10th EDITION

Objective

AGRICULTURE

FOR ALL COMPETITIVE EXAMS.

Includes Previous years questions

of **JRF** *(2003 - 2011)*

(Memory Based)

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PREFACE

This book owes its origin to the sincere and hardworking analysis of questions being asked in examination, being conducted by ASRB, ARS, SRF, JRF/NET and various Agricultural Universities including Bank Exams. The compilation is an endeavour to present, present day relevant questions in user-friendly/systematic in more reliable way. The questions presented in this book are mostly memory based which were asked in various examination. These set of questions will give the candidates an idea about the model question and will help them to be focused.

The main objective of this book is to help the readers to quickly grasp the facts comprehensively and systematically from various branches of agriculture like Agronomy, Soil Science, Plant Pathology, Entomology, Genetics and Plant Breeding, Agriculture Economics, Agricultural Extension, Agricultural Statistics, Plant Physiology, Horticulture, Animal Husbandry, Veterinary Science, Agricultural Engineering and Fisheries Science. However, I should consider my labour well rewarded only if this book serves the needs of all concerned.

Readers are welcome to point out errors and omissions, if any, and send their valuable suggestions for improving the quality of book.

S.R. Kantwa

Dedicated to Nature

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CONTENTS

Syllabi For ICAR's All India Entrance Examination for Admission to Master Degree Programmes and ICAR- JRF(PGS)

A. PLANT BIOTECHNOLOGY

(**Subjects** : Plant Biochemistry, Plant Biotechnology & Molecular Biology / Biotechnology, Plant Physiology/Crop Physiology)

UNIT - I : Basic Sciences & General Agriculture: Importance of agriculture in national economy; basic principles of crop production; cultivation of rice, wheat, chickpea, pigeon-pea, sugarcane, groundnut, tomato, and mango. Major soils of India; role of NPK and their deficiency symptoms. General structure and function of cell organelles; mitosis and meiosis; Mendelian genetics. Elementary knowledge of growth, development, photosynthesis, respiration and transpiration; Elements of economic botany. General structure and function of carbohydrates, proteins, nucleic acids, enzymes and vitamins. Major pests and diseases of rice, wheat, cotton, chickpea, sugarcane and their management. Organic farming; biofertilizers; biopesticides. Recombinant DNA technology; transgenic crops. Important rural development programmes in India; organizational set up of agricultural research, education and extension in India. Elements of statistics.

UNIT - II : Plant Biochemistry: Importance of biochemistry in agriculture. Acid-base concept and buffers; pH. Classification, structure and metabolic functions of carbohydrates, lipids and proteins. Structure and function of nucleic acids. Enzymes: structure, nomenclature, mechanism of action; vitamins and minerals as coenzymes and cofactors. Metabolic pathways: glycolysis, TCA cycle, fatty acid oxidation, triglyceride biosynthesis. Electron transport chain; ATP formation. Photosynthesis: C-3, C-4 and CAM pathways. Nitrate assimilation; biological nitrogen fixation. Colorimetric and chromatographic techniques

UNIT-III : Plant Biotechnology and Molecular Biology/Biotechnology: Characteristics of prokaryotic and eukaryotic organisms; differences between fungi, bacteria, mycoplasms and viruses. Physical and chemical basis of heredity; chromosome structure. DNA replication, transcription and translation; genetic code; operon concept. Genetic engineering; restriction enzymes; vectors; gene cloning; gene transfer. Plant cell and tissue culture; micro-propagation; somaclonal variation. Transformation; recombination; heterosis. General application of biotechnology. Molecular and immunological techniques. Concept of bioinformatics, genomics and proteomics

UNIT-IV: Plant Physiology/ Crop Physiology: Plant physiology– importance in agriculture. Seed germination, viability and vigour. Photosynthesis- significance of C-3, C-4 and CAM pathway; photorespiration and its implications. Translocation of assimilates; dry matter partitioning; Harvest index of crops. Growth and development; growth analysis; crop-water relationship. Plant nutrients and their functions. Phytohormones and their physiological role. Photo-periodism, vernalisation; pollination/ fertilization in flowering plants. Post-harvest physiology and its significance.

B. PLANT SCIENCES

(**Subjects** : Plant Breeding & Genetics, Plant Pathology, Agricultural Microbiology, Seed Science & Technology, Plant Genetic Resources)

UNIT-I: Importance of Agriculture in national economy; basic principles of crop production; cultivation of rice, wheat, chickpea, pigeon-pea, sugarcane, groundnut, tomato, potato and mango. Major soils of India, role of NPK and their deficiency symptoms.

UNIT-II: Structure and function of cell organelles; mitosis and meiosis; Mendelian genetics; elementary knowledge of photosynthesis; respiration, and transpiration; structure and functions of carbohydrates, proteins, nucleic acids, enzymes and vitamins. Major pests and diseases of rice, wheat, cotton, chickpea, sugarcane and their management.

UNIT-III: Characteristics of prokaryotic and eukaryotic organisms, differences between fungi, bacteria, mycoplasmas and viruses; physical and chemical basis of heredity; chromosome structure; genes/operon concept; protein biosynthesis; transformation, recombination, heterosis; Elements of economic botany; integrated diseases management; sterilisation, disinfection and pasteurization; Koch's postulates; aetiological agents of rusts, smuts, powdery/downy mildews, wilts, yellows, mosaic, necrosis, enations, blights and witches-broom; pH, buffer, vitamins, role of plant hormones in seed germination and dormancy; pollination/fertilization in flowering plants; methods of seed testing; breeders, foundation and certified seeds; seed production in self and cross pollinated crops, nitrate assimilation; biological nitrogen fixation and other uses of microorganisms in agriculture.

UNIT-IV: Food and industry; composting and biogas production. Important rural development programmes in India; organizational set up of agricultural research, education and extension in India.

C. PHYSICAL SCIENCE

(**Subjects** : Agricultural Meteorology, Soil Science & Agricultural Chemistry/Soil Conservation and Water Management SWC / Irrigation and Water Management, Agricultural Physics, Agricultural Chemicals, Environmental Scienc

UNIT-I: Importance of Agriculture in national perspective; basic principles of crop production, diversification diversification of Agriculture, principle of nutrient and water management, package of practices for rice, whea sorghum, maize, chickpea, pigeon pea, potato, sugarcane, groundnut, major vegetable crops. Role of esse plant nutrients, their deficiency symptoms and management options. Structure and function of plant cells, cel division, Basic concept of plant physiology relating to crop production-Biochemical compounds viz, carbohydrate proteins, enzymes, fats, liquid vitamins and their function, developmental programmes relating to rural upliftm and livelihood security; organisational set up of agricultural education research and extension and future strategies for upgradation.

UNIT-II: Volumetric and gravimetric analysis including complexmetric methods, periodic classification of element Basic principle of instrumental analysis including spectro-photometry· (Absorption and emission spectrography) Atomic structure –elementary concept of radioactivity, element and compound common ion effect, solub product—hydrolysis of salts, buffer solution indicates equivalent weights and standard solution. Elementary concepts of organic compounds- nomenclature and classifications including hydrocarbons, alcohol, aldehydes, acids and esters, carbohydrates, fats and liquids, amino acids, nucleic acids. Pesticides, their classification and use biopesticides and botanical pesticides.

UNIT-III: Soil as a medium for plant growth, composition of earth's crust, weathering of rocks and miner components of soil- their importance, soil profile, soil partials- physical mineralogical and chemical nature. Mechanical analysis, Stokes law, assumptions, limitations and applications. Soil, physical propertiesdensity, porosity, texture, soil structure and their brief descriptions. Rheological properties in soils, calculations of porosity bulk density. Soil air-Aeration, causes of poor aeration, factors affecting aeration, importance for plant growth. Soil temperature - sources and losses of soil heat. Factors affecting soil temperature, its importance in plant growth. Soil water- structure of water, soil-water-energy relationship, classifications, surface tension and movement in soil. Soil colloids- properties, structure of silicate clay minerals, sources of negative charges, properties, kaolinite, illite, montmorillonite and vermiculite clay minerals, milli-equivalent concept , cation exchan capacity, anion exchange capacity, buffering of soils. Problem soils- acid, saline, sodic and acid sulphate soils – their characteristics, formation, problems and management. Irrigation, water quality and its evaluation. Waterlogged soils- basic features, distinction with upland soils.

UNIT-IV: Essential plant nutrients- criteria of essentiality, functions for plant growth, mechanisms for movement and uptake of ions in soils and plants, Forms of nutrients in soils, deficiency symptoms on plants, lux consumption, nutrient interactions and chelated micronutrients. Soil fertility, evaluation and management for plan growth, soil testing and fertilizer recommendations. Soil classifications- diagnostic surface and sub-surface horizons, soil survey- types, objectives, uses, land capability classifications. Remote sensing and its application in agricultu SIS, GIS and GPS- basic features and uses in agriculture, Elementary concepts of radio isotopes and uses in agriculture. Soil micro-organisms, Classifications and their roles. Organic matter- decomposition, C:N ratios, mineralization and immobilization processes, humus, role of organic matter in soil quality. Soil erosion, types control measures. Fertilizers and manuresclassifications, NPK fertilizers, their reactions in soils, green manuring, recycling of organic wastes, composting. Soil and water pollution- sources, brief idea about different pollutant in soils and their managements.

D. ENTOMOLOGY AND NEMATOLOGY

(**Subjects** : Agricultural Entomology, Nematology, Apiculture, Sericulture, Plant Protection.)

UNIT-I: Importance of Agriculture in national economy; basic principles of crop production; cultivation of ri wheat, chickpea, pigeon-pea, sugarcane, groundnut, tomato, cole crops, mango, grapes, banana, oilseeds other than groundnut, soybean and mustard. Major soils of India, role of NPK and their deficiency symptoms. Mendelian genetics; elementary knowledge of photosynthesis; respiration, and transpiration; Major cropping systems (ri wheat cropping, crop rotations, mixed cropping); soil degradation-soil salinity and acidity and management; some aspects of post-harvest technology; varietal improvement; importance of heterosis in crop production; crop protection principles in field and storage. Major insect pests and diseases of agricultural crops like rice, cotto pulses, oilseed crops like groundnut, soybean and mustard, vegetables like tomato, cole crops; fruit crops like mango and banana and their management principles. Transgenic crops. Important rural development programm in India; organizational set up of agricultural research, education and extension in India; Elements of statistics.

UNIT-II: Classification of animal kingdom up to class; distinguishing characters up to orders in class Insecta: general organization of an insect external morphology with special reference to lepidopteran larvae, coleopter

adults; and honeybee; metamorphosis and moulting; different physiological systems; insectplant relationship; insect pests of agricultural and horticultural crops, and their stored/processed products, insect vectors of plant diseases-identification, biology, nature of damage, and their management tactics; and pests of household, medical and veterinary importance and their control; useful and beneficial insects like honeybee, lac insect, silkworm and pollinators; Nematode taxonomy, biology of important plant parasitic nematodes and their control; entomopathogenic nematodes, basic principles of insect and nematode pest management-cultural, biological, insecticidal, quarantine, and regulatory aspects; insecticide classification and insecticide resistance management; and insect protective transgenic crops.

E. AGRONOMY (**Subjects**: Agronomy / Farming Systems Management, Tea Husbandry)

UNIT - I : General: Importance of Agriculture in national economy; basic principles of crop production; cultivation of rice, wheat, chickpea, pigeon-pea, sugarcane, groundnut, rapeseed and mustard, potato. Major soils of India, role of NPK and their deficiency symptoms. Structure and function of cell organelles; mitosis and meiosis; Mendelian genetics: elementary knowledge of photosynthesis; respiration, photorespiration and transpiration; structure and functions of carbohydrates, proteins, nucleic acids, enzymes and vitamins. Major pests and diseases of rice, wheat, cotton, chickpea, sugarcane and their management. Important rural development programmes in India; organisational set up of agricultural research, education and extension in India; Elements of statistics.

UNIT - II : Principles of Agronomy, Crop ecology and geography and Agricultural Meteorology: Agronomy – meaning and scope, National & International agricultural research institutes in India, Agro climatic zones of India, Tillage, crop stand establishment and planting geometry and their effect on crop, Physiological limits of crop yield and variability in relation to ecological optima, organic farming, Precision farming, Integrated farming systems, Principles of field experimentation. Principles of crop ecology and crop adaptation, climate shift and its ecological implications, Agro-ecological regions in India, Geographical distribution of crop plants, Greenhouse effect, Climatic factors and their effect on plant processes and crop productivity, Role of GIS and GPS in agriculture. Weather & climate, Earth's atmosphere, Solar radiation, Atmospheric temperature and global warming. Crops and atmospheric humidity, Weather forecasting.

UNIT - III : Field crops : Origin, distribution, economic importance, soil and climatic requirement, varieties, cultural practices and yield of cereals (rice, wheat, maize, sorghum, pearl millet, minor millets, barley), pulses (chickpea, lentil, peas, Pigeon pea, mungbean, urdbean), oilseeds (groundnut, sesame, soybean, rapeseed & mustard, sunflower, safflower, linseed), fibre crops (cotton, jute, sun hemp), sugar crops(sugarcane), fodder & forage crops (sorghum, maize, napier, berseem, Lucerne, oats), medicinal & aromatic plants (menthe, lemon grass and isabgol) and commercial crops(potato, tobacco).

UNIT - IV : Weed management : Principles of weed management, Classification, biology and ecology of weeds, crop weed competition and allelopathy, concepts and methods of weed control, Integrated weed management, Classification, formulations, selectivity and resistance of herbicides, Herbicide persistence in soil and plants, Application methods and equipments, Weed flora shifts in cropping systems, Special and problematic weeds and their management in cropped and non-cropped situations, Weed management in field crops.

UNIT - V : Water management : Principles of irrigation, Water resources and irrigation development in India, Water and irrigation requirements, Concepts and approaches of irrigation scheduling, Methods of irrigation, Measurement of irrigation water, application, distribution and use efficiencies, Conjunctive use of water, Irrigation water quality and its management, water management in major field, crops (rice, wheat, maize, groundnut, sugarcane) Agricultural drainage.

UNIT - VI : Soil fertility and fertilizer use : Essential plant nutrients and their deficiency symptoms, concept of essentiality of plant nutrients, Indicators of soil fertility and productivity, Fertilizer materials and their availability to plants, slow release fertilizers, Nitrification inhibitors, Principles and methods of fertilizer application, Integrated nutrient management, site specific nutrient management.

UNIT - VII : Dryland Agronomy : Characteristics of Dryland farming and delineation of Dryland tracts, constraints of Dryland farming in India, Types of drought and their management, contingency crop planning and midseason corrections for aberrant weather and its recycling. Watershed management.

UNIT - VIII : Problem soils : Problem soils and their distribution in India, Characteristics and reclamation of these soils, Crop production techniques in problem soils.

UNIT - IX : Sustainable land use systems : Sustainable agriculture: parameters and indicators, Conservation agriculture, safe disposal of agri-industrial waste for crop production, Agro-forestry systems, shifting cultivation, Alternate land use systems, Wastelands and their remediation for crop production.

F. SOCIAL SCIENCES (Agricultural Economics, Agriculture Extension / Communication Dev

UNIT - I : Importance of Agriculture in national economy; basic principles of crop production; cultivatio wheat, chickpea, pigeon-pea, sugarcane, groundnut, tomato and mango. Major soils of India, role of their deficiency symptoms. Structure and function of cell organelles, mitosis and meiosis; Mendelian elementary knowledge of photosynthesis; respiration, and transpiration; structure and functions of carbo proteins, nucleic acids, enzymes and vitamins. Major pests and diseases of rice, wheat, cotton, sugarcane and their management. Important rural development programmes in India; organisational s agricultural research, education and extension in India; Elements of statistics. Measures of central and dispersion, regression and correlation; concept of probability, sampling techniques and tests of sig

UNIT - II : Theory of consumer behaviour, theory of demand, elasticity of demand, indifference curve theory of firm, cost curves, theory of supply, price determination, market classification, concept of macroec money and banking, national income. Agricultural marketing—role, practice, institutions, problems and role of capital and credit in agriculture, crop insurance, credit institutions, cooperatives, capital form agriculture, agrarian reforms, globalization, WTO & its impact on Indian agriculture.

UNIT - III : Basic principles of farm management, concept of farming system and economics of farming agricultural production economics-scope and analysis, factor-product relationship, marginal cost and revenue, farm planning and budgeting, Agricultural finance: nature and scope. Time value of money, Comp and discounting. Agricultural credit: meaning, definition, need, classification. Credit analysis: 4R's, 5C's P's of credit, repayment plans. History of financing agriculture in India. Commercial banks, nationaliz commercial banks. Lead bank scheme, regional rural banks, scale of finance. Higher financing agencie NABARD, AFC, Asian Development Bank, World Bank, role of capital and credit in agriculture; credit inst co-operatives and agrarian reforms in India.

UNIT - IV : Extension Education- concept, meaning, principles, philosophy, scope and importance; Ex programme planning and evaluation- steps and principles, models of organizing agricultural extension; h development of extension in USA, Japan and India. Rural development, meaning, importance and problems development programmes in India- Pre-independence era to recent ones; Extension teaching methods, de and concept of sociology, differences between rural & urban communities, social stratification, social social organization and social change. Rural leadership, educational psychology- learning and teaching, personality in agricultural extension Indian rural system- its characteristics; value system, cost and class; st and customs; rural group organization and adult education.

UNIT - V : Communication, principles, concepts, process, elements and barriers in teaching methods. D kinds of communication methods and media and AV aids/materials. Media mix, Campaign, Cyber extension in cybercafé, Kisan Call Centers, teleconferencing, agriculture journalism, diffusion and adoption of innova adopter categories, capacity building of extension personnel and farmerstraining to farmers, women & rural

G. STATISTICAL SCIENCES (**Subjects**: Agricultural Statistics, Statistics, Con Application, Bioinformatics)

UNIT - I : Agriculture: Importance of Agriculture/Forestry/Livestock in national economy. Basic principles of production. Major diseases & pests of crops. Elementary principles of economics & agri-extension. Important development programmes in India. Organizational set up of Agricultural research, education & extension in

UNIT - II : Mathematics: Real and complex numbers; polynomial and roots; de Moivre's theorem an applications. Elements of set theory- De Morgan's laws; vector space, linear independence, orthogon matricesaddition and multiplication, rank of a matrix, determinants, inverse of a matrix, solution of a sy of linear equations, characteristic roots and vectors; convergence of infinite sequences and infinite series for convergence, absolute convergence; co-ordinate geometry in two dimensions - line, circle, parabola, e and hyperbola; Differential calculus: limits, differentiation of function of a single variable; Taylor's and Macla theorems, mean-value theorem; maxima and minima; indeterminate form; curvature, asymptotes, tracing of cu function of two or more independent variables, partial differentiation, homogeneous functions and Euler's theo composite functions, total derivatives, derivative of an implicit function, change of variables, Jacobians. Int calculus: integration by simple methods, standard forms, simple definite integrals, double integrals, chang order of integration, Gamma and Beta functions, application of double integrals to find area. Ordinar, differe equations: differential equations of first order, Exact and Bernoulli's differential equations, equations redu to exact form by integrating factors, equations of first order and higher degree, Clairaut's equation meth of finding complementary functions and particular integrals. Calculus of finite differences, interpolation nume differentiation and integration, difference equations; solution of simple non-linear equations by numerical meth like Newton- Raphson method.

UNIT - III : Introduction : Statistics – definition, use and limitations; Frequency Distribution and Curves; Measures of Central Tendency: Arithmetic mean; Geometric mean, Harmonic mean, Median, Mode; Measures of Dispersion: Range, Mean deviation, Quartile deviation, Variance and Coefficient of Variation; Probability: Definition and concepts, law of addition and multiplication, conditional probability, Bayes' theorem; Binomial, multinomial, Poisson and normal distribution; Introduction to Sampling: Random Sampling; Standard Error; Tests of Significance - Types of Errors, Null Hypothesis, Level of Significance, Testing of hypothesis; Large Sample Test- SND test for Means, Single Sample and Two Samples; Student's t-test for Single Sample, Two Samples and Paired t test. F test; Chi-Square Test for goodness of fit and independence of attributes; Correlation and Regression and associated tests of significance. Experimental Designs: basic principles, Analysis of variance, Completely Randomized Design (CRD), Randomized Block Design (RBD).

UNIT - IV : Computers : input, output devices, memory, hardware, software; Classification, booting computer. Viruses, worms and antivirus. Operating System- some DOS commands, FORMAT, DIR, COPY, PATH, MD, CD and DELTREE. Types of files. WINDOWS: Desktop and its elements, WINDOWS Explorer, working with files and folders; setting time and date. Anatomy of WINDOWS. Applications – MSWORD: Word processing features- Creating, Editing, Formatting and Saving; MSEXCEL: Electronic spreadsheets, concept, packages. Creating, editing and saving a spreadsheet. In-built statistical and other functions. Excel data analysis tools, Correlation and regression, t-test for two-samples and ANOVA with one-way classification. Creating graphs. MS Power Point and its features. MSACCESS: Concept of Database, creating database; Computer programming: Flow charts and Algorithms, Programming languages- BASIC, FORTRAN and C. Internet: World Wide Web (WWW), Concepts, web browsing & electronic mail. Bioinformatics - NCBI Genebank sequence database - primary & secondary database.

H. HORTICULTURE (**Subjects**: Horticulture, Vegetable Crops / Olericulture, Pomology (Fruit and Orchard crops, Management of Plantation Crops, Fruit Breeding), Post - harvest Technology of Horticultural Crops, Floriculture & Landscaping, Spices and Plantation Crops)

UNIT - I : Importance of Agriculture in national economy; basic principles of crop production; cultivation of rice, wheat, chickpea, pigeon-pea, sugarcane, groundnut, tomato and mango. Major soils of India, role of NPK and their deficiency symptoms. Structure and function of cell organelles; mitosis and meiosis; Mendelian genetics; elementary knowledge of photosynthesis; respiration, and transpiration; structure and functions of carbohydrates, proteins, nucleic acids, enzymes and vitamins. Major pests and diseases of rice, wheat, cotton, chickpea, sugarcane and their management. Important rural development programmes in India; organizational set up of agricultural research, education and extension in India; Elements of statistics.

UNIT - II : Layout and establishment of orchards; pruning and training; propagation, climatic requirement and cultivation of fruits like mango, banana, citrus, guava, grape, pineapple, papaya, apple, pear, peach and plum; cultivation of plantation crops like coconut and cashew nut and spices like black pepper, coriander, turmeric, important physiological disorders; major vegetable crops of tropical, subtropical and temperate regions like cole crops (cauliflower, cabbage and knol khol), cucurbits (pumpkin, bottlegourd, bittergourd, luffa, muskmelon and watermelon, cucumber), root crops (radish, tapioca sweet potato and potato), leafy vegetables (fenugreek and spinach); solanaceous crops (tomato, chillies and brinjal); techniques for raising the nursery; nutritive value of fruits and vegetables and their role in human nutrition; basic physiology of ripening in fruits and vegetables and their products; type of fruits and vegetable products and control of fungal and bacterial diseases; major floricultural crops grown in India for commercial purposes like rose, carnation, chrysanthemum, marigold, tuberose, gladiolus, orchids; establishment and maintenance of lawns, trees, shrubs, creepers, hedges and annuals; type of gardens, methods of crop improvement; male sterility and incompatibility; pure line and pedigree selection; backcross, massselection; heterosis; plant nutrients, deficiency symptoms of nutrients, manures and fertilisers, systems of irrigation, management of important pests and diseases of fruits and vegetables.

J. FORESTRY / AGROFORESTRY & SILVICULTURE

(**Subjects** : Forest Products, Silviculture, Forestry including Tree Genetic Resource, Agroforestry)

UNIT - I : Importance of Agriculture/Forestry/Livestock in national economy. Basic principles of crop production. Important rural development programmes in India Elementary principles of economics and agri-extension. Organizational set up of Agricultural Research, education and extension in India. Major diseases and pests of crops. Elements of statistics.

UNIT - II : Forest- importance, types, classification, ecosystem, biotic and abiotic components, ecological succession and climax, nursery and planting technique, social forestry, farm forestry, urban forestry, community forestry, forest management, silvicultural practices, forest mensuration, natural regeneration, man-made plantations, shifting cultivation, taungya, dendrology, hardwoods, softwoods, pulpwoods, fuelwoods, multipurpose tree species,

wasteland management. Agroforestry – importance and land use systems, forest soils, classification – conservation, watershed management, forest genetics and biotechnology and tree improvement, tree see technology, rangelands, wildlife – importance, abuse, depletion, management, major and minor forest product including medicinal and aromatic plants, forest inventory, aerial photo interpretation and remote sensing, fo depletion and degradation – importance and impact on environment, global warming, role of forests and tree in climate mitigation, tree diseases, wood decay and discolouration, tree pests, integrated pest and diseas management, biological and chemical wood preservation, forest conservation, Indian forest policies, Indian fo act, forest engineering, forest economics, joint forest management and tribology.

K. AGRICULTURAL ENGINEERING AND TECHNOLOGY

(**Subjects** : Soil & Water Conservation Engg., Irrigation & Drainage Engg./Irrigation & Water Managem Engineering, Agri. Process & Food Engg./Processing & Agri. Structures/Process Engg./P.H.T., Farm Implem & Machinery / Farm Power and Machinery, Bio-energy including Renewable Energy Sources)

UNIT - I : Elementary Statistics and theory of probability, differential and integral calculus, linear algebra Fourier series, differential equations, vector algebra & vector calculus, elementary numerical analysis.

UNIT - II : Electric motors: Types, performance, selection, installation and maintenance, measuring instrumen fundamentals of computers, power distribution.

UNIT - III : Thermodynamic principles; fluid mechanics, theory of machines

UNIT - IV : Soil mechanics, soil classification, compaction & shear strength of soils, engineering mechanics, stren of materials

UNIT - V : Importance of farm equipment and role of mechanization in enhancing productivity & profitability Indian agriculture; analysis of forces, design and production of farm machinery and power units; mechanics o tillage & traction operation, repair and maintenance of farm machines and equipment, farm engines; tractor and power tillers; tractor stability and operators comfort; field capacity and cost analysis; test codes procedure; safety and ergonomic principles. Role of energy in economic development; solar, wind and bio-energy biogas plants & gasifiers; biofuels from biomass; collection, characterization and storage of biomass, solar cooker & solar refrigerators.

UNIT - VI : Biochemical and engineering properties of biological materials; quality control & safety of raw and finished products. Principles, practices and equipments for drying, milling, separation and storage of agricult produce and by-products; material handling equipment and operations; farmstead planning; heating & cooli load calculation; seed processing practices and equipments; food preservation methods and products development refrigeration and air conditioning; cold stores; waste management, cost analysis & food processing plants lay feasibility reports

UNIT - VII : Surveying and leveling; hydrology, water resources in India; efficiency in water use; irrigation syst and equipment; water conveyances and associated efficiency; soil-plant-water relationship; estimation of evaporati and water requirements of crop; water harvesting and use, farm ponds and reservoirs, command area development, land use capability classification, ground water development, wells and pumping equipment, erosion and its control, land shaping and grading equipment and practices, hydraulic structures, drainage o irrigated and humid areas; salt balance and reclamation of saline and alkaline soils.

L. WATER SCIENCE AND TECHNOLOGY (**Subject** : Water Science and Technology)

Unit - I : Importance of Agriculture in national economy; basic principles of crop production; cultivation of ri wheat, chickpea, pigeon-pea, sugarcane, groundnut, tomato and mango. Major soils of India, role of NPK and their deficiency symptoms. Structure and function of cell organelles; mitosis and meiosis; Mendelian genetic elementary knowledge of photosynthesis; respiration, and transpiration; structure and functions of carbohydrates, proteins, nucleic acids, enzymes & vitamins. Pests & diseases of major crops & their management, important rural development programmes in India; organizational set up of agricultural research, education & and extension India.

Unit - II : Water resources of India, surface and groundnut resources, rainfall, rainfall-runoff relations, measurement and estimation of runoff, irrigation development in India, command area development, watershed managem principles, government schemes in watershed management program, water harvesting structures including farm ponds, water quality including physical, chemical and biological properties.

Unit - III : Physical properties of soils—texture, structure, density and consistency, infiltration, field capacity, permanent wilting point, available water hydraulic conductivity, soil water flow including Darcy's law, mechanical analysis, chemical properties of pH, EC, atoms, molecules, colloids, clay mineral, major and trace elements, sali

and sodicity, cation exchange capacity, evaporation, evapotranspiration, water requirements of crop, plant growth process, soil and water conservation practices and tillage.

Unit - IV : Simultaneous and quadratic equations, differentiation and integration, differential equations, elements of statistics, frequency distribution, probability concepts, basic concepts of economics, energy, horse power, efficiency of machines, concepts of fluid flow, hydrostatic pressure, surface tension, irrigation water distribution and control, irrigation methods, irrigation efficiencies, irrigation scheduling, water lifting devices and pumps, construction of wells, drainage principles and applications, surface drainage, subsurface drainage, water pricing, water laws and irrigation acts.

M. HOME SCIENCE (Subjects : Food & Nutrition, Human Development & Family Studies / Child Development, Home Management/Family Resource Management, Clothing & Textile, Home Science Extension Education)

UNIT - I : Importance of agriculture in national economy; basic principles of crop production; cultivation of rice, wheat, chickpea, pigeon-pea, sugarcane, groundnut, tomato, and mango. Major soils of India; role of NPK and their deficiency symptoms. General structure and function of cell organelles; mitosis and meiosis; Mendelian genetics. Elementary knowledge of growth, development, photosynthesis, respiration and transpiration; Elements of economic botany. General structure and function of carbohydrates, proteins, nucleic acids, enzymes and vitamins. Major pests and diseases of rice, wheat, cotton, chickpea, sugarcane and their management. Organic farming; biofertilizers; biopesticides. Recombinant DNA technology; transgenic crops. Natural Resources: forest, water, mineral, food, energy and land resources. Ecosystems. Biodiversity & its conservation. Environmental pollution. Environmental ethics. Important rural development programmes in India; organizational set up of agricultural research, education and extension in India. Elements of Statistics.

UNIT - II : Food & Nutrition. Elements of Human Nutrition i.e. Food groups and the nutrients contributed by each group to the diet, composition and nutritive value of foods; food processing and preservation, meal planning i.e. principles menu planning for normal individuals for different age groups and at different stages of life, diet therapy, institutional food management, community nutrition and health, food related laws, policy and programmes in India. Organic and genetically modified foods.

UNIT - III : Human Development & Family Studies/Child Development. Introduction to child/human development -meaning, concept, principles, prenatal development (conception to child birth), care of new born, prenatal and post natal care of mother, development of child in early and late childhood, early childhood education, adolescence, development and relationship with peers & family, marriage and family dynamics, meaning, definition of family life cycle, family welfare programmes in India, community education, child studies methods, participation in pre-school/crèche.

UNIT - IV : Home Management/ Family Resource Management: Concept and principles of management, management process, work, work environment, work simplification, fundamentals of housing, principles of design & home furnishing-selection, care and maintenance of accessories, equipments, furniture, paintings, family finance/ economics and consumer education. Functional interiors for special needs.

UNIT - V : Clothing & Textiles: Introduction to clothing construction- sewing machine its parts and use, preparation of fabric for lay out textile fibre-classification, processing/manufacturing method, clothing need of family members, household textile and consumers, weaving and hosiery, traditional textiles and embroideries of India, care of clothing and textile finishes, dying & printing. Organic dyes.

UNIT - VI : Home Science Extension Education. Introduction to Home Science Education communication and extension methods, programme planning & evaluation, entrepreneurial education, projected and nonprojected aids (audio-visual aids) rural development programmes in India. Empowerment of women.

N. ANIMAL BIOTECHNOLOGY (Subjects : Animal Biotechnology, Vety/Animal Biochemistry)

UNIT - I : Structure of prokaryotic and eukaryotic cells, cell wall, membranes, cell organelles, organization and functions, chromosome structure and functions, cell growth division and differentiation. Sub unit structure of macromolecules and supermolecular systems. Self assembly of sub units, viruses, bacteriophage, ribosomes and membrane systems.

UNIT - II : Scope and importance of biochemistry in animal sciences, cell structure and functions. Chemistry and biological significance of carbohydrates, lipids, proteins, nucleic acids, vitamins and hormones. Enzymes—chemistry, kinetics and mechanism of action and regulation. Metabolic inhibitors with special reference to antibiotics and insecticides. Biological oxidation, energy metabolism of carbohydrates, lipids, amino acids and nucleic acids. Colorimetry, spectrophotometry, chromatography and electrophoresis methods.

UNIT - III : Chemistry of antigens and antibodies and molecular basis of immune reaction, radio-immu and other assays. Chemistry of respiration and gas transport, water and electrolyte metabolism. diseases, metabolic disorders and clinical biochemistry. Endocrine glands, biosynthesis of hormones mechanism of action.

UNIT - IV : History of molecular biology, biosynthesis of proteins and nucleic acids, genome organization, of gene expression, polymerase chain reaction, basic principles of biotechnology applicable to veterinary gene sequence, immunodiagnostics, animal cell culture, in vitro fertilization. Sub-unit vaccines: Prin fermentation technology. Basic principles of stem cell and animal cloning.

O. VETERINARY SCIENCE (Subjects : Veterinary Anatomy, Veterinary Obste Gynaecology, Medicine (Clinical and Preventive), Veterinary Parasitology, Veterinary Pharmacology and To Veterinary Pathology including Wild Life, Epidemiology / Wild Life, Vety. Virology, Vety. Immunology, Ve Microbiology / Bacteriology, Veterinary. Surgery, Veterinary Public Health)

UNIT I : Anatomy and Physiology. Structure of cells, cell organelles, chromosome structure and fu cell growth, division and differentiation and functions. Structure and function of basic tissues-epithelium, co tissue, muscle and nervous tissue. Gross Morphology, Histology and physiology of mammalian organs and s major sense organs and receptors, circulatory system. Digestion in simple stomached animals, bir fermentative digestion in ruminants, Kidney and its functions-respiratory systemanimal behaviour-growth-in of environment on animal production-biotechnology in animal production and reproduction-electrophysiol different types of muscle fibres. Exocrine and endocrine glands, hormones and their functions, blood comp and function. Homeostasis, osmoregulation and blood clotting. Gametogenesis and development of uro organs. Boundaries of body cavities. Pleural and peritoneal reflections.

UNIT - II : Veterinary Microbiology (Bacteriology, Virology, Immunology), Veterinary Path Parasitology. Classification and growth characteristics of bacteria, important bacterial diseases of livestoc poultry, general characters, classification of important fungi. Nature of viruses, morphology and characte viral immunity, important viral diseases of livestock and poultry. Viral vaccines. Antigen and antibody, an formation, immunity, allergy, anaphylaxis, hypersensitivity, immunoglobulins, complement system. Etiolo diseases and concept, extrinsic and intrinsic factors, inflammation, degeneration, necrosis, calcification, gan death, atrophy, hypertrophy, benign and malignant tumours in domestic animals. General classification, morph life cycle of important parasites, important parasitic diseases (Helminths, Protozoa and Arthropods) of vete importance with respect to epidemiology, symptoms, pathogeneses, diagnosis, immunity and control.

UNIT - III : Veterinary Medicine, Epidemiology veterinary surgery and Veterinary Obstetrics Gynaecology including reproduction. Clinical examination and diagnosis, Etiology, epidemiology, sympt diagnosis, prognosis, treatment and control of diseases affecting different body systems of various speci domestic animals, epidemiology— aims, objectives, ecological concepts and applications. General surgical prin and management of surgical cases. Types, administration and effects of anaesthesia. Principles and us radiological techniques in the diagnosis of animal diseases. Estrus and estrus cycle in domestic ani Synchronization of estrus, fertilization, pregnancy diagnosis, parturition, management of postpartum complica dystokias and its management, fertility, infertility and its management, artificial insemination.

UNIT - IV : Veterinary Public Health, Veterinary Pharmacology & Toxicology. Zoonotic diseases thr milk and meat, Zoo animal health. Source and nature of drugs, pharmacokinetics, Chemotherapy-sulpha dr antibiotics, mechanism and problem of drug resistance. Drug allergy, important poisonous plants, toxicity important agro-chemicals and their detoxification, drugs action on different body systems.

P. ANIMAL SCIENCES (Subjects : Animal Husbandry / Animal Sci. / Dairy Sci, Animal Gene & Breeding, Animal Nutrition / Feed / Fodder Tech., Vety / Animal Physiology, Livestock Production & Managem Livestock Product Technology & Meat Science, Poultry Science, Animal Husbandry / Veterinary Extension Educatio Dairy Extension Education, Livestock / Animal Husbandry / Veterinary Economics / Dairy Economics and Bio-Statisti

UNIT - I : Animal Genetics and Breeding- Principles of animal genetics, cell structure and multiplicat Mendel's laws, principles of population genetics, concept of heredity, heterosis and mutation, principles evolution, principles of molecular genetics, genetic code, quantitative and qualitative traits. Selection of breed methods in livestock and poultry. Population statistics of livestock.

UNIT - II : Animal Nutrition, Feed Technology, Animal Physiology. General nutrition, proximate principl carbohydrates, proteins and fats their digestion and metabolism in ruminants and non-ruminants. Energy partitio measures of protein quality. Water, minerals, vitamins and additives, feeds and fodders and their classificatio Common anti-nutritional factors and unconventional feeds. Hay and silage making. Grinding, chaffing, pelletin

roasting, feed block. Feed formulation principles. Digestion- control motility and secretion of alimentary tract. Mechanism, natural and chemical control of respiration, gaseous exchange and transport, high altitude living, physiology of work and exercise. Cardiac cycle, natural control of cardiovascular system. Smooth and skeletal muscle contraction. Blood coagulation. Physiology of immune system. Male and female reproduction including artificial insemination, in-vitro fertilization, cryo-preservation. Excretory system.

UNIT - III : Animal Husbandry, Dairy Science, Livestock Production and Management, Animal Product Technology & Meat Science and Poultry Science. General concepts of livestock production and management, status of dairy and poultry industry, impact of livestock farming in Indian agriculture. Livestock housing, production and reproduction management, lactation management, breeding programmes for livestock and poultry. Composition, quality control and preservation of livestock products, methods of processing and storage livestock products. International Trade/WTO/IPR issues related to livestock products.

UNIT - IV : Veterinary Extension. Concept of sociology, differences between rural, tribal and urban communities, social change, factors of change. Principles and steps of extension education, community development– aims, objectives, organizational set up and concept evolution of extension in India, extension teaching methods. Role of livestock in economy. Identifying social taboos, social differences, obstacles in the way of organizing developmental programmes. Concept of marketing, principles of co-operative societies, animal husbandry development planning and programme, key village scheme, ICDD, Gosadan, Goshala, Role of Gram Panchayat in livestock development. Basics of statistics, data analysis and computational techniques.

Q. FISHERIES SCIENCE (Subjects : Fisheries Sciences / Fish Hydro / Fish Env. / Fish IT / FL, Fisheries Resource Management / FPM, Inland Aquaculture/Mariculture/Freshwater Aquaculture. Fish Processing Technology, Aquatic / Fish Biology, Fish Microbiology / Fish Pathology, Fisheries Extension, Aquatic Env. Management, Post-Harvest Technology (Fisheries), Fish Genetic & Biotechnology, Fish Nutrition & Biochemistry, Fish Business Management)

UNIT - 1 : Fishery resources and management. Classification and taxonomical characteristics of cultivablev fisheries, crustaceans and molluscs. Fresh water, brackish water and marine fishery resources of India, marine fisheries of the world. Estuarine, lacustrine, brackish water and pond ecosystem. Population dynamics, fish stock, abundance methods and analysis. Conservation and management of fishery resources. Fisheries legislations and law of the Seas. Impact of over exploitation and climate change on fisheries resources.

UNIT - 2 : Fish aquaculture. Reproduction and breeding behaviour in fishes and shellfishes, brood stock improvement, maturity and fecundity studies. Induced spawning methods and seed production, natural fish seed collection and rearing methods. Types of eggs and development of larval stages of fin fishes and shellfishes. Preparation and management of fresh water and brackish water fishponds. Cultivable species identification, introduction of exotic fishes in India. Culture methods: Pen and cage culture practices, crap and shrimp hatchery management, basic aspects of biotechnology in relation to fisheries.

UNIT - 3 : Ecology of water bodies. Important limnological, oceanographical and biological parameters in relation to fisheries of lotic and lentic waters, biological productivity and its impact on fisheries. Environmental impact assessment on fisheries in lentic and lotic waters. Biological parameters including energy flow, community ecology and aquatic association, biodiversity and its conservation, aquatic pollution and its management

UNIT - 4 : Harvest and post harvest technology. Common crafts and gears used for fish capture. Boat building material and demerits of wood, steel, aluminum, Ferro cement and FRP. Different types of fibres and netting materials and their characteristics, preservation of netting, parts of a trammel net, purse-scene, gill net and tuna long line. Food chemistry, fundamentals of microbiology. General methods of fish preservation and fishery by products. Canning and packaging techniques, processing and product development techniques.

UNIT - 5 : Fisheries economics, extension & statistics. Introduction to fishery economics and concepts of cooperative, marketing and banking management. Supply v/s demand economics of hatchery management and fish culture operations. Profit maximization. Problems in estimating costs and returns in fisheries. WTO agreements in Fisheries sector, intellectual property rights (IPR) and international fish trade; Fisheries extension methods. Training and education needs in fisheries. Communication concepts, Modern tools of fishery extension education, participatory rural appraisal (PRA), Rapid rural appraisal (RRA), role of women in fisheries; Basics of statistics in fisheries and computer science.

R. DAIRY SCIENCE (Subjects: Dairy Microbiology, Dairy Chemistry)

Unit - I : Chemical composition of various food of plant and animal origin, structure and functions of food constituents, additives, preservatives, flavours and antioxidants, composition and physico-chemical and nutritional

properties of milk and colostrum, chemistry of milk, constituents, nutrients and milk products. Test for the qualit of milk, butter, ghee, milk powder etc., adulterants, neutralizers and preservatives, their detection, heat stab of milk.

Unit - II : Introduction to dairy microbiology – Milk production hygiene and critical risk factors affectin microbiological quality on-farm; Microorganisms associated with milk and their classification based on gro temperature – psychrotrophs, mesophiles, thermodurics and thermophiles; Microbial metabolites and their rol in spoilages - souring, curdling, gassiness, ropiness, proteolysis, lipolysis, abnormal flavour and colour; Antimicro systems in raw milk; Microbiological grading of raw milk; Microflora of mastitic milk and its importance in da industry; Food poisoning, food infections, toxi-infections and other milk borne diseases and their control.

Unit - III : Composition and chemistry of cream, butter, ghee, ice-cream, cheese, condensed and dried mi infant food, spoilage of ghee and use of antioxidants, chemistry of milk fermentation, chemistry of renni coagulation of milk and changes occurring during ripening of cheese, physico-chemical changes in the manufactu and storage of milk powder, lactose, crystallization and its significance, physicochemical changes during manufacture of indigenous milk products, quality standards of dairy products.

Unit - IV : Bacteriological aspects of milk processing - Thermization, pasteurization, boiling, sterilization, U bactofugation, and membrane filtration; Microbiological quality of cream, butter, ice-cream, concentrated dair products, dried milks, infants milk foods, indigenous dairy products; Factors affecting the microbiological qualit of these products during production, processing, handling, storage and distribution; Enumeration, isolation identification of conventional and emerging dairy pathogens, detection of microbial toxins, drug residues in milk and their public health importance; Microbial defects associated with dairy products and their control; Microbiolo of dairy starters; Classification, genetic aspects and carbohydrate metabolism of Lactic Acid Bacteria (LAB Preservation, propagation and quality control of dairy starters and their inhibition by antibiotic residues, detergents, sanitizers, bacteriophages etc.; Microbiology of fermented milks, cheeses and application of probi concept in dahi, yoghurt, Kefir, Kumiss, Bulgarian milk, cultured buttermilk, leben, yakult, cheddar and processed cheese; Dairy plant hygiene and sanitation - Microbiology of air, water, equipments, packaging materials, personnel, disposal of dairy waste; Microbiological standards for milk and milk products - PFA, BIS, Codex/ I standards (ISO 9001: 2001/ISO 22000:2005).

S. DAIRY TECHNOLOGY (Subjects : Dairy Technology, Dairy Engineering)

UNIT - I : Principles and processes of food preservation, non-conventional sources, processing of fluid milk Computerization and Automatic Process Controls in Milk Processing. HACCP Concepts in Fluid Milk Processi Advances in Centrifugal Separation and Bactofugation. Manufacture of various types of dairy products and changes occurring during manufacture and storage and their defects. Sensory evaluation and judging of m and milk products, types of packaging materials and their properties, packing forms and operations, problems in food packaging, recent advances in packaging dairy and food products. Intelligent Food Packaging. Nutritional Labeling of Food Products. Application of Membrane Processing in Milk Processing.

UNIT - II : Materials and sanitary features of the dairy equipments. Homogenizer- Theory of Homogenization. Triplex pump, Lubrication of the Homogenizer, care and Management of homogenizer, Homogenizer Accessorie and Standards for Homogenizer. Pasteurizer- Pasteurizer construction & Principle Materials used in Constructi of Pasteurizers. High temperature short time Pasteurizer, care of Pasteurizer, Reaction Kinetics, Sterilizer, Mixing & agitation equipments, principles of evaporation, drying. Atmosphere concentration, Vacuum Pan, Fluidizatic Care of Vacuum Pan, Atmospheric Drum Dryer. Spray Dryer principles of dairy plant layout and design, Functiona Design, space requirement of Milk Plant, problem through computers, centralized dispersal of data processing, d-BASE-III, Lotus 1-2-3 to graphics, Fortran.

UNIT - III : Fluid mechanics- properties of fluids, Bernoulli's equation and its applications, hydraulic systems Types of Pumps, Sanitary pumps, Standards for Centrifugal and Positive Rotatory Type of pumps, Selection of Pump Care and Upkeep of Pumps dimensional analysis, refrigeration and air-conditioning. Artificial Refrigeratio Compression Refrigeration System, Refrigeration Accessories. Calculation of size of Refrigeration Machine Requirements. Heat-transfer and thermodynamics; mechanical separations, Rittinger's and Kick's laws, Engineeri of mechanics, theory of machine, strength of materials, Hook's law, materials of fabrications, machine tools, Electrical Engg., Electromagnetic induction, Magnetic- Hysteresis loop (BH Curve), AC fundamentals.

T. FOOD SCIENCE TECHNOLOGY (Subject: Food Science & Technology)

UNIT - I : General chemistry of food constituents, physical properties of foods, properties of cottoldal syster gels and emulsions. Minerals in foods, physicochemical changes in foods during processing and storage, functions of food nutrients, dietary allowances and nutritional requirements. Metabolism of carbohydrates, lipids and protein

Biological value and PER. Food additives, contaminants and anti-nutritional factors. Food flavors and puff-flavors. National and international food standards, modern analytical techniques in food analysis.

UNIT - II : Engineering properties of food materials, System analysis, mass and energy balance, Principles operations and equipment for food materials flow handling, cleaning, dehusking, sorting and grading; peeling, size reduction, mixing and forming, bakery foods manufacture, extrusion, separation, filtration and membrane processes, expression, baking roasting, frying, extraction and leaching, crystallization, distillation, blanching, pasteurization, sterilisation, evaporation, drying, freezing, packing, heat exchanging, dairy specific operations. Process equipment design, heat and mass transfer, equipment for steam generation, compressed air, refrigeration and air conditioning, water and waste water treatment, biochemical engineering and thermo bacteriology. Automation, on-line data acquisition and process control. Food plant layout and design. Energy audit.

UNIT - III : Preparation and manufacturing technology of cereals and bakery products, beef, pork, poultry, fish & sea foods and egg, sausages and table ready meats, dairy products, fresh fruits, fresh vegetables, processed fruits, processed vegetables, Post Harvest Handling and storage of Fruits and Vegetables. Sugars, sweets, fats and oils, fermented foods, alcoholic and non-alcoholic beverages, indigenous foods, fast, readymade and fashion foods. Dehydration and concentration methods, irradiation, microwave and solar processing of foods, food by-products & downstream processing, flavoring and pigment technology. Judging of food products, food plant management and legal aspects, food plant safety, risk and hazards. Effluent treatment and environment pollution, waste solids upgrading and treatment, food storage, functions of packaging, packaging operations, types of containers, FFS, hermetics closures, canning packaging materials and package testing, transportation and marketing food products.

UNIT - IV : Role of intrinsic and extrinsic properties of food in relation to microbial growth. Microbiology of fruits, fruit products, vegetables, soft drinks, bakery products, milk and milk products, milk, fish, egg and marine produces. Spoilage of foods, food pathogens and their toxins in relation to human health. Food preservation by sugar, salt, chemicals, heat, cold, irradiation, dehydration and packaging. Microbiology of fermented foods and beverages and factors affecting their quality. Methods for microbiological examination of foods, food hygiene and safety regulations. Water quality and waste disposal in food industry.

U. AGRI BUSINESS MANAGEMENT

(**Subjects** : Agri-Business Management, Agricultural Marketing & Cooperation)

UNIT - 1 : Social, political and economic structure in rural India. Importance of agriculture/forestry/ horticulture/ livestock in national economy. Cultivation of major cereal crops, legume crops, vegetable crops, fruits and their importance in human diet. Major soils of India, essential plant nutrients, their role, deficiency symptoms and sources. Pests and diseases of major crops, vegetables, fruits and their management. Forestry production, pests and diseases management of major trees grown in India. Watershed management. Organizational set up of agricultural research, education and extension in India. Elements of statistics.

UNIT - 2 : Farm equipments and Farm Machinery in India, sources of energy and power on farms. Irrigation and drainage systems. Basics of post-harvest technology, Basics of energy in agriculture.

UNIT - 3 : Basics of veterinary, gynaecology, veterinary microbiology, veterinary pathology and Parasitology, veterinary surgery, veterinary public health, veterinary pharmacology and toxicology.

UNIT - 4 : Basics of human food and nutrition, human/child development, home and family resource management, clothing and textile.

UNIT - 5 : Quantitative ability: Test the ability of candidates to make mathematical calculations under stress conditions. All these calculations will be based on analytical skills of the candidates with understanding of mathematics at Intermediate level.

UNIT - 6 : Communicative ability: Test English comprehension wherein the knowledge of language skills are tested as to how effectively the candidate communicates his thoughts and ideas.

UNIT - 7 : Data Interpretation: Calculations requiring skills of interpretation of facts and figures. The questions can be posed as graphs, tables and charts.

UNIT - 8 : Logical reasoning: Evaluating logical thinking capacity by providing various options.

UNIT - 9 : Agricultural Marketing and Cooperation: Fundamentals of managerial economics, market structure conduct and performance, agricultural marketing concepts- functions and institutions, trade in agriculture sector; principles of corporation; cooperatives in India; agribusiness institutions in India; entrepreneurship development. Besides above, any other topic of scientific, social and educational importance can also be included.

NOTE : 20–25% questions are likely to be related to agriculture and agriculture related science subjects including recent developments.

1 Agronom

1. Which of the following crop has the highest cultivated area in the world ?
   (a) Rice (b) Wheat
   (c) Barley (d) Bajra
2. Rice is originated in
   (a) SW Asia (b) Europe
   (c) South America (d) India & Burma
3. India has the largest area in rice cultivation in the world, which is about
   (a) 26 mha (b) 36 mha
   (c) 45 mha (d) 50 mha
4. Productivity of rice is highest in
   (a) Haryana (b) Punjab
   (c) West Bengal (d) Uttar Pradesh
5. The genus *Oryza* includes
   (a) 14 species (b) 22 species
   (c) 24 species (d) 30 species
6. The varieties which belong to species *Oryza glaberrima* are found in
   (a) Europe (b) Asia
   (c) America (d) Africa
7. The rice varieties grown in India belongs to
   (a) *Indica* (b) *Japonica*
   (c) *Javanica* (d) *Asiatica*
8. Rice grown in Indonesia belongs to
   (a) *O. glaberrima* (b) *O. sativa indica*
   (c) *O. sativa japonica*
   (d) *O. sativa javanica*
9. Non traditional areas of rice cultivation include
   (a) Punjab and Haryana
   (b) Uttar Pradesh and Bihar
   (c) West Bengal and Orissa
   (d) Tamil Nadu and Andhra Prad
10. The rice inflorescence is known a
    (a) Panicle (b) Spikelets
    (c) Ear (d) Siliqua
11. The dehulled rice grain is known
    (a) White rice (b) Brown rice
    (c) Red rice (d) Grey rice
12. Rice crop needs
    (a) Warm and humid climate
    (b) Hot and humid climate
    (c) Dry and hot conditions
    (d) Cold and dry climate
13. For ripening of rice, temperature sh lie between
    (a) 21 - 37°C (b) 26.5 - 29.5°
    (c) 20 - 25°C (d) 15 - 20°C
14. Photoperiodically, rice is a type of .... plant
    (a) Long day (b) Short day
    (c) Day neutral (d) Intermediat
15. The sowing time of Aus rice is
    (a) Nov. - Dec. (b) June - July
    (c) May - June (d) March - A
16. The sowing time of boro or dalua is
    (a) Nov. - Dec. (b) June - July
    (c) May - June (d) March - A

Answers										
	1. (b)	4. (b)	7. (a)	10. (a)	13. (c)	16.
	2. (d)	5. (c)	8. (d)	11. (b)	14. (b)	
	3. (c)	6. (d)	9. (a)	12. (b)	15. (c)	

17. The optimum pH of soil for rice cultivation varies in range
(a) 4 - 6 (b) 5 - 6.5
(c) 6 - 7 (d) 7 - 9

18. IR-8 variety of rice is introduced in India from
(a) Taiwan (b) Philippines
(c) Indonesia (d) USA

19. Which of the following variety is a dwarf mutant ?
(a) IR-8 (b) Jaya
(c) Pusa-2-21 (d) Jagannath

20. The seed rate of rice cultivation in broadcasting and drilling method, respectively should be
(a) 100, 60 kg/ha (b) 60, 100 kg/ha
(c) 45, 100 kg/ha (d) 100, 45 kg/ha

21. For transplanting one hectare area of rice how much area is sufficient for nursery raising
(a) 100 m^2 (b) 500 m^2
(c) 1000 m^2 (d) 1500 m^2

22. Dapog method of raising nursery of rice has been introduced in India from
(a) Indonesia (b) Taiwan
(c) Israel (d) Philippines

23. In wet bed method of nursery raising of rice, seedling would be ready for transplanting at an age of
(a) 14 days (b) 15 - 20 days
(c) 20 - 25 days (d) 25 - 30 days

24. In rice, Dapog seedlings would be ready for transplanting in
(a) 11 - 14 days (b) 14 - 17 days
(c) 17 - 20 days (d) 20 - 23 days

25. Propanil (Stamp F-34) herbicides should be applied in rice after transplanting
(a) 2 - 4 DAT (b) 6 - 8 DAT
(c) 10 - 14 DAT (d) 2 weeks

26. The Kresek occurs in early stage of plant growth of rice in
(a) BLB
(b) Bacterial leaf streak
(c) Tungro virus (d) False Smut

27. Tungro virus of rice is transmitted by
(a) Stem borer (b) Leaf roller
(c) Green leaf hopper (d) Gundhi bug

28. Dead heart and white head damage to rice is caused by
(a) Gall midge (b) Leaf roller
(c) Army worm (d) Stem borer

29. Silvery shoot or onion leaf symptom of rice tillers is caused by
(a) Rice hispa (b) Gall midge
(c) Leaf roller (d) Gundhi bug

30. Grassy stunt virus disease of rice is transmitted by
(a) Green leaf hopper
(b) Brown plant hopper
(c) White fly (d) Gundhi bug

31. Gundhi bug insect attack on rice during
(a) Germination (b) Flowering
(c) Milking stage (d) Harvesting stage

32. Test weight of basmati rice is
(a) 15 g (b) 21 g
(c) 24 g (d) 30 g

33. *Oryza sativa* is a diploid species having ..... chromosomes.
(a) 18 (b) 24
(c) 28 (d) 42

34. Gene responsible for dwarfing characters in rice is
(a) Tift 23A (b) Dee-gee-woo-gen
(c) Norin-10 (d) Opaque-2

Answers						
	17. (a)	20. (a)	23. (c)	26. (a)	29. (b)	32. (b)
	18. (b)	21. (c)	24. (a)	27. (c)	30. (b)	33. (b)
	19. (d)	22. (d)	25. (b)	28. (d)	31. (c)	34. (b)

35. Golden rice is a rich source of
(a) Vitamin A (b) Vitamin B
(c) Ascorbic acid (d) Vitamin K

36. Idea of super rice was given by
(a) GH Shull (b) GS Khush
(c) VL Chopra (d) Yoshida

37. Government of India started subsidy on fertilizers with effect from
(a) Nov. 1, 1966 (b) Nov. 1, 1969
(c) Nov. 1, 1977 (d) Oct. 2, 1988

38. The scientific name of common bread wheat is
(a) *T. dicoccum*
(b) *Triticum aestivum*
(c) *T. spherococcum*
(d) *T. spelta*

39. Indian dwarf wheat belongs to
(a) *T. durum*
(b) *Triticum aestivum*
(c) *T. spherococcum*
(d) *T. spelta*

40. Select the pair which is not correctly matched.
(a) Emmer wheat - *T. dicoccum*
(b) Macaroni - *T. durum*
(c) Mexican wheat - *T. aestivum*
(d) Indian dwarf wheat - *T. vulgare*

41. Wheat is originated in
(a) South America
(b) Central Asia (Turkey)
(c) SE Asia
(d) Europe

42. Common bread wheat (2n = 42) is
(a) Diploid (b) Tetraploid
(c) Hexaploid (d) Triploid

43. *Dwarf Wheat (Mexican)* is introduced in India by
(a) Dr. N E Borlaug
(b) Dr. M S Swaminathan
(c) Dr. Subramanian
(d) Dr. B P Pal

44. Maximum area under wheat is in
(a) India (b) USA
(c) Russia (d) China

45. Which country rank second in wheat production ?
(a) India (b) USA
(c) Russia (d) China

46. The first wheat variety having short plant height, lodging resistance and higher grain yield was
(a) Dee-gee-woo-gen
(b) Norin-10
(c) Lerma Rojo 64A
(d) Sonara-64

47. Temperature requirement for proper grain filling of wheat is
(a) 20 - 25°C (b) 20 - 23°C
(c) 23 - 25°C (d) 16 - 20°C

48. The inflorescence of wheat is known as
(a) Ear (b) Raceme
(c) Panicle (d) Umbel

49. The normal seed rate of wheat is
(a) 50 kg/ha (b) 75 kg/ha
(c) 100 kg/ha (d) 125 kg/ha

50. Wheat crop yielding 50 quintals of grain per hectare removes N, P_2O_5 and K_2O kg/ha, respectively
(a) 100 - 150, 70 - 80 and 125 - 150
(b) 90 - 100, 60 - 70 and 100 - 110
(c) 120 - 40 - 80
(d) 80 - 30/40 - 20

Answers						
	35. (a)	38. (b)	41. (b)	44. (d)	47. (c)	50. (a)
	36. (b)	39. (c)	42. (c)	45. (a)	48. (a)	
	37. (c)	40. (d)	43. (a)	46. (b)	49. (c)	

51. The recommended dose of N, P_2O_5 and K_2O kg/ha for wheat are
(a) 80 - 40 - 0 (b) 120 - 40 - 0
(c) 30 - 20 - 0 (d) 40 - 30 - 0

52. N, P_2O_5 and K_2O contents of DAP are
(a) 46 - 18 - 0 (b) 18 - 46 - 0
(c) 0 - 18 - 46 (d) 0 - 46 - 18

53. The N fertilizer use efficiency in rice can be increased by using
(a) S-coated urea
(b) Urea super granules
(c) BGA
(d) Both (a) and (b)

54. *Triticale* is a cross between
(a) Wheat × rye (b) Oat × barley
(c) Wheat × barley (d) None of these

55. *Phalaris minor* belongs to the family
(a) Cyperacene (b) Gramineae
(c) Solanaceae (d) Malvaceae

56. The nitrogen losses in rice can be reduced by placing NH_4 fertilizer in
(a) Oxidised zone (b) Reduced zone
(c) Both (a) & (b) (d) None of these

57. Green revolution has been most successful in
(a) Wheat & potato (b) Wheat & rice
(c) Tea & coffee (d) Barley & rice

58. Record production of food grains was ensured in
(a) 1999 - 2000 (b) 2000 - 01
(c) 2001 - 02 (d) 2004 - 05

59. 'Akiochi' disease in rice is due to the toxicity caused by
(a) Zinc (b) Iron
(c) Phosphorus
(d) Hydrogen sulphide

60. At pH 4.0, the predominant ionic form of phosphorus present is
(a) HPO_4 (b) $H_2PO_4^-$
(c) PO_4^{3-} (d) None of these

61. First irrigation to the wheat crop should be given at
(a) CRI stage (b) Tillering stage
(c) Jointing stage (d) Dough stage

62. *Phalaris minor* in wheat can be controlled by using
(a) 2, 4 - D (b) Isoproturon
(c) Atrazine (d) Gramaxone

63. Test weight of *Phalaris minor* is
(a) 2 g (b) 4 g
(c) 22 g (d) 40 g.

64. Directorate of Wheat Research (DWR) is located at
(a) Hyderabad (b) New Delhi
(c) Karnal (d) Bikaner

65. The scientific name of noble cane is
(a) *Saccharum officinarum*
(b) *Saccharum spontaneum*
(c) *S. barberi*
(d) *S. sinense*

66. *Saccharum officinarum* is a native of
(a) New Guinea (b) India
(c) Indonesia (d) China

67. Which state has the highest productivity of sugarcane ?
(a) U.P. (b) W.B.
(c) Karnataka (d) Tamil Nadu

68. Which state has the largest acreage and highest production of sugarcane in country ?
(a) Tamil Nadu (b) Karnataka
(c) U.P. (d) Bihar

Answers						
	51. (b)	54. (a)	57. (b)	60. (b)	63. (a)	66. (a)
	52. (b)	55. (b)	58. (c)	61. (a)	64. (c)	67. (d)
	53. (d)	56. (b)	59. (d)	62. (b)	65. (a)	68. (c)

69. Which of the following roots are of permanent type on sugarcane cane setts ?
(a) Sett roots (b) Shoot roots
(c) Prop roots (d) All of these

70. The inflorescence of sugarcane is known as
(a) Arrow (b) Panicle
(c) Capitulum (d) Racemose

71. The best suited temperature for growth of sugarcane lies between
(a) 15 - 20°C (b) 20 - 25°C
(c) 26 - 32°C (d) 32 - 35°C

72. AICRP on sugarcane was started in
(a) 1959 (b) 1960
(c) 1970 - 71 (d) 1985 - 86

73. Adsali sugarcane is planted in
(a) July-August
(b) January-February
(c) February-March
(d) October-November

74. The top portion of sugarcane should be selected for seed purposes because bud tissues are rich in
(a) Sucrose (b) Glucose
(c) Galactose (d) Maltose

75. Which element is essential for sugar translocation in sugarcane ?
(a) P (b) K
(c) B (d) Mo

76. Which growth stage of sugarcane is critical for irrigation ?
(a) Germination
(b) Grand growth phase
(c) Formative stage
(d) Ripening stage

77. Most critical weed competition peri upto ..... months after transplar exist in sugarcane
(a) 2 (b) 4
(c) 5 (d) 6

78. Most common herbicides used for w control in sugarcane is/are
(a) Simazine (b) Atrazine
(c) Alachlor (d) All of the t

79. Most serious disease of sugarcane
(a) Red stripe (b) Red rot
(c) Wilt (d) Smut

80. How many setts are needed to plant hectare of sugarcane ?
(a) 30,000 - 35,000
(b) 35,000 - 40,000
(c) 40,000 - 45,000
(d) 50,000 - 55,000

81. Trench method of sugarcane plantin used in
(a) North India
(b) Western India
(c) Coastal area
(d) Waterlogged area

82. With too much increase in nitro application, sugar content in juice i
(a) Decreased
(b) Increased
(c) Remain constant
(d) None of the above

83. *Epricania melanoleuca* is a parasit effective against
(a) Sugarcane scale
(b) Rice mealy bug
(c) Sugarcane pyrilla
(d) Rice leaf hopper

Answers						
	69. (b)	72. (c)	75. (b)	78. (d)	81. (c)	
	70. (a)	73. (a)	76. (c)	79. (b)	82. (a)	
	71. (c)	74. (b)	77. (b)	80. (b)	83. (c)	

84. Which one of the following types of resistance is present in a crop variety showing high degree of resistance to a pathogen but becoming susceptible to it after large scale cultivation for 4 to 5 years or so ?
(a) Vertical resistance
(b) Horizontal resistance
(c) Durable resistance
(d) General resistance

85. Which one of the following food grains is most coarse ?
(a) *Panicum miliaceum*
(b) *Echinochloa frumentacea*
(c) *Setaria italica*
(d) *Paspalum scrobiculatum*

86. Which one of the following pairs of crops and critical stage of irrigation is not correctly matched ?
(a) Bajra : Ear head
(b) Cotton : Pre-flowering
(c) Wheat : Crown root initiation
(d) Groundnut : Pod development

87. Contribution of flag leaf in photosynthates is about
(a) 52% (b) 40%
(c) 35% (d) 20%

88. Which one of the following crops is most sensitive to both excess moisture and drought ?
(a) Direct seeded rice (b) Maize
(c) Sunflower (d) Sorghum

89. Atrazine used as an antitranspirant
(a) Reduces the growth of the crop
(b) Does not reflect light from plant leaf surface
(c) Affects the closure and opening of stomata
(d) Forms thin layer on leaf surface

90. Which one of the following pairs of weeds and crops is not correctly matched ?
(a) Striga : Sorghum
(b) Cuscuta : Lucerne
(c) Typha : Sugarcane
(d) Orobanche : Tobacco

91. 'Atrazine' effectively control grasses in maize field without causing harm to the crop plants, as degradation of the chemical in maize plant occurs due to the presence of
(a) R-Q enzyme
(b) Amylases
(c) Aryl acyl amidase
(d) GSH enzyme

92. Which one of the following is mycoheribicide ?
(a) Diquat
(b) Met sulfuron methyl
(c) Collego
(d) Bromacil

93. Which one of the following crop rotation is the best for maintaining soil fertility ?
(a) Maize - toria - wheat
(b) Paddy - wheat - cowpea
(c) Paddy - potato - greengram
(d) Soybean - wheat - greengram

94. Productivity of an intercrop per unit area of ground compared with that expected from sole crop sown in the same proportions is termed as
(a) Land equivalent ratio
(b) Competitive ratio
(c) Land equivalent coefficient
(d) Crop performance ratio

Answers				
	84. (a)	87. (a)	90. (c)	93. (d)
	85. (d)	88. (b)	91. (d)	94. (a)
	86. (d)	89. (c)	92. (c)	

95. Which one of the following fertilizer schedule is recommended to optimize the productivity in intercropping system ?
(a) Full recommended dose of both the main crop and intercrop,
(b) Full recommended dose of main crop and half of intercrop,
(c) Half recommended dose of main crop and intercrop,
(d) Full recommended dose of main crop only

96. The capacity of a soil to resist appreciable change in pH value is called
(a) CEC
(b) Buffering capacity
(c) Percentage base saturation
(d) Anion-exchange capacity

97. Mechanical analysis of soil makes use of
(a) Darcy's law (b) Stoke's law
(c) Schofield's law (d) Ohm's law

98. Which one of the following planting geometry is recommended to optimize system productivity in intercropping system in semi-arid and sub-humid ecosystem ?
(a) Normal planting of intercrops between two rows of normal planted main crop
(b) Skip row planting
(c) Three rows of main crop and two rows of intercrops
(d) Four rows of main crop and one row of intercrops

99. Humic acid is a fraction of humus, which is
(a) Soluble in alkali and acid
(b) Soluble in alkali and insoluble in acid
(c) Insoluble in alkali and soluble in acid
(d) Insoluble in both in alkali and acid

100. The processes of replacement of one atom by another atom of similar size, in a crystal lattice of a soil clay without disrupting or changing the crystal structure of the mineral is termed as
(a) Ion exchange
(b) Isomerism
(c) Isomorphic substitution
(d) Polymorphism

101. Which one of the follcwing sequences is being used in a combination seed treatment ?
(a) *Rhizobium*, fungicide and insecticide
(b) *Rhizobium*, insecticide and fungicide
(c) Fungicide, insecticide and *Rhizobium*
(d) Insecticide, *Rhizobium* and fungicide

102. Which one of the following is the characteristic of stripe rust of wheat ?
(a) Brown, elongated ruptured pustules on stem and leaf-sheath
(b) Yellow, small, spherical to oval ruptured uredo-pustules in rows of leaf
(c) Brown, spherical to oval, ruptured uredo-pustules on leaf
(d) Black teliopustules, scattered on under surface of the leaf

103. Consider the following pairs of crops and varieties and select the pair which is not correctly matched.
(a) Barley : Clipper
(b) Cotton : Sujata
(c) Cowpea : Pusa Phalguni
(d) Green gram : UPAS 120

Answers			
	95. (d)	98. (b)	101. (c)
	96. (b)	99. (b)	102. (b)
	97. (b)	100. (c)	103. (d)

104. Which of the following is the ideal temperature range for tillering stage in wheat ?
(a) 10 - 15°C (b) 16 - 20°C
(c) 20 - 23°C (d) 23 - 25°C

105. The element which does not enter into permanent organic combination in plants is
(a) Nitrogen (b) Phosphorus
(c) Magnesium (d) Potassium

106. The plateau with little growth rate and continuing accumulation of nutrient element in the plants can be defined as
(a) Severe deficiency range
(b) Toxic range
(c) Moderate deficiency range
(d) Sufficiency range

107. The major organic cementing agent in soil aggregate formation is
(a) Lipids
(b) Proteins and protein derivatives
(c) Polysaccharides
(d) Organic acids

108. Tetrazoloin test is used to determine
(a) Seed purity
(b) Seed germination
(c) Seed viability
(d) Seed quality

109. How much quantity of true potato seed is required for one hectare planting ?
(a) 100 g (b) 200 g
(c) 300 g (d) 400 g

110. The largest producer of mothbean in India is
(a) Rajasthan (b) Punjab
(c) M.P. (d) Uttar Pradesh

111. The seed rate for Sesamum is
(a) 2 - 3 kg (b) 3 - 4 kg
(c) 4 - 5 kg (d) 5 - 6 kg

112. The highest production of mustard in India is in the state of
(a) Gujarat (b) U.P.
(c) Punjab (d) Rajasthan

113. The fruit of rapeseed and mustard is known as
(a) Pod (b) Grain
(c) Siliqua (d) Caryopsis

114. The inherent capacity of soil to supply plant nutrients in adequate amount and suitable proportion is called
(a) Fertility index
(b) Soil fertility
(c) Soil productivity
(d) None of these

115. The criteria of essentiality of nutrients in plants was given by
(a) DJ Nicholas
(b) Arnon and Stout
(c) JS Kanwar
(d) Rajendra Prasad

116. Potato is a
(a) Modified stem (b) Modified root
(c) Modified leaf (d) Modified flower

117. The method of irrigation employed where surface is undulating is
(a) Flood irrigation
(b) Spinkler irrigation
(c) Drip irrigation
(d) Subsurface irrigation

118. The depth of sowing of bajra is
(a) 1-2 cm (b) 3-4 cm
(c) 4-5 cm (d) 5-6 cm

Answers					
	104. (b)	107. (c)	110. (a)	113. (c)	116. (a)
	105. (d)	108. (c)	111. (b)	114. (b)	117. (b)
	106. (d)	109. (a)	112. (d)	115. (b)	118. (a)

119. Which is generally used for correcting soil acidity ?
(a) Gypsum (b) Lime
(c) Iron pyrites (d) Both (a) and (b)

120. The main objective of growing a catch crop is to
(a) Add more residues to the soil
(b) Prevent cracking of soil
(c) Suppress weeds
(d) Get an additional income without further investment

121. Biuret content in urea should not exceed ..... according to fertilizer control order, 1957.
(a) 1.0% (b) 1.5%
(c) 2.0% (d) 2.5%

122. Bund former is used for making
(a) Furrows (b) Ridges/bunds
(c) Soil smooth (d) All of these

123. The force of attraction binds the molecules of the same kind is
(a) Adhesion (b) Matric force
(c) Cohesion (d) None of these

124. The upper limit of the soil moisture available for the plant growth is
(a) PWP (15 bars)
(b) Field capacity (1/3 bars)
(c) Hygroscopic coefficient
(d) Matric suction

125. A device for measuring percolation and leaching losses from a column of soil under controlled conditions is known as
(a) Infiltrometer (b) Evaporimeter
(c) Psycrometer (d) Lysimeter

126. A calibrated device for measuring the flow of water in open conduit is known as
(a) V-notch (b) Parshall fl
(c) Watermeter (d) None of t

127. The instrument used for meas depth of water table is known a
(a) Lysimeter (b) Odo
(c) Piezometer (d) Evap

128. The seed rate of hybrid maize is
(a) 20 - 25 kg/ha (b) 18 - 20 k
(c) 30 - 35 kg/ha (d) 10 - 15 k

129. Botanical name of Ragi is
(a) *Eleusine coracana*
(b) *Echinochloa frumentacea*
(c) *Panicum miliacium*
(d) None of these

130. The most serious pest of bengalgr
(a) Pod borer (b) Cut worm
(c) Aphid (d) None of t

131. The oil and protein content of grou are
(a) 20% & 50% (b) 26% & 45
(c) 45% & 26% (d) 50% & 26

132. Raising of crop with the least t operations is called
(a) Zero tillage (b) Minimum
(c) No tillage (d) Heavy till

133. For which type of fertilizer India is dependent on imports
(a) N-fertilizer (b) P-fertilizer
(c) K-fertilizer (d) None of t

134. National Agriculture Policy aim growth rate of
(a) > 2.5% p.a. (b) > 3.0 p.a
(c) > 4.0% p.a. (d) > 5 p.a

135. Which is the leading state in produ of groundnut ?
(a) U.P. (b) Rajasthan
(c) Haryana (d) Gujarat

Answers						
	119. (b)	122. (b)	125. (d)	128. (a)	131. (c)	13
	120. (d)	123. (c)	126. (b)	129. (a)	132. (b)	13
	121. (b)	124. (b)	127. (c)	130. (a)	133. (c)	

136. Remote sensing helps in studying
(a) Cropped area
(b) Soil characters
(c) Underground water
(d) All of the above

137. Sunflower act as an indicator plant to diagnose the deficiency of
(a) Boron (b) Iron
(c) Nitrogen (d) Phosphorus

138. Which of the following elements is not considered as fertilizer nutrient ?
(a) C (b) N
(c) S (d) Zn

139. The type of germination in mungbean is known as
(a) Epigeal (b) Hypogeal
(c) Hypoepigeal (d) Epihypogeal

140. Bacteria responsible for N fixation in soybean is
(a) *R. phaseoli*
(b) *R. glycicum*
(c) *R. japonicum*
(d) *R. leguminosorum*

141. Sesamum belongs to the family
(a) Chenopodiaceae
(b) Papilionaceae
(c) Leguminosae
(d) Pedaliaceae

142. Fluchloralin can be used in soybean as
(a) Pre - emergence
(b) Post - emergence
(c) Pre - plant incorporation
(d) None of these

143. Topping of safflower plants is beneficial
(a) To reduce lodging
(b) To promote branching and flowering
(c) To reduce water loss
(d) All of these

144. Delinting of cotton seed may be done with
(a) Sulphuric acid
(b) Citric acid
(c) Nitric acid
(d) Hydrochloric acid

145. Optimum plant population ha^{-1} for cotton has estimated as
(a) 25,000 - 50,000 (b) 30,000 - 60,000
(c) 50,000 - 80,000 (d) 80,000 - 1,00,000

146. The insect bollworm is commonly found on
(a) Maize (b) Wheat
(c) Cotton (d) Rice

147. Stomata closing can be induced by
(a) Kaoline (b) Linseed oil
(c) 2, 4 - D (d) PMA

148. The most critical stage of maize from irrigation point of view is
(a) Silking stage (b) Tasseling stage
(c) Boot stage (d) Dough stage

149. Relationship between water and fertilizer as production factors in crops is
(a) Additive (b) Synergetic
(c) Antagonistic (d) None of these

150. Growing of coconut, black pepper and ginger simultaneously in the same field is called
(a) Relay cropping
(b) Inter cropping
(c) Multiple cropping
(d) Multistoried cropping

151. Stevenson screen is related to
(a) Bacteriology (b) Biotechnology
(c) Agrometeorology
(d) Remote sensing

Answers						
	136. (d)	139. (a)	142. (c)	145. (c)	148. (b)	151. (c)
	137. (a)	140. (c)	143. (b)	146. (c)	149. (b)	
	138. (a)	141. (d)	144. (a)	147. (d)	150. (d)	

152. Botanical name of Sewan grass is
(a) *Lasiurus sindicus*
(b) *Panicum maximum*
(c) *Cynodon dactylon*
(d) *Cenchrus ciliaris*

153. RMO - 40 is a variety of
(a) Mungbean (b) Urdbean
(c) Horsebean (d) Mothbean

154. Amongst oil cakes, the highest nitrogen content is in
(a) Castor cake
(b) Neem cake
(c) Groundnut cake
(d) Coconut cake

155. The term "Evergreen Revolution" has been given by
(a) Dr. AS Faroda
(b) Dr. MS Swaminathan
(c) Dr. VL Chopra
(d) Dr. RS Paroda

156. Maximum residual acidity is associate with the continuous soil application of
(a) Urea
(b) Ammonium nitrate
(c) Ammonium sulphate
(d) CAN

157. The quantity of SSP (16% P_2O_5) required for application to one acre of rice-field at a dose of 60 kg P_2O_5 ha^{-1} is
(a) 250 kg (b) 200 kg
(c) 150 kg (d) 100 kg

158. The most important potential contaminant of food produced on sewage sludge amended soils is
(a) Chromium (b) Lead
(c) Zinc (d) Cadmium

159. Which one of the following nutrients is constituent of cell wall in the plants ?
(a) Phosphorus (b) Calcium
(c) Sulphur (d) Potassium

160. Which of the following phytohormone is involved in nutrient mobilization ?
(a) Gibberellin (b) Cytokinin
(c) Auxin (d) ABA

161. Heavy applications of potassium fertilizers often lead to reduced absorption of
(a) Mg and Ca (b) B and Mn
(c) N and P (d) Zn and Cu

162. If a plant shows extensive interveinal chlorosis of the older leaves and later this reaches the younger leaves, the symptoms is due to lack of
(a) Magnesium (b) Calcium
(c) Phosphorus (d) Copper

163. Phenylmercuric acetate (PMA) is chemical used in agricultural crops in order to
(a) Increase CO_2 uptake
(b) Reduce respiration
(c) Reduce transpiration
(d) Increase transpiration

164. Water requirement (WR) includes the losses due to
(a) Evapotranspiration and application of water
(b) Consumptive use of water and application of water
(c) Consumptive use, water required for special operations and other economically unavoidable losses of water
(d) ET and water required for special operations

Answers					
	152. (a)	155. (b)	158. (d)	161. (d)	164. (c)
	153. (d)	156. (c)	159. (b)	162. (a)	
	154. (c)	157. (c)	160. (c)	163. (c)	

165. If on a 20 acre farm, crops are raised on 15 acres in *rabi*, 15 acres in *kharif* and 20 acres in *zaid* in a year, what shall be the cropping intensity
(a) 300% (b) 400%
(c) 250% (d) 150%

166. Which one of the following pairs is not correctly matched ?
(a) Bajra - Tift 23 D_2A
(b) Maize - T Cytoplasm
(c) Wheat - Rht1 Rht2
(d) Rice - Norin 10

167. Which one of the following disease does not induce floral abnormalities ?
(a) Downey mildew of mustard
(b) Green ear of bajra
(c) White rust of crucifers
(d) None of these

168. Which one of the following pairs is not correctly matched ?
(a) Paddy gall fly : Silver leaf
(b) Rice bug : Repugnant smell
(c) Rice stem borer : Black ears
(d) Rice zig-zag leaf hopper : Orange leaf

169. Which one of the following diseases of pigeonpea is transmitted by Eryophid mite ?
(a) *Phytophthora* stem rot
(b) *Cercospora* leaf spot
(c) Yellow mosaic
(d) Sterility mosaic

170. Which one of the following was introduced in the country to eradicate prickly pear (*Opuntia dilleni*) weed ?
(a) *Chrysomella spp.*
(b) *Dactylopius tomentosus*
(c) *Zygogramma bicolarata*
(d) *Neochetina spp.*

171. *Parthenium hysterophorus* (Congress grass) can be controlled by
(a) *Chrysomella spp.*
(b) *Dactylopius tomentosus*
(c) *Zygogramma bicolarata*
(d) *Neochetina spp.*

172. Which one of the following microbial agents is being commercially exploited as biocontrol agent ?
(a) *Penicillium notatum*
(b) *Bacillus subtilis*
(c) *Trichoderma viridiae*
(d) *Sclerotium rolfsii*

173. Which one of the following causes more wastages of herbicide by drift ?
(a) High volume sprayer
(b) Ultra-low volume sprayer
(c) Hand sprayer
(d) Low volume sprayer

174. Application of organic materials with C:N ratio wider than 20 to 30:1 leads to ..... of soil N
(a) Nitrification (b) Fixation
(c) Mineralization (d) Immobilization

175. For sugarcane 'N' fertilizer application has to be completed within ..... days after planting for better sugar content in juice
(a) 20 (b) 40
(c) 60 (d) 80

176. Postponing of first irrigation to 40-45 days after sowing is always preferable for cotton crop to
(a) Promote sympodial branching
(b) Prevent excessive vegetative growth
(c) Promote early flowering
(d) Promote monopodial branches

Answers

165. (c)	168. (c)	171. (c)	174. (d)
166. (d)	169. (d)	172. (c)	175. (c)
167. (a)	170. (b)	173. (b)	176. (b)

177. In functional allelopathy
(a) Toxic substances are released as such from the plant
(b) A precursor is released which is converted into active substances by some microorganisms
(c) There is no question of release of any toxic substance
(d) Release of nitrogen from nodule of legume take place

178. Water harvesting is defined as
(a) Application of water at the time of harvesting crops like colocasia, tapioca and yam
(b) Harvesting deep water from soils by pumping devices
(c) Unit of water applied to crops
(d) Collecting the excess run off from rain on the farm in ponds and utilizing it later for agriculture

179. Which one of the following operations is associated with the process of nipping in gram ?
(a) Treating the seed with *Rhizobium* culture
(b) Tying the branches to avoid lodging
(c) Picking green leaves for vegetable purposes
(d) Plucking the apical buds to promote branches

180. Which one of the following is the best example of catch crop ?
(a) Linseed (b) Mustard
(c) Toria (d) Groundnut

181. Which one of the following is relay cropping system ?
(a) Maize - mustard - pearlmillet + cowpea
(b) Maize - potato - wheat - greengram
(c) Blackgram - wheat - greengram
(d) Pearlmillet - mustard - greengram

182. Temporal complementarity intercropping results from
(a) The growth patterns of component crops differing in t
(b) The growth patterns of component crops differing in he
(c) Differences in yield
(d) Differences in cost of cultivatio

183. In dwarf wheat, sowing depth is rel to
(a) Length of radicle
(b) Length of coleoptile
(c) Temperature
(d) Humidity

184. The cohesiveness and tenderness cooked rice depends largely on
(a) The percentage of amylose
(b) The percentage of amylopectin
(c) The proportion of amylose protein
(d) The proportion of amylose amylopectin

185. The concept of Q, relationship developed by
(a) Mitscherlich
(b) Beckett
(c) Schofield
(d) Martin

186. Which one of the following pairs is correctly matched ?

Herbicide group	Common name
(a) Phenoxy acids	2, 4, 5- T
(b) Urea	Isoprotu
(c) Acetamide	Butachl
(d) Carbamates	Dinoseb

Answers

177. (b)	180. (c)	183. (b)	186. (c)
178. (d)	181. (b)	184. (d)	
179. (d)	182. (a)	185. (b)	

187. The possible limitation in the effective usage of *Azolla* are
(a) Less availability of water
(b) Low survival rate during summer
(c) Problem of transportation
(d) All of the above

188. The origin place of potato is
(a) China
(b) South America
(c) Tropical America
(d) Africa

189. Which one of the following pairs is not correctly matched ?

	Crop	Sowing time
(a)	Cotton (Southern India)	August-September
(b)	Sugarcane (Adsali crop)	July - August
(c)	Lentil (Northern India)	July - August
(d)	Soybean (Northern India)	June - July

190. Soybean is originated in
(a) India
(b) China
(c) Tropical America
(d) Japan

191. At field capacity the value of *pF* is
(a) 0.0 (b) 2.5
(c) 4.2 (d) 6.0

192. At permanent wilting point (PWP) the *pF* value is
(a) 0.0 (b) 2.5
(c) 4.2 (d) 6.0

193. The % pore space in a soil having a bulk density of 1.16 mg m^{-3} and particle density of 2.62 mg m^{-3} is
(a) 26.2 (b) 44.2
(c) 55.7 (d) 81.7

194. Among the following, the set of essential nutrient elements, which are absorbed as anions by plants is
(a) Boron, chlorine, copper, iron, manganese
(b) Copper, iron, phosphorus, sulphur, zinc
(c) Potassium, manganese, molybdenum, phosphorus, zinc
(d) Boron, chloride, molybdenum, phosphorus, sulphur

195. A fertilizer which supplies three essential plant nutrients is
(a) DAP (b) MOP
(c) SSP (d) SOP

196. The Fe-chelate suitable for application to crops grown on acid soils is
(a) Fe-EDTA (b) Fe-EDDHA
(c) Fe-DTPA (d) Fe-HEDTA

197. Which one of the following fertilizers contain water soluble P
(a) SSP (b) DCP
(c) MAP (d) both (a) and (c)

198. Stem noduiation occurs in green manure crop of
(a) *Sesbania aculeata*
(b) *Sesbania cannabina*
(c) *Crotolaria juncea*
(d) *Aeschynomene afraspera*

199. Hyrbid rice for commercial production was first evolved in
(a) India (b) China
(c) Japan (d) USA

Answers					
	187. (d)	190. (b)	193. (c)	196. (d)	199. (b)
	188. (b)	191. (b)	194. (d)	197. (d)	
	189. (c)	192. (c)	195. (c)	198. (d)	

200. In tobacco, the basic aim of topping and desuckering is to
(a) Reduce the plant height
(b) Encourage branching
(c) Divert energy and nutrients from flower heads to leaves
(d) Protect the plants against lodging

201. Crop logging is used in
(a) Sugarcane (b) Sugarbeet
(c) Maize (d) Tea

202. The neutron scattering method is not useful in estimating the moisture in
(a) Acidic soils (b) Alluvial soils
(c) Lateritic soils (d) Organic soils

203. Heavy shedding of buds and bolls occurs in cotton due to
(a) Deficiency of nitrogen in the soil
(b) Deficiency of phosphorus in the soil
(c) Deficiency of magnesium in the soil
(d) Water stress at bud formation stage

204. In furrow method of irrigation
(a) Only $1/4^{th}$ of the furrow is wetted
(b) Only $4/5^{th}$ of the furrow is wetted
(c) Only 1/2 of the furrow is wetted
(d) Only $3/4^{th}$ of the furrow is wetted

205. If the rate of application per hectare is 3.00 kg a.i., the quantity of simazine WP (80% a.i.) required to be sprayed in 0.20 hectare area would be
(a) 0.50 kg (b) 0.75 kg
(c) 1.25 kg (d) 1.87 kg

206. Yield advantage in an intercropping system occurs due to the development of
(a) Temporal complementarity
(b) Spatial complementarity
(c) Both (a) and (b)
(d) Competitive relationship

207. At field capacity the water is held at
(a) 0.033 MPa (b) 0.30 MPa
(c) 3.00 MPa (d) 30.00 MPa

208. 'A' value concept was given by
(a) Sorenson (b) Beckett
(c) Schofield (d) Fried and De...

209. Which one of the following has organic form of sulphur ?
(a) Purine (b) Cysteine
(c) RNA (d) Phytin

210. The process of formation of nitrogen and nitrous oxide gases from ammonical fertilizers in soil is known as
(a) Ammonification (b) Nitrification
(c) Denitrification (d) Mineralization

211. *Brassica juncea* has been evolved after hybridization between
(a) *B. nigra and B. campestris*
(b) *B. nigra and B. oleracea*
(c) *B. campestris and B. oleracea*
(d) *B. campestris and B. carinata*

212. Dolomite is
(a) $CaCO_3$ (b) $MgSO_4$
(c) $Ca(OH)_2$ (d) $MgCO_3CaCO_3$

213. Salts in the xylem ducts of the root are carried upward with
(a) Photosynthesis
(b) Transpiration stream
(c) Respiration
(d) Guttation

214. The organic residues with wider C:N ratios as compared to narrow C:N ratios are decomposed at
(a) Faster rate (b) Slow rate
(c) Equal rate
(d) Faster rate followed by slow rate

Answers					
	200. (c)	203. (d)	206. (c)	209. (b)	212. (d)
	201. (a)	204. (d)	207. (a)	210. (c)	213. (b)
	202. (d)	205. (b)	208. (d)	211. (a)	214. (b)

215. Which form of nitrogen is available in urea ?
(a) Ammonical (b) Amide
(c) Nitrite (d) Nitrate

216. At what pH value, phosphate availability is the highest in the soil ?
(a) 5.5 (b) 6.5
(c) 7.5 (d) 8.5

217. Bunchy top in sugarcane is caused by
(a) Root borer (b) Stock borer
(c) Internode borer (d) Top shoot borer

218. Bacterial diseases are controlled by use of ..... chemicals
(a) Antibiotics (b) Viricides
(c) Fungicides (d) Kelthane

219. Application of potash increases
(a) Disease resistance in plants
(b) Resistance for water logging
(c) Frost resistance in plants
(d) None of these

220. The downward movement of surface soil water is known as
(a) Infiltration (b) Percolation
(c) Leaching (d) Wash out

221. The herbicides containing carbon and hydrogen in their molecule are called
(a) Arsenic (b) Acid
(c) Organic herbicide (d) Salt

222. 'Alley cropping' means
(a) Growing of pastures in between two widely spaced rows of fast growing trees
(b) Growing of field crops in between two widely spaced rows of fast growing trees
(c) Growing of only short duration crops in between two widely spaced rows of fast growing trees
(d) Growing of only fodder crops in between two widely spaced rows of fast growing trees

223. 'Relay cropping' means
(a) Growing of more than one crop on the same land in a year.
(b) Growing of three crops on the same land in a year.
(c) Growing of four crops on the same land in a year in such a manner that the following crop is sown before the harvest of preceding crop.
(d) None of these

224. How much seed of legume crop should be treated with one packet of *Rhizobium* culture ?
(a) 5 kg (b) 10 kg
(c) 15 kg (d) 20 kg

225. Which one of the following is not correctly matched ?

Crop	Seed rate
(a) Wheat	100
(b) Urd	20
(c) Maize	18
(d) Mustard	10

226. The huskless variety of barley is
(a) Manjula (b) KK 141
(c) Dolma (d) RS 6

227. Which one of the following is not correctly matched ?

Crop	Variety
(a) Mustard	Basanti
(b) Groundnut	Chandra
(c) Lentil	Malika
(d) Arhar	Neelum

Answers					
	215. (b)	218. (a)	221. (c)	224. (b)	227. (d)
	216. (b)	219. (a)	222. (b)	225. (d)	
	217. (d)	220. (b)	223. (c)	226. (c)	

228. The crown roots in wheat appear
(a) Above soil surface
(b) Below soil surface but above seed
(c) Below soil surface and below seed
(d) Below seed

229. A short duration crop in between two main seasonal crops is termed as
(a) Cash crop
(b) Intercrop
(c) Companion crop
(d) Catch crop

230. 'Awarodhi' variety of gram is resistant to
(a) Wilt (b) Blight
(c) Flooding (d) Drought

231. In which crop, the use of BGA as a biofertilizer, will be most useful ?
(a) Maize (b) Potato
(c) Rice (d) Sugarcane

232. Which vegetable oil is good for heart patient ?
(a) Groundnut oil (b) Mustard oil
(c) Soybean oil (d) Sunflower oil

233. Nitrogen is applied into transplanted rice in the proportion of
(a) 50 % at basal + nil at tillering + 50 % at panicle emergence stage,
(b) Nil at basal + 50 % at tillering + 50 % at panicle emergence stage,
(c) 25 % at basal + 50 % at tillering + 25 % at panicle emergence stage,
(d) 50 % at basal + 25 % at tillering + 25 % at panicle emergence stage

234. The optimum plant population per hectare of sorghum is
(a) 50,000 plants (b) 1,00,000 plants
(c) 1,50,000 plants (d) 2,00,000 plants

235. The crop grown in U.P. during al three seasons is
(a) Urd (b) Sorghum
(c) Moong (d) Maize

236. Irrigations in gram are recommend
(a) Early flowering and maturity s
(b) Late flowering and maturity s
(c) Early flowering and pod form stages
(d) Before flowering and pod form stages

237. UPAS 120 is a variety of
(a) Wheat (b) Pigeonpea
(c) Barley (d) Urd

238. Interculture in groundnut is avoid
(a) Flowering stage
(b) Seedling stage
(c) Pegging stage
(d) None of these

239. The ginning percentage in cotton c worked out by the formula
(a) Weight of lint/weight of cotton × 100.
(b) Weight of lint/weight of seed c × 100.
(c) Weight of cotton seed/weight c × 100.
(d) Weight of seed cotton/weight c × 100

240. Maximum yield of mustard is obt at a plant geometry of :
(a) 45 × 20 cm (b) 60 × 30 cm
(c) 90 × 30 cm (d) 105 × 30 cm

241. Application of gypsum is required for
(a) Paddy (b) Berseem
(c) Lucerne (d) Groundnut

Answers					
	228. (b)	231. (c)	234. (c)	237. (b)	240. (a)
	229. (d)	232. (d)	235. (d)	238. (c)	241. (d)
	230. (a)	233. (d)	236. (d)	239. (b)	

242. The rotation intensity of maize-wheat + gram - moong is
(a) 200% (b) 250%
(c) 300% (d) 400%

243. An example of companion cropping is
(a) Sugarcane + potato
(b) Potato + mustard
(c) Potato + radish
(d) Wheat + mustard

244. Intercropping of mustard with potato is recommended in
(a) Replacement series
(b) Additive series
(c) Replacement cum additive series
(d) None of these

245. Which clay mineral is rich in potash ?
(a) Montmorillonite (b) Kaolinite
(c) Illite (d) Chlorite

246. Decomposition of organic matter in submerged soil is carried out by
(a) Bacteria (b) Actinomycetes
(c) Fungi (d) Earthworm

247. Arrowing is known as
(a) Tillering of sugarcane
(b) Emergence of inflorescence in sugarcane
(c) Arrow like shape of sugarcane
(d) None of these

248. Plant food manufactured by the process of photosynthesis in the presence of a nutrient in chlorophyll is
(a) Ca (b) Mg
(c) Iron (d) Boron

249. The carbohydrates produced in leaves can not be translocated to different growing parts of plant in the absence of
(a) Manganese (b) Boron
(c) Zinc (d) Iron

250. 'Aruna' is a mutant variety of
(a) Pea (b) Cotton
(c) Castor (d) Soybean

251. Which soil has the highest cation exchange capacity ?
(a) Loam (b) Loamy sand
(c) Sandy loam (d) Clay loam

252. Which one of the following is not correctly matched ?

	Crop variety	Origin
(a)	Aruna	Interspecific cross
(b)	Jagannath	Mutation
(c)	Jaya	Intervarietal cross
(d)	Pusa Jaikishan	Soma clonal variation

253. During germination radical and plumule develop from
(a) Embryo (b) Endosperm
(c) Hilum (d) Seed coat

254. Antisenescent polyhormone is represented by
(a) Auxins (b) Cytokinins
(c) Gibberellin (d) Ethylene

255. Which of the following plants does not show photorespiration ?
(a) Pea (b) Wheat
(c) Rice (d) Maize

256. In which of the following, composite and synthetic cultivars are used ?
(a) Rice (b) Wheat
(c) Maize (d) Cotton

257. The recently developed terminator technology has been used in
(a) Rice (b) Cotton
(c) Tobacco (d) Wheat

Answers						
	242. (c)	245. (c)	248. (b)	251. (d)	254. (c)	257. (b)
	243. (a)	246. (a)	249. (b)	252. (a)	255. (d)	
	244. (a)	247. (b)	250. (c)	253. (a)	256. (c)	

258. Which one of the following is not correctly matched ?

	Crop	Variety
(a)	Cotton	Digvijaya
(b)	Soybean	Bragg
(c)	Groundnut	AK 12-24
(d)	Sunflower	Prabhat

259. Which cation has higher aggregation capacity in soil ?
(a) Al^{3+} (b) Ca^{2+}
(c) Mg^{2+} (d) K^{+}

260. Which cation has low adsorption capacity on clay ?
(a) H (b) Ca
(c) Fe (d) Na

261. Black cotton soil is rich in
(a) Montmorillonite (b) Kaolinite
(c) Illite (d) Chlorite

262. Which form of nitrogen is absorbed by paddy under waterlogged conditions ?
(a) N_2 (b) NH_4 ion
(c) NO_3 ion (d) Nitrate ion

263. Phosphate containing mineral is
(a) Dolomite (b) Apatite
(c) Marble (d) Pyrites

264. PDM 11 is a variety of
(a) Urd (b) Arhar
(c) Moong (d) Lobia

265. Rainfall intensity is generally higher on
(a) Northern hemisphere
(b) Southern hemisphere
(c) Near the equator
(d) None of these

266. Soils of which soil order have no diagnostic horizon ?
(a) Mollisols (b) Entisols
(c) Andisols (d) Aridisols

267. Excess uptake of which element is known as luxury consumption ?
(a) N (b) P
(c) K (d) Zn

268. The soil carried in saltation consists of ..... particle size.
(a) 0.1 to 0.5 mm (b) 0.1 to 0.2 mm
(c) 0.5 to 1.0 mm (d) None of these

269. Which one of the following cause pungency of mustard oil ?
(a) Phenols (b) Amino acids
(c) Glucosinolates (d) Erucic acid

270. Texture of the soil can be changed by
(a) Use of fertilizer
(b) Use of manures
(c) Use of tillage practices
(d) None of these

271. The slow growing species of legume root nodule bacteria are included in bacterial genus
(a) *Rhizobium* (b) Brady *rhizobium*
(c) Sino-rhizobium (d) Azo-*rhizobium*

272. Substances responsible for bread making quality of wheat is
(a) Gluten (b) Globulin
(c) Glycine (d) Lycine

273. Which one of the following increases phosphate solubility ?
(a) *Clostridium* (b) *Pseudomonas*
(c) *Azotobacter* (d) *Nitrosomonas*

274. Seed work board is required for
(a) Viability test of seed
(b) Germination test of seed
(c) Purity test of seed
(d) Blending of seed

Answers						
	258. (d)	261. (a)	264. (c)	267. (c)	270. (d)	273. (b)
	259. (a)	262. (b)	265. (c)	268. (a)	271. (b)	274. (d)
	260. (d)	263. (b)	266. (b)	269. (c)	272. (a)	

275. The formula LER-1/LER × value of combined intercrop represents
(a) MAI (b) LER
(c) LAI (d) IER

276. LEISA is related to
(a) Organic farming
(b) Inorganic farming
(c) Natural farming
(d) All of these

277. Under drought the sorghum plants synthesize Dhurin in
(a) Roots
(b) Shoots
(c) Leaves
(d) All the plant parts

278. Which one of the following varieties of barley is nematode resistant ?
(a) Jyoti
(b) Ratna
(c) Karan-19
(d) Raj Kiran (RD-387)

279. All the grain legumes have a high photo respiration because of
(a) C_3 mechanism
(b) More vegetative growth
(c) Indeterminate
(d) Pod position

280. Pollen viability of wheat is related to supply of
(a) Zinc (b) Molybdenum
(c) Boron (d) Magnesium

281. Which one of the following is a green house gas ?
(a) Oxygen (b) Ammonia
(c) Methane (d) Chlorine

282. Khaira disease in rice is caused due to
(a) Fungal infection
(b) Zinc deficiency
(c) Excessive application of potassium
(d) Bacterial infection

283. Soil structure is improved by application of
(a) Urea
(b) Super phosphate
(c) Muriate of potash
(d) Zinc sulphate

284. Hydraulic conductivity of soils varies directly with
(a) Capillary porosity
(b) Non-capillary porosity
(c) Total porosity
(d) Water holding capacity

285. The principal way in which P and K ions move from the soil to the root of field crops is :
(a) Root interception
(b) Mass flow
(c) Diffusion
(d) None

286. Immobilization of sulphur take place when the 'S' content of organic matter is less than
(a) 0.45 % (b) 0.60 %
(c) 0.30 % (d) 0.15 %

287. Organic carbon is a measure of
(a) Available N in soil
(b) Available P in soil
(c) Available K in soil
(d) Available Mg in soil

288. 'Tarai' soils are deficient in
(a) N (b) P
(c) S (d) Zn

Answers					
	275. (a)	278. (d)	281. (c)	284. (c)	287. (a)
	276. (a)	279. (a)	282. (b)	285. (c)	288. (d)
	277. (a)	280. (c)	283. (b)	286. (d)	

289. Soil structure concerns with
(a) Particle size distribution
(b) Arrangement of soil particles
(c) Aggregation of soil particles
(d) WHC

290. Per cent content of sulphur in single super phosphate is
(a) 8 (b) 12
(c) 16 (d) 20

291. Hydraulic conductivity of soil is very low in case of
(a) Acid soils (b) Saline soils
(c) Loam soils (d) Alkali soils

292. In a good quality manure C/N ratio should not be more than
(a) 10 (b) 20
(c) 30 (d) 40

293. Approximate weight of surface 15 cm soil of one hectare field is
(a) 1×10^6 kg (b) 1.5×10^6 kg
(c) 2×10^6 kg (d) 2.24×10^6 kg

294. Concentration of which element is highest in soil ?
(a) O_2 (b) Fe
(c) Al (d) Si

295. If the gravimetric moisture content of soil is 15% and the bulk density is 1.4 g/cc, the volumetric moisture content is
(a) 18.0% (b) 21.0%
(c) 24.0% (d) 27.0%

296. Which is not a correct match in the following ?
(a) Flocculation : Setting of the soil particles
(b) Dispersion : Repellence of the soil particles
(c) Cohesion : Attraction of the soil particles
(d) Structure : Relative distribution o soil particles

297. Tilth is related to
(a) Shape of the soil aggregates
(b) Size distribution of the soil aggre
(c) Arrangement of the soil aggreg
(d) All of these

298. Soybean seeds contain
(a) 20% oil and 20% protein
(b) 40% oil and 40% protein
(c) 40% oil and 20% protein
(d) 20% oil and 40% protein

299. Which one of the following is correctly matched ?

Acid forming fertilizers	Acid equival
(a) Ammonium chloride	128
(b) Urea	60
(c) ASN	93
(d) Ammonium sulphate	110

300. Sunflower oil is rated as good qualit because it contains
(a) Low quantities of saturated acids
(b) Low quantities of unsaturated acid
(c) High quantities of saturated fatty
(d) High quantities of unsaturated acid

301. Which crop of the following has double symbiotic relationship nitrogen fixing bacteria ?
(a) *Phaseolus vulgaris*
(b) *Cajanus cajan*
(c) *Sesbania rostrata*
(d) *Glycine max*

Answers					
	289. (b)	292. (a)	295. (b)	298. (d)	301. (c)
	290. (b)	293. (d)	296. (d)	299. (b)	
	291. (d)	294. (a)	297. (d)	300. (d)	

302. Which one of the following crops has the highest consumption of pesticide ?
(a) Paddy (b) Cotton
(c) Oilseeds (d) Vegetables

303. Canola is a group of plants belongs to
(a) Mustard (b) Safflower
(c) Niger (d) Sunflower

304. Which one of the following is TPS variety of potato ?
(a) JH 222 (b) HPS 1/113
(c) PJ 376 (d) Jr 5857

305. For calculating value of P, P_2O_5 is multiplied by
(a) 3.258 (b) 2.146
(c) 0.437 (d) 2.29

306. Which one of the following crops causes maximum reduction in soil alkalinity ?
(a) Paddy (b) Maize
(c) Cowpea (d) Wheat

307. Permanent soil property is
(a) Fertility status (b) pH
(c) Texture (d) Structure

308. The ratio between gross and net cropped area is called an index of
(a) Cropping intensity
(b) Multiple cropping
(c) High intensity cropping
(d) None of these

309. Blind tillage refers to
(a) Summer ploughing
(b) Hoeing in standing crop rows
(c) Primary tillage
(d) Hoeing before germination

310. Zero tillage system was first used successfully in 1950 in pasture renovation in
(a) Germany
(b) Japan
(c) United Kingdom
(d) USA

311. The total volume of water ..... on melting of ice
(a) Increases
(b) Remains constant
(c) Decreases
(d) None of these

312. The normal form of plant is maintained by
(a) Water (b) Gases
(c) Solids (d) None

313. An annual weed commonly found in rice field is
(a) *Anagalliis arvensis*
(b) *Echinochloa crusgalli*
(c) *Amaranthus spinosus*
(d) *Phalaris minor*

314. Process of loosening for separating fibres from plant is known as
(a) Curing (b) Retting
(c) Wetting (d) Netting

315. Flow of water in saturated soil is described by
(a) Poiseuille's law
(b) Darcy's law
(c) Fick's law
(d) Both (a) and (b)

316. True density of most mineral soils is usually
(a) 1.35 g/cm³ (b) 1.65 g/cm³
(c) 2.65 g/cm³ (d) 3.5 g/cm³

317. Nitrogen fixation in soil by Rhizobium is increased by
(a) P (b) Ca
(c) Mg (d) K

Answers						
	302. (b)	305. (c)	308. (a)	311. (c)	314. (b)	317. (a)
	303. (a)	306. (a)	309. (d)	312. (a)	315. (d)	
	304. (b)	307. (c)	310. (d)	313. (b)	316. (c)	

318. The use of tensiometer is confined up to metric potential of
(a) - 0.8 bar (b) - 0.6 bar
(c) - 0.4 bar (d) - 0.2 bar

319. Each unit change in pH represents a change in activity of H^+ or OH^- ions by
(a) One fold (b) Ten fold
(c) Hundred fold (d) Thousand fold

320. Relative weeds are
(a) Plants of same crops but other variety in the field
(b) Plants of other crop in the crop field
(c) Seasonal weeds in the crop field
(d) All of these

321. Seed rate of transplanted basmati rice is
(a) 25-30 kg/ha (b) 35-40 kg/ha
(c) 45-60 kg/ha (d) 55-70 kg/ha

322. 'Chipsona' is a variety of
(a) Tapioca (b) Sweet potato
(c) Elephant foot (d) Potato

323. Which country is the place of origin of sunflower ?
(a) Southern United State and Mexico
(b) Spain
(c) Soviet Union
(d) Argentina

324. How many agroclimatic zones are categorized in India ?
(a) 20 (b) 18
(c) 14 (d) 15

325. Mat type nursery is related to
(a) Tobacco crop (b) Paddy crop
(c) Onion crop (d) Brinjal

326. Zero-till seed drill is used for sowing of
(a) Wheat in maize-wheat cropping system
(b) Wheat in mung-wheat cropping system
(c) Wheat in rice-wheat cropping system
(d) None of these

327. In maize plants
(a) Silk appears first
(b) Tassels appear first
(c) Both the appear at the same time
(d) None of these

328. The panicle initiation stage in rice plants comes
(a) Immediate after transplanting
(b) After maximum tillering stage
(c) After boot leaf stage
(d) At any time after transplanting

329. The first GM potato developed at CPRI for increasing protein content in tuber consists of genes from
(a) Chickpea (b) Pigeonpea
(c) Field pea
(d) Grain amaranthus

330. The current per capita forest area in India is
(a) 0.11 ha (b) 0.09 ha
(c) 0.07 ha (d) 0.05 ha

331. Cultivation of durum wheat is primarily confined to
(a) Central India
(b) Southern India
(c) Central and Southern India
(d) UP hills

332. Which one of the following is not correctly matched ?

Crop	Test weight in gram
(a) Pearlmillet	5-7
(b) Wheat	20-22
(c) Mungbean	34-36
(d) Sunflower	60-62

Answers					
	318. (a)	321. (b)	324. (d)	327. (b)	330. (c)
	319. (b)	322. (d)	325. (b)	328. (b)	331. (c)
	320. (a)	323. (a)	326. (c)	329. (d)	332. (b)

333. The most concentrated fertilizer used for nutrient supply is
(a) Urea
(b) DAP
(c) Anhydrous ammonia
(d) SSP

334. Which one is the recommended optimum plant population for maize ?
(a) 50,000 plants (b) 66,000 plants
(c) 80,000 plants (d) 90,000 plants

335. Which one of the following is non selective herbicide ?
(a) Alachlor (b) Butachlor
(c) Paraquat (d) Atrazine

336. Which one of the following is not narrow leaved weeds ?
(a) *Cynodon dactylon*
(b) *Cyperus rotundus*
(c) *Setaria glauca*
(d) *Melilotus indica*

337. Which one of the following is not *kharif* season weed ?
(a) *Chenopodium album*
(b) *Amaranthus viridis*
(c) *Echinochloa colonum*
(d) *Commelina bengalensis*

338. Which gas is released from paddy fields ?
(a) CH_4 (b) H_2S
(c) CO_2 (d) NH_3

339. CO_2 content in soil air is
(a) 0.03% (b) 0.003%
(c) 0.25% (d) 0.50%

340. Rancidity in sunflower oil is caused by
(a) Reduction (b) Oxidation
(c) Esterification (d) Nitrification

341. Opaque-2 maize composites are richer as compared to normal maize in
(a) Tryptophan
(b) Lysine
(c) Tryptophan & Lysine
(d) Protein

342. Flint corn is commonly grown in India is also known as
(a) *Zea mays* indentata
(b) *Zea mays* indurata
(c) *Zea mays* everta
(d) *Zea mays* saccharata

343. The most suitable temperature for maize growth is
(a) 21°C (b) 26°C
(c) 29°C (d) 32°C

344. First hybrid maize Ganga-1 was developed in India in
(a) 1957 (b) 1961
(c) 1964 (d) 1965

345. Most common herbicide used in maize is
(a) Atrazine (b) Alachlor
(c) Simazine (d) Metribuzin

346. Which cereal is non tillering in nature ?
(a) Maize (b) Wheat
(c) Barley (d) Paddy

347. Which one of the following is a hybrid variety of maize ?
(a) Vikram (b) Amber
(c) Kissan (d) Sangam

348. Who introduced the technique of production of double cross hybrid maize ?
(a) EM East (b) DF Jones
(c) GH Shull (d) Mendel

Answers						
	333. (c)	336. (d)	339. (c)	342. (b)	345. (c)	348. (b)
	334. (b)	337. (a)	340. (b)	343. (d)	346. (a)	
	335. (c)	338. (a)	341. (b)	344. (b)	347. (d)	

349. Jowar is primarily a native of
(a) India (b) Africa
(c) Europe (d) Central Asia

350. Test weight of sorghum is
(a) 20-25 gram (b) 25-30 gram
(c) 30-35 gram (d) 70-72 gram

351. Soil sickness is caused by
(a) Maize (b) Jowar
(c) Linseed (d) Both (b) and (c)

352. Required plant population of jowar may be obtained by using a seed rate of (kg/ha)
(a) 9-10 (b) 12-15
(c) 15-18 (d) 18-20

353. CSH-1 was first sorghum hybrid released in
(a) 1961 (b) 1962
(c) 1963 (d) 1964

354. Fertilization application in maize should be completed before
(a) Tasseling (b) Silking
(c) Ripening (d) Knee high stage

355. The fat content in bajra is around
(a) 2% (b) 3%
(c) 4% (d) 5%

356. HB-1 hybrid of bajra released in 1965 evolved from a cross
(a) Tift-23-A × BIL-3B
(b) Tift-23-A × J-88
(c) Tift-23-A × J-104
(d) None of these

357. Seed rate for transplanting of bajra is
(a) 1 kg (b) 2 kg
(c) 3 kg (d) 4 kg

358. Required plant population of gram may be obtained by using a seed rate of ha)
(a) 50-75 (b) 75-100
(c) 90-110 (d) 100-125

359. The optimum seed rate for normal s crop of lentil is (kg/ha)
(a) 20-25 (b) 25-30
(c) 30-40 (d) 40-45

360. Arkel, Early Badger, Bonneville and I December are the improved varieti
(a) Lentil (b) Pea
(c) Gram (d) Safflower

361. Which one of the following varieti pigeonpea is an extra early maturi
(a) Pusa Ageti (b) UPAS-120
(c) Mukta (d) Prabhat

362. The optimum seed rate for pigeon crop is
(a) 10-12 kg/ha (b) 12-15 kg/h
(c) 15-17 kg/ha (d) 20-25 kg/h

363. When mungbeans are allowed to sp which vitamin is synthesized ?
(a) Vit. A (b) Vit. B
(c) Vit. C (d) Vit. D

364. Which variety of mungbean is suit for cultivation both during rainy summer seasons ?
(a) Type-1
(b) Type-44 (Pusa Baisakhi)
(c) K-851
(d) Varsha

365. Blackgram is originated in
(a) India
(b) Tropical Americ
(c) China
(d) Indonesia

Answers						
	349. (b)	352. (b)	355. (d)	358. (b)	361. (d	364
	350. (b)	353. (d)	356. (a)	359. (c)	362. (b)	365
	351. (d)	354. (a)	357. (b)	360. (b)	363. (c)	

366. Which one of the following pulse crops is used as a pulse, a fodder and a green manure crop ?
(a) Moong (b) Urd
(c) Cowpea (d) Pea

367. Pusa Phalguni, Pusa Barsati, Pusa Rituraj and Pusa Dofasli are the improved varieties of
(a) Moong (b) Urd
(c) Pea (d) Cowpea

368. Soybean is introduced in India from USA in
(a) 1901 (b) 1947
(c) 1960 (d) 1969

369. Optimum seed rate of soybean is (kg/ha)
(a) 50 - 60 (b) 70 - 80
(c) 80 - 90 (d) 100 - 110

370. The trailing or spreading type of groundnut include
(a) *Arachis hypogea* subsp. *fastigiata*
(b) *Arachis hypogea* subsp. *procumbens*
(c) Both (a) and (b)
(d) None of these

371. The chromosome number of *Sesamum indicum* (Sesamum) is
(a) 14 (b) 18
(c) 22 (d) 26

372. Castor (*Ricinus communis*) is originated in
(a) India (b) Tropical Africa
(c) Tropical America
(d) Tropical Asia

373. The optimum seed rate (kg/ha) for getting desired population of castor is
(a) 12 - 15 (b) 18 - 20
(c) 20 - 25 (d) 25 - 30

374. The per cent protein in linseed is
(a) 26 (b) 36
(c) 40 (d) 44

375. Linseed belongs to family
(a) Liliaceae (b) Linaceae
(c) Tiliaceae (d) Pedaliaceae

376. Seed ball is a fruit of
(a) Safflower (b) Sunflower
(c) Linseed (d) Sugarbeet

377. *Carthamus tinctorius* is a botanical name of
(a) Linseed (b) Safflower
(c) Sunflower (d) Rai

378. The optimum seed rate for sunflower is (kg/ha)
(a) 8 - 10 (b) 10 - 15
(c) 18 - 20 (d) 30 - 35

379. The oil content in the cotton seed ranges from
(a) 10 - 15% (b) 15 - 25%
(c) 25 - 35% (d) 40 - 42%

380. Sea island cotton belong to
(a) *Gossypium arboreum*
(b) *Gossypium herbaceum*
(c) *Gossypium hirsutum*
(d) *Gossypium barbadense*

381. Varalaxmi is a interspecific variety of cotton evolved at
(a) Udaipur (b) Nagpur
(c) Dharwad (d) Surat

382. Origin of *Corchorus capsularis* (White jute) is believed to be in the
(a) Africa
(b) Indo - Burma region
(c) China
(d) USA

Answers						
	366. (c)	369. (b)	372. (b)	375. (b)	378. (a)	381. (c)
	367. (d)	370. (b)	373. (b)	376. (c)	379. (b)	382. (b)
	368. (c)	371. (d)	374. (b)	377. (b)	380. (d)	

383. Weight of one cotton bale is equal to
(a) 160 kg (b) 170 kg
(c) 180 kg (d) 178 kg

384. The optimum period of sowing for *Capsularis* types (white jute) is
(a) March - April (b) April - May
(c) July - August
(d) November - December

385. The ideal stage of harvest of jute for fibre purpose is
(a) One month old
(b) Flowering
(c) Small pod stage
(d) Mature pod stage

386. Retting temperature for jute is
(a) 14 °C (b) 26 °C
(c) 28 °C (d) 34 °C

387. The optimum temperature for retting of sannhemp is
(a) 14 - 21 °C (b) 21 - 27 °C
(c) 30 - 34 °C (d) 35 - 38 °C

388. Berseem was introduced into India from ..... in 1904
(a) South Africa (b) Armenia
(c) Egypt (d) England

389. Berseem seeds are treated with
(a) *R. meliloti* (b) *R. trifoli*
(c) *R. lupini* (d) *R. japonicum*

390. The optimum seed rate for berseem should be (kg/ha)
(a) 15 - 20 (b) 20 - 25
(c) 25 - 30 (d) 30 - 40

391. Lucerne (*Medicago sativa*) is a native of
(a) Persia (b) India
(c) Iraq (d) Afghanistan

392. Rambler, NDRI Selection No. 1 and Moopa are the varieties of
(a) Oat (b) Berseem
(c) Lucerne (d) Guar

393. Pusa Sadabhar, Pua Mausmi and Pu Naubahar are the improved varieties of
(a) Oat (b) Berseem
(c) Lucerne (d) Guar

394. Napier grass (*Pennisetum purpureum*) w introduced to India in 1912 from
(a) Zimbabwe (b) South Africa
(c) Egypt (d) Tanzania

395. About ..... root slips or stem cutting are required for planting one hectare of land in Napier grass
(a) 18,800 (b) 27,800
(c) 33,800 (d) 42,800

396. Sugarbeet (*Beta vulgaris*) originated in Mediterranean region belongs to
(a) Gramineae
(b) Convolvulaceae
(c) Chenopodiaceae
(d) Liliaceae

397. Sugarbeet matures in
(a) April/May
(b) June/July
(c) September/October
(d) January/February

398. For ideal plant population, the seed rate of sugarbeet should be (kg/ha)
(a) 4 - 8 (b) 8 - 10
(c) 10 - 15 (d) 25 - 30

399. The ideal temperature for tuberization in potato is
(a) 14 °C (b) 18 °C
(c) 21 °C (d) 34 °C

Answers						
	383. (b)	386. (d)	389. (b)	392. (c)	395. (b)	398. (b)
	384. (a)	387. (b)	390. (c)	393. (d)	396. (c)	399. (b)
	385. (c)	388. (c)	391. (a)	394. (b)	397. (a)	

400. The main crop of potato is planted from
(a) 25th September to 10th October
(b) 15th October to 25th October
(c) 25th October to 25th November
(d) March-April

401. Optimum seed rate of tobacco is (kg/ha)
(a) 0.5 (b) 2 - 3
(c) 3 - 4 (d) 5 - 6

402. Topping consists in removal of the terminal bud with or without some of the small leaves practiced in
(a) Gram (b) Castor
(c) Cotton (d) Tobacco

403. In tobacco, the correct chronological order of practices is
(a) Topping - desuckering - priming
(b) Desuckering - topping - priming
(c) Priming - desuckering - topping
(d) Priming - topping - desuckering

404. Kent, Coachman and Fleming Gold are the varieties belongs to
(a) Lucerne (b) Oat
(c) Tobacco (d) Berseem

405. India has about ..... per cent of its total cultivated area under fodder crops
(a) 4.5 (b) 7.5
(c) 10.0 (d) 15.0

406. In India, first Dry Farming Research Station, Manjri was started in
(a) 1923 (b) 1933
(c) 1934 (d) 1935

407. Under stress condition, which amino acid accumulated in crop plants
(a) Methionine
(b) Tryptophan
(c) Proline
(d) Phenyl alanine

408. Jadia and Jwala varieties of moth bean were developed at
(a) Jobner (b) Jodhpur
(c) Jalore (d) Jabalpur

409. Headquarter of Rainfed Authority of India is located at
(a) New Delhi (b) Bikaner
(c) Hyderabad (d) Indore

410. In North India under Rice-Wheat cropping system which micro-nutrient is most deficient ?
(a) Fe (b) Zn
(c) Cu (d) Boron

411. UG - 99 is a stem rust causing fungi in wheat was reported first time from :
(a) Uganda (b) Pakistan
(c) America (d) Ukraine

412. In world, which scientist had developed first cotton hybrid H-4 at Surat (India) :
(a) C. T. Patel (b) B. P. Pal
(c) K. C. Mehta (d) R. S. Paroda

413. Which one of the following solid particles will form a soil suspension exhibting high colloidal properties ?
(a) Kaolinite (b) Vermiculite
(c) Illite (d) Hematite

414. Which nitrogen transformation process is responsible for causing a decrease in nitrate-N under anaerobic condition ?
(a) Mineralization (b) Nitrification
(c) Denitrification (d) Immobilization

415. Which of the following micronutrients is especially tightly held by organic matter that its availability to crop plants can be very low in organic soils ?
(a) Zinc (b) Iron
(c) Copper (d) Manganese

Answers

400. (b)	403. (a)	406. (a)	409. (a)	412. (a)	415. (c)
401. (b)	404. (b)	407. (c)	410. (b)	413. (b)	
402. (d)	405. (a)	408. (a)	411. (a)	414. (c)	

416. Which one of the following groups of nutrients is absorbed by plants only in anionic form ?
(a) Nitrogen, Manganese and Phosphorus
(b) Phosphorus, Sulphur and Boron
(c) Copper, Zinc and Iron
(d) Molybdenum, Potassium and Mangenese

417. Among the following four common constituents of organic manures, the slowest rate of decomposition is seen with which of the following ?
(a) Cellulose (b) Sugar
(c) Lignin (d) Hemicellulose

418. When ammonia reacts with water, what is the result ?
(a) Increased nitrate content and decreased pH
(b) Decreased nitrate content and increased pH
(c) Increased ammonium content and decreased pH
(d) Increased ammonium content and increased pH

419. For application of phosphorus at the rate of 50 kg P_2O_5 ha^{-1} to cotton crop, the quantity in kg of single super phosphate (P_2O_5 = 16%) required for 1½ acres is
(a) 80 (b) 108
(c) 188 (d) 216

420. Which of the clay minerals are found most in agriculture soils ?
(a) Cyclosilicates (b) Phyllosilicates
(c) Sorosilicates (d) Nesosilicates

421. Among the following, which plants-nutrient elements reaches roots by the process of diffusion ?
(a) Phosphorus (b) Calcium
(c) Nitrogen (d) Potassium

422. For which nutrient element, depend strongly on chelation to in availability and transport from plant root surfaces ?
(a) Ca (b) Mn
(c) Fe (d) B

423. Consider the following elements
1. Ca 2. Zn
3. P 4. Mg
The acidic soils are deficient in wh the above nutrient elements ?
(a) 1, 2 and 3 only
(b) 2, 3 and 4 only
(c) 1, 3 and 4 only
(d) 1, 2 and 4 only

424. The roots of which crop plant r allelopathic chemicals into the so inhibit the germination of succe crop ?
(a) Sorghum (b) Sunflowe
(c) Maize (d) Red gra

425. Which one of the following do reflect India's position in the w agriculture in recent years ?
(a) First in milk production
(b) Second in sugarcane product
(c) Third in use of tractors
(d) Fourth in area under irrigati

426. To which family does the developed plant variety canola be
(a) Papilionaceae
(b) Caesalpinaceae
(c) Compositae
(d) Cruciferae

Answers

416. (b)	419. (c)	422. (c)	425. (d)	
417. (c)	420. (b)	423. (c)	426. (d)	
418. (d)	421. (a)	424. (b)		

427. Mixed cropping is the growing of
(a) Two or more crops simultaneously intermingled without any row pattern
(b) A crop intermingled with Sericulture
(c) A crop along with apiculture
(d) Two or more crops simultaneously intermingled with a definite row pattern

428. Due to a wide C : N ratio, application of bulky organic manures like paddy straw will lead to
(a) Greater supply of available N due to quick deposition
(b) Gaseous loss of N by increased microbial activity in the soil
(c) Immobilisation of soil N
(d) More loss of N by leaching as it is not organically bound

429. The black colour of vertisols is due to the presence of ..... in these soils of.
(a) Fe and Mg
(b) Cu and organic matter
(c) Mn, titanium and organic matter complex
(d) Organic matter and calcium

430. Which one of the following nutrients promotes root growth, keeps the soil reaction neutral and improves the soil structure ?
(a) Sulphur (b) Potassium
(c) Calcium (d) Magnesium

431. Fresh organic residue as addition to a standing crop leads to
(a) Denitrification loss of soil nitrogen
(b) Volatilization loss of nitrogen
(c) Decomposition of ammonia in soil
(d) Immobilization of available nitrogen in soil

432. Consider the following statements :
Green manuring with dhaincha (*Sesbania aculeata*) improves soil fertility by
1. lowering the pH of soil
2. atmospheric nitrogen fixation through root nodules
3. Contributing large quantity of biomass to the soil
Which of the statements given above is/ are correct ?
(a) 1 and 2 only (b) 2 and 3 only
(c) 3 only (d) 1, 2 and 3

433. High organic matter content in the soil reduces the availability of which one of the following to the plants ?
(a) Copper (b) Iron
(c) Boron (d) Molybdenum

434. Which one of the following crops is used in crop rotation for the management of plant parasitic nematodes ?
(a) Castor (b) Wheat
(c) Marigold (d) Sweet pea

435. The study of the relationship of agriculture crops and environment is called
(a) Agro - ecology
(b) Agro - climatology
(c) Agro - meteorology
(d) Auto - ecology

436. Normally C : N : S ratio of soil is :
(a) 100 : 20 : 1 (b) 100 : 10 : 1
(c) 200 : 10 : 1 (d) 100 : 10 : 2

437. Sorghum crop is considered as camel crop because of :
(a) Deep root system
(b) Resistant to drought
(c) Shallow root system
(d) Nutrient exhaustiveness

Answers				
	427. (a)	430. (c)	433. (a)	436. (b)
	428. (c)	431. (d)	434. (c)	437. (b)
	429. (c)	432. (d)	435. (a)	

438. Average rainfall of the country is
(a) 590 mm (b) 1190 mm
(c) 1290 mm (d) 1490 mm

439. Which of these herbicides is used to control weeds in zero tillage ?
(a) Pendimethalin (b) Fluchloralin
(c) Paraquat (d) Alachlor

440. Repetitive growing of same sole crop on the same field is known as
(a) Mono Cropping
(b) Sequential Cropping
(c) Relay Cropping
(d) Multiple Cropping

441. The biuret percent limit of urea for foliar application is
(a) 0·25 (b) 0·75
(c) 1·25 (d) 1·75

442. What is optimum plant population for Bt (*Bacillus thuringensis*) cotton ?
(a) 10,000 (b) 27,000
(c) 37,000 (d) 42,000

443. Dropsy disease in human beings is caused by which weed ?
(a) *Pluchea lanceolata*
(b) *Argemone mexicana*
(c) *Digera arvensis*
(d) *Convolvulus arvensis*

444. Finger leaf disease in cotton is caused due to residual effect of which chemical ?
(a) Chlorophyriphos
(b) Mancozeb
(c) 2, 4 - D
(d) N. A. A.

445. Long term persistent herbicide is
(a) Pendimethalin (b) 2, 4 - D
(c) Paraquat (d) Glyphosate

446. Pop pod in groundnut is mainly due to deficiency of which essential plant nutrient ?
(a) Nitrogen (b) Sulphur
(c) Zinc (d) Calcium

447. The 'Leaf colour chart' (LCC) is used for judging the amount of nitrogen application to the standing crop of which one of the following ?
(a) Wheat (b) Rice
(c) Maize (d) Sorghum

448. Which one among the following is the predominant species of cotton grown in India ?
(a) *Gossypium herbaceum*
(b) *Gossypium hirsutum*
(c) *Gossypium arboreum*
(d) *Gossypium barbadense*

449. Which one of the following substances is used as sugarcane ripener ?
(a) Cycocel (b) Ethylene
(c) Ethepon (d) NAA

450. Which one of the following micronutrients is a constituent of the enzyme carbonic anhydrase ?
(a) Zinc (b) Copper
(c) Iron (d) Chlorite

451. The micronutrient which is constituent of vitamin B_{12} is
(a) Copper (b) Cobalt
(c) Zinc (d) Boron

○○○○○

Answers					
	438. (b)	441. (a)	444. (c)	447. (b)	450. (a)
	439. (c)	442. (a)	445. (d)	448. (b)	451. (b)
	440. (a)	443. (b)	446. (d)	449. (c)	

2 Soil Science

Important Notes

Nitrogen

- Legumes have higher Nitrate Reductase (NR) activity in roots, while in the cereals, NR activity is more in leaves.
- Total Nitrogen in Indian soils (0–15 cm layer) vary from 0.02 to 0.1%.
- NH_4^+ get fixed in the crystal lattice of clay minerals like micas, vermicullites and other minerals (Due to almost same ionic radius of NH_4^+ and K^+ ions).
- Annually, total biological N_2-fixation by different organisms in the world is estimated at 175 Tg (1 Tg = 10^6 Mg).
- In India, urea contributes 81% of fertilizer nitrogen used in the country.
- Widely used nitrification inhibitors (NI) are N serve (2-chloro-6-trichloromethyl pyridine), AM (2 amino-4-chloro-6-methyl pyridine), DCD (dicyandiamine), etc..
- **N Ratings**

  Low : < 280 kg N ha^{-1}
  Medium : 280 – 560 kg N ha^{-1}
  High : > 560 kg N ha^{-1}

Phosphorus

- Major reserve and producer of rock phosphate in world is China followed by Morocco.
- Major phosphorus containing minerals are Variscite ($AlPO_4$, $2H_2O$), Strengite ($FePO_4.2H_2O$), Brusite ($CaHPO_4.2H_2O$) and Fluor apatite ($Ca_{10}(PO_4)_6.F_2$).
- Olsen's extracting solution is 0.5 M $NaHCO_3$ and most widely used test for available P in India (suited for neutral, calcareous and alkaline soils).
- PSB (*Bacillus meghatherium*) was first used in Russia.
- P Ratings

  Low : < 10 kg P ha^{-1}
  Medium : 10 – 25 kg P ha^{-1}
  High : > 25 kg P ha^{-1}

Potassium

- Potash deposits applied directly as a fertilizer.
- World's largest high grade potash deposit lies in Saskatchewan (Canada).
- Potassium plays an important role in the opening of stomata, maintaining adequate turgor, transportation of photosynthates in phloem and imports disease resistance.
- Under K deficiency, leaves initially become chlorotic, especially close to dark nerotic lesions (dead or dying spots) or tips and margins of leaves die first.
- Activity ratio of K (AR^K) =

$$\frac{\text{Activity of K}}{\sqrt{\text{Activity of Ca+Mg}}}$$

- Maximum K fixation take place in weathered micas, vermiculites and illites (under both moist and dry conditions) whereas smectites fix K only on drying of the soil.
- 1 NH_4OAC (Ammonium Acetate) extractable K is the most widely used soil test for available K.
- **K ratings :**

  Low : < 108 Kg K ha^{-1}
  Medium : 108 – 280 Kg K ha^{-1}
  High : > 280 Kg K ha^{-1}
- World's largest producer and exporter of potassic fertilizers is Canada.
- Potassic fertilizer was first produced in Germany in 1857.

Sulphur

- SO_4^{-2} assimilation $\xrightarrow{\text{ATP Sulphurylase}}$ Adenosine phosphosulphate (APS)
- Sulphur containing amino acids are cysteine/cystine and methionine.
- Cysteine + Cysteine → Cystine + 2H
- Diallyl disulphide ($CH_2 = CH - CH_2 - S - S - CH_2 - CH = CH_2$) responsible for pungency and lachrometry effect in onions.
- Indirectly sulphur is a precursor of the plant hormone ethylene.
- Sulphur containing minerals in soil are pyrites (FeS_2), Chalcocite (Cu_2S), Bornite (Cu_2FeSO_4), Digenite (Cu_9S_5), Molybdenite (MoS_2), Sphalerite (ZnS), elemental sulphur and gypsum ($CaSO_4 \cdot 2H_2O$)
- Under submerged soil conditions SO_4^{2-} (Sulphate) is reduced to H_2S (Hydrogen sulphide) by bacteria belong to genera *Disulfovibro* and *Desulfotomaculum*.
- Soil tests for available sulphur are 0.15% $CaCl_2.2H_2O$ solution and 0.4 N ammonium acetate + 0.25 N acetic acid.
- Critical limit of available sulphur in s 10 ppm.

Magnesium

- Chlorophyll has Mg as the central c bound to N atoms of 4 porphyrins by covalent and two coordinate bonds.
- Mg containing minerals in soil are bio phlogopite olvine, hornblende, serpen epsomite ($MgSO_4.7H_2O$) and dolo ($CaCO_3.MgCO_3$).
- Mg containing fertilizers are magnes limestone, ground burnt magnesium li epsom salts ($MgSO_4.2H_2O$), pot magnesium sulphate ($K_2SO_4.MgSO$ Magnesite ($MgCO_3$) and Kieser ($MgSO_4.H_2O$).

Calcium

- Ca deficiency causes diseases such blossom end rot (BER) in tomato, blosso end rot of pepper, cavity spots in carr bitter pit in apple, black head in cele internal browning in Brussels Sprouts e
- Ca containing minerals are anorthite, augi albite and hornblende (occurs as silica minerals) and calcite ($CaCO_3$) dolomi ($CaCO_3.MgCO_3$) both as carbonate.
- Ca minerals also found as sulphat (gypsum) or phosphate minerals (Apatite, $[Ca_3(Po_4)_2]$, CaX_2].
- Rajasthan have monopoly in gypsun deposits.
- Calcium carbonate equivalent (CCE) of CaC is 179%, of $Ca(OH)_2$ is 135%, of dolomite is 109% and of $CaCO_3$ is 100%.
- Generally lime (of 8–10 mesh) is applied every 4th or 5th year.

Mn

- Mn have role in the biosynthesis of chlorophyll, carotenoids, gibberellic acid, quinines and sterols.
- Mn impart disease resistance or reduces infection of take all of wheat, downey mildew of sorghum, powdery mildew of cereals etc.
- Mn deficiency characterized by small yellow spots on the leaves and interveinal chlorosis (as in the case of Fe deficiency, whole young leaf becomes chlorotic).
- The critical deficiency level for most plant species is in the range of 10 - 20 ppm of Mn in dry matter of leaves.
- Well known diseases caused by Mn deficiency are grey speck in oats and marsh spots in peas.
- Mn toxicity causes crinkle leaf of cotton (Mn induced Ca deficiency).
- In Mn deficient soils, diseases like blast and leaf spot of rice, powdery mildew of wheat and potato scals are very often occurred.
- Common Mn containing minerals in Soil are Pyrolusite (β MnO_2), Birnessite (δ MnO_2), Maganite (γ MnOOH), Corondite ($Pb_2 Mn_8 O_{16}$), Hollandite ($Ba_2 Mn_8 O_{16}$), Hausmannite (Mn_3O_4) and Rhodochrosite ($MnCO_3$).
- For the presence of O_2 in atmosphere, credit goes to Mn (involves in photosynthetic O_2 evolution by splitting a molecule of H_2O in PS II).
- Mn containing fertilizers are $MnSO_4.4H_2O$ (26.28%), MnO (40% of Mn), $MnCl_2$ (17% Mn), $MnCO_3$ (31% Mn).

Fe

- Fe deficiency in human being is popularly known as anaemia.
- Chloroplasts are the richest organelle in Fe (80% of the total Fe in plant).
- Fe involves in haem enzyme systems include catalases, peroxidases and cytochrome oxidases.
- Fe is the components of nitrate reductase (NR), act as redox in nitrate reduction, sulphate reduction and N_2 assimilation.
- High conc. of Fe reduces the infection of smut in wheat, rust on wheat and *Colletotrichum musae* in banana.
- When iron values are ≤ 50 ppm in dry matter, deficiency is likely to occur.
- Fe containing minerals are geothite (Fe OOH), hematite (Fe_2O_3), maghemite (r-Fe_2O_3) and magnetite (Fe_3O_4).
- Commonly available iron fertilizers are ferrous sulphate ($FeSO_4.7H_2O$ = 18-20% Fe), ferrous ammonium phosphate (29% Fe), NaFe-DTPA (10% Fe).

Cu

- Copper is a constituent of plastocyanin (in PS I).
- Copper containing protein enzymes are superoxide dismutase isoenzymes, phenolase and amine oxidases.
- Cu containing minerals are chalcocite (Cu_2S), Covellite (CuS), Chalcopyrite ($CuFeS_2$), Cuprite (Cu_2O), Malachite ($Cu_2(CH)_2CO_3$).
- Copper deficiency is often the first nutritional disease to appear in plants grown on newly reclaimed and histosols and this condition is usually described as

reclamation disease.

- In trees, impairment of lignin synthesis (pendula forms) take place due to lack of the enzymes phenolase and lactase (due to Cu deficiency).
- The normal ranges of Cu concentration in leaf tissue are < 4 ppm (deficient), 5-10 ppm (sufficient) and > 20 ppm (toxic).
- The diethylene triamine penta acetic acid (DTPA) soil test developed for neutral and calcareous soils (0.005 M DTPA and 0.01 M $CaCl_2$).
- Cu fertilization decrease the severity of ergot on rye and barley.
- Copper deficiency causes "**citrus decline**" or die back in citrus fruits.

Zn

- The essentiality of Zn in plant was established by Sommer and Lipman (1926).
- Zinc containing minerals are sphalerite (ZnS) and Smithsonite ($ZnCO_3$).
- Zn is a constituent of the enzymes carbonic anhydrase (CA), superoxide dismutase, RNA polymerase and alcohol dehydrogenase (ADH).
- Zinc is essential for IAA synthesis (as tryptophan is a precursor of IAA).
- Zinc help in treating of diseases like *Fusarium* wilt of cotton, black scurf of potato, *verticillium* of cotton, Fusarium wilt of gram and *Rotylenchus reniformis* of tomato.
- Maize is a indicator plant for zinc deficiency.
- Khaira disease of rice is caused by Zn deficiency, first time identified in India by Y.L. Nene (1966) at Pant Nagar.
- In fruit trees, "rosettes" are formed at the end of the young shoots due to zinc deficiency.
- The critical deficiency level of zinc in plant tissue is < 20 ppm.
- The common soil test for Zn include 0.05 M DTPA and 0.01 M $CaCl_2$.
- Common zinc containing fertilizers are zi sulphate monohydrate ($ZnSO_4.H_2O$ = 35% Zn), Zinc sulphate heptahydra ($ZnSO_4.7H_2O$ = 21% Zn), Zinc oxide (ZnO = 67 - 80 % Zn), Zinc chloride (ZnC = 45% of Zn), Zinc carbonate ($ZnCO_3$ = 52 - 56% Zn) and Spent zinc oxide (ZnS 60 - 66% Zn).
- Common zinc deficiency diseases are little leaf of citrus, white bud of maize, khaira disease of rice (also known as "Iron rust"), little leaf or sickle shape of groundnu rosette or little leaf of coconut.
- Zinc deficiencies are generally found i soils having pH more than 6.0
- Zinc reaches plant roots mainly through the diffusion process.
- P-Zn have antagonistic interaction in the soil.
- Zn×Mo : Molybdenum had synergistic effect on Zn conc.
- The concept of the Apoplasm was first introduced by Munch (1930).
- Zinc plays an important role in auxin and protein synthesis, seed production, rate of maturity, gene expression and regulation and membrane integrity.

Boron

- B is single one non-metal micro-nutrient.
- Boron plays an important role in sugar transport, cell wall synthesis, liquification of cell wall, respiration and IAA and

carbohydrate metabolism.

- Bihar, West Bengal and Punjab's soils are found boron deficient.
- Boron concentration in earth's crust is 10 ppm.
- Boron containing mineral is tourmaline (3-4% B)
- Boron can be transported from soil solution to absorbing plant roots by the phenomenon of mass flow and diffusion.
- Boron deficiency more common in sandy soils and greater movement are also recorded in same compound to clay soils.
- Most symptoms of boron deficiency includes thickened, cracked and wilted leaves, petioples and discolouration, cracking or rotting of fruits.
- Boron deficiency diseases in plants are crown and heart rot in sugarbeet, tip burn in lettuce, cracked stems in celery, fruit cracking in tomato, pomegranate and litchi and fruit necrosis in aonla.
- The critical deficiency limit of boron is less than 15 ppm in plant tissues.
- Boron decrease the expression of potato wart disease (***Synchytrium endobioticum***) and club root (***Plasmodiophora brassicae***) of crucifers.
- Common boron containing fertilizers are borax ($Na_2B_4O_7.10H_2S$=11%B), sodium tetraborate ($Na_2B_4O_7.5H_2O$ = 14 - 15% B), boric acid (H_3BO_3 = 17%) and solubor (20 - 21% B)

Molybdenum

- Critical limit of Mo in soils is 0.05 ppm in Indian soils.
- Common Mo containing minerals are as wulfenite ($PbMoO_4$), powellite ($CaMoO_4$) and ferromolybdite ($Fe(MoO_4)_3\,8H_2O$).
- Plant absorb Mo as MoO_4^{2-}.
- Availability of Mo increased with a rise in soil pH.
- Molybdenum is an essential component of two major enzymes in plants nitrogenase (N fixation) and nitrate reductase (N assimilation).
- Whiptail disease of cauliflower and citrus yellow spots are caused due to Mo deficiency.
- Mo content above 5 - 10 ppm in forage crops (dry weight basis) are considered high and toxic and at these concentration of molybdenum molybdenosis occurs.
- Molybdenosis (cattle disease) is caused by an imbalance of Mo and Cu in the diet of ruminants (an induced Cu deficiency).
- The concentration of Mo in pasture and forage crops ranges from 5 - 10 ppm and 3 ppm has been found to be considered toxic and safe for livestock, respectively.
- Mo containing fertilizers are sodium molybdate ($NaMoO_4.2H_2O$ =39% Mo), ammonium molybdate ($(NH_4)_6\,Mo_7O_{24}\cdot 4H_2O$ = 54% Mo), molybdenite (MoS_2 = 60% Mo) and Molybdenum trioxide (MoO_3 = 66% Mo).
- Mo is the heaviest essential plant nutrient which is taken up by the plants in the least amount.
- Most commonly used soil test for Mo is acid ammonium oxalate (AAO).

Chlorine

- Chlorine is required in Hill reaction or water splitting system of PS II in photosynthesis.

- Wilting is considered the most general symptom of chlorine.
- Chloride (Cl^-) is usually used an indicator of nitrate (NO_3^-) ion mobiliy in soils because Cl^- is not undergone biological and chemical transformation.
- Potassium (K^+) is largely accumulated in the cytoplasm and chloride (Cl^-) in the vacuole of the plant.
- Chloride play an essential role in stomatal regulation.
- Chloride sensitive crops are tobacco, beans, citrus, potatoes, lettuce and gram.
- Soils containing Cl^- concentration of 2 ppm or less are considered low or deficient.
- Chloride deficiency diseases are herring bone (root become smaller and show herring bone appearance) of tomato, cupping of the leaf blade appears at the mid rib in sugarbeet, "purplish bronzing" of the older chlorotic areas appears at the later stages.
- Due to chloride deficiency in coconut palm, leaves become yellowish with orange mottling, reduced growth, very few nut setup, droppy leaves, smaller nut size and stem cracking bleeding etc. are appeared.
- Common chloride containing fertilizers are muriate of potash (KCl = 47.0% of Cl^-), ammonium chloride (NH_4Cl = 66.0% Cl^-), calcium chloride ($CaCl_2$ = 65.0% Cl^-), NaCl (60.0% Cl), magnesium chloride ($MgCl_2$ = 74.0% Cl^-).
- Application of KCl reduced the "hollow heart" disease of potato.
- Wheat take all fungal disease (*Gaeumanno myces graminis var. tritici*) has been found to be suppressed by the application of ammonium chloride.
- Yellow rust (*Puccinia striformis*) in is one of the first foliar disease repor be suppressed by Cl^-.

Cobalt

- Cobalt is essential for N_2 fixati legumes.
- Cobalt is required for formati leghemoglobin.
- Soils containing total cobalt of less ppm showed nutritional disorde animals.
- Soils containing available cobalt content of less than 0.25 ppm are cons as deficient in Co.
- Three Co requiring enzymes are Meth synthase (protein synthesis), ribonucl reductase (DNA synthesis) and M malonyl-coenzyme a mutase (synthe heme).
- Cobalt is a metal component of Vitan essential in nitrogen metabolism ruminant
- Cobalt deficiency in plants can be co by application of cobalt @ 1 - 2 kg h cobalt chloride ($CoCl_2$) and cobalt su ($CoSO_4$).

Vanadium

- Vanadium is claimed to be essential green algae.
- Vanadium is absorbed as V_2O_5 by th (substitute for Mo).

Silicon

- Silicon makes up 27.6% (weight ba the earth crust.

- Critical deficiency level of silicon in plants is < 5% Si in plant tissue.
- Silicon is required for the development of strong roots, stems and leaves.
- It reduces lodging in rice.
- The high amounts of silicon in the plant increases the proportion of air filled spaces in the shoot and root which allows increased transport of O_2 to the roots under submerged condition.
- Silicon involves in the biosynthesis of lignin and its transport take place only in the xylem.
- The application of silicon bearing materials in the soil may increase the availability of P and vice/versa (synergistic interaction).
- Silicon containing fertilizers are potassium silicate (14% Si, and 17% K), calcium silicate (14 - 20% Si), blast furnace (14 - 19% Si).
- Rice straw and its compost (3 - 6% Si) is the available organic source of silicon.

Nickel

- Major Ni containing mineral is Serpentine $[Mg_3 Si_2O_5 (OH)_4]$, a igneous rock.
- Ni is a component of urease enzyme needed for hydrolysis of urea.

Sodium

- Soils containing sodium more than 15% of the CEC are termed as sodic or alkali soil.
- Na never occurs in free state.
- Brownell (1965) established that Na^+ is an essential mineral nutrient for the *Atriplex vesicaria* (Halophyte).
- The sodium requirement for lactating cows is about 0.2% in the forage (dry weight-basis).
- High sodium requiring crops are sugarbeet, spinach, fodder beet and table beet (pulses are sensitive to Na).

Selenium

- It is essential for animals.
- Selenium deficient feeds (0.1 ppm se) produce deficiency disorders like white muscle disease or nutritional muscular dystrophy.
- Selenium toxicity causes blindness and paralysis and under chronic alkali disease characterized by lameness and loss in vitality (when Se content in fodder on dry weight basis is in the range of 5 - 40 mg^{-1})
- The rate of application of Se for most of the plants should not be more than 1 ppm.

Fluorine

- It is highly poisonous and also called super halogens.
- It can be used as an insecticide.
- Irrigation water containing > 1 ppm of fluorine is considered detrimental for human and cattle health.
- The indicator plant for fluorine is gladiolus.

Others

- Chromium is essential for the activation of insulion (essential element for human beings).

(References : 1. Crop Nutrition – Principles and Practices – Dr. Rajendra Prasad New Vishal Publications
2. Nature and Properties of Soil – N. C. Brady and Wek)

Questions :

1. 'Soil fertility and fertilizers' was written by
   (a) NC Brady (b) Tisdale *et al.*
   (c) MM Rai (d) None
2. Who suggested that the principal nourishment of plant was water ?
   (a) Pietro de Crescenzi
   (b) J B Helmont
   (c) Francis Bacon
   (d) Jethro Tull
3. Who gave the statement 'water was the sole nutrient of plants' ?
   (a) Robert Boyle (b) John Woodward
   (c) J R Glauber (d) J B Helmont
4. ..... suggest that saltpeter (KNO_3), and not water, was the 'principle of vegetation'.
   (a) JR Glauber (b) Jethro Tull
   (c) Johnwoodward (d) John Mayow
5. 'Horse hoeing husbandry' was written by
   (a) Liebig (b) Arthur Young
   (c) Baker (d) Jethro Tull
6. 'Annals of Agriculture' a book was written by
   (a) Sir Humphry Davy
   (b) Arthur Young
   (c) JS Kanwar
   (d) Robert Warrington
7. Who is considered the father of field plot technique ?
   (a) JB Boussingault (b) Pushkarnath
   (c) Ramanunjan (d) Liebig
8. The law of the minimum, was given by Liebig in
   (a) 1842 (b) 1852
   (c) 1862 (d) 1875
9. In 1843, Agricultural Experiment Statio. at Rothamsted, England was started by
   (a) Liebig (b) Blackman
   (c) Lawes & Gilbert
   (d) Benjamin Franklin
10. Who isolated *Bacillus radicicola,* the organism responsible for N fixation in 1888 ?
    (a) S Winogradsky
    (b) MW Beijerinck
    (c) Milton Whitney
    (d) J B Lawes
11. In remote sensing, which type of radiation is utilized for photography ?
    (a) Violet (b) Far red light
    (c) Infra red (d) Green light
12. One bushel (bu) is equal to
    (a) 28.35 gram (b) 35.24 litres
    (c) 101.30 atm (d) 0.454 lb
13. One ton is equal to (kg)
    (a) 100 (b) 907
    (c) 1000 (d) 2240
14. It has been observed that soil pH increases in
    (a) Summer
    (b) Winter
    (c) Zaid
    (d) Post monsoon season
15. The behaviour of the plant in relation to day length is termed
    (a) Thermoperiodism
    (b) Photoperiodism
    (c) Heliotropic
    (d) None of above

Answers

1.	(b)	4.	(a)	7.	(a)	10.	(b)	13.	(b)
2.	(c)	5.	(d)	8.	(c)	11.	(c)	14.	(b)
3.	(d)	6.	(b)	9.	(c)	12.	(b)	15.	(b)

16. Scab of Irish potatoes, pox of sweet potatoes, and black root rot of tobacco are favoured by
(a) Acidic conditions
(b) Highly alkaline
(c) Neutral to alkaline conditions
(d) Extremely acidic condition

17. "Increase in yield of a crop as a result of increasing a single growth factor is proportional to the decrement from the maximum yield obtainable by increasing the particular growth factor" was described by
(a) Liebig (b) Bray
(c) Spillman
(d) EA Mitscherlich

18 Which one of the following is an example of positive interaction ?
(a) Lime × P (b) Mo × P
(c) P × Si (d) Na × K

19. Bray has modified the mitscherlich equation to
(a) $G = f(x_1, x_2, x_3 \ldots\ldots x_n)$
(b) $dy/dx = (A-y)\,C$
(c) $Y = A\,(1-10^{-cx})$
(d) $\log (A-y) = \log A - C_1 b - cx$

20. The nutrient concentration range in which added nutrient will not increase yield but can increase nutrient concentration is referred as
(a) Deficient range
(b) Critical range
(c) Luxury consumption
(d) Toxic range

21. Reduction reaction (NO_2 to NH_3) for nitrate assimilation by enzyme nitrite reductase takes place in
(a) Protoplasm (b) Cytoplasm
(c) Chloroplast (d) Nucleus

22. Which element is considered as energy currency for the plant ?
(a) N (b) P
(c) K (d) Mo

23. Which element is indirectly related with drought resistance ?
(a) N (b) K
(c) P (d) Zn

24. The purpling along the leaf edges is the characteristic deficiency symptom of
(a) P (b) K
(c) B (d) Fe

25. Which one of the following element is considered to be an immobile element in the plant ?
(a) Ca (b) Mg
(c) N (d) P

26. Among the families of crop plants, the sulphur requirement increases in the order of
(a) Leguminosae > Cruciferae > Graminae
(b) Graminae > Cruciferae > Leguminosae
(c) Graminae < Leguminosae < Cruciferae
(d) None of these

27. Major form of boron absorbed by plants is
(a) $B_4O_7^{-2}$ (b) $H_2BO_3^-$
(c) BO_3^{2-} (d) H_3BO_3

28. When Fe contents in plants falls below or equal to ..... ppm, deficiency is likely to occur.
(a) 20 (b) 40
(c) 50 (d) 100

Answers					
	16. (c)	19. (d)	22. (b)	25. (a)	28. (c)
	17. (d)	20. (c)	23. (c)	26. (c)	
	18. (c)	21. (c)	24. (a)	27. (d)	

29. Fe deficiency is mostly seen in crops growing on
(a) Calcareous or alkaline soils
(b) Salt affected soils
(c) Acidic soils
(d) Neutral soils

30. Fe is an important component of enzymes
(a) Nitrogenase
(b) Nitrate reductase
(c) Nitrite reductase
(d) All of these

31. Bronzing is associated with Fe levels greater than 300 ppm in the leaf blade of
(a) Wheat (b) Rice
(c) Maize (d) Sorghum

32. Crinkle leaf of cotton is caused by
(a) Fe toxicity (b) Cu toxicity
(c) Mn toxicity (d) Zn toxicity

33. In plants, deficiency of Zn are usually associated with concentrations of less than ..... .
(a) 6 ppm (b) 20 ppm
(c) 50 pm (d) 100 pm

34. Molybdenum is a component of
(a) Urease (b) Nitrogenase
(c) Nitrate reductase
(d) Both (b) and (c)

35. Downey mildew of pearlmillet may be suppressed by increased soil levels of
(a) Ca (b) Cu
(c) Cl (d) Mo

36. Fertilizers containing Cl^- ions are not suitable for
(a) Sugarcane (b) Potato
(c) Wheat (d) Pigeonpea

37. Intracellular deposits of which e is known as plant opals ?
(a) Sodium (b) Silicon
(c) Nickel (d) Vanadium

38. Stem melanosis disease occurs in due deficiency of
(a) Mn (b) Cu
(c) Zn (d) Si

39. Which element is the metal comp of urease enzyme ?
(a) Silicon (b) Sodium
(c) Molybdenum (d) Nickel

40. CEC of which clay mineral is hi (120-150 cmol/kg) ?
(a) Mica (b) Vermiculite
(c) Montmorillonite (d) Chlorite

41. The negative charge on 2 : 1 clay
(a) pH dependent
(b) pH independent
(c) Both (a) and (b)
(d) None of these

42. CEC values for organic soils lies in ra of
(a) 3 - 5 meq/100 g
(b) 10 - 20 meq/100 g
(c) 20 - 50 meq/100 g
(d) 50 - 100 meq/100 g

43. For most minerals, the strength of cat adsorption, or lyotropic series, is
(a) $Ca^{2+} > Al^{3+} > Mg^{2+} > K = NH_4^+ > Na^+$
(b) $Al^{3+} > Ca^{2+} > Mg^{2+} > K^+ = NH_4^+ > Na^+$
(c) $Mg^{2+} > Al^{3+} > Ca^{2+} > K^+ = Na^+ > NH_4^+$
(d) $Al^{3+} > Mg^{2+} > Ca^{2+} > K^+ = NH_4^+ > Na$

Answers					
	29. (a)	32. (c)	35. (c)	38. (b)	41. (c)
	30. (d)	33. (b)	36. (b)	39. (d)	42. (c)
	31. (b)	34. (d)	37. (b)	40. (b)	43. (b)

44. Which extract is used for determination of CEC ?
(a) 1N NH_4OAC (b) 1N $NaOHCO_3$
(c) 1N KOAC (d) Olsen reagent

45. Which one of the following formula is used for calculation of base saturation ?
(a) Total bases/CEC × 100
(b) Exchangebale bases/CEC × 100
(c) CEC/total bases × 100
(d) CEC/exchangeable bases × 100

46. The anion exchange capacity (AEC) increases as soil pH
(a) Increases
(b) Decreases
(c) First increases then decreases
(d) Remain unaffected

47. One acre of soil to a depth of 6 inch weight about
(a) 2.25×10^6 kg (b) 2×10^6 kg
(c) 2×10^6 lb (d) 2.25×10^6 lb

48. Which plant nutrient move from soil to the roots by root interaction, mass flow and diffusion in equal proportion ?
(a) Zinc (b) Boron
(c) Sulfur (d) Calcium

49. Which organisms are microaerobic, free fixers or in association with grasses ?
(a) *Azotobacter* (b) *Azospirillum*
(c) *Rhizobium* (d) *Frankia*

50. In which country most of the N required for crop production is obtained through N_2 fixation by legumes ?
(a) India (b) USA
(c) Japan (d) New Zealand

51. Which of the following pairs is not correctly matched ?

Organic substances	C/N ratio
(a) Soil microorganisms	8 : 1
(b) Soil organic matter	10 : 1
(c) Barnyard manure (rotted)	20 : 1
(d) Saw dust	1000 : 1

52. For nitrification, the optimum pH is
(a) 6.5 (b) 7.5
(c) 8.5 (d) 9.5

53. *Nitrosomonas* and *Nitrobacter* cause nitrification are an obligate
(a) Autotrophic bacteria
(b) Heterotrophic bacteria
(c) Both (a) and (b)
(d) Saprophytes

54. Maximum nitrification takes place at
(a) 10% O_2 (b) 20% O_2
(c) 30% O_2 (d) 40% O_2

55. NH_4^+ fixation takes place in
(a) Vermiculite and illite
(b) Montmorillonite and kaolinite
(c) Chlorite and kaolinite
(d) All of these

56. Which fertilizer has risk of fire or even explosion ?
(a) Aqua NH_3
(b) Ammonium nitrate
(c) Potassium nitrate
(d) Ammonium chloride

57. Biuret in urea applied as a foliar spray in citrus fruits should not be more than
(a) 0.25% (b) 0.50%
(c) 0.75% (d) 1.50%

58. Which fertilizer act as a nitrification inhibitor and as a slow release N source ?
(a) CDU (b) IBDU
(c) N-serve (d) DCD

Answers					
	44. (a)	47. (c)	50. (d)	53. (a)	56. (b)
	45. (a)	48. (a)	51. (d)	54. (b)	57. (a)
	46. (b)	49. (b)	52. (c)	55. (a)	58. (d)

59. The inorganic and organic labile P fraction of soil are collectively called
(a) Intensity factor (b) Quantity factor
(c) Capacity factor (d) None of these

60. At what pH, three are approximately equal amounts of $H_2PO_4^-$ and HPO_3^{2-} ?
(a) 6.5 (b) 7.0
(c) 7.2 (d) 8.5

61. Select the pair which is not correctly matched

C/P ratio	Mineralization/ immobilization
(a) < 200	Net mineralization of organic P
(b) 200 - 300	No gain/loss of inorganic P
(c) > 300	Net immobilization of inorganic P
(d) > 400	Net immobilization of inorganic P

62. 'Peat' soil are generally characterized as
(a) Black, heavy and acidic
(b) Red, light and acidic soil
(c) Black, light and alkaline soil
(d) Black, heavy and neutral soil

63. P content in DAP is
(a) 20 % (b) 36 %
(c) 46 % (d) 50 %

64. What is the porosity percentage if the particle density of soil is 2.6 and bulk density is 1.3 ?
(a) 35 % (b) 40 %
(c) 50 % (d) 55 %

65. Chemical formula of single superphosphate is
(a) $Ca(H_2PO_4)$
(b) $CaHPO_4$
(c) $Ca_3(PO_4)$
(d) $Ca(H_2PO_4).CaSO_4.2H_2O$

66. Height of rise of water in a capillary tube is directly proportional to
(a) Surface tension of water
(b) Radius of capillary tube
(c) Viscosity of water
(d) As in (a) and (c) above

67. Hill soils are generally
(a) Acidic (b) Alkaline
(c) Neutral (d) Saline

68. The diagnostic surface horizons are called
(a) Genetic horizons
(b) Pedons
(c) Epipedons
(d) Endopendons

69. Available water holding capacity is maximum in
(a) Clay loam (b) Sandy clay loam
(c) Silty clay loam (d) Loam

70. Size of colloidal clay particle is less than
(a) 0.2 mm (b) 0.02 mm
(c) 0.002 mm (d) 0.0002 mm

71. Soil aeration limits plants growth when per cent pores filled with water are more than
(a) 50 - 60% (b) 60 - 70%
(c) 70 - 80% (d) 80 - 90%

72. Soil colour determination chroma refers to which of the following ?
(a) Dominant spectral colour
(b) Lightness or darkness of the colour
(c) Purity or strength of colour
(d) None of these

Answers					
	59. (b)	62. (a)	65. (a)	68. (c)	71. (a)
	60. (c)	63. (a)	66. (a)	69. (a)	72. (c)
	61. (d)	64. (c)	67. (a)	70. (d)	

73. Chemical formula of pyrite reclaiment is
(a) FeS (b) CuS
(c) MnS (d) FeS_2

74. How much muriate of potash will be required to supply 50 kg K_2O/ha ?
(a) 50 kg (b) 73.3 kg
(c) 83.3 kg (d) 125.3 kg

75. Concentration of which element is highest in soil
(a) Fe (b) O_2
(c) Al (d) Si

76. Which is a incorrect match in the following ?
(a) Soil bulk density : Hydrometer
(b) Particle size analysis of soil : Picnometer
(c) Soil moisture retention : Permeameter
(d) Soil moisture estimation : Potometer

77. Specific heat is higher in
(a) Sand (b) Silt
(c) Clay (d) Humus

78. Laterization is a process of accumulation in soil
(a) Iron and aluminium oxides
(b) Silica
(c) $CaCO_3$ (d) $CaSO_4$

79. Podzolization is a process of accumulation in soil
(a) Silica
(b) Iron and aluminium oxides
(c) $CaCO_3$
(d) $CaSO_4$

80. Rocks containing more than 65% SiO_2 are
(a) Neutral (b) Alkaline
(c) Acidic (d) Calcareous

81. Average content of silica in soil is
(a) 24 % (b) 27 %
(c) 31 % (d) 35 %

82. Concentration of nitrogen in soil air is
(a) 70 % (b) 74 %
(c) 78 % (d) 82 %

83. Which of the following is not correctly matched ?
(a) Kaolinite : P
(b) Illite : Iron
(c) Montmorillonite : K, Mg
(d) Vermiculite : Mg

84. Critical limit of available phosphorus in soil for wheat crop by Olsen's method is
(a) 5 kg/ha (b) 10 kg/ha
(c) 15 kg/ha (d) 22.5 kg/ha

85. Sulphur content in ammonium sulphate is
(a) 12 % (b) 20 %
(c) 24 % (d) 30 %

86. Which one is dominating salt in alkali soil ?
(a) $CaCl_2$ (b) $MgSO_4$
(c) $NaHCO_3$ (d) Na_2CO_3

87. In which soil, zinc availability to crop is higher ?
(a) Acidic soil (b) Alkaline soil
(c) Calcareous soil (d) Waterlogged soil

88. Which of the following is correct ?
(a) $P_2O_5 \times 0.44 = P$
(b) $P_2O_5 \times 2.29 = P$
(c) $P_2O_5 \times 0.83 = P$
(d) $P_2O_5 \times 1.20 = P$

Answers

73. (d)	76. (d)	79. (a)	82. (c)	85. (c)	88. (a)
74. (c)	77. (d)	80. (c)	83. (b)	86. (d)	
75. (b)	78. (a)	81. (b)	84. (b)	87. (a)	

89. The major organic cementing agent in soil aggregate formation is
(a) Lipids
(b) Proteins and protein derivatives
(c) Polysaccharides
(d) Organic acids

90. The element present in the porphyrin structure of chlorophyll molecules are
(a) Magnesium
(b) Iron
(c) Nitrogen
(d) Magnesium and nitrogen

91. Among the following, the sequence of textural classes of soil with increasing order of fineness of texture is
(a) CL, L, LS, SL, SCL
(b) L, CL, SCL, SL, LS
(c) SL, SCL, LS, L, CL
(d) LS, SL, L, SCL, CL

92. Among the following, the correct sequence of biotic biopolymer degradation pathway is
(a) Recalcitrant biopolymers - a humin acid - a humic acid - a fulvic acid
(b) Fulvic acid - a humic acid - a recalcitrant biopolymers - a humin acid
(c) Humin acid - a humic acid - a fulvic acid - a recalcitrant biopolymers
(d) Humic acid - fulvic acid - a recalcitrant biopolymers - a humin acid

93. If the contents of exchangeable ions (cmol kg^{-1}) determined in soil are Na^+ = 5, K^+ = 5. Ca^{2+} = 10, Mg^{2+} = 2, H^+ = 1, Al^{+3} = 1, Cl^- = 1.6 and HCO_3^- = 0.4, the CEC of soil is
(a) 12 cmol (P^+) kg^{-1}
(b) 22 cmol (P^+) kg^{-1}
(c) 24 cmol (P^+) kg^{-1}
(d) 26 cmol (P^+) kg^{-1}

94. Which one of the following i manganese containing minerals ?
(a) Magnetite (b) Tourmaline
(c) Apatite (d) Pyrolusite

95. Which one of the following sets sh the correct soil order in sequence increasing age ?
(a) Entisol, mollisol, alfisol, ultisol
(b) Entisol, mollisol, ultisol, alfisol
(c) Ultisol, alfisol, mollisol, entisol
(d) Alfisol, mollisol, entisol, ultisol

96. Humic acid isolated from soils is
(a) Aromatic with high molecular we
(b) Aromatic with low molecular we
(c) Aliphatic with high molecular we
(d) Aliphatic with low molecular we

97. The Fe-chelate suitable for applica to crops grown on calcareous soils
(a) Fe-EDTA (b) Fe-EDDHA
(c) Fe-DTPA (d) Fe-HEDTA

98. Amongst oil cakes, the highest nitro content is in
(a) Castor cake
(b) Neem cake
(c) Coconut cake
(d) Groundnut cake

99. Plasticity of soil can be determined using
(a) Pycnometer
(b) Buoyoucos hydrometer
(c) Atterberg's apparatus
(d) IRGA

Answers

89. (c)	92. (b)	95. (a)	98. (d)	
90. (d)	93. (c)	96. (a)	99. (c)	
91. (d)	94. (d)	97. (b)		

100. Soil aggregation can be estimated by using
(a) Yoder's apparatus
(b) IRGA
(c) Cone penetrometer
(d) Atterberg's apparatus

101. Which one of the following values given in terms of redox-potential of soils (mv) represents a highly reduced condition of the soii ?
(a) -250 (b) -100
(c) +200 (d) +600

102. From Q/I relationship described by Beckett (1964), a high PBC^K indicates that
(a) The soil has been recently limed
(b) The soil needs potassium fertilization
(c) Availability of potassium in the soil is excellent
(d) The soil needs liming

103. Which one of the following is the correct quantity of zinc sulphate required to prepare 100 litres of 200 ppm solution for foliar spray ? Quantity of zinc sulphate required (in grams).
(a) 20 (b) 100
(c) 200 (d) 2000

104. Which plant element accounts for at least one half of the total number of ions absorbed ?
(a) N (b) P
(c) K (d) Ca

105. The readily available form of K in soil ranges from
(a) 0.1 - 2.0 % (b) 1 - 10 %
(c) 30 - 40 % (d) 90 - 98 %

106. Cation exchange capacity (CEC) of mica is
(a) 0 (b) 30 - 50
(c) 80 - 100 (d) 150

107. Sulphur content (%) in potassium sulphate is
(a) 50 (b) 22
(c) 17 (d) 12

108. Sulphur soil testing is determined by using
(a) $CaCl_2$ (b) Hot water
(c) NH_4OAC (d) $NaHCO_3$

109. Grass tetany is caused by deficiency of ..... in forage crops
(a) Mg (b) S
(c) Ca (d) Mn

110. Which one of the following is an example of natural chelate ?
(a) EDTA (b) DTPA
(c) Citric acid (d) EDDHA

111. Which method is applied for testing of Fe, Zn, Cu and Mn ?
(a) EDDHA (b) HEDTA
(c) Oxalic acid (d) DTPA

112. Which one of the following is not a Mn mineral ?
(a) Pyrolusite (b) Hausmanite
(c) Rhodonite (d) Tenorite

113. Which element is the only non metal among the micronutrients ?
(a) Manganese (b) Boron
(c) Iron (d) Zinc

114. Molybdenosis, a disease in cattle, is caused by an imbalance of Mo and Cu in the diet, when Mo content of the forage is greater than .....
(a) 5 ppm (b) 10 ppm
(c) 15 ppm (d) 20 ppm

Answers					
	100. (a)	103. (c)	106. (a)	109. (a)	112. (d)
	101. (a)	104. (a)	107. (c)	110. (c)	113. (b)
	102. (c)	105. (a)	108. (a)	111. (d)	114. (a)

115. Calcium hydroxide has a neutralizing value (calcium carbonate equivalent) of ..... .
(a) 179 % (b) 136 %
(c) 109 % (d) 100 %

116. ..... toxicity is probably the important growth limiting factor in acid soils, particularly when pH < 5.0 to 5.5
(a) Fe (b) H^+
(c) Al (d) Mn

117. Lime recommendation is made on the basis of a ..... inch furrow slice
(a) 2 (b) 4
(c) 6 (d) 15

118. Which of the following soils have poor physical condition ?
(a) Saline (b) Sodic
(c) Saline - alkali (d) None

119. Sodium adsorption ratio (SAR) can be calculated by using of formula
(a) $SAR = Na^+ / \sqrt{Ca^{2+} + Mg^{2+}}$
(b) $SAR = Na^+ / \sqrt{Ca^{2+} + Mg^{2+}/2}$
(c) $SAR = Ca^{2+} + Mg^{2+} / \sqrt{Na^+}$
(d) $SAR = Na^+ / \sqrt{Ca^{2+} + K/2}$

120. The exchangeable sodium ratio (ESR) can be calculated as
(a) ESR = Exchangeable $(Ca^{2+} + Mg^{2+})$/ Exchangeable Na^+
(b) ESR = Exchangeable Na^+ / $\sqrt{\text{Exchangeable } (Ca^{2+} + Mg^{2+})}$
(c) ESR = Exchangeable Na^+/ Exchangeable $(Ca^{2+} + K^+)$
(d) ESR = Exchangeable Na^+/ Exchangeable $(Ca^{2+} + Mg^{2+})$

121. Leaching requirement can be estimated by formula
(a) $LR = EC_{iw} / EC_{dw}$
(b) $LR = EC_{dw} / EC_{iw} \times 100$
(c) $LR = D_{iw} / D_{dw}$
(d) None of the above

122. ..... refers to a condition in which a crop needs more of a given nutrient yet has shown no deficiency symptom
(a) Bare economic optimum
(b) Luxury consumption
(c) Hidden hunger
(d) Toxicity of nutrient

123. In sugarcane, which leaf is most appropriate for total tissue test
(a) The second leaf from the top of the plant
(b) The third leaf from the top of the plant
(c) Fully mature leaves midway between the younger centre leaves and the oldest leaf when on the outside
(d) Fourth fully developed leaf from the top

124. Which part of cotton plant is used for tissue test ?
(a) All the above ground portion
(b) The youngest fully mature leaves of the main stem
(c) Fourth fully developed leaf from the top
(d) The four upper leaf blades

Answers				
	115. (b)	118. (b)	121. (a)	124. (b)
	116. (c)	119. (b)	122. (c)	
	117. (c)	120. (d)	123. (d)	

125. Diagnosis and recommendation integrated system (DRIS) is applicable for
(a) Long duration crops
(b) Short duration crops
(c) Oilseed crops
(d) Vegetables

126. Crop logging developed by CF Clement is carried out for sugarcane in
(a) Brazil (b) Hawai
(c) New Zealand (d) Cuba

127. In crop logging, during growing season, plant tissue is sampled every ..... days and analysed for N, sugar, moisture and weight of the young sheath tissue
(a) 15 (b) 25
(c) 35 (d) 45

128. ..... is the ratio of the increase in osmotic pressure produced by the fertilizer to that produced by the same weight of sodium nitrate ($NaNO_3$).
(a) Osmotic pressure
(b) Nutrient index
(c) Sodium index
(d) Salt index

129. From top 25% of effective root zone depth, how much quantity of total water extraction take place by roots
(a) 10 % (b) 20 %
(c) 30 % (d) 40 %

130. Weight of grain per bushel in corn is
(a) 50 lb (b) 56 lb
(c) 60 lb (d) 48 lb

131. Who considered the father of pedology ?
(a) CG Hopkins (b) JB Lawes
(c) VV Dokuchaev (d) Liebig

132. Who consider the various properties of soils in relation to plant production ?
(a) Agronomists (b) Edaphologists
(c) Pedologist (d) Soil chemists

133. Unconsolidated material overlying rocks is known as
(a) Solum (b) Regolith
(c) Bed rocks (d) A horizon

134. Vertical section of a soil is known as
(a) Horizons (b) Solum
(c) Profile (d) A soil

135. The solum is comprised of
(a) A, B and E horizons
(b) A and B horizons
(c) A, B and C horizons
(d) A + regolith

136. The organic soils commonly contain more than 50% organic matter by volume and at least ..... by weight basis
(a) 20 % (b) 30 %
(c) 40 % (d) 58 %

137. Among primary minerals, most resistant to weathering is
(a) Quartz (b) Olivine
(c) Albite (d) Gypsum

138. Least resistant mineral to weathering is
(a) Quartz (b) Olivine
(c) Geothite (d) Anorthite

139. Which of the followings is a secondary mineral ?
(a) Muscovite (b) Anorthite
(c) Dolomite (d) Biotite

140. Inorganic parent material transported by gravity is
(a) Glacial (b) Eolian
(c) Marine (d) Colluvial

Answers

125. (a)	128. (d)	131. (c)	134. (c)	137. (a)	140. (d)
126. (b)	129. (d)	132. (b)	135. (a)	138. (b)	
127. (c)	130. (b)	133. (b)	136. (a)	139. (c)	

141. Wind blown materials, comprised primarily of silt with some fine sand and clay, are called
(a) Eolian (b) Loess
(c) Moraine (d) Alluvial

142. Passive factor of soil formation includes
(a) Climate (b) Organisms
(c) Parent material (d) None

143. Which soil order derived from volcanic ejecta and dominated by allophane or Al-humic complexes ?
(a) Histosols (b) Andisols
(c) Ultisols (d) Alfisols

144. Which one of the following is not correctly matched ?

Soil order		Pronunciation
(a) Entisols	:	Recent
(b) Aridisols	:	Arid
(c) Histosols	:	Organic
(d) Vertisols	:	Pedalfor

145. Lowest category of soil classification includes
(a) Order (b) Great group
(c) Series (d) Family

146. Which one of the following is not correctly matched ?

(a) Feldspars	:	Potassium silicates
(b) Micas	:	Iron and aluminium silicates
(c) Gibbsite	:	Hydrous oxides of aluminium
(d) Geothite	:	Hydrous iron oxides

147. A clay soil must contain at least ..... clay separate, to be designated a clay
(a) 70 % (b) 80 %
(c) 40 % (d) 35 %

148. Which type of structure is dominan grasslands ?
(a) Spheroidal (b) Platy
(c) Columnar (d) Blocky

149. Per cent pore space can be calculate using of which formula
(a) % PS = 100 - (D_p/D_b × 100)
(b) % PS = 100 - (D_b/D_p × 100)
(c) % PS = 1 - (D_p/D_b × 100)
(d) % PS = (D_p/D_p × 100)

150. Which one of the following w potential in soil is always positive
(a) Osmotic potential
(b) Matric potential
(c) Gravitational potential
(d) None of these

151. In neutron moisture meter, source fast neutrons is/are
(a) Radium
(b) Americium - beryllium
(c) Both (a) and (b)
(d) None of these

152. How much quantity of total incom solar radiation is absorbed by the and can be used to warm it ?
(a) 10 % (b) 20 %
(c) 42 % (d) 50 %

153. The external surface area of 1 g colloidal clay is at least ..... times t of 1 g of coarse sand
(a) 10 (b) 100
(c) 1000 (d) 10000

154. Magnesium in octahedral sheet of c mineral indicates
(a) Dioctahedral (b) Trioctahedral
(c) Tetrahedral (d) Monohedral

Answers

141. (b)	144. (d)	147. (d)	150. (c)	153. (c)
142. (c)	145. (c)	148. (a)	151. (c)	154. (b)
143. (b)	146. (b)	149. (b)	152. (a)	

155. Aluminium in octahedral sheet of clay mineral indicates
(a) Dioctahedral
(b) Trioctahedral
(c) Tetrahedral
(d) Monohedral

156. Pressure membrane apparatus is used to measure matric potential moisture content relations at potential values as low as
(a) 1 bar (b) 10 bar
(c) 100 bar (d) 1000 bar

157. Availability of which micronutrient increases with increase in soil pH
(a) B (b) Fe
(c) Zn (d) Mo

158. Which lime is referred to as burned lime or quick lime ?
(a) CaO (b) $Ca(OH)_2$
(c) $CaMg(CO_3)_2$ (d) $CaCO_3$

159. 'White alkali' soils are
(a) Acid soil
(b) Saline soil
(c) Saline sodic soil
(d) Sodic soil

160. Which group of microorganisms have highest biomass in soil ?
(a) Bacteria
(b) Actinomycetes
(c) Fungi
(d) Algae

161. Humus fraction lightest in colour is
(a) Fulvic acid (b) Humic acid
(c) Humin acid
(d) None of these

162. The water holding capacity (WHC) of humus on a mass basis is ..... times that of the silicate clays
(a) 2 - 3 (b) 4 - 5
(c) 9 - 10 (d) 100

163. Which group of colloid have highest cation exchange capacity by volume basis ?
(a) Humus (b) Vermiculite
(c) Smectite (d) Kaolinite

164. In agricultural soils, ... of the total nitrogen is found as fixed ammonium ion
(a) 5% (b) 10%
(c) 20% (d) 40%

165. Select the wrong pair from the following given below :
(a) Strengite : $FePO_4.2H_2O$
(b) Variscite : $AlPO_4.2H_2O$
(c) Gibbsite : $Al_2O_3.3H_2O$
(d) Hematite : FeOOH

166. Zinc sulfate monohydrate contains Zn %
(a) 19 (b) 54
(c) 21 (d) 35

167. Boron content in borax (suhaga) is
(a) 11% (b) 25%
(c) 19% (d) 39%

168. The soil erodibility factor (K) indicates the inherent erodibility of a soil gives an indication of the soil loss from a unit plot ..... m long with a 9% slope under continuous fallow culture
(a) 22 (b) 40
(c) 62 (d) 72

169. Land capability class restricted to recreation, wildlife, water supply, or aesthetic purposes is
(a) I (b) VI
(c) VII (d) VIII

Answers					
	155. (a)	158. (a)	161. (a)	164. (b)	167. (a)
	156. (c)	159. (b)	162. (b)	165. (d)	168. (a)
	157. (d)	160. (c)	163. (b)	166. (d)	169. (d)

170. A sequence of soils of about the same age, derived from similar parent material, and occurring under similar climatic conditions, but having different characteristic due to variation in relief and drainage is called
(a) Ca^{+} clays
(b) Catena
(c) Truncated profile
(d) Caliche

171. Soft and unconsolidated calcium carbonate, usually mixed with varying amounts of clay or other impurities is described as
(a) Mar (b) Marl
(c) Mor (d) Mull

172. The smallest volume that can be called 'a soil' is
(a) Pedon (b) Ped
(c) Radon (d) Pans

173. Soils have no diagnostic pedogenic horizons are included in soil order
(a) Histosols (b) Mollisols
(c) Ultisols (d) Entisols

174. The microrelief of soils produced by expansion and contraction with changes in moisture is known as
(a) Fluvial deposits
(b) Gilgai
(c) Mottling
(d) Heaving

175. Flame photometer is used in the determination of
(a) Nitrogen (b) Phosphorus
(c) Potassium (d) Boron

176. The extractant used for available phosphorus in soils is
(a) Alkaline permangnate
(b) 0.5 M $NaHCO_3$
(c) NN Ammonium acetate
(d) N Acetic acid

177. Soils having 200 kg available K_2O/ha will be classed as
(a) Low (b) Medium
(c) High (d) None of these

178. Sugarbeet is an indicator plant for
(a) Phosphorus (b) Boron
(c) Magnesium (d) Sodium

179. On the functional basis Fe, Zn, Mn and Cu have been classified as
(a) Main structural elements
(b) Accessory structural elements
(c) Regulators and carriers
(d) Catalyst and activators

180. In Mitscherlich technique ..... plants are grown to maturity
(a) Barley (b) Oat
(c) Wheat (d) Sunflower

181. Calcium cyanamide contains nitrogen (%)
(a) 16 (b) 21
(c) 26 (d) 33

182. Which of the following oil cakes, in addition to its manurial value, also acts as a nitrification inhibitor ?
(a) Mustard (b) Groundnut
(c) Neem (d) Sesame

183. The term functional or metabolic nutrient was given by
(a) JV Liebig
(b) DJ Nicholas
(c) DI Arnon
(d) None

Answers					
	170. (b)	173. (d)	176. (b)	179. (c)	182. (c)
	171. (b)	174. (b)	177. (b)	180. (b)	183. (b)
	172. (a)	175. (c)	178. (d)	181. (b)	

184. Science dealing with the origin or formation of soil from the unconsolidated parent material with special reference to factors and process of soil formation is known as
(a) Soil science (b) Pedology
(c) Soil genesis (d) Edaphology

185. Rocks formed by solidification of molten magma at the surface of the earth are called
(a) Sedimentary (b) Metamorphic
(c) Igneous (d) None

186. The rate of weathering is generally high in
(a) Arid tropical climate
(b) Arid temperate climate
(c) Humid tropical climate
(d) Humid temperate climate

187. The dominant spectral colour in soil indicates
(a) Hue (b) Value
(c) Chroma (d) Organic matter

188. The pH of the soil solution determines
(a) Active acidity
(b) Exchange acidity
(c) Total acidity
(d) None

189. The major source of negative charge on humus colloids is due to
(a) Carboxylic (-COOH) groups
(b) Enolic (-OH) groups
(c) Phenolic groups
(d) All of these

190. The value of ESP in alkali soils is always
(a) Greater than 15
(b) Less than 15
(c) Any value
(d) None

191. Most dominant mineral in earth crust is
(a) Feldspar (b) Amphiboles
(c) Quartz (d) Mica

192. Munsell colour chart contains about ..... different coloured papers or chips
(a) 100 (b) 125
(c) 150 (d) 175

193. A mature and dry plant tissue contain about ..... proteins (%)
(a) 20 - 50 (b) 1 - 15
(c) 1 - 8 (d) 10 - 30

194. The moisture equivalent was introduced by
(a) Briggs and McLane (1907)
(b) Richards and Weaver (1944)
(c) Shaw and Baver (1939)
(d) Whitney

195. Which type of soil survey use the lowest categories of taxonomic and mapping units, i.e. types and phases ?
(a) Detailed survey
(b) Reconnaissance survey
(c) Detailed reconnaissance survey
(d) None

196. Fluor apatite is a rich source of
(a) Nitrogen (b) Phosphorus
(c) Potassium (d) Molybdenum

197. Fe concentration used for foliar spray is
(a) 0.2 % (b) 0.4 %
(c) 0.05 % (d) 1.0 %

198. Equivalent acidity of anhydrous ammonia is
(a) 148 (b) 128
(c) 110 (d) 93

Answers					
	184. (c)	187. (a)	190. (a)	193. (b)	196. (b)
	185. (c)	188. (a)	191. (a)	194. (a)	197. (b)
	186. (c)	189. (d)	192. (d)	195. (a)	198. (a)

199. Molybdate reagent is used for estimation of
(a) N (b) P
(c) Ca (d) B

200. Who developed method for estimation of lime requirement ?
(a) Sckooner (1952)
(b) Shoemaker *et al.* (1961)
(c) Stanford and English (1949)
(d) Olsen *et al.* (1954)

201. Indicator plant of copper is
(a) Maize (b) Wheat
(c) Sorghum (d) Potato

202. *Aspergillus niger* is used to test the status of which element in the soil
(a) N (b) P
(c) K (d) Fe

203. *Mehlich's cunninghamella* plague method is used to test .....
(a) N (b) P
(c) Mn (d) Zn

204. Which science assumes the status of petrology, pedography and pedogenesis ?
(a) Soil Science (b) Edaphology
(c) Pedology (d) Petrology

205. 2 : 1 : 1 type of clay mineral contain an extra sheet of ..... as compared to 2 : 1 type of clay minerals.
(a) Gibbsite (b) Pyroxenes
(c) Brucite (d) Biotite

206. Chemical formula of siderite is
(a) $CaCO_3$ (b) Fe_2O_3
(c) $Ca_3(PO_4)_3$ (d) $FeCO_3$

207. The peeling off the plates from parent rock due to differential expansion and contraction of minerals as a resul changes in temperature, is called
(a) Meander (b) Exfoliation
(c) Illuviation (d) Moraine

208. The term catena (a Latin word mea chain) was introduced by
(a) Milne (1935)
(b) Schofield (1935)
(c) Mulder (1909)
(d) Richard (1950)

209. Select the correct sequence of weathe stages in soil formation
(a) Juvenile - initial - virile - seni final
(b) Senile - virile - juvenile - initi final
(c) Initial - juvenile -virile - seni final
(d) Initial - virile - juvenile - seni final

210. Silica : sesquioxide (R_2O_3) ratio tropical ecoregion is
(a) > 3.5 (b) 3 to 3.5
(c) 2 to 3 (d) < 2

211. Hydromorphic soils are evolved by w process
(a) Calcification (b) Gleization
(c) Salinization (d) Solonization

212. Solodization refers to the remova ..... from the exchange sites
(a) Ca^{++} (b) Mg^{++}
(c) Na^{+} (d) NaCl

213. Pedoturbation is the process of ....
(a) Mixing of the soil
(b) Mixing of FYM in soil
(c) Mixing of fertilizer in the soil
(d) Mixing of pesticides

Answers					
	199. (b)	202. (c)	205. (c)	208. (a)	211. (b)
	200. (b)	203. (b)	206. (d)	209. (c)	212. (c)
	201. (b)	204. (c)	207. (b)	210. (d)	213. (a)

214. Permafrost is a layer where soil temperature is always
(a) $\leq 0\,^{\circ}C$ (b) $\neq 0\,^{\circ}C$
(c) 0 to $100\,^{\circ}C$ (d) $\leq 10\,^{\circ}C$

215. Which soil order have highest area in India ?
(a) Entisols (b) Inceptisols
(c) Vertisols (d) Alfisols

216. In India, which soil order have negligible area ?
(a) Oxisols (b) Ustisols
(c) Mollisols (d) Histosols

217. Which mineral substance placed at number 10 in Mho's scale ?
(a) Talc (b) Gypsum
(c) Carborundum (d) Diamond

218. Which rock is volcanic (extrusive) in native ?
(a) Gabbro (b) Diorite
(c) Basalt (d) Monzonite

219. When organic matter is > 1.5% in soil, rated as
(a) Low (b) Medium
(c) High (d) Very high

220. A soil profile having two sola, one above the other is known as
(a) Bisequem profile
(b) Truncated profile
(c) Soil monolith
(d) Soil fabric

221. Chernozem soils are found in
(a) India (b) USA
(c) Russia (d) Brazil

222. Which of the following mineral is non expanding 2:1 type mineral ?
(a) Montmorillonite
(b) Beidellite
(c) Nontronite (d) Illite

223. Which index proved to be useful to assess the dominating type of clay mineral in soil proposed by Martin and Russell ?
(a) Y-index (b) A-value
(c) CYI (d) E-value

224. Humus forming fungi includes which genera
(a) *Trichoderma* (b) *Alternaria*
(c) *Aspergillus* (d) Both (b) and (c)

225. Red sols are mainly confined to
(a) Uttar Pradesh (b) Rajasthan
(c) Tamil Nadu (d) Bihar

226. Thermal conductivity follows the order
(a) Sand > loam > clay > peat
(b) Sand > peat > loam > clay
(c) Loam > sand > peat > clay
(d) Peat > sand > loam > clay

227. "Law of restitution" was proposed by
(a) Olsen (b) Das
(c) Liebig (d) Bray

228. Nutrient index between 1.5 and 2.5 is categorized as
(a) Low (b) Medium
(c) High (d) None of these

229. The coordinated project on long term fertilizer experiment was sponsored by ICAR in
(a) 1970-71 (b) 1975-76
(c) 1980-81 (d) 1985-86

230. Total number of master horizons present in soil are
(a) 4 (b) 5
(c) 6 (d) 7

Answers						
	214. (a)	217. (d)	220. (a)	223. (a)	226. (a)	229. (a)
	215. (b)	218. (c)	221. (c)	224. (d)	227. (c)	230. (b)
	216. (d)	219. (c)	222. (d)	225. (c)	228. (b)	

231. The B horizon is generally absent in
(a) Black soils
(b) Red soils
(c) Desert soils
(d) Brown hill soils

232. Most salt tolerant grass is
(a) Karnal grass (*Diplachne fusca*)
(b) Rhodes grass (*Chloris gayana*)
(c) Para grass (*Brachiaria mutica*)
(d) Bermuda grass (*Cynodon dactylon*)

233. Apparent nutrient recovery (ANR) can be calculated by using of which formula
(a) ANR = Nutrient removed from fertilized plot - Nutrient removed from unfertilized plot/Nutrient added × 100
(b) ANR = Nutrient removed from unfertilized plot - Nutrient removed from fertilized plot/Nutrient added × 100
(c) ANR = Nutrient removed from unfertilized plot - Nutrient removed from fertilized plot/ Nutrient removed from unfertilized plot × 100
(d) None of these

234. Oldest soil living long term manurial trial in India is located at ....., initiated in 1969
(a) Kanpur (b) Coimbatore
(c) Bijapur (d) Pusa, Bihar

235. Biosuper is a fertilizer containing
(a) Rock phosphate + elemental sulphur + S. oxidizing bacteria
(b) Phosphoric acid + elemental sulphur + S. oxidizing bacteria
(c) Ammonium sulphate + elemental sulphur + S. oxidizing bacteria
(d) None of these

236. Fertilizer control order issued in
(a) 1947 (b) 1957
(c) 1977 (d) 1986

237. Gapon's equation is widely used equation to describe
(a) P status of soils
(b) CEC of soils
(c) Organic matter of soils
(d) Water status of soils

238. Who established the essentiality of F for plant in 1844 ?
(a) Gilbert (b) Glauber
(c) Gris (d) Grigg

239. Major deposits of gypsum are found in
(a) Rajasthan (b) Haryana
(c) Gujarat (d) Punjab

240. Which formula is applied to calculate gypsum requirement (meq/100 gm) ?
(a) $GR = ESP_{(final)} - ESP_{(initial)}/100 \times CEC$
(b) $GR = ESP_{(initial)} - ESP_{(final)}/CEC \times 100$
(c) $GR = ESP_{(initial)} - ESP_{(final)}/100 \times CEC$
(d) $GR = ESP_{(initial)} - ESP_{(final)}/AEC \times 100$

241. Who developed the DTPA tests for available soil micronutrients ?
(a) Kudra LT (b) Lindsay WL
(c) Larsen (d) Jackson ML

242. The value of Von Bemmelen factor is
(a) 0.430 (b) 1.200
(c) 2.290 (d) 1.724

243. Slow nodulating *Rhizobium* spp. is
(a) *Sino-rhizobium* (b) *Erdyrtizobium*
(c) *Azo-rhizobium* (d) All of these

Answers					
	231. (a)	234. (a)	237. (b)	240. (c)	243. (c)
	232. (a)	235. (a)	238. (c)	241. (b)	
	233. (a)	236. (b)	239. (a)	242. (d)	

244. One ha cm of water is equal to
(a) 100 tonnes water
(b) 100000 litres water
(c) Both (a) and (b)
(d) 10 tonnes water

245. Who is considered as father of soil testing ?
(a) Colwell (b) Troug
(c) Parker (d) Puri

246. Select the pair which is not correctly matched.
(a) Salt index : Puri
(b) Nutrient index : Parker
(c) A value : Fried and Dean
(d) DRIS concept : Beckett

247. Which one of the following pair is mismatched ?
(a) L value : Larsen
(b) Integrated soil test approach : Colwell
(c) Biogas : Desai & Biswas
(d) Law of limiting factor : Lundegardh

248. Journal 'Plant and Soil' is published from
(a) New Delhi
(b) The Netherlands
(c) Japan
(d) USA

249. The relative proportion of sand, silt and clay in a soil is known
(a) Soil texture (b) Soil structure
(c) Soil taxonomy (d) Soil aggregation

250. 1 bar is equal to
(a) 0.9869 atm
(b) Weight of a 1020 cm water column
(c) 75.01 cm high mercury column
(d) All of these

251. The tension of the water at the upper plastic limit is equivalent to pF value
(a) 0.5 (b) 1.0
(c) 2.0 (d) 2.8 - 3.3

252. Sources of negative charges on silicate clays is/are
(a) Exposed crystal edges
(b) Isomorphus substitution
(c) Anion exchange
(d) All of these

253. Browning disease of rice is a
(a) Physiological disease
(b) Fungal disease
(c) Bacterial disease
(d) Viral disease

254. Walkley and Black's method of organic matter determination allows ..... per cent recovery
(a) 54 (b) 64
(c) 74 (d) 84

255. Soil order characterized by excess of weathering with dominant iron and aluminium oxide clays, common in tropics is
(a) Entisols (b) Mollisols
(c) Alfisols (d) Oxisols

256. Which of the following nutrients is lost in the greatest amount by allowing exposure of manure pile to rain ?
(a) N (b) P
(c) K (d) Ca

257. Water stable aggregates in soil increase by addition of
(a) N-fertilizers
(b) P-fertilizers
(c) K-fertilizers
(d) Micronutrients

Answers					
	244. (c)	247. (d)	250. (d)	253. (a)	256. (a)
	245. (b)	248. (b)	251. (a)	254. (c)	257. (b)
	246. (d)	249. (a)	252. (d)	255. (d)	

258. A soil which has pH < 8.5, ESP < 15 and EC > 4 dSm^{-1} at 25°C is called
(a) Saline soil
(b) Alkaline soil
(c) Saline - alkaline soil
(d) None of these

259. Fertility gradient approach was given by
(a) BV Mehta (b) B. Ramamoorthy
(c) AB Ghosh (d) B Murthy

260. Which of the following crops is most tolerant to salty soils ?
(a) Cotton (b) Corn
(c) Rice (d) Carrot

261. Hydrogen bonding takes place in the interlayer of
(a) Kaolinite (b) Montmorillonite
(c) Mica (d) Chlorite

262. Ionic potential is maximum in case of
(a) Na (b) Cs
(c) K (d) Li

263. Ligand adsorption of weak acid anion is maximum at a pH which is
(a) Equal to pK of weak acid
(b) Greater than 10 times of pK
(c) Less than 10 times of pK
(d) Independent of pK

264. Which one of the following will perform very poor as a source of N fertilizer under waterlogged rice field ?
(a) Ammonium nitrate
(b) Urea
(c) Ammonium chloride
(d) Ammonium sulphate

265. Which one of the following is commonly used as urease inhibitor ?
(a) Dicyandiamide
(b) Thiourea
(c) Urea formaladehyde
(d) Phenol phosphorodiamidate

266. Indian agriculture is operating negative balance of plant nutrient
(a) 2 - 5 mt (b) 8 - 10 mt
(c) 10 - 15 mt (d) 20 - 25 m

267. Which country has largest deposi K ?
(a) India (b) Canada
(c) U.S.A. (d) China

268. Which country have monopoly deposits ?
(a) Morocco (b) South Afri
(c) Russia (d) Pakistan

269. In India, which fertilizer manufac first ?
(a) Urea (b) DAP
(c) SSP (d) ASN

270. Hartig nets in soil produce by
(a) Rhizobium
(b) Ectomycorrhiza
(c) Endomycorrhiza
(d) None

271. End product of Dinitrification proc
(a) N_2 (b) NO_3
(c) N_2O and N_2 (d) NH_3

272. Which nitrogenous fertilizer indust made first ?
(a) $CaCN_2$
(b) Ammonium Sulphat
(c) $NaNO_3$
(d) Urea

273. Which crop is more tolerant to sali
(a) Sunflower (b) Barle
(c) Cowpea (d) Groundnut

Answers						
	258. (a)	261. (a)	264. (a)	267. (b)	270. (b)	273
	259. (b)	262. (d)	265. (d)	268. (a)	271. (c)	
	260. (a)	263. (a)	266. (b)	269. (c)	272. (a)	

274. India is divided into how many ecological zones ?
(a) 5 (b) 10
(c) 15 (d) 20

275. Bench terraces are constructed for the areas having land slope above :
(a) 10% (b) 15%
(c) 20% (d) 25%

276. Plant nutrients which show deficiency symptoms on older leaves, the correct sequence is :
(a) N, P, Mg, Zn (b) Ca, Mn
(c) Ca, S, Cu (d) Boron, Iron

277. Available phosphorus of more than 25 kg/ha of soil is considered as :
(a) Low (b) Medium
(c) High (d) Trace

278. White irregular spots between veins of upper leaves of maize plant shows the deficiency of :
(a) Copper (b) Molybdenum
(c) Manganese (d) Boron

279. Average annual loss of nutrients due to erosion is
(a) 2·4 million tonnes
(b) 4·4 million tonnes
(c) 8·4 million tonnes
(d) 6·4 million tonnes

280. The amount of nitrogen fixed by soybean in Kg N $ha^{-1} year^{-1}$ is in which range ?
(a) 49 - 130 (b) 35 - 80
(c) 15 - 30 (d) < 15

281. The volume wetness of soil can be derived from which one of the following ?
(a) Mass wetness and bulk density
(b) Bulk density and particle density
(c) Hydraulic conductivity and maximum WHC
(d) Particle density and intrinsic permeability

282. A soil sample indicating pH = 7·5, EC_e = 4·8 ds/m, exchangeable sodium percentage = 12, may be categorised as which one of the following ?
(a) Alkaline soil (b) Saline soil
(c) Saline - alkaline soil
(d) Normal fertile soil

283. Consider the following statements :
1. Diffusion is the dominant mechanism for transporting soil Zn^{2+} to plant roots.
2. Zinc solubility in soil solution decreases 100 fold for each unit increase in pH.
Which of the statements given above is/are correct ?
(a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

284. Consider the following :
1. Brucite 2. Gibbsite
3. Albite 4. Boehmite
Which of the above are Al-containing minerals ?
(a) 1, 2 and 3 only
(b) 2, 3 and 4 only
(c) 1, 3 and 4 only
(d) 1, 2 and 3 only

285. Consider the following statements :
1. Ca 2. Zn
3. P 4. Mg
The acidic soils are deficient in which of the above nutrient elements ?
(a) 1, 2 & 3 only (b) 2, 3 & 4 only
(c) 1, 3 & 4 only (d) 1, 2 & 4 only

Answers				
	274. (d)	277. (c)	280. (a)	283. (c)
	275. (b)	278. (c)	281. (a)	284. (b)
	276. (a)	279. (a)	282. (b)	285. (c)

286. Consider the following :
1. Phosphorus availability is one of the major constraints to plant growth in nature.
2. Phosphorus has low solubility and high sorption capacity in soil.
Which of the above statements is/are true ?
(a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

287. What is the fraction of soil organic matter which is soluble both in alkali and acid ?
(a) Humic acid
(b) Fulvic acid
(c) Hymatomelonic acid
(d) Humin acid

288. In terms of the order from youngest to the oldest soil, which one of the following is the correct chronological sequence ?
(a) Oxisol - inceptisol - alfisol - entisol
(b) Entisol - inceptisol - alfisol - oxisol
(c) Entisol - alfisol - inceptisol - oxisol
(d) Inceptisol - entisol - oxisol - alfisol

289. The phosphorus bearing compounds in soils mean
(a) Phytins (b) ATP
(c) Both a and b (d) Proteins

290. Tick out the incorrect match :

List I (Ore)	List II (Mineral)
(a) Dolomite	$CaCO_3.MgCO_3$
(b) Gibbsite	$Al_2O_3.3H_2O$
(c) Gypsum	$CaSO_4.2H_2O$
(d) Geothite	Fe_2O_3

291. The immobility of phosphorus in soils is primarily a result of orthophosphates
(a) reacting with Ca in acid soils and Fe and Al in neutral and basic soils
(b) being immobilised in organic matter
(c) reacting with Fe and Al in acid soils and Ca in neutral and basic soils
(d) reacting with K in acid soils and Ca in neutral and basic soils

292. Select the wrong matched pair in the following :

List I (Microbial process)	List II (Micro-organism)
(a) Nitrification	*Nitrosomonas*, *Nitrobacter*
(b) Denitrification	*Bacillus*, *Pseudomonas*
(c) Non-symbiotic nitrogen fixation	*Clostridium*, *Azotobacter*
(d) Symbiotic nitrogen fixation	*Thiobacillus*

293. Which of the given below is/are facultatively anaerobic bacteria ?
(a) *Azotobacter*
(b) *Bacillus*
(c) *Klebsiella*
(d) Both (b) and (c)

294. Consider the following statements :
1. Zinc ion is a cofactor for the enzyme carbonic anhydrase.
2. A common symptom of zinc deficiency in plants is leaf mottling.
Which of the statements given above is/are correct ?
(a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

295. Whiptail in *Brassica* is due to the deficiency of
(a) Calcium (b) Molybdenum
(c) Manganese (d) Zinc

Answers				
	286. (c)	289. (c)	292. (d)	295. (b)
	287. (b)	290. (d)	293. (d)	
	288. (b)	291. (c)	294. (c)	

296. Consider the following statements :
1. Some plants exhibit iron chlorosis when grown in calcareous soils.
2. High concentration of calcium ions in soil prevent the absorption of iron by root hairs.

Which of the statements given above is/are correct ?
(a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

297. Which one of the following is not correctly matched ?

List I (Available nutrient)	List II (Extractants used)
(a) Potassium	1. Neutral normal ammonium acetate
(b) Boron	2. Cold Water
(c) Iron	3. 0·005 M DTA (pH = 3.3)
(d) Molybdenum	4. Ammonium oxalate (pH = 3.3)

298. Which one of the following is the primary mineral that occurs predominantly in igneous rocks ?
(a) Micas (b) Feldspars
(c) Quarty (d) Pyroxenes

299. Consider the following rocks :
1. Diorite 2. Basalt
3. Breccia

Which of the above is/are igneous rocks ?
(a) 1 and 2 only (b) 2 only
(c) 1 and 3 only (d) 1, 2 and 3

300. If the contents of Ca^{++}, Mg^{++}, Na^{+}, K^{+} and H^{+} are 13, 4, 3, 2 and 2 mol (p^{+}) kg^{-1} respectively and the CEC of soil is 25 mol (p^{+}) kg^{-1}, what is the base saturation (%) ?
(a) 68 (b) 80
(c) 88 (d) 96

301. To which one of the soil orders do black soils of India belong ?
(a) Alfisol (b) Inceptisol
(c) Vertisol (d) Oxisol

302. Which one of the following has the highest cation exchange capacity (weight basis) ?
(a) Kaolinite (b) Illite
(c) Montmorillonite (d) Humus

303. Which one of the following has the highest iron content (%) ?
(a) Ferrous sulphate
(b) Ferrous ammonium phosphate
(c) Ferrous oxide
(d) Ferrous ammounium sulphate

304. A sample of soil weighs 110 g and contains 75% moisture. If the volume of the soil is 75 cm^3, what is the bulk density of the soil ?
(a) 1·80 g/cm^3 (b) 1·52 g/cm^3
(c) 1·47 g/cm^3 (d) 1·28 g/cm^3

305. Which one of the following micronutrients is a constituent of the enzymes carbonic anhydrase, Alcohol dehydrogenase and RNA polymerase ?
(a) Zinc (b) Copper
(c) Iron (d) Chlorine

306. For the estimation of which one of the following is "Normal Neutral" ammonium acetate solution is used ?
(a) Available sulphur in soil
(b) Available phosphorus in soil
(c) Potassium content in plant material
(d) Available potassium content in soil

Answers				
	296. (c)	299. (a)	302. (d)	305. (a)
	297. (b)	300. (c)	303. (c)	306. (d)
	298. (b)	301. (c)	304. (d)	

307. Among the following sources of salts in soils, which one is the primary source ?
(a) Ground water
(b) Organic manures
(c) Canal irrigation
(d) Rock weathering

308. Match List - I with List - II and select the correct answer using the code given below the lists :

List - I (Micro-organisms)	List - II (Functions)
A. *Nitrobacter*	1. Conversion of NH_4-N to NO_2-N
B. *Nitrosomonas*	2. Hydrolysis of urea
C. *Clostridium*	3. Oxidation of sulphur
D. *Thiobacillus*	4. Conversion of NO_2-N to NO_3-N
	5. Asymbiotic fixation of nitrogen

Codes :

	A	B	C	D
(a)	5	3	2	1
(b)	4	3	5	1
(c)	4	1	5	3
(d)	5	1	2	3

309. Match List - I with List - II and select the correct answer using the code given below the lists :

List - I (Micronutrient)	List - II (Mineral)
A. Zn	1. Wulfenite
B. Mo	2. Pyrite
C. Cu	3. Smithsonite
D. Mn	4. Malachite
	5. Pyrolusite

Codes :

	A	B	C	D
(a)	2	1	4	3
(b)	3	1	4	5
(c)	2	4	1	3
(d)	3	4	1	5

310. Which one of the following is incor matched ?

Scientist	Area of contrib
(a) Mohr	1. Relative ha ness of mir
(b) Munsell	2. Soil colour
(c) Atterberg	3. Soil moistu limit
(d) C. F. Clement	4. Water logg

311. Improper development of w inflorescence is due to deficiency
(a) Iron (b) Zinc
(c) Phosphorus (d) Boron

312. On weight basis which element occu a major part (46·46%) in earth's c
(a) O (b) Si
(c) Al (d) Fe

313. Which one is associative N-fix bacteria ?
(a) *Rhizobium* (b) *Azospirillu*
(c) *Azotobacter* (d) *Acetobacter*

314. Which one is purely a chemical proce
(a) Ammonia volatilizati
(b) Denitrification
(c) N-fixation
(d) Nitrification

Answers				
	307. (d)	310. (d)	313. (b)	
	308. (c)	311. (d)	314. (a)	
	309. (b)	312. (a)		

3 Horticulture

1. Pectin is measured by :
   (a) Jelli Meter (b) Thermometer
   (c) Refractometer (d) All the above
2. "Pusa - Meghali" is an improved variety of :
   (a) Carrot (b) Radish
   (c) Beet root (d) Turnip
3. Cum - swelling is due to :
   (a) Presence of acid
   (b) *Clostridium botulinum*
   (c) Presence of sulphur
   (d) None
4. "Parbhani Kranti" is a popular variety of :
   (a) Brinjal (b) Okra
   (c) Potato (d) Chilli
5. "Pungency" in chilli is due to presence of :
   (a) Capsaicin (b) Sulphur
   (c) Amides (d) Magnesium
6. Which of the following crops is produced maximum in the world ?
   (a) Mango (b) Tomato
   (c) Potato (d) Grapes
7. Which of the following fruits contains the highest amount of Ascorbic Acid ?
   (a) Aonla (b) Mango
   (c) Apple (d) Orange
8. The stem above the ground in banana is known as :
   (a) Rhizome (b) Pseudostem
   (c) Sucker (d) None of these
9. Browning in Cauliflower is due to deficiency/excess of :
   (a) Boron (b) Nitrogen
   (c) Boron (d) Molybdenum
10. Richest source of Vitamin 'A' is :
    (a) Ripe mango fruit
    (b) Carrot root
    (c) Ripe papaya fruit
    (d) Ripe tomato fruit
11. Which of the following is used to check sprouting of onion under storage ?
    (a) N.A.A. (b) M.H.
    (c) G.A. (d) F.C.F.A.
12. Varsha Upahar is a variety of :
    (a) Okra (b) Cabbage
    (c) Chilli (d) Cowpea
13. The plant growth hormone which helps in enlarging the grape fruit is :
    (a) Abscisic acid (b) Gibberellic acid
    (c) Cytokinnins (d) Ethylene
14. Kinnow is basically a :
    (a) Tangerine (b) Tangor
    (c) Mandarin (d) Citrange
15. Redness in apple is due to :
    (a) Anthocyanin (b) Lycopene
    (c) Carotene (d) Xanthophyll
16. Best method of vegetative propagation in Aonla is :
    (a) Veneer grafting (b) Air layering
    (c) Chip budding (d) Patch budding

Answers						
1. (a)	4. (b)	7. (a)	10. (a)	13. (b)	16. (d)	
2. (a)	5. (a)	8. (b)	11. (b)	14. (c)		
3. (b)	6. (c)	9. (a)	12. (a)	15. (a)		

17. Vegetative parthenocarpy is found in :
    (a) Grape (b) Banana
    (c) Fig (d) Seedless guava
18. Central Institute of Subtropical Horticulture is located at :
    (a) Lucknow
    (b) Udham Singh Nagar
    (c) Jorhat
    (d) Bangalore
19. Which of the following preservative is used for preparation of tomato ketchup ?
    (a) Potassium metabisulphite
    (b) Sodium benzoate
    (c) Sodium metabisulphite
    (d) Citric acid
20. Cladiolus is propagated by which method ?
    (a) True seed (b) Bulbs
    (c) Stem cutting (d) Roots
21. The Taj garden of Agra (Tajmahal) is the typical example of :
    (a) Italian Style of gardening
    (b) Japanese Style of gardening
    (c) Hindu (Indian) Style of gardening
    (d) Mughal Style of gardening
22. The leading Indian State in Floriculture trade is :
    (a) Uttar Pradesh (b) Punjab
    (c) Karnataka (d) Jharkhand
23. Seed Constitutes more than 30 % of cost of production in the crop :
    (a) Tomato (b) Potato
    (c) Sugarcane (d) Hybrid Sunflower
24. In India the productivity of banana is highest in :
    (a) West Bengal (b) Tamil Nadu
    (c) Kerala (d) Maharastra
25. Which one of the following is the permanent method of preservation of fruits and vegetables ?
    (a) Pasteurization (b) Blanching
    (c) Canning and bottling
    (d) Exclusion of moisture
26. The uniform flowering in pineapple can be induced by application of
    (a) 100 ppm MH (b) 50 ppm GA3
    (c) 25 ppm Ethephon + 2% urea
    (d) 50 ppm paclobutrazol
27. 'Roopa' is an improved variety of
    (a) Litchi (b) Walnut
    (c) Pomegranate (d) Guava
28. Which one of the following variety of mangoes is developed by clonal selection and bears fruit regularly ?
    (a) Niranjan (b) Manjira
    (c) Dashehari - 51 (d) Arka Neelkiran
29. Match List I (Vegetable Crops) with List II (Insect Pests) and select the correct answer.

List - I	List - II
A. Cauliflower	1. Thrips
B. Chilli	2. Diamond back moth
C. Okra	3. Cut worm
D. Potato	4. Shoot & fruit borer

	A	B	C	D
(a)	2	1	4	3
(b)	2	1	3	4
(c)	1	2	3	4
(d)	1	2	4	3

30. Which of the following fruits are botanically called as "Hesperidium" ?
    (a) Jack fruit (b) Orange
    (c) Litchi (d) Apple

Answers					
17. (b)	20. (b)	23. (a)	26. (c)	29. (a)	
18. (a)	21. (d)	24. (b)	27. (b)	30. (b)	
19. (b)	22. (c)	25. (d)	28. (c)		

31. Olour is [illegible] polyembryonic variety of which fru[illegible]
(a) Guav[illegible] (b) Citrus
(c) Mang[illegible] (d) Strawberry

32. Which on[illegible] of the following is a stem vegetable
(a) Carro[illegible] (b) Sweet potato
(c) Knol-[illegible] (d) Radish

33. Edible banana fruit is seedless because of :
(a) Embryo abortion
(b) Absence of ovule
(c) Vegetative parthenocarpy
(d) Stimulated parthenocarpy

34. 'RATNA' variety of mango is a cross of :
(a) Neelam × Dashehari
(b) Dashehari × Neelam
(c) Neelam × Alphonso
(d) None of these

35. Which one of the following is dioecious plant ?
(a) Peach (b) Pomegranate
(c) Pea (d) Pointed gourd

36. Which one of the following is not a variety of mango ?
(a) Arka Aruna (b) Arka Puneet
(c) Arka Anmol (d) Arka Hans

37. Which of the following fruits are indigenous to India ?
(a) Mango, Banana (b) Bael, Jack fruit
(c) Aonla, Phalsa (d) All of these

38. Wax coating treatments enhances the shelf life of fruits because it blocks :
(a) Transpiration (b) Respiration
(c) Ripening process (d) None of these

39. Yellow coloured fruits and vegetables are rich source of :
(a) Vitamin E (b) Vitamin [illegible]
(c) Vitamin A (d) Vitamin [illegible]

40. Pusa Giant variety of papaya [illegible]
(a) Dioecious (b) Gynodi[illegible]
(c) Monoecious
(d) Andromonoecious

41. Which of the following frui[illegible] not suitable for jam making ?
(a) Mango (b) Banana
(c) Aonla (d) Lemon

42. Pruning in ber is done ?
(a) During rainy season
(b) During winter
(c) During spring
(d) During summer

43. Which one of the following is a rich source of iron ?
(a) Mango (b) Datepalm
(c) Apple (d) Karonda

44. Edible banana is :
(a) Diploid (b) Triploid
(c) Tetraploid (d) None of these

45. Polyembryonic varieties of mango is :
(a) Chandrakaran (b) Olour
(c) Salem (d) All of these

46. Refractometer is used to determine:
(a) Minerals
(b) T.S.S. (total soluble solids)
(c) Vitamins
(d) None of these

47. Vegetables are canned in :
(a) Brine (b) Syrup
(c) Distilled water (d) None of these

48. Fruits are blanched before canning at :
(a) 80 °C (b) 90 °C
(c) 100 °C (d) None of these

Answers					
31. (c)	34. (c)	37. (d)	40. (a)	43. (d)	46. (b)
32. (c)	35. (d)	38. (a)	41. (d)	44. (b)	47. (a)
33. (c)	36. (d)	39. (c)	42. (c)	45. (d)	48. (a)

49. C.F.T.[illegible] is located at :
(a) New Delhi (b) Banglore
(c) Hyderabad (d) Mysore

50. Which one of the following is a regular bearing variety of mango ?
(a) Samar bahista chausa
(b) Langra
(c) Amrapali
(d) Alphonso

51. In north India pruning in grape is done in the month of
(a) October (b) March
(c) January (d) July

52. Which one of the following is the gynodioecions cultivar of papaya ?
(a) Ranchi (b) Pusa Dwarf
(c) Pusa Giant (d) Pusa Majesty

53. Which of the following is the late ripening cultivar of ber ?
(a) Umran (b) Gola
(c) Kaithli
(d) Sindhura Narnaul

54. Generally seedless watermelon is
(a) Diploid (b) Triploid
(c) Tetraploid (d) Hexaploid

55. For biological control of tomato fruit borer, the ideal trap crop is
(a) Marigold (b) Mustard
(c) Tobacco (d) Garlic

56. The yellow colour in onion is due to the pigment
(a) Anthocyanin (b) Quercetin
(c) Lycopene (d) Carotene

57. Krishna and Kanchan are varieties of
(a) Grape (b) Loquat
(c) Aonla (d) Apple

58. [illegible] one is not correc[illegible]
[illegible]inger [illegible] Rhiz[illegible]
[illegible]arlic [illegible] Bulb
[illegible]tato [illegible] Tube[illegible]
[illegible] sweet potato [illegible] Stolo[illegible]

59. [illegible] edible part of pom[illegible]
[illegible] Thalamus (b) [illegible]
(c) Endocarp (d) [illegible]

60. Wind breaks are planted [illegible] orcha[illegible] towards
(a) South West (b) Nor[illegible] West
(c) North East (d) East S[illegible]

61. Onion variety suitable for kharif crop[illegible]
(a) Pusa red (b) Pusa [illegible]
(c) Agrifound dark red
(d) Agrifound light red

62. Exhausting temperature of canned fr[illegible] and vegetables i[illegible]
(a) [illegible] (b) 80-8[illegible]
(c) [illegible] (d) 100-102 [illegible]

63. Botanically pineapple fruit is
(a) [illegible] (b) Balusta
(c) Berry (d) Pom[illegible]

64. [illegible] primary objective of [illegible] cultivation of vegetables is
(a) To get early yield
(b) To get off season yield
(c) To protect the crop from [illegible]
(d) To protect the c[illegible] [illegible]

65. T[illegible] richest source of [illegible] is
(a) Parsley (b) Spi[illegible]
(c) [illegible] (d) [illegible]

66. Pa[illegible] is rich in
(a) [illegible] (b) [illegible]
(c) Vitamin C (d) [illegible]

Answers				
49. (d)	52. (d)	55. (a)	5[illegible]	[illegible]
50. (c)	53. (a)	56. (b)	59. [illegible]	[illegible]
51. (c)	54. (b)	57. (c)	6[illegible]	[illegible]

67. An ideal fruit for making jelly should be rich in
(a) Pectin and sugars
(b) Acids and proteins
(c) Sugars and acids
(d) Pectin and acids

68. The recommended storage temperature to extend the shelf life of banana is
(a) 0 °C (b) 2-5 °C
(c) 12-15 °C (d) 25-28 °C

69. Which of the following statement is correct ? Controlled atmosphere storage of fruits and vegetables;
(a) Maintains higher concentration of carbon dioxide than the normal atmosphere
(b) Maintains higher concentration of oxygen than the normal atmosphere
(c) Maintains higher concentration of Nitrogen than the normal atmosphere
(d) Maintains higher concentration of ethylene than the normal atmosphere

70. In India, which of the following fruit has the highest production ?
(a) Mango (b) Citrus
(c) Banana (d) Grapes

71. Late cauliflower does not set seed in plains due to absence of
(a) Long day and high temperature
(b) Long day and low temperature
(c) Short day and high temperature
(d) Short day and low temperature

72. Pusa Mukta, an improved variety of cabbage is resistant to
(a) White rot
(b) Black rot
(c) Downey mildew
(d) Powdery mildew

73. Which one of the following states / regions is famous for the cultivation of orchids ?
(a) Himachal Pradesh
(b) Uttaranchal
(c) N.E. Region
(d) Kerala

74. Which one of the following pairs is not correctly matched ?
(a) Stone grafting Mango
(b) Cutting Strawberry
(c) Tongue grafting Apple
(d) Ring budding Jujube

75. Which one of the following is most suitable used as a filler crop in a mango orchard ?
(a) Aonla (b) Grape
(c) Pomegranate (d) Papaya

76. Budding is most commonly done when there is
(a) Good sap flow in the plants
(b) No sap flow in the plants
(c) Early initiation of growth in the plants
(d) Late initiation of growth in the plants

77. In hexagonal system of planting how much more percentages of trees can be planted as compared to square method :
(a) 25 (b) 40
(c) 10 (d) 15

78. Kinnow mandarin was developed by :
(a) L. Moss (b) W. B. Hayes
(c) T. Tanaka (d) H. B. Frost

79. The antisterility vitamin is
(a) Vitamin A (b) Vitamin B
(c) Vitamin E (d) Vitamin D

Answers					
	67. (d)	70. (c)	73. (c)	76. (a)	79. (c)
	68. (c)	71. (d)	74. (b)	77. (d)	
	69. (a)	72. (b)	75. (d)	78. (d)	

Mango seed lose their viability within
(a) 3-4 week (b) 4-5 week
(c) 7-8 week (d) 10-15 week

81. International Institute of Horticulture is situated in
(a) Italy (b) Brazil
(c) India (d) China

82. Which country ranked highest in vegetables production ? (Economic Survey, 2004-05)
(a) India (b) China
(c) USA (d) USSR

83. Who is the father of systematic pomology ?
(a) Decandole (b) Mendel
(c) Darwin (d) None of these

84. National Horticulture Board was established in
(a) 1975 (b) 1984
(c) 1985 (d) 1990

85. Agriculture and Processed Products Development Authority (APEDA) was came in existence in
(a) 19[illegible] (b) [illegible]
(c) 1985 (d) [illegible]

86. Which fruit is known as "Miracle fruit of China" ?
(a) Kiwi Fruit (b) Mango
(c) Litchi (d) Loquat

87. Granulation is a physiological disorder of
(a) Sapota (b) Citrus
(c) Mango (d) Guava

88. Pineapple is highly suited for
(a) Tropical humid region
(b) Arid region
(c) Temperate
(d) None of these

89. Which one of the following fruits belongs to family Anacardiaceae ?
(a) Aonla (b) Litchi
(c) Cashewnut (d) Walnut

90. Skiffing is practised in which plantation crop
(a) Rubber (b) Coffee
(c) Tea (d) Cashewnut

91. D-leaf is a best indicator of nutrient status of
(a) Pineapple (b) Apple
(c) Banana (d) Ber

92. Most heavily pruned fruit plant is
(a) Ber (b) Litchi
(c) Mango (d) Guava

93. Fruit which starts bearing in one year of planting
(a) Pineapple (b) Papaya
(c) Banana (d) Strawberry

94. Fruit on the basis of respiration can be classified as
(a) Parthenocarpic
(b) Climacteric and Non climacteric
(c) Non climacteric
(d) None of these

95. Disease free plants in micropropagation can be obtained through
(a) Anther culture
(b) Meristem culture
(c) Meristem culture
(d) Embryo culture

96. Free inhibiting growth regulator is
(a) NAA (b) IAA
(c) CK (d) GA$_3$

Answers							
	80. (b)	83. (a)	86. (a)	89. (c)	92. (a)	95. (c)	
	81. (b)	84. (b)	87. (c)	90. (c)	93. (d)	96. (a)	
	82. (a)	85. (c)	88. (a)	91. (a)	94. (b)		

97. Iron deficiency in plant is characterised by
(a) Mottling of leaf
(b) Yellowing of new leaves
(c) Interveinal chlorosis of old leaves
(d) Little leaf

98. Best root stock for citrus in south India is
(a) Citrange
(b) Cleopatra mandarin
(c) Rangpur lime
(d) Name of these

99. Leaf scorching in Mango is due to
(a) Chloride toxicity
(b) Chloride deficiency
(c) N deficiency
(d) P deficiency

100. Protandry is a problem in
(a) Banana (b) Walnut
(c) Papaya (d) Grape

101. Pine apple belong to which family
(a) Juglandaceae (b) Palmae
(c) Anacardiaceae (d) Bromeliaceae

102. Most acidic citrus fruit belongs to
(a) *Citrus megalaxycarpa*
(b) *C. jambhiri*
(c) *C. medurensis*
(d) *C. pennivesiculata*

103. Which chemical acts as an aid for mechanical harvesting ?
(a) ABA (b) GA_3
(c) Ethephon (d) IAA

104. Which one of the following statements is not correct ?
(a) Maleness in fruit can be induced by the application of GA_3
(b) Femaleness in fruits can be induced by application of maleic hydrazide
(c) Root formation in cutting can be increases by application of IBA
(d) Calcium carbide chemical is not used for artificial ripenenning in banana.

105. Which fruit follows a double sigmoid curve ?
(a) Mango (b) Fig
(c) Pear (d) Ber

106. A dwarf rootstock of apple is
(a) M 25 (b) M 13
(c) M 12 (d) M 9

107. A dwarf rootstock of pear is
(a) Quince B (b) Quince A
(c) Kainth (d) Quince C

108. First successful transgenic fruit plant is produced in which fruit ?
(a) Apple (b) Mango
(c) Pear (d) Walnut

109. Botanically loquat fruit is a
(a) Sorosis (b) Nut
(c) Pome (d) Stone

110. Black tip in mango is a physiological disorder due to
(a) Chloride toxicity
(b) Carbon monoxide
(c) Deficiency of Mg
(d) Excess Boron

111. The most susceptible fruit crop to water logging is
(a) Banana (b) Ber
(c) Papaya (d) Jamun

112. Which fruit is most suited for preparation of marmalade ?
(a) Litchi (b) Guava
(c) Orange (d) Mango

Answers						
	97. (b)	100. (b)	103. (a)	106. (d)	109. (c)	112. (c)
	98. (c)	101. (d)	104. (d)	107. (d)	110. (b)	
	99. (a)	102. (a)	105. (b)	108. (c)	111. (c)	

113. Which one of the following is an aggregate fruit ?
(a) Strawberry (b) Pineapple
(c) Guava (d) Fig

114. Biggest cultivated fruit in the world is
(a) Papaya (b) Jack fruit
(c) Bread fruit (d) Coconut

115. The most cold hardy citrus root stock is
(a) Trifoliate orange
(b) Mosambi
(c) Sour lime
(d) Lemon

116. Viviparous seed are reported in
(a) Grapes (b) Ber
(c) Jack fruit (d) Mango

117. The red colour of Jelly is due to addition of
(a) Charring of sugar
(b) Pectin
(c) Artificial colour
(d) Acid

118. Most important disease of banana in India is
(a) Panama wilt
(b) *Cercospora* leaf spot
(c) Sigatoka
(d) Bunchy top

119. Santa rosa is a popular variety of
(a) Plum (b) Pear
(c) Walnut (d) Cashew nut

120. Sweetest sugar in fruit is
(a) Galactose (b) Glucose
(c) Fructose (d) Sucrose

121. The inception of ripening in grape is termed as
(a) Colour break (b) Turning stage
(c) Ver... (d) Stock even

122. Dwarf ... cultivar of papaya
(a) Pus... (b) CO...
(c) Pus... (d) Pusa Maje

123. Which one of the following is eth... absorbent ?
(a) KCl (b) $KMnO_4$
(c) KNO_3 (d) K_2SO_4

124. Fruit which show either a ri... respiration rate or an assoc... production of ethylene during ripening process are called
(a) Climacteric (b) Non-Clim...
(c) Parthenocarpic (d) Parthenog...

125. Pusa early dwarf is an improved v... of
(a) Apple (b) Mango
(c) Strawberry (d) Pea

126. Almond is originated from which ... of origin
(a) Asia minor
(b) Mediterranean region
(c) South American
(d) Chinese

127. *Murraya hexandra* (Koenig) is us... root stock for
(a) Jamun (b) Sapota
(c) Sweet orange (d) Cr...

128. Plants which become dormant d... summer are known as
(a) Deciduous (b) Evergreen
(c) Caducous (d) ... of t...

129. Which fruit crop has the hi... chromosome (2n = 30) ?
(a) Banana (b) ...
(c) Mulberry (d) ...

Answers						
	113. (a)	116. (c)	119. (a)	122. (c)	125. (b)	128. (...)
	114. (b)	117. (a)	120. (c)	123. (b)	126. (...)	129. (...)
	115. (a)	118. (d)	121. (c)	124. (c)	127. (...)	

130. Fruit of bael (*Aegle marmelos*) is botanically
(a) Drupe
(b) Hard Shelled Berry
(c) Stone
(d) Hesperidium

131. Which one of the following is not correctly matched ?
(a) Phalsa — Tiliaceae
(b) Litchi — Sapindaceae
(c) Apple — Rosaceae
(d) Mulberry — Apocynaceae

132. Karonda (*Carrisa carandus*) is belongs to family
(a) Apocynaceae (b) Euphorbiaceae
(c) Boraginaceae (d) Euphorbiaceae

133. Lasoda (*Cordia mixa*) is a minor fruit of India belongs to family
(a) Anacardiaceae (b) Rosaceae
(c) Boraginaceae (d) Euphorbiaceae

134. Hand pollination is most useful in which fruit ?
(a) Grape (b) Mango
(c) Pineapple (d) Date palm

135. Cashewnut has originated from
(a) India
(b) South East Asia
(c) Brazil
(d) Caspian Sea Area

136. Most common training system of apple in India is
(a) Open Centre
(b) Modified leader
(c) Leader
(d) Spindle bush system

137. Most ideal method for top working in Mango is
(a) Inarching (b) Veneer grafting
(c) Side grafting (d) None

138. Dwarfing rootstock in mango is
(a) Totapuri red small
(b) Dashehari
(c) Olour
(d) Alphonso

139. Best time for the propagation of apple is
(a) Dec - Jan
(b) July - August
(c) February - March
(d) April - May

140. Botanically, ber fruit is
(a) Stone (b) Berry
(c) Drupe (d) Pome

141. Botanically, the fruit of litchi is a
(a) Nut (b) Berry
(c) Drupe (d) Pome

142. Litchi is native to
(a) North China (b) India
(c) North America (d) South China

143. Guava belongs to family
(a) Myrtaceae (b) Caricaceae
(c) Euphorbiaceae (d) Rosaceae

144. The yellow pigment in papaya fruit is :
(a) Carotene (b) Anthocyanin
(c) Xanthophyll (d) Caricaxanthin

145. Papaya is a commercially propagated by :
(a) Layering (b) Cutting
(c) Budding (d) Seed

146. Origin place of pineapple is :
(a) Brazil (b) Australia
(c) China (d) India

Answers						
	130. (b)	133. (c)	136. (b)	139. (a)	142. (d)	145. (d)
	131. (d)	134. (d)	137. (c)	140. (c)	143. (a)	146. (a)
	132. (a)	135. (c)	138. (a)	141. (a)	144. (d)	

147. The inflorescence of banana is :
(a) Umbel (b) Catkin
(c) Spadix (d) Raceme

148. 'Spongy tissue' is a serious problem of mango cultivar
(a) Malda (b) Alphonso
(c) Totapari (d) Langra

149. Best time of budding in ber is
(a) July - August (b) Feb - March
(c) Sept - Oct (d) May - June

150. In budding and grafting the union between stock and scion take place through
(a) Xylem (b) Cortex
(c) Phloem (d) Cambium

151. Litchi is commercially propagated by
(a) Veneer grafting (b) Tip layering
(c) Air layering (d) March grafting

152. Type of parthenocarpy in sindhu variety of Mango is
(a) Stenospermocarpy (b) Vegetative
(c) Stimulative (d) All of these

153. Seedless mango 'Sindhu' has been developed by back cross between
(a) Rumani and Alphonso
(b) Kesar and Neelum
(c) Alphonso and Amrapali
(d) None of these

154. Pollen sterility is a serious problem in
(a) Aonla (b) Grape
(c) Pomegranate (d) Fig

155. Only aneuploid variety reported in mango
(a) Kurrukan (b) Vellaikolamban
(c) Olour (d) Amrapali

156. Fruit production in protected cultivation is due to
(a) Higher photosynthetic efficiency
(b) High temperature
(c) High O_2 (d) All of these

157. Fruits are suitable for high soil pH
(a) Mango (b) Guava
(c) Pomegranate (d) Ber

158. In situ method of grafting in mango is
(a) Inarching
(b) Stone grafting
(c) Epicotyl grafting
(d) Soft wood grafting

159. Metaxenia is commonly observed in which fruit plant
(a) Date (b) Grape
(c) Mango (d) Apple

160. Super dwarfing rootstock of apple is
(a) M 9 (b) M 11
(c) M 25 (d) M 27

161. Which one of the following fruits contain more fat than the rest ?
(a) Avocado (b) Grape
(c) Guava (d) Jackfruit

162. Multi storyed cropping is practised in
(a) J & K and Kerala
(b) Bihar and Madhya Pradesh
(c) Karnataka and Kerala
(d) Rajasthan and Haryana

163. Fruit stored in a cold chamber exhibit longer storage life because
(a) The rate of respiration is decreased
(b) There is an increase in humidity
(c) Exposure to sun light is prevented
(d) CO_2 conc. in the environment is increased

Answers						
	147. (c)	150. (c)	153. (c)	156. (c)	159. (c)	162. (c)
	148. (b)	151. (c)	154. (c)	157. (a)	160. (c)	163. (a)
	149. (a)	152. (d)	155. (b)	158. (c)	161. (a)	

164. Which of the following fruit plants bear fruits twice a year ?
1. Cashew 2. Grape
3. Jack fruit 4. Pomegranate
(a) 1, 2, 3 (b) 1 and 3
(c) 2, 3, 4 (d) 1, 2, 4

165. Sodium benzoate is added for the preservation of fruit juice in the concentration of
(a) 0.01 - 0.5 % (b) 0.06 - 0.10 %
(c) 1.1 to 1.5 % (d) 1.6 - 2.0 %

166. Which of the following pairs is not correctly matched ?
(a) Date palm Monoecious
(b) Papaya Polygamous
(c) Walnut Monoecious
(d) Pistachionut Dioecious

167. Which of the following is most suitable for growing under arid zones of India ?
(a) Papaya (b) Ber
(c) Sweet Orange (d) Jack fruit

168. Chemical formula of potassium metabisulphite is
(a) KMS (b) $K_2S_2O_7$
(c) K_2SO_2 (d) KSO_2

169. Granulation can be reduced by spraying of
(a) KNO_3 (b) Copper oxide
(c) Lead arsenate (d) Urea

170. Which one of the following is a rich source of fat ?
(a) Almond (b) Walnut
(c) Mango (d) Cashew nut

171. Which one of the following is a rich source of protein ?
(a) Walnut (b) Cashew nut
(c) Banana (d) Almond

172. [illegible]ness in lemon (*Citrus lem[illegible]*) is
(a) Self incompatibility
(b) Parthenocarpy
(c) Parthenogenesis
(d) Cytoplasmic sterility

173. Which portion of the plant is considered free from viruses ?
(a) Embryo (b) Xylem
(c) Meristem (d) Cambium

174. The chief ingredient of the medicinal value of the beal is
(a) Ricin (b) Lycopene
(c) Marmelosin (d) Annonine

175. Indicator plant for tristeza virus in citrus is
(a) *Citrus limmetoides*
(b) *C. aurantifolia*
(c) *C. reticulata*
(d) *C. paradisi*

176. Which of the following fruit is a single seeded nut ?
(a) Litchi (b) Mangosteen
(c) Almond (d) Date

177. 'Cricket ball' is an improved variety of
(a) Sapota (b) Mango
(c) Litchi (d) Guava

178. 'Little leaf' of mango is due to the deficiency of
(a) Fe (b) Mo
(c) Zn (d) Mn

179. Basrai Dwarf and Amrit Sagar are the varieties of
(a) Banana (b) Papaya
(c) Mango (d) Sapota

Answers						
	164. (c)	167. (b)	170. (b)	173. (c)	176. (a)	179. (a)
	165. (b)	168. (b)	171. (b)	174. (c)	177. (a)	
	166. (a)	169. (c)	172. (a)	175. (b)	178. (c)	

180. Which of the following citrus type is monoecious ?
(a) Citron (b) Mandarin
(c) Pummelo (d) Sour lime

181. Tamarind fruit botanically is a type of fruit
(a) Berry (b) Hesperidium
(c) Pod (lomentum) (d) Pome

182. Which of the following is a parthenocarpic grape variety ?
(a) Perlette (b) Kali sahibi
(c) Black corianth (d) Arka hans

183. Which one of the following is not correctly matched ?

Fruit	Fat (%)
(a) Cocoa	37
(b) Cashew nut	47
(c) Coconut	20
(d) Avocado	26

184. Which fruit is richest source of riboflavin ?
(a) Bael (b) Pineapple
(c) Mango (d) Ber

185. Balanced diet includes at least [illegible] g of vegetables.
(a) 90 (b) 120
(c) 200 (d) 300

186. Which vitamin is called as coagulating vitamin ?
(a) Vitamin A (b) Vitamin E
(c) Vitamin K (d) Vitamin C

187. The edible portion of cabbage is
(a) Head (b) Curd
(c) Swollen stem (d) None of these

188. Flavour in cabbage leaves is due to the glycoside
(a) Glucobrassicin (b) Sinigrin
(c) Glucocapparin (d) Progoitrin

189. Golden Acre, Pride of India a[illegible] are the improved varieties of
(a) Cauliflower (b) Cabbage
(c) Knol-Khol (d) Peas

190. Optimum seed rate (g/ha) [illegible] is
(a) 200 (b) 300
(c) 400 (d) 500

191. Optimum seed rate (g/ha) of [illegible] is
(a) 300 - 400 (b) 500 - 700
(c) 700 - 800 (d) 800 - 900

192. Buttoning is a physiological disorder [illegible]
(a) Cabbage (b) Cauliflower
(c) Onion (d) Garlic

193. Kunwari, Giant Snow Ball and [illegible] synthetic are varieties of
(a) Cauliflower (b) Knol-khol
(c) Brinjal (d) Chilli

194. Hairiness, fuzziness, hollow [illegible] hairiness and pinking are physiolo[illegible]
(a) Knol-Khol (b) Brinjal
(c) Cauliflower (d) Broccoli

195. Edible portion of brussels sprouts [illegible]
(a) Small head or bud
(b) [illegible]
(c) [illegible] (d) [illegible]

196. Pusa Purple long, Pusa Kranti and [illegible] Sheel are the improved varieties of
(a) Sprouting Broccoli
(b) [illegible]
(c) [illegible]
(d) [illegible]

Answers						
	180. (c)	183. (c)	186. (c)	[illegible]	[illegible]	[illegible]
	181. (c)	184. (a)	187. (a)	[illegible]	[illegible]	[illegible]
	182. (c)	185. (d)	188. (b)	[illegible]	[illegible]	[illegible]

197. Which of the following variety is resistant to little leaf of brinjal ?
(a) [illegible] purple cluster
(b) [illegible] purple round
(c) [illegible] samrat
(d) [illegible]

198. The [illegible] colour in chilli fruits at the ripening stage is due to pigment
(a) Capsaicin (b) Capsanthin
(c) Alkaglucoside (d) Mimosine

199. For getting optimum plant population of chilli how much seed will be required (Kg/ha)
(a) 1.0 - 1.5 (b) 1.5 - 2.0
(c) 2.0 - 3.0 (d) 3.0 - 4.0

200. Leaf curl virus of chilli is transmitted by
(a) White fly (b) Aphid
(c) Jassid (d) Honey bees

201. Pusa Early Dwarf, Pusa Ruby and Angurlata are improved varieties of
(a) Grape (b) Tomato
(c) Brinjal (d) Chilli

202. Non parasitic disorder due to deficiency of Ca in tomato is
(a) Buttoning (b) Greening
(c) BER (d) Browning

203. Cat face is a physiological disorder of
(a) Tomato (b) Brinjal
(c) Pea (d) Onion

204. Okra belongs to family
(a) Solanaceae (b) Malvaceae
(c) Tiliaceae (d) Cruciferae

205. Optimum seed rate to get desired population of okra (kg/ha) in *Kharif* season is
(a) 4 - 5 (b) 8 - 10
(c) 15 - 20 (d) 20 - 25

206. Pusa sawani, Pusa M[illegible], [illegible] and Punjab Padmani are the varieties of
(a) Okra (b) C[illegible]
(c) Garlic (d) [illegible]

207. The red colour in tomato is due to pigment
(a) Lycopine (b) C[illegible]
(c) Capsanthin (d) None

208. Shoot and fruit borer of okra belongs to
(a) *Earias vitella*
(b) *Amrasca biguttula biguttula*
(c) *Tetranychus spp*
(d) *Heliothis armigera*

209. Cluster bean contains mucilaginous substance is
(a) Mannogalacton
(b) Asparagine
(c) Glutamine
(d) Galacturonic acid

210. Optimum seed rate of cluster bean to sow one hectare area is (kg)
(a) 20 - 30 (b) 15 - 20
(c) 40 - 50 (d) 50 - 60

211. Which crop is known as vegetable meat ?
(a) Okra (b) French bean
(c) Cowpea (d) Pea

212. Pusa Phalguni, Pusa Barsati, Pusa-do fasli and Pusa Rituraj are the improved varieties of
(a) Cowpea (b) Pea
(c) French bean (d) Broad bean

213. Pant Anupama, Arka Komal and Blue Lake are the varieties of
(a) Dew bean (b) French bean
(c) Moth bean (d) Indian bean

Answers						
	197. (b)	200. (a)	203. (a)	206. (a)	209. (a)	212. (a)
	198. (b)	201. (b)	204. (b)	207. (a)	210. (b)	213. (b)
	199. (b)	202. (c)	205. (b)	208. (a)	211. (c)	

214. To get desired plant population of [illegible] bean, seed rate will be (kg/ha)
(a) 60 - 70 (b) 85 - 95
(c) 95 - 110 (d) 110 - 120

215. An illness which is known as "favism" is caused in peoples due to allergy to pollen and to green pod of
(a) French bean (b) Indian bean
(c) Broad bean (d) Moth bean

216. Application of which chemical in the form of foliar spray at the beginning of flower bud development may improved drought resistance is pea
(a) Kaolin (b) CCC
(c) Diuron (d) Chlormequat

217. Which variety is an edible podded variety of pea ?
(a) Early Badger (b) Khapar Kheda
(c) Rachna (d) Sylvia

218. Kasmir beauty and Golden heart are the varieties of
(a) Radish (b) Carrot
(c) Turnip (d) Beet root

219. Carrot is a heavy feeder particularly for
(a) [illegible] (b) [illegible]
(c) K (d) Ca

220. Pungency in radish is due to volatile compound
(a) Erucic acid
(b) Isothiocyanates
(c) Allyl propyldisulphide
(d) Diallyl disulphide

221. French Breakfast, Pusa Chetki, Arka Nishant and Bombay Red are the varieties of
(a) Carrot (b) Radish
(c) Beet root (d) Turnip

222. Optimum seed rate of turnip is (kg/ha)
(a) 1 - 2 (b) 3 - 4
(c) 4 - 6 (d) 8 - 10

223. Brown heart in turnip is a physiological disorder caused by deficiency of
(a) B (b) Fe
(c) Mo (d) Chlorine

224. *Beta vulgaris* (Beet root) belongs to family
(a) Convolvulaceae (b) Chenopodiaceae
(c) Cruciferae (d) Compositeae

225. Optimum seed rate for beet root (Chukandar) is (kg/ha)
(a) 4 - 6 (b) 10 - 12
(c) 15 - 20 (d) 20 - 25

226. Which of the following pairs is not correctly matched ?
(a) Colocasia Tuber
(b) Potato Tuber
(c) Yam Tuber
(d) Turnip Tuber

227. In which crop side harvesting or partial harvesting is practiced in our country ?
(a) [illegible] (b) Potato
(c) Colocasia (d) Garlic

228. Potato tubers contain less then ________ mg solanine per 100 g fresh weight is considered safe for human consumption.
(a) [illegible] (b) 12
(c) [illegible] (d) 2[illegible]

229. [illegible] potato can be [illegible] by use of
(a) Th[illegible]
(b) [illegible]
(c) [illegible]
(d) All of these.

Answers						
	214. (b)	217. (d)	220. ([illegible])	223. ([illegible])	226. ([illegible])	229. (d)
	215. (c)	218. (b)	221. ([illegible])	224. ([illegible])	227. (c)	
	216. (d)	219. (c)	222. (b)	225. ([illegible])	228. ([illegible])	

230. First earthing in potato should be done _____ days after planting to provide optimum space for tuberization.
(a) 20 - 30 (b) 30 - 35
(c) 40 - 45 (d) 50 - 60

231. Major pest of potato during storage is
(a) Cut worms
(b) Aphids
(c) Jassids
(d) Potato tuber moth

232. Potato is a _____ day plant but it is cultivated as _____ day plant for its tuber, respectively.
(a) Long, short
(b) Short, long
(c) Short, intermediate
(d) Long, intermediate

233. Sweet potato belongs to family
(a) Scrophullraceae
(b) Convolvulaceae
(c) Solanaceae
(d) Malvaceae

234. Which of the following pair is not correctly matched ?
(a) Onion - bulb
(b) Garlic - clove
(c) Sweet potato - tuber
(d) Cauliflower - head

235. _____ is a phenolic factor present in onion which has anti-fungal properties.
(a) Quercetin
(b) Catechol
(c) Sinigrin
(d) Allyl propyl disulphide

236. Optimum seed rate of onion to get desired plant population (kg/ha)
(a) 4 - 5 (b) 8 - 10
(c) 12 - 15 (d) 20 - 25

237. Onion bulbs are stored well at
(a) 0° to 1°C (b) 10° - 15°C
(c) 15° - 20°C (d) 20° - 25°C

238. Pungency in onion is to due presence of :
(a) Allyl propyl disulphide
(b) Diallyl disulphide
(c) Isothiocyanate
(d) Capsaicin

239. Pre-emergence of seed stalks prior to time of their formation at the cost of bulb formation and development in onion is known as :
(a) Buttoning (b) Bolting
(c) Browning (d) None

240. Garlic contain amino acid :
(a) Alliin
(b) Allicin
(c) Diallyl disulphide
(d) Allinage

241. Optimum seed rate of garlic (kg/ha) in terms of clove :
(a) 100 - 200 (b) 400 - 500
(c) 600 - 800 (d) 900 - 1000

242. Pointed gourd (dioecious) is propagated by :
(a) Root cutting (b) Stem cutting
(c) Seeds (d) None

243 _____ is the only cultivated member of cucurbitaceae family which is single seeded :
(a) Pointed gourd (b) Kartoli
(c) Kakrol (d) Chayote

Answers					
	230. (b)	233. (b)	236. (b)	239. (b)	242. (b)
	231. (d)	234. (d)	237. (a)	240. (a)	243. (d)
	232. (a)	235. (b)	238. (a)	241. (b)	

244. Pusa Meghdoot and Pusa Manjari are the improved varieties of :
(a) Bottle gourd (b) Bitter gourd
(c) Ridge gourd (d) Snake gourd

245. Which of the following pairs is not correctly matched ?

Vegetable	Seed rate (kg/ha)
(a) Cucumber	4 - 5
(b) Bottle gourd	6 - 8
(c) Bitter gourd	4 - 6
(d) Sponge gourd	8 - 10

246. Which glucoside is helpful in preventing spoilage of cooked vegetable of bitter gourd ?
(a) Cucurbitacin (b) Quercetin
(c) Sinigrin (d) Alliin

247. Among cucurbits, which fruit is richest in iron content ?
(a) Musk melon (b) Water melon
(c) Bottle gourd (d) Bitter gourd

248. Durgapura Meetha, Durgapur Kesar and Pusa Bendana are the improved variety of :
(a) Musk melon (b) Water melon
(c) Sweet potato (d) Beet

249. Jobner Green is a high yielding variety of :
(a) Indian spinach (beet leaf)
(b) Spinach
(c) *Amaranthus*
(d) Onion

250. Which state is highest producer of fenugreek in India ?
(a) Rajasthan
(b) Madhya pradesh
(c) Gujarat
(d) Maharashtra

251. Which countr ranked 1st in expor floricultural products in the world ?
(a) Italy (b) Netherlands
(c) Columbia (d) India

252. Who established most fam LALBAGH garden in Bangalore ?
(a) King Hyd Ali (b) Tipu Sult
(c) Ranjit Singh (d) King Sura

253. First variety of Hybrid Teas (H.T.) c of rose is :
(a) La France (b) Tushar
(c) Vasant (d) Sonia

254. Roses are commonly propagated b
(a) 'T' or shield budding
(b) Grafting
(c) Stem cutting
(d) Seeds

255. Gladiolus is belongs to :
(a) Rosaceae (b) Compositae
(c) Solanaceae (d) Iridaceae

256. Rose Supreme, Happy End Friendship are improved varieties
(a) Rose (b) Gladiolus
(c) Carnation (d) Marigold

257. Gladiolus is generally propogated b
(a) Tuber (b) Corm
(c) Rhizome (d) Root

258. Optimum seed rate for marigold is ha)
(a) 0.5 (b) 1.5
(c) 2.5 (d) 3.5

259. Art of training plants into diffe shapes of birds, domes, anim umbrellas etc is known as
(a) Topiary (b) Hedges
(c) Standard shrubs (d) Barada

Answers						
	244. (a)	247. (b)	250. (a)	253. (a)	256. (b)	259
	245. (d)	248. (b)	251. (b)	254. (a)	257. (b)	
	246. (a)	249. (a)	252. (a)	255. (d)	258. (b)	

260. "Hillocks are made to create a natural mountains scenery" are the characteristic feature of (informal style)
(a) Persian garden
(b) Mughal garden
(c) Japanese garden
(d) Rose garden of Ludhiana

261. Running water, high protecting wall, terminal building and Baradari are the important feature of :
(a) Mughal garden
(b) Rose garden of Ludhiana
(c) English garden
(d) Persian garden

262. Garden lanterns, garden pagoda, garden bridges, tea garden and flat garden are the unique feature of :
(a) Japanese garden (b) Mughal garden
(c) English garden (d) Rose garden

263. In India date is harvested at _____
(a) Doka stage (b) Dang stage
(c) Pind stage (d) All of these

264. Oleoresin is extracted from :
(a) Onion (b) Garlic
(c) Chillies (d) Fenugreek

265. Panama disease of banana is prevented by
(a) Spraying copper fungicide
(b) Spraying zinc carrier
(c) Application of lime to the soil
(d) Providing adequate irrigation

266. Which one of the following is not a self pollinated vegetables ?
(a) Cowpea (b) French bean
(c) Tomato (d) Chilli

267. Which one of the following fruits is grown in semi-wild form in wasteland of peninsular India but is one of the largest foreign exchange earners ?
(a) Coconut (b) Mango
(c) Cashew (d) Banana

268. Zero energy cool chamber operates on the principles of
(a) Second law of thermodynamics
(b) Evaporative cooling
(c) Boyle's law (d) Charle's law

269. Citronella is used for
(a) Flavouring the cosmetics and soaps
(b) Recovery of health
(c) Curing respiratory troubles
(d) Checking bleeding

270. The medicinal plant known as "Second shilajeet" is
(a) Asparagus (b) Safed musli
(c) Kal Megh (d) Isabgol

271. What is the correct sequence of the given five major fruits in descending order of their production in India ?
(a) Mango – Banana – Citrus – Apple – Grapes
(b) Mango – Grapes – Banana – Apple – Citrus
(c) Banana – Citrus – Mango – Apple – Grapes
(d) Banana – Mango – Citrus – Grapes – Apple

272. 'Japanese Long Green' is a popular variety of
(a) Watermelon (b) Cucumber
(c) Snake gourd (d) Bottle gourd

273. Which one of the following pairs is not correctly matched ?
(a) Papaya : Chinni champa
(b) Date palm : Gold finger
(c) Walnut : Chakrata selections
(d) Strawberry : Tioga

Answers					
	260. (c)	263. (a)	266. (d)	269. (a)	272. (b)
	261. (a)	264. (c)	267. (c)	270. (b)	273. (a)
	262. (a)	265. (c)	268. (b)	271. (d)	

274. Which one of the following parts of the plant is considered free from viruses ?
(a) Cambium (b) Xylem
(c) Apical meristem (d) Embryo

275. 'Mangala' is an improved variety of :
(a) Arecanut (b) Coconut
(c) Cashewnut (d) Walnut

276. In grapes, fore-pruning is done to
(a) Remove dead wood/shoots
(b) Encourage vegetative growth
(c) Encourage reproductive growth
(d) Dwarfen the plant

277. Which one of the following ranges of soil pH is good for potato growth and development ?
(a) 4.8 to 5.4 (b) 5.5 to 7.5
(c) 7.0 to 8.0 (d) 7.5 to 8.5

278. Which one of the following is a vector for transmitting leaf curl viruses in vegetable crops ?
(a) Aphids (b) Thrips
(c) Honey bees (d) White fly

279. Which one of the following crops is used as both tubers and leafy vegetables ?
(a) Yam
(b) Elephant's foot yam
(c) Lettuce (d) Colocasia (Taro)

280. Which one of the following is an ethylene absorbant ?
(a) $KMnO_4$ (b) KCl
(c) K_2SO_4 (d) $Ca(NO_3)_2$

281. Around 395 mg of Ca per 100 g of edible portion is found in
(a) Fenugreek leaves (b) Yam
(c) Peas (d) Potato

282. What is the optimum temperature required for snowball group cauliflower for curd initiation and development ?
(a) 4°C – 8°C (b) 10°C – 16°C
(c) 18°C – 21°C (d) 22°C – 25°C

283. Which one of the following cropping systems is effective for the control of cabbage club rot ?
(a) Long rotation with non-cruciferous crops
(b) Intercropping with brussels sprouts
(c) Intercropping with mustard
(d) Intercropping with turnip

284. Which of the above are responsible for the deterioration of flowers after the harvest ?
(a) Temperature of the surrounding atmosphere
(b) Gaseous composition of the atmosphere surrounding the flowers
(c) Respiration rate of the flowers
(d) All of these

285. Consider the following fruits :
1. Banana 2. Litchi
3. Pineapple 4. Strawberry
In which of the above is shape of the fruit one of the main key indices for the harvesting ?
(a) 1, 2 and 3 only
(b) 1 and 3 only
(c) 2 and 4 only
(d) 1, 2, 3 and 4

286. Which of the statements given below is/are correct ?
(a) Guava is propagated through seed only
(b) Most common method of propagating litchi is air layering
(c) The propagation of peach is done by budding on seedling peach
(d) Both (b) and (c)

Answers					
	274. (c)	277. (b)	280. (a)	283. (c)	286. (d)
	275. (a)	278. (a)	281. (a)	284. (d)	
	276. (c)	279. (d)	282. (c)	285. (b)	

287. Which one of the following groups denotes the species of rose predominantly used for rose oil extraction ?
(a) *Rosa bourboniana, R. foetida, R. indica*
(b) *R. chinensis, R. rugosa, R. canina*
(c) *R. damascena, R. centifolia, R. bournoniana*
(d) *R. multiflora, R. canina, R. chinensis*

288. Which one of the following is the recommended storage temperature range to extend the storage life of cut spikes of gladiolus for two weeks ?
(a) – 2 to 0°C (b) 1 to 2°C
(c) 10 to 15°C (d) 20 to 25°C

289. Which of the statements given below is/ are correct ?
(a) Marigold flowers last longer if the field is irrigated before plucking of flowers
(b) Carnation flowers should always be transported pre-cooled
(c) Both (a) and (b)
(d) Neither (a) nor (b)

290. Which of the below pairs is/are not correctly matched ?
(a) Cucumber : Monoecious plant
(b) Bitter gourd : Monoecious plant
(c) Pointed gourd : Dioecious plant
(d) Papaya : Hermaphrodite plant

291. Infectious chlorosis in banana is caused by which one of the following ?
(a) Virus (b) Bacteria
(c) Fungus
(d) Phanerogamic plant parasite

292. Which one of the following is the vector for yellow vein mosaic of okra ?
(a) White fly (b) Green plant hopper
(c) Aphids (d) Jassids

293. In the context of post-harvest handling, which one among the following vegetables has highest rate of respiration ?
(a) Beans (b) Cabbage
(c) Carrot (d) Onion

294. Tomato is which one of the following ?
(a) Long day plant
(b) Short day plant
(c) Day neutral plant
(d) Quantitative short day plant

295. Which one of the following systems of orchard planting accommodates the maximum number of plants per unit area ?
(a) Square system
(b) Hexagonal system
(c) Rectangular system
(d) Contour system

296. Which one of the following pairs is not correctly matched ?
(a) Bract mosaic virus : Banana
(b) Yellow vein mosaic : Cassava
(c) Ring spot virus : Papaya
(d) Leaf curl virus : Tomato

297. Which one of the following pairs is not correctly matched ?
(a) Seedless watermelon : Pusa Bedana
(b) Soft seeded guava : Sharad Seedless
(c) Soft seeded mango : Sindhu
(d) Seedless lime : Tahiti

298. Rayan is commonly used as a rootstock in the propagation of which one of the following ?
(a) Mango (b) Custard apple
(c) Tamarind (d) Sapota

Answers				
	287. (c)	290. (d)	293. (a)	296. (b)
	288. (b)	291. (a)	294. (c)	297. (b)
	289. (c)	292. (a)	295. (b)	298. (d)

299. Aonla is best suited to grow under which one of the following ?
(a) Acidic soil condition
(b) Slightly acidic to saline sodic soil conditions
(c) Calcareous soil condition
(d) Alkali soil condition

300. Which one of the following methods of grafting is not normally used for plant propagation ?
(a) Approach (b) Bridge
(c) Veneer (d) Whip

301. Which of the statements given below is/ are correct ?
(a) The flesh and seeds of Brinjal fruit contain linoleic and lenolenic acids which help in lowering blood cholesterol
(b) Cabbage gives protection against bowel cancer due to the presence of Indole-3 carbinol
(c) Neither (a) nor (b)
(d) Both (a) and (b)

302. Match List I (Disorder) with List II (Fruit) and select the correct answer using the codes given below the lists.

List – I	List – II
A. Malformation	1. Pineapple
B. Fasciation	2. Sweet orange
C. Seediness	3. Mango
D. Granulation	4. Banana

Codes :

	A	B	C	D
(a)	3	1	4	2
(c)	3	4	1	2

	A	B	C	D
(b)	2	4	1	3
(d)	2	1	4	3

303. Match List I (Crop) with List II (Family) and select the correct answer using the codes given below the lists.

List – I	List – II
A. Asparagus	1. Araceae
B. Colocasia	2. Compositae
C. Lettuce	3. Liliaceae
D. Radish	4. Cruciferae

	A	B	C	D
(a)	3	2	1	4
(c)	3	1	2	4

	A	B	C
(b)	4	2	1
(d)	4	1	2

304. Which one of the following fruit c is an amphidoploid ?
(a) Mango (b) Strawberry
(c) Banana (d) Kiwifruit

305. Which one of the following properti the seeds is tested by 2,3,5-triph tetrazolium chloride (TZ) ?
(a) Viability (b) Purity
(c) Moisture content (d) Germina

306. Which system is used for hybrid production in onion ?
(a) Self-compatibility
(b) Dioecious
(c) Cytoplasmic male sterility
(d) Genetic male sterility

307. Consider the following pairs :
1. Molybdenum deficiency : Whip disease of cauliflower
2. Zinc deficiency : Little leaf in m
3. Boron deficiency : Brown ro cauliflower

Which of the pairs given above correctly matched ?
(a) 1 and 2 only (b) 2 and 3 or
(c) 1 and 3 only (d) 1, 2 and 3

308. The deficiency of which one of following elements causes die bac citrus decline disease in citrus ?
(a) Cobalt (b) Copper
(c) Manganese (d) Magnesium

Answers				
	299. (b)	302. (a)	305. (a)	308. (b)
	300. (a)	303. (c)	306. (c)	
	301. (d)	304. (a)	307. (d)	

309. ... deficiency of which one of the following causes lime induced chlorosis ?
(a) Iron (b) Zinc
(c) Boron (d) Magnesium

310. Which one of the following is a monoembryonic citrus species ?
(a) *Citrus paradisi* (Grape fruit)
(b) *Citrus sinensis* (Sweet orange)
(c) *Citrus reticulata* (Mandarin)
(d) *Citrus grandis* (Pummelo)

311. Which one of the following cultivars of papaya is gynodioecious ?
(a) Pusa Dwarf (b) Pusa Nanha
(c) Pusa Giant (d) Pusa Majesty

312. Which one of the following conditions is the reason for the seedlessness in 'Thompson Seedless' grapes ?
(a) Incomplete flower
(b) Non-viable pollen
(c) Parthenocarpy
(d) Stenospermocarpy

313. Which one of the following causes inflorescence blight in cashew (as vector) ?
(a) *Helopeltis antonii*
(b) *Plocaderus ferrugineus*
(c) *Nephoteryx sp.*
(d) *Thylocoptila paurosema*

314. Banana plant gives fruits only ..... in life.
(a) Four times (b) Thrice
(c) Twice (d) Once

315. Foster pink is a bud sport of :
(a) Apple (b) Nagpur orange
(c) Kinnow orange (d) Grape fruit

316. Which one of the following pairs is not correctly matched ?
(a) Budding : Aonla
(b) Cutting : Grape
(c) Epicotyle grafting : Mango
(d) Mound layering : Jack fruit

317. Which one of the following is a non-climacteric fruit ?
(a) Banana (b) Pineapple
(c) Sapota (d) Plum

318. Which one of the following pairs is not correctly matched ?
(a) Pusa Sawani : Okra
(b) Pusa Barsati : Cowpea
(c) Pusa Katki : Cauliflower
(d) Pusa Kiran : Tomato

319. Which one of the following timings is correct in terms of fertilizer application schedule of banana ?
(a) Planting to harvest
(b) Planting to bunch emergence
(c) Bunch emergence to harvest
(d) Before planting

320. Which of the following types of flowers are present in mango panicles ?
(a) Male and hermaphrodite
(b) Female only
(c) Male and female
(d) Male and neutral

321. For controlling which one of the following are roots of *Rauvolfia serpentina* used ?
(a) High blood pressure
(b) Insulin levels
(c) Bronchial asthma
(d) Diarrhoea

Answers					
	309. (a)	312. (d)	315. (d)	318. (d)	321. (a)
	310. (d)	313. (a)	316. (d)	319. (b)	
	311. (d)	314. (d)	317. (b)	320. (a)	

322. ... (*Pogostemon cablin*) ... be ...
... Malayan tropics
Central America
South Africa
Mediterranean region

323. ... one of the following pairs is not correctly matched ?
(a) Capsicum : Contender
(b) Carrot : Early Nantes
(c) French Bean : Arka Komal
(d) Knol knol : White Vienna

324. Match List I (Crop) with List II (Disorder) and select the correct answer using the codes given below the lists.

List - I	List - II
A. Mandarin Orange	1. Heavy drop of flowers and fruits
B. Jamun	2. Spongy tissue
C. Mango	3. Decline
D. Litchi	4. Hollow heart

	A	B	C	D
(a)	3	1	2	3
(c)	1	2	1	3

	A	B	C	D
(b)	3	1	2	4
(d)	3	2	1	4

325. Sigatoka is a serious fungal disease in ... first reported in the Sigatoka valley in 1928 in ____
(a) Tamil Nadu (b) Goa
(c) Fiji (d) ...

326. Harvesting of best plucking in tea is referred as
(a) Two leaves and a bud
(b) Only bud
(c) Four leaves and a bud
(d) Only Leaves

327. In hilly areas fruit plants should be planted in :
(a) Rectangular system
(b) Square system
(c) Quincunx system
(d) Contour system

328. Which is frost-resistant papaya ?
(a) *Carica papaya*
(b) *Carica cauliflora*
(c) *Carica candamarcensis*
(d) None of the above

329. In Onion 'bolting' takes place due to
(a) High temperature
(b) Low temperature
(c) Excess of nitrogen
(d) Deficiency of nitrogen

330. Red flesh is a variety of :
(a) Tomato (b) Mango
(c) Guava (d) Papaya

331. Gibberellic acid is commercially used to improve size of fruit in :
(a) Aonla (b) Pomegranate
(c) Ber (d) Grapes

332. Mango malformation can be reduced by spraying of
(a) GA (b) IAA
(c) NAA (d) ...

333. Fruit crop tolerant to salinity is
(a) Fig (b) Mango
(c) Orange (d) Apple

Answers				
	322. (a)	325. (...)	328. (c)	331. (...)
	323. (a)	326. (a)	329. (a)	332. (...)
	324. (b)	327. (d)	330. (c)	333. (...)

Explanations of some questions

5. (a) Pungency and red color in chilli is due to capsaicin and capsaithin pigments, respectively.
7. (a) Aonla has higher amount of Vit. C, whereas highest Vit. C containing fruit is Barbados cherry.
14. (c) Kinnow Mandarin is a hybrid between king (*Citrus nobilis*) and willow leaf (*Citrus deliciosa*) developed at Citrus Experiment Station, California by HB Frost in 1935.
19. (b) Sodium benzoate is used to preserve coloured juices/pulps along with citric acid (only in non-acid fruits), whereas KMS is used to preserve most of the pulps/juices.
41. (d) Jam is prepared by boiling the fruit pulp with a sufficient quantity of sugar (minimum 68 %) to a reasonably thick consistency, whereas jelly is prepared by fruit juices/ or clear water extract of fruit.
54. (b) Pusa Bedana is a seedless hybrid having aborted embryos and false seeds, whereas Sugar Baby is an introduction from the USA.
63. (a) Botanically pineapple is a syncarpous (multiple) fruit known as sorosis and it has originated in Brazil.
82. (a) India ranked first in vegetable production in the year 2004-05, whereas in the year 2007-08, China ranked first.
87. (b) Granulated fruits of Citrus are characterized by decrease in total soluble.
90. (c) Skiffing is practiced in tea and it is the lightest form of pruning, whereas collar pruning is the severe most pruning used for rejuvenation of tea gardens.
98. (c) Rangpur lime is the most preferred rootstock for sweet orange and mandarin in Central and South India.
104. (d) Calcium carbide is used for artificial ripening in Banana.
106. (d) M9 is dwarf rootstock of apple evolved as a chance seedling, whereas M27 is a ultra dwarf rootstock developed as a result of cross between M13 x M9.
110. (b) Black tip in mango is caused due to harmful effect of brick kilns fumes which contain carbon monoxide (CO), SO_2 and acetylene.
122. (c) Dwarf mutant cultivar of papaya Pusa Nanha (Dioecious) was developed at IARI regional Station, Pusa Bihar.
130. (b) Fruit of Bael is botanically known as hard shelled berry contain marmelosin an active ingredient (in all parts) and this fruit is the richest source of Riboflavin.
143. (a) Guava and Jamun both belongs to family Myrtaceae.
151. (c) Litchi is propagated through air layering, native of southern China and belongs to family Sapindaceae (Bihar is leading producer of Litchi).
154. (d) Incompatibility and polyploidy are two serious problems in ber improvement.
159. (a) Under metaxenia, pollens have a direct effect on somatic tissues of fruit results in early or late ripening, changes in colour and size of fruit and seed.
175. (b) Cross protection technique is effective to check the tristeza virus in acid lime (*C. aurantifolia*).
177. (a) Cricket Ball, CO 1 (Cricket ball x Oval), CO 2, DHS 1, DHS 2, PKM 2, PKM 3, Kallipati, Calcutta Round are improved varieties of Sapota (Climacteric fruit).

192. (b) Developed of small curds in young plants with less developed leaves is known as buttoning.
194. (c) Flower pedicels of velvety curds elongate and such condition is known as fuzziness. Plants grow without terminal bud and fail to form any curd in cauliflower is called blindness.
195. (a) Jade Cross, Hills Ideal and Rubine are improved varieties of Brussels sprout (*Brassica oleracea* var *gemmifera*) and 500 g of seed is enough to raise seedling for one ha.
197. (b) Little leaf of brinjal is transmitted by leaf hopper (*Amrasca biguttula biguttula*).
226. (d) Turnip is grown for roots and propagated through seeds.
234. (d) Cauliflower is grown for curd (economic part), whereas, economic part of cabbage is head.
247. (b) Water melon fruit is the richest source of Iron amongst cucurbits and it contains about 92 % water, 7 % carbohydrates, 0.2 % protein and 0.3 minerals.
255. (b) Gladiolus is an indicator plant for fluoride pollution even at very low conc.(1 ppb).
257. (b) 1,50,000 corms can be accommodate in one ha area.
288. (b) To enhancing the vase life of gladiolus spikes, pulsing with 20 % sucrose and 200 ppm hydroxyl quinoline citrate for 24 hrs is excellent. Cut spikes be stored successfully for 2 wee 1-2°C.
310. (d) *Citrus grandis* (Pummelo), *Citrus lat* (Tahiti lime) and *Citrus medica* (Cit are the three mono embryo species of *Citrus*.
311. (d) Pusa Majesty and Pusa Delicious gynodioecious varieties of papay
312. (d) Thompson seedless, Pusa seedl Delight, Perlette and Beauty Seed belongs to Stenospermocar whereas Black Corianth sho vegetative Parthenocarpy.
313. (a) *Helopeltis antonii* (tea mosquito b causes shoot blight or inflorescer blight and can be controlled by sp of carbaryl (0.05 %), quinalphos (0 %) or phosphomidon (0.03 %).
315. (d) Foster, Thompson and burgun pigmented grapefruit (*Citrus paradi* are perclinial chimeras by soma mutations in white grape.
316. (d) Jackfruit is commonly propagat through seeds, air layering, grafti and budding.
323. (a) Contender is a popular variety French bean tolerant to powde mildew and mosaic.
331. (d) GA3 is most commonly used grow regulator for berry elongation ar quality improvement in grape.
332. (c) Spray of NAA @ 200 ppm in Oct-No followed by de-blossoming (Fel March) control the malformation.

Table 1

S.No.	Vegetable	Botanical Name	Family	Chromo-some Number (2n)	Origin Place
1.	Brinjal	*Solanum melongena*	Solanaceae	24	India
2.	Chillies	*Capsicum annuum*	Solanaceae	24	Mexico
3.	Okra	*Abelmoschus esculantus*	Malvaceae	73-132	Tropical Africa
4.	Tomato	*Lycopersicon esculantum*	Solanaceae	24	Peru & Mexico
5.	Cauliflower	*Brassica oleracia* var *botrytis*	Cruciferae	18,20	Eastern Mediterranean region
6.	Cabbage	*Brassica oleracia* var *capitata*	Cruciferae	18	Mediterranean region
7.	Knolkhol	*Brassica oleracia* var *caulorapa*	Cruciferae	18	Coastal Northern Europe
8.	Cowpea	*Vigna sinensis*	Leguminosae	22	Central Africa
9.	French bean	*Phaseolus vulgaris*	Leguminosae	22	South America
10.	Cluster bean	*Cymopsis tetragonoloba*	Leguminosae	14	West Africa & India
11.	Indian bean	*Dolichos lablab*	Leguminosae	22,24	India
12.	Pea	*Pisum sativum*	Leguminosae	14	Ethiopia
13.	Radish	*Raphanus sativus*	Cruciferae	18	China & India
14.	Carrot	*Daucus carota*	Umbelliferae	18	Europe & SW Africa
15.	Beet root	*Beta vulgaris*	Chenopodiaceae	18	Mediterranean region
16.	Potato	*Solanum tuberosum*	Solanaceae	48	South America
17.	Sweet potato	*Ipomea batatas*	Convolvulaceae	90	Tropical America
18.	Garlic	*Allium sativum*	Amaryllidaceae	16	Central Asia & MR
19.	Onion	*Allium cepa*	Amaryllidaceae	16	Central Asia
20.	Cucumber	*Cucumis sativus*	Cucurbitaceae	14	Asia & Africa
21.	Bottle gourd	*Laginaria siceraria*	Cucurbitaceae	22	Africa & India
22.	Bitter gourd	*Momordica charantia*	Cucurbitaceae	22	Tropical Africa & Asia
23.	Ridge gourd	*Luffa acutangula*	Cucurbitaceae	26	India
24.	Sponge gourd	*Luffa cylindrica*	Cucurbitaceae	26	India

25.	Round gourd	*Citrullus vulgaris fistulosus*	Cucurbitaceae	24	North India
26.	Musk melon	*Cucumis melo*	Cucurbitaceae	24	NW India
27.	Water melon	*Citrullus lanatus*	Cucurbitaceae	22	Tropical Africa
28.	Pumpkin	*Cucurbita moscheta*	Cucurbitaceae	40	Tropical America
29.	Beet leaf	*Beta vulgaris va benghalensis*	Chenopodiaceae	18	Indo-China Region
30.	Spinach	*Spinacea oleracia*	Chenopodiaceae	12	South West Asia
31.	Fenugreek	*Trigonella foenum graecum*	Leguminosae	16	SE Europe & Ethiopia
32.	Celery	*Apium graveolens*	Umbelliferae	22	Mediterranean region & Himalayas
33.	Asparagus	*Asparagus officinalis*	Liliaceae	20,40	European region

Table 2. Common, botanical names, family, type of fruit, edible portion and method of propagation of different fruits

Fruits	Botanical name	Family	Type of fruit	Edible portion	Method of propagation
Mango	*Mangifera indica*	Anacardiaceae	Drupe	Mesocarp	Veneer grafting
Banana	*Musa paradisica*	Musaceae	Berry	Mesocarp	Sword suckers
Mandarin	*Citrus reticulata*	Rutaceae	Hesperidium	Juicy placental hairs	T-budding
Sweet orange	*Citrus sinensis*	Rutaceae	Hesperidium	Juicy placental hairs	T-budding
Acid lime	*Citrus aurantifolia*	Rutaceae	Hesperidium	Juicy placental hairs	Seed
Lemon	*Citrus limon*	Rutaceae	Hesperidium	Juicy placental hairs	Air layering
Grape fruit	*Citrus paradisi*	Rutaceae	Hesperidium	Juicy placental hairs	Budding
Pummelo	*Citrus grandis*	Rutaceae	Hesperidium	Juicy placental hairs	Seed, T-budding
Sweet lime	*Citrus limmettoides*	Rutaceae	Hesperidium	Juicy placental hairs	Hard wood stem cutting
Aonla	*Embilica officinalis*	Euphorbiaceae	Berry	Mesocarp & endocarp	T or Shield budding
Guava	*Psidium guajava*	Myrtaceae	Berry	Thalamus & pericarp	Inarching
Ber	*Zizyphus mauritiana*	Rhamnaceae	Drupe	Epicarp	Shield budding

Grape	*Vitis venifera*	Vitaceae	Berry	Pericarp & placentae	Hard wood stem cutting
Papaya	*Carica papaya*	Caricaceae	Berry	Mesocarp	Seeds
Datepalm	*Phoenix dactylifera*	Palmae	Drupe	Pericarp	Off shoots
Litchi	*Litchi chinensis*	Sapindaceae	Single seeded nut	Aril	Air layering
Phalsa	*Grewia subinaequalis*	Tiliaceae	Drupe	Epi & mesocarp	Seed
Pomegranate	*Punica granatum*	Punicaceae	Balausta	Aril	Hard wood cutting
Bael	*Aegle marmelos*	Rutaceae	Amphisiaraca	Succulent placentae	Patch budding
Pine apple	*Ananas comosus*	Bromeliaceae	Sorosis	Bracts and perianth	Suckers & slips
Sapota	*Achras zapota*	Sapotaceae	Drupe	Mesocarp	Inarching
Loquat	*Eriobotrya japonica*	Rosaceae	Pome	Fleshy thalamus	Inarching & shield budding
Apple	*Malus malus*	Rosaceae	Pome	Fleshy thalamus	Budding
Pear	*Pyrus communis*	Rosaceae	Pome	-	Tongue grafting
Strawberry	*Fragaria ananosa*	Rosaceae	Etaerio of achenes	Succulent thalamus	Runners
Walnut	*Juglans regia*	Juglandaceae	Nut	Lobed cotyledons	Patch budding

Plantation Crops

Tea	*Camellia sinensis*	Theaceae	-	-	Soft wood cutting
Coffee	*Coffea arabica*	Rubiaceae	Drupe	Seeds	Seed
Cashewnut	*Anacardium occidentale*	Anacardiaceae	Drupe	Lobed cotyledons	Soft wood grafting
Coconut	*Cocos nucifera*	Palmae	One seeded drupe	Endosperm	Seed
Arecanut	*Areca catechu*	Arecaceae	Single seeded berry	-	-
Rubber	*Hevea brasiliensis*	Euphorbiaceae		-	Forket budding
Cacoa	*Theobroma cacao*	Sterculiaceae	Drupe (Pod)	-	Seed

IMPORTANT FACTS

1. Monoecious species of papaya - *Carica monoica*
2. Pomology is derived from - Greek word
3. Predominant organic acid present in grape - Tartaric acid
4. Only citrus fruit which contain malic acid - Sweet lime
5. Largest producer of citrus in the world - USA
6. Outer layer of papaya seed which hinders germination is called - Sarcotesta
7. Inarching in mango in India was suggested by - S.K. Mukherjee
8. Fruit with maximum iron content - Karonda
9. Quincunx system accommodates (Times) more plants than square system - 2
10. First president of H S I - G.S. Cheema
11. Deciduous types of ber - *Z. jujuba*
12. Horticulture society of India was established in - 1942
13. Guava bears mostly on - Current season growth
14. Best planting material of pineapple - Slip
15. Kinnow is a hybrid between - *Citrus nobilis* & *Citrus deli*
16. Botanically, Chinese guava is - *Psidium friedrichsthalia*
17. The nutrient which improves quality of fruit is - K
18. Lime is a good source of - Vitamin C
19. Pusa majesty and Pusa Delicious varieties of papaya are - Gynodioecious
20. The main insect responsible for pollination in mango - Common house fly
21. Best suited crop as inter crop in Banana - Papaya
22. Most suitable fruit for avoiding scurvy - Aonla
23. Citranges has originated as a result of cross between - Trifoliate orange & swe orange
24. High density planting in pineapple accommodates plants about - 60,000 / ha
25. Vector for transmission of tristeza virus in citrus is - *Toxoptera citricida*
26. Fruit crop suitable for cold desert of cold arid zone - Apricot
27. Seedlessness in grape is due to - Stenospermocarpy
28. Which beverage crop is referred as food of god - Cacao
29. Theobromin in cacao is extracted from - Bark
30. Kniffin system of training in grape was developed by - William kniffin (USA)
31. Aroma of over ripe fruit of banana is due to - Isopentanol
32. Bronzing in guava is caused by deficiency of - Zn
33. The term stenospermocarpy was coined in 1936 by - Stout
34. King of arid fruit - Ber
35. Which fruit is also known as butter fruit - Avocado
36. King of temperate fruits - Apple
37. Queen of beverage crop - Tea
38. Which plantation crop is also known as small holder irrigated crop ? - Oil palm
39. Richest source of Vitamin C among fruits - Barbados Cherry
40. Highest oil producing tree plant is - Oil Palm
41. Rubber is native to - Brazil

4 Genetics & Plant Breeding

1. An organism which has acquired a heritable variation as a result of sudden change in the hereditary material is called as a :
(a) Hybrid (b) Biotype
(c) Mutant (d) Albino

2. A polyploid having chromosome sets from different sources such as different species is known as
(a) Autopolyploid (b) Aneuploid
(c) Tetraploid (d) Allopolypoid

3 Sex form in most cucurbits including melons is
(a) Hermaphrodite (b) Monoecious
(c) Dioecious (d) None of these

4 The increased performance of F_1 hybrid over its parents is called
(a) Dominance (b) Heterosis
(c) Crossing over (d) None of these

5 Ratio of the genetic variance to the total variance which determines the relationship between phenotype and genotype is known as
(a) Genetic advance (b) Penetrance
(c) Heritability (d) Dominance

6. Mass pedigree selection method of breeding is particularly, useful for improvement of
(a) Self pollinated crops
(b) Self compatible cross pollinated crops
(c) Self incompatible crops
(d) Dioecious crops

7. Emasculation of flower is necessary for hybridization in
(a) Male sterile plants
(b) Self pollinated plants
(c) Self incompatible plants
(d) Dioecious plants

8. Leafy vegetables like palak, amaranthus, spinach, are
(a) Highly cross pollinated
(b) Often cross pollinated
(c) Self pollinated
(d) Often self pollinated

9. The modern hybrid tea roses were evolved as a result of which of the following crossing ?
(a) Hybrid perpetuals × Tea roses
(b) Hybrid perpetuals × Floribunda
(c) Floribunda × Tea roses
(d) Tea roses × Polyanthus

10. Mendel did not face the problem of linkage, however, seven characters studied by him were located on how many chromosomes ?
(a) Seven (b) Four
(c) Five (d) Three

11. Test cross ratio in case of duplicate gene action will be
(a) 1 : 1 (b) 1 : 1 : 1 : 1
(c) 3 : 1 (d) 1 : 3

Answers								
	1. (c)	4. (b)	7. (b)	10. (b)
	2. (d)	5. (c)	8. (a)	11. (c)
	3. (b)	6. (a)	9. (c)	

12. A : T ratio in one strand of DNA duplex is 2, what will be the ratio in the complementary strand ?
(a) 1.0 (b) 0.5
(c) 2.5 (d) 2.0

13. The term gene was coined by
(a) Mendel (b) Bateson
(c) Shull (d) Johannsen

14. Number of chromosomes in wheat endosperm is
(a) 21 (b) 42
(c) 63 (d) 14

15. Cytoplasmic male sterility is best suited for hybrid seed production in
(a) SP crops (b) CP crops
(c) Vegetatively propagated crops
(d) All above

16. Multiple effects of a single gene is known as
(a) Pleiotropy (b) Polyploidy
(c) Heteroploidy (d) None of these

17. An example of a heterozygous but homogeneous population is
(a) Pure line
(b) Open pollinated variety
(c) Hybrid variety
(d) Synthetic variety

18. The cross of an inbred line with an open pollinated variety is known as
(a) Back cross (b) Top cross
(c) Three way cross (d) Double cross

19. The first artificial hybrid was made by
(a) Mendel (b) Thomas Fairchild
(c) Koelreuter (d) Beal

20. Systematic hybridization on a scientific basis began with the work
(a) Shull - Maize
(b) Patel - Cotton
(c) Koelreuter - *Nicotiana*
(d) Knight - Fruits

21. Double cross plan was suggested by
(a) Beal (b) Shull
(c) Jones (d) Knight

22. Who gave the concept of circular chromosome in *E. coli* ?
(a) Cairns (b) Meselson
(c) Watson (d) Stahl

23. Sex in plants was discovered by
(a) Grew (b) Camerarious
(c) T Fairchild (d) Linnaeus

24. Who produced puppies through artificial insemination in dogs ?
(a) de Graaf (b) O Hertwig
(c) Spallanzani (d) Tyndall

25. Concept of epigenesis was proposed by
(a) Aristotle (b) Bonnet
(c) Wolf (d) Darwin

26. 'Origin of species' was published in
(a) 1775 (b) 1859
(c) 1953 (d) 1905

27. Germplasm theory was proposed by
(a) Darwin (b) Weismann
(c) Castle (d) Philips

28. Cell linkage theory was proposed by
(a) Virchow (b) Nagali
(c) Schleiden and Schwann
(d) Hooke

29. The chromosomes are most condensed at
(a) Prophase (b) Metaphase
(c) Anaphase (d) Telophase

Answers								
	12. (b)	15. (c)	18. (b)	21. (c)	24. (c)	27. (b)
	13. (d)	16. (a)	19. (b)	22. (a)	25. (c)	28. (a)
	14. (c)	17. (c)	20. (c)	23. (b)	26. (b)	29. (c)

30. DNA synthesis takes place in which stage ?
(a) G_1 phase (b) G_2 stage
(c) S phase (d) None of these

31. In the DNA double helix G/A is equal to
(a) C/T (b) T/A
(c) C/A (d) C/G

32. Harshey and Chase in their experiments labelled DNA with
(a) 3H (b) ^{35}S
(c) ^{32}P (d) All above

33. The number of bases in the single turn of the DNA helix is
(a) 5 (b) 7
(c) 10 (d) 12

34. The common form of DNA present in the living organisms is the
(a) A form (b) Z form
(c) C form (d) B form

35. DNA polymerase I was discovered by
(a) Harshey (b) Yanofsky
(c) Kornberg (d) Crick

36. The DNA replicating enzyme in bacteria is :
(a) DNA Pol I (b) DNA Pol II
(c) DNA Pol III (d) None of these

37. Protein involved in keeping the DNA single stranded during replication is
(a) Ligase (b) Helicase II
(c) Topoisomerase (d) SSB protein

38. Okazaki fragments are formed due to synthesis of DNA in direction :
(a) 5'-3' (b) 3'-5'
(c) Both (d) None

39. Deamination of adenine leads to the formation of
(a) Xanthine (b) Hypoxanthine
(c) Uracil (d) Cytosine

40. Maximum absorbance of DNA molecule is at ..... O_A wave length
(a) 260 (b) 280
(c) 600 (d) 630

41. In *Drosophilla* 16A region of X chromosome cause normal eye. If the region is repleated the eye produced is
(a) Normal (b) White
(c) Barr (d) Yellow

42. The resulting two daughter cells produced by bridge-breakage fusion cycle will have
(a) Duplication (b) Deficiency
(c) Both (a) & (b) (d) None

43. A tautomeric shift in adenine (amino to imino) allows it to pair with ..... only
(a) Cytosine (b) Adenine
(c) Guanine (d) Thymine

44. In humans, an XO individual has how many barr body in her cells ?
(a) One (b) Two
(c) Three (d) None

45. Nucleolus plays an important role in the production of
(a) rRNA (b) tRNA
(c) mRNA (d) All of these

46. An example of dicotyledonous albuminous seed is
(a) Soybean (b) Castor bean
(c) Sweet pea (d) Cotton

47. An amino acid which is related to drought tolerance in plants is
(a) Glutamic acid (b) Proline
(c) Glycine (d) Hydroxyproline

Answers						
	30. (c)	33. (c)	36. (c)	39. (b)	42. (c)	45. (a)
	31. (a)	34. (d)	37. (d)	40. (a)	43. (a)	46. (a)
	32. (c)	35. (c)	38. (a)	41. (c)	44. (d)	47. (b)

48. Which of the following are the inhibitors to cell wall synthesis ?
(a) Penicillin
(b) Oxamycin and Ristocatin
(c) Vanomycin (d) All above

49. Inhibitors to cell membrane synthesis are
(a) Polymixin
(b) Gramicidin and Circulin
(c) Tyrocidin (d) All above

50. Inhibitors to mRNA synthesis (Transcription) are
(a) Actinomycin-D (b) Rifampicin
(c) 5-Bromouracil (d) All above

51. Inhibitors to translation (protein synthesis) are
(a) Streptomycin
(b) Uromycin and Neomycin
(c) Chloramphanicol and Erythromycin
(d) All above

52. What is seed multiplication ratio in chickpea and wheat are, respectively ?
(a) 1 : 4 and 1 : 10 (b) 1 : 20 and 1 : 10
(c) 1 : 8 and 1 : 30 (d) 1 : 10 and 1 : 20

53. What is seed multiplication ratio in potato and groundnut are, respectively ?
(a) 1 : 4 and 1 : 8 (b) 1 : 8 and 1 : 4
(c) 1 : 10 and 1 : 8 (d) 1 : 8 and 1 : 10

54. Seed multiplication ratio in paddy is
(a) 1 : 100 (b) 1 : 80
(c) 1 : 40 (d) 1 : 10

55. Seed multiplication ratio in bajra is
(a) 1 : 100 (b) 1 : 150
(c) 1 : 200 (d) 1 : 300

56. Seed multiplication ratio of rapeseed, red gram, hybrid maize, sorghum and jute is
(a) 1 : 100 (b) 1 : 5
(c) 1 : 60 (d) None

57. In green plants photosynthesis place in
(a) Proplastids (b) Leucoplast
(c) Chromoplast (d) Chloroplas

58. Site of protein synthesis in a cel
(a) Ribosomes
(b) Endoplasmic reticulum
(c) Chloroplasts
(d) Mitochondria

59. Which cell organelle is having dig enzymes ?
(a) Ribosomes (b) Golgi bod
(c) Mitochondria (d) Lysosomes

60. Who discovered 'X-rays' first ?
(a) Wilson (b) Roentgen
(c) Benzer (d) Muller

61. The defective copies of normal are known as
(a) Selfish genes (b) Jumping g
(c) Split genes (d) Pseudo ge

62. The terms recon, muton and cistron coined in 1957 by
(a) Bridges (b) Muller
(c) Benzer (d) Morgan

63. The variance which is fixable is
(a) Additive (b) Dominanc
(c) Epistatic (d) All above

64. The term cybrid refers to the
(a) Somatic hybrids
(b) Gametic hybrids
(c) Both (a) and (b)
(d) None of these

Answers						
	48. (d)	51. (d)	54. (b)	57. (d)	60. (b)	63.
	49. (d)	52. (d)	55. (c)	58. (a)	61. (d)	64.
	50. (d)	53. (a)	56. (a)	59. (d)	62. (c)	

65. Which component of immune response is crippled in AIDS ?
(a) B-cell (b) Macrophase
(c) Helper T-cells (d) NK cells

66. During mitosis, chromosomal DNA duplication takes place in
(a) Interphase (b) Prophase
(c) Metaphase (d) Anaphase

67. The cell walls of fungi are made up of
(a) Cellulose (b) Chitin
(c) Pectin (d) Proteins & lipids

68. Which of the following compound contains cobalt ?
(a) Pyridoxal phosphate
(b) Vitamin B_{12}
(c) Hemocyanin
(d) Cytochrome P_{450}

69. Antibiotic that cause mis-incorporation of amino acids in protein synthesis is
(a) Cycloheximide (b) Ampicillin
(c) Puromycin (d) Streptomycin

70. 'DNA as a genetic element' was shown by the experiment of
(a) Avery, Macleod and McCarty
(b) Watson and Crick
(c) Grifith
(d) Maxam and Gilbert

71. The inherent capacity of an organism to increase in numbers under ideal condition is known as
(a) Growth rate
(b) Biotic potential
(c) Reproductive potential
(d) Population explosion

72. rDNA analysis provides information on
(a) Phylogenetic relationships
(b) Population differences
(c) Biotype differences
(d) Strain differences

73. The wetlands are threatened due to
(a) Draining and conversion into rice fields
(b) Infestation with exotic water weeds
(c) Silting due to soil erosion
(d) Overexploitation of fish resources

74. Cryopreservation is not suitable for preserving organisms which are
(a) Frost sensitive (b) Frost resistant
(c) Aerobic (d) Anaerobic

75. Tiger project is a holistic approach for the conservation of
(a) Ecosystem (b) Tiger
(c) Deer (d) Plant communities

76. Two species belonging to the same genus are identical in morphology which of the following structural characteristics is more useful in distinguishing such species
(a) Gross anatomical features
(b) Ultrastructural features of cell organelles
(c) Chromosome number & morphology
(d) Distribution pattern of trichomes

77. Two taxonomic species are distinguished from each other by
(a) Their failure to interbreed
(b) Their ability to exchange genes freely
(c) Their similarity in correlated morphological characters
(d) Discontinuity in a set of correlated characters

78. A common crop which is grown of natural autopolyploid grown
(a) Mustard (b) Wheat
(c) Potato (d) Cotton

Answers					
	65. (c)	68. (b)	71. (c)	74. (c)	77. (a)
	66. (a)	69. (c)	72. (a)	75. (a)	78. (c)
	67. (b)	70. (a)	73. (c)	76. (c)	

79. Pearlmillet is predominantly cross pollinated because it is
(a) Protoandrous (b) Protogynous
(c) Hermaphrodite (d) Heterozygous

80. A F_1 plant with the genetic constitution AaBbccDd is test crossed with aabbccdd, there will be
(a) 10 genotypes (b) 8 genotypes
(c) 12 genotypes (d) 4 genotypes

81. In wheat and rice the genetic purity of a variety can deteriorate due to
(a) Inbreeding
(b) Delayed segregation
(c) Mechanical contamination with seeds of other varieties
(d) Due to (a) and (b) both

82. A mating among the following can not lead to heterosis
(a) AAbb × aaBB
(b) aaBBcc × AABBCC
(c) AABBccdd × AABBccdd
(d) AABBccdd × aabbCCDD

83. What is the most useful method of detecting virus infection in seeds ?
(a) Seed plating (b) Phage test
(c) ELISA (d) None

84. The most important factor which determines stability of seed is
(a) Light (b) Temperature
(c) Moisture (d) Nutrients

85. In seed testing, the grow out test is conducted to determine
(a) Physical purity (b) Seed viability
(c) Genetic purity (d) None of these

86. Translocation of carbohydrates mostly takes place in the form of
(a) Glucose (b) Fructose
(c) Sucrose (d) Maltose

87. If the gametic composition of a genotype is AbC, Abc, abc, abC in equal proportion the genotype of the source individual
(a) AaBbCc (b) AABbCc
(c) AabbCc (d) AabbCC

88. The stalk of the ovules is called
(a) Pedicel (b) Peticle
(c) Funicle (d) Micropyle

89. IPGRI headquarter is situated in
(a) New Delhi, India
(b) New York, USA
(c) Sydney, Australia
(d) Rome, Italy

90. A fertilized mature ovule whi possesses an embryonic plant, food reserve and protective coating in a pla species is
(a) Embryo Sac
(b) Embryonic callus
(c) Embryo
(d) Seed

91. The visible scar (spot) observed on seed at the place of the detachment from seed stalk is known as
(a) Micropyle (b) Stone
(c) Pole (d) Hilum

92. Aflatoxins are produced by
(a) Infected plants (b) Infected bacteria
(c) Fungi (d) Nematodes

93. Golgi apparatus is also known as
(a) Ribosomes (b) Dictyosome
(c) Centriole (d) Lysosome

94. 'Law of homologous series' is given
(a) Bateson (b) Debary
(c) Darwin (d) Vavilov

Answers						
	79. (b)	82. (c)	85. (c)	88. (c)	91. (c)	94. (d)
	80. (b)	83. (c)	86. (a)	89. (d)	92. (c)	
	81. (c)	84. (c)	87. (a)	90. (c)	93. (b)	

95. Transposable elements were discovered by
(a) McClintock (b) Mendel
(c) Robert (d) Shull

96. Wobble hypothesis was given by
(a) Flor (b) Crick
(c) Benzer (d) Watson

97. Gene for gene hypothesis is proposed by
(a) McLintoch (b) Biffen
(c) Flor (d) DeBary

98. Pure line variety is a
(a) Homozygous - Heterogenous
(b) Homozygous - Homogenous
(c) Heterogenous - Heterogenous
(d) Heterogenous - Homozygous

99. Land races are
(a) Advanced strains
(b) Hybrid varieties
(c) Local varieties
(d) All of these

100. Lysine is limiting amino acid in
(a) Cereals (b) Pulses
(c) Green vegetables (d) None of these

101. In pulses, limiting amino acids are
(a) Methionine (b) Tryptophan
(c) Lysine (d) Both (a) and (b)

102. The low neurotoxin variety of *Lathyrus* is
(a) Pusa 6 (b) Pusa 8
(c) Pusa 24 (d) Pusa 12

103. Pusa Sugandha-5 is new variety of
(a) Rice (b) Rose
(c) Marigold (d) Gladiolus

104. Shaktiman is the new variety of
(a) Wheat (b) Rice
(c) Maize (d) Chickpea

105. Pusa Gold is a new variety of
(a) Rice (b) Wheat
(c) Mustard (d) Mango

106. Pusa 1088, Pusa 1103, Pusa 1105 are new varieties of
(a) Chickpea (b) Mustard
(c) Pea (d) Lentil

107. Pusa Karishma and Mahak are new varieties of
(a) Palak (b) Bathua
(c) Mustard (d) Amarantha

108. Pusa Arunima and Pusa Surya are new varieties of
(a) Mango (b) Guava
(c) Citrus (d) Ber

109. Poorva, Urja and Pusa Vishesh are new varieties of
(a) Bajra (b) Wheat
(c) Rice (d) Chickpea

110. Pusa Ratna is a new variety of
(a) Wheat (b) Bajra
(c) Rice (d) Mungbean

111. Source of dwarfing gene in wheat is
(a) Dee - Gee - Woo - Gen
(b) Norin - 10
(c) Opaque (d) Hipsoli

112. Dee - Gee - Woo - Gen is the source of dwarfing gene in
(a) Wheat (b) Bajra
(c) Peanut (d) Rice

113. The ratio of economic yield to the biological yield is
(a) Leaf area ratio (b) Harvest index
(c) Total harvest (d) Total biomass

Answers						
	95. (a)	98. (b)	101. (d)	104. (c)	107. (c)	**110. (d)**
	96. (b)	99. (c)	102. (c)	105. (b)	108. (a)	**111. (b)**
	97. (c)	100. (a)	103. (a)	106. (a)	109. (b)	**112. (d)**
						113. (b)

114. The plant type concept was first introduced by
(a) Jenings (1964)
(b) Donald (1968)
(c) Finley (1968)
(d) Rasmusson (1987)

115. There is an increase in ..... under drought conditions
(a) ABA content (b) Ethylene level
(c) Proline content (d) All of these

116. The concept of vertical and horizontal resistance was introduced by
(a) Nelson (1973)
(b) Vander Plank (1963)
(c) Robinson (1971)
(d) Russell (1978)

117. The concept of physiological races was given by
(a) Barrus (1911)
(b) De Barry (1914)
(c) Robinson (1971)
(d) Russell (1963)

118. The source of 'A' genome in wheat is
(a) *T. urartu* (b) *T. dicoccoides*
(c) *T. durum* (d) *T. turgidum*

119. An amphidiploid between *B. nigra* and *B. campestris* is
(a) *B. napus* (b) *B. carinata*
(c) *B. juncea* (d) *N. tomentosa*

120. Who made first intergeneric cross between bread wheat and rye ?
(a) Muntzing (1951)
(b) Rimpu (1928)
(c) Vavilov (1926)
(d) Richey (1923)

121. BTT is associated with
(a) Rice (b) Wheat
(c) Maize (d) Barley

122. Triploids are normally
(a) Sterile (b) Fertile
(c) Malesterile (d) None of t

123. First man made cereal is
(a) Triticale (b) Raphanob
(c) Pomato (d) None of t

124. Cells without cell wall are know
(a) Protoplasts (b) Proplastid
(c) Chloroplast (d) Cybrids

125. A condition in which F_1 plants interspecific cross are vigorous fertile but their F_2 progeny is weak sterile is called
(a) Hybrid sterility
(b) Hybrid inviability
(c) Hybrid breakdown
(d) All of these

126. Inability of a hybrid to produce vi offspring is known as
(a) Hybrid sterility
(b) Hybrid inviability
(c) Hybrid breakdown
(d) All of these

127. Term heterosis was introduced by
(a) Davenport (1908)
(b) Shull (1911)
(c) Hull (1945)
(d) East (1936)

128. Highest uniformity is present i
(a) Double cross (b) Multiple cros
(c) Single cross (d) Th... cr

129. Double top cross refers
(a) (A × B) × OPV (b) ... × (C ×
(c) (A × B) × C (d) (... × B) × (A ×

Answers						
	114. (a)	117. (a)	120. (b)	123. (a)	126. (a)	129. (a)
	115. (d)	118. (a)	121. (d)	124. (a)	127. (b)	
	116. (b)	119. (c)	122. (a)	125. (c)	128. (c)	

130. The dominance hypothesis of heterosis was first proposed by
(a) Davenport (1908)
(b) East (1908)
(c) Hull (1945)
(d) Shull (1914)

131. The method(s) used for fixation of heterosis are
(a) Apomixis
(b) Polyploid
(c) Asexual reproduction
(d) All of these

132. In cross pollinated species, a true breeding line obtained by continuous inbreeding is called
(a) Synthetic variety (b) Inbred
(c) Composite variety (d) Clone

133. Progeny of a single plant obtained by asexual reproduction is
(a) Pune line (b) Inbred
(c) Clone (d) Strain

134. The progeny of a single homozygous self pollinated plant is known as
(a) Pune line (b) Clone
(c) Inbred (d) Land race

135. The 'pure line' theory was proposed by
(a) Bateson (b) Johannsen
(c) Yule (d) Nilsson Ehle

136. The term genetics is coined by
(a) Johannsen (b) Bateson
(c) Punnet (d) Morgan

137. The phenomenon of linkage was first observed by
(a) Bateson and Punnet
(b) Morgan
(c) Hugo de Vries
(d) Mendel

138. The 'one gene one enzyme' hypothesis was proposed by
(a) Lederberg ad Tatum
(b) Muller and Stadler
(c) Watson and Crick
(d) Beadle and Tatum

139. The 'operon concept' of gene regulation was proposed by
(a) Beadle and Tatum
(b) Jacob and Monod
(c) Watson and Crick
(d) None of these

140. Dr. Hargovind Khurana was awarded the Nobel Prize in 1968 for his work on
(a) Mutation
(b) RNA synthesis
(c) Genetic code and *in vitro* synthesis of DNA
(d) Protein synthesis

141. Which one of the following sets is the correct sequence of events in the cell ?
(a) Transcription, translation, protein synthesis
(b) Transcription, protein synthesis, translation
(c) Translation, protein synthesis, transcription
(d) Protein synthesis, transcription, translation.

142. The performance of a double cross hybrid (A × C) × (B × D) can be predicted from the average performance of the combination of
(a) A × B, A × C, C × B and C × D
(b) A × B, A × D, B × C and C × D
(c) A × B, A × C, A × D and B × C
(d) A × B, C × D, A × C and B × D

Answers					
	130. (a)	133. (c)	136. (b)	139. (b)	142. (b)
	131. (d)	134. (a)	137. (a)	140. (c)	
	132. (b)	135. (b)	138. (d)	141. (a)	

143. The number of single crosses will be equal to
(a) n(n - 1)/2
(b) n(n - 1)(n - 2)/8
(c) n(n - 1)(n - 2)(n - 3)/8
(d) n(n + 1)(n + 2)/4

144. The number of double crosses will be equal to
(a) n(n - 1)/2
(b) n(n - 1)(n - 2)(n - 3)/8
(c) n(n - 1)(n - 2)/2
(d) n(n + 1)(n - 2)/8

145. The number of three way crosses are
(a) n(n - 1)(n - 2)/2
(b) n(n + 1)(n + 2)/2
(c) n(n - 1)(n - 2)(n - 3)/8
(d) None of these

146. The variety of wheat developed from spring × winter wheat crosses is termed as
(a) Kalyansona (b) Sonalika
(c) WL 711 (d) VEERY

147. The immediate effect of pollen on the character of endosperm is called
(a) Metaxenia (b) Xenia
(c) Epistasis (d) Hypoxenia

148. An individual with gametic chromosome number is
(a) Haploid (b) Monoploid
(c) Dihaploid (d) Polyploid

149. The individuals with 2n±1 chromosomes are commonly known as
(a) Euploid (b) Aneuploid
(c) Heteroploids (d) None of these

150. Pollination and fertilization in an unopened flower bud is the situation called
(a) Cleistogamy (b) Chasmogamy
(c) Homogamy (d) Dichogamy

151. The situation in which one gene hide the effect of a second gene when both are present in a chromosome is called
(a) Dominance
(b) Epistasis
(c) Both (a) and (b)
(d) None of these

152. An individual with 2n - 1 - 1 chromosome constitution is called
(a) Monosomic
(b) Double monosomic
(c) Disomic
(d) Double trisomic

153. Which one of the following statements regarding selfing is correct ?
(a) It improves heterozygosity
(b) It does not have any effect on heterozygosity
(c) It reduces heterozygosity
(d) It decreases homozygosity

154. Triticale is
(a) Interspecific cross
(b) Intraspecific cross
(c) Intergeneric cross
(d) Intrageneric cross

155. Cabbage is cross pollinated owing to
(a) Floral morphology
(b) Protandry
(c) Protogyny
(d) Self incompatibility

156. In maize, cross pollination occurs due to
(a) Protandry
(b) Protogyny
(c) Self incompatibility
(d) All of these

Answers					
	143. (a)	146. (a)	149. (b)	152. (b)	155. (d)
	144. (b)	147. (b)	150. (a)	153. (c)	156. (a)
	145. (a)	148. (a)	151. (b)	154. (c)	

157. Bulk population breeding is suitable for
(a) Fruit crops
(b) Vegetable crops
(c) Small grain crops
(d) Flower crops

158. In sugarcane breeding the initial selection after hybridization is done in the generation
(a) F_0 (b) F_1
(c) F_2 (d) F_6

159. In a synthetic variety of maize produced by combining 10 lines, the loss of excess vigour in F_2 generation will be
(a) 1/2 (b) 1/4
(c) 1/5 (d) 1/10

160. The equilibrium in random mating population is disturbed by selection, mutation, inbreeding, migration and genetic drift in which situation the population may regain its original composition ?
(a) Inbreeding and selection
(b) Mutation
(c) Migration
(d) Genetic drift

161. Consider the following genotypes
(1) Breeding lines (2) Land races
(3) Variety under cultivation
What is the correct sequence of these in terms of their importance to farmers
(a) 1, 2 and 3 (b) 2, 3 and 1
(c) 3, 1 and 2 (d) 1, 3 and 2

162. The smallest unit of genetic material that can not be divided but is interchangeable among units refers to
(a) Cistron (b) Muton
(c) Recon (d) Plasmon

163. What is the plausible reason for availability of most of the tomato varieties in the market to be almost uniformly oval shaped and firm
(a) Expansion in genetic diversity
(b) Reduction in genetic diversity
(c) Cloning
(d) Floral abnormality

164. In a cross if we get 8 types of gametes from both male and female parents, the resultant selfing will produce a ratio of
(a) 1 : 1 : 1 : 1 : 1 : 1 : 1 : 1
(b) 9 : 9 : 9 : 9 : 3 : 3 : 3 : 1
(c) 27 : 9 : 9 : 9 : 3 : 3 : 3 : 1
(d) 9 : 3 : 3 : 1

165. Seedless watermelon is a
(a) Diploid (b) Triploid
(c) Tetraploid (d) Pentaploid

166. Which of the following rice variety has been developed through induced mutagenesis ?
(a) IR 8 (b) Mahsuri
(c) Pankaj (d) Jagannath

167. In back cross breeding repeated crossing with recurrent parent is done to
(a) Transfer the desirable gene from donor parent
(b) Break undesirable linkage
(c) Retain the intensity of desirable gene
(d) Completely recover the genotype of recurrent parent

168. In apomixis, the progeny closely resembles
(a) Male parent
(b) Female parent
(c) Both male and female parents
(d) None of these

Answers				
	157. (c)	160. (b)	163. (b)	166. (d)
	158. (b)	161. (b)	164. (c)	167. (d)
	159. (d)	162. (c)	165. (b)	168. (b)

169. Superiority of F_1 hybrid over a standard commercial variety is called
(a) Heterobeltiosis
(b) Luxuriance
(c) Economic heterosis
(d) Relative heterosis

170. Inbred lines in maize are maintained by
(a) Self pollination
(b) Open pollination
(c) Cross pollination
(d) Sib pollination

171. NBPGR is located at
(a) Lucknow (b) Karnal
(c) Bikaner (d) New Delhi

172. The component lines used in development of composite variety of maize are
(a) Inbred lines
(b) Single crosses
(c) Top crosses
(d) Open pollinated varieties

173. Mutation due to change in gene because of
(a) Loss (b) Degeneration
(c) Addition (d) All of these

174. The chemical mutagens usually induce
(a) Chromosomal breakages
(b) Gene mutation
(c) Chromosomal translocation
(d) None of these

175. A cybrid is a
(a) Sexual hybrid
(b) Hybrid formed by cell division
(c) Plant formed by tissue culture
(d) Synonymous to hybrid

176. Reversion occurs due to
(a) Gene intraction
(b) Mutation
(c) Gene intraction and mutation
(d) None of these

177. Breeding method for transfer monogenic disease resistance from species to improved variety of whea
(a) Pedigree method
(b) Bulk method
(c) Backcross method
(d) Pure line selection

178. Physical basis of life is
(a) Nucleus (b) Cell
(c) Protoplasm (d) Food

179. Botanically pineapple fruit is
(a) Sorosis (b) Balusta
(c) Berry (d) Pome

180. First hybrid in pulses (Arhar) in Ind developed through genetic male steril
(a) IPCH-8 (b) ICPH-8
(c) IHCP-8 (d) IHPC-8

181. First cotton hybrid variety in the wo developed in India, the variety is
(a) H4 (b) Varalaxmi
(c) Sugna (d) None of thes

182. Dr. C. R. Rao is a famous plant breed working on
(a) Sorghum (b) Maize
(c) Bajra (d) Potato

183. In which crop, the first transgenic w developed ?
(a) Cotton (b) Soybean
(c) Tobacco (d) Tomato

184. 'Flavr savr' is associated wit
(a) Potato (b) Tomato
(c) Tobacco (d) Pomato

Answers						
	169. (c)	172. (d)	175. (b)	178. (c)	181. (a)	1 : (b)
	170. (a)	173. (d)	176. (b)	179. (a)	182. (a)	
	171. (d)	174. (b)	177. (c)	180. (b)	183. (c)	

185. The capacity of a cell to develop into a complete plant is called
(a) Tissue culture (b) Fecundity
(c) Totipotency (d) Haploidy

186. 'Bulbosum Technique' is used in barley for the production of
(a) Hybrids (b) Haploids
(c) Monoploids (d) Trisomics

187. Wheat is naturally
(a) Auto polyploids
(b) Auto - allopolyploids
(c) Segmental allopolyploids
(d) Segmental autopolyploids

188. 'Colchicine' interferes with
(a) Replication
(b) Recombination
(c) Formation of spindle fibres
(d) None of these

189. 'Colchicine' is generally used for
(a) Chromosome doubling
(b) Hybridization
(c) Mutation
(d) All above

190. Sum total of deleterious genes present in species is known as
(a) Genetic advance
(b) Genetic erosion
(c) Genetic load
(d) Species diversity

191. 'Chromosomal theory' of inheritance was given by
(a) Beadle and Tatum
(b) Watson and Crick
(c) Bateson and Punnet
(d) Sutton and Boveri

192. 'Multiple factors hypothesis' is given by
(a) Sutton and Boveri
(b) Nilson Ehle
(c) Galton
(d) East

193. Reverse transcription is also known as
(a) Teminism (b) Temin
(c) Translation (d) All of these

194. RFLP is a
(a) Genetic marker
(b) Molecular marker
(c) Morphological marker
(d) Physiological marker

195. Who is known as father of genetics ?
(a) Mendel (b) Kolreuter
(c) Darwin (d) None of these

196. Double helical structure of DNA was shown by
(a) Watson and Crick
(b) Beadle and Tatum
(c) Bateson and Punnet
(d) Jacob and Monod

197. The F_2 ratio in complementary gene action is
(a) 9 : 3 : 4 (b) 9 : 7
(c) 15 : 1 (d) 13 : 3

198. The test cross ratio in complementary gene action is
(a) 3 : 1 (b) 1 : 2 : 1
(c) 1 : 3 (d) 2 : 1 : 1

199. The F_2 ratio in polymeric gene action is
(a) 9 : 3 : 4 (b) 12 : 3 : 1
(c) 9 : 6 : 1 (d) 13 : 3

200. Translocation involves
(a) Homologous chromosomes
(b) Non homologous chromosomes
(c) Chromosomes from other species
(d) None of these

Answers						
	185. (c)	188. (c)	191. (d)	194. (b)	197. (b)	200. (a)
	186. (b)	189. (a)	192. (b)	195. (a)	198. (c)	
	187. (c)	190. (c)	193. (a)	196. (a)	199. (c)	

201. Chromosomes other than sex chromosomes are called
(a) Allosomes (b) Autosomes
(c) Heterosomes (d) Autoallosomes

202. An exchange of genetic material between homologous chromosomes is called
(a) Recombination (b) Mutation
(c) Crossing over (d) Introgression

203. The world 'Mutation' was first used by
(a) Muller (b) Hugo de Vries
(c) S Wright (d) Morgan

204. Coupling and repulsion hypothesis was given by
(a) Morgan (b) Darlington
(c) Bateson (d) Muller

205. Theory of 'Gemmules' was proposed by
(a) Darwin (b) Lamark
(c) Kolreuter (d) Weisman

206. Incompatibility is very common in plant kingdom was reported by
(a) East (b) Lewis
(c) Mather (d) None of these

207. Improved seed distributed to farmers for commercial cultivation is
(a) Nucleus (b) Breeder
(c) Foundation (d) Certified

208. D - genome of common cultivated wheat has been contributed by
(a) *T. monococcum* (b) *T. durum*
(c) *T. timopheevi* (d) *Ae squarrosa*

209. Recommended concentration of EMS for induced mutagenesis is
(a) 0.03 to 1.5% (b) 0.30 to 3.0%
(c) 1.00 to 3.5% (d) Above 4%

210. When chiasma frequency is 100%, the percentage of crossing over is
(a) 150% (b) 100%
(c) 50% (d) 25%

211. The tissue which nourish microspores is
(a) Tapatum (b) Nucellus
(c) Endodermis (d) Mesophyll

212. The analogue of 5-bromouracil is
(a) Thyamine (b) Cytosine
(c) Adenine (d) Guanine

213. How many mitotic divisions will tak place to produce 512 cells from a single parent cell ?
(a) 9 (b) 256
(c) 158 (d) 511

214. The cDNA libraries can be prepared by isolating
(a) tRNA (b) mRNA
(c) DNA (d) rDNA

215. Substitution haploids are represented as
(a) n + 1 (b) n - 1
(c) n - 1 + 1 (d) None

216. How many phenotypes are possible in ABO blood groups ?
(a) 3 (b) 4
(c) 6 (d) 8

217. From the marriage between two heterozygotes for albinism, what is the chance that the first would be non-albino ?
(a) 1/4 (b) 1/2
(c) 3/4 (d) 3/8

218. DNA can be denatured by heating at a temperature of
(a) 72°C (b) 86°C
(c) 90°C (d) 94°C

219. The following amongst the molecular markers is codominant in nature
(a) RAPD (b) SSR and RFLP
(c) VNTR (d) None of these

Answers						
	201. (b)	204. (c)	207. (d)	210. (c)	213. (d)	**216. (b)**
	202. (c)	205. (a)	208. (d)	211. (a)	214. (b)	**217. (c)**
	203. (b)	206. (b)	209. (a)	212. (a)	215. (c)	**218. (d)**
						219. (b)

220. Genomic imprinting occurs in
(a) Plants (b) Animals
(c) Humans (d) All of these

221. If the DNA of a species has the mole fraction of G+C= 0.48, the mole fraction of A will be
(a) 0.24 (b) 0.26
(c) 0.48 (d) 0.52

222. Which one of the following is not a protein ?
(a) Macrozyme (b) DNA pol
(c) Ribozyme (d) Zymase

223. A virus free clone from a virus infected plant can be obtained by
(a) Tissue (b) Leaf
(c) Stem (d) Meristem culture

224. Self splicing introns are found in
(a) tRNA genes
(b) rRNA genes
(c) Structural genes
(d) All of these

225. Oxysomes occurs in
(a) Plastids (b) Golgi bodies
(c) ER (d) Mitochondria

226. In mitosis, longest phase is
(a) Anaphase (b) Telophase
(c) Prophase (d) Metaphase

227. Nullisomic condition is represented by
(a) 2n + 1 (b) 2n + 1 - 1
(c) 2n - 2 (d) 2n - 1

228. Who discovered triangle of Brassica ?
(a) Rimpu (b) Negaheru
(c) Blakeslee (d) Karpechenko

229. The combination of male and female features in the body of an individual is known as
(a) Sex mosaic (b) Sex chromatin
(c) Autosomes (d) None

230. Collection of germplasm from foreign countries is called
(a) Indigenous collection
(b) Indirect introduction
(c) Exotic collection
(d) Alien collection

231. The best method for developing disease resistant plants is
(a) Mutation (b) Selection
(c) Hybridization (d) Back crossing

232. The growth of tissues of living plants on a suitable culture medium is called
(a) Anther culture
(b) Plant tissue culture
(c) Genetic engineering
(d) None of these

233. Clonal selection is used in
(a) Flowering species
(b) Non - flowering species
(c) Seeds propagating species
(d) None of these

234. Population which intermate freely are called as
(a) Random mating population
(b) Mendalian population
(c) Panmictic population
(d) All of these

235. Genetically most pure seed is
(a) Breeder seed
(b) Nucleus seed
(c) Foundation seed
(d) Certified seed

Answers						
	220. (d)	223. (d)	226. (c)	229. (a)	232. (b)	235. (b)
	221. (b)	224. (b)	227. (c)	230. (c)	233. (b)	
	222. (c)	225. (d)	228. (b)	231. (d)	234. (d)	

236. Which of the event(s) given below is/ are correct ?
(a) The duration of prophase is larger than anaphase
(b) The DNA synthesis take place in prophase stage of cell division
(c) Both (a) and (b)
(d) Neither (a) nor (b)

237. What is the most effective method for transfer of on oligogenic character in an otherwise agronomically superior genotype ?
(a) Pedigree
(b) Bulk population
(c) Recurrent selection
(d) Backcross

238. Maintenance and multiplication of 'A' line used in crops like pearmillet, is done through
(a) Crossing the plants of 'A' line with those of 'B' line
(b) Crossing the plants of 'A' line with those of 'R' line
(c) Selfing the plants of 'A' line
(d) Crossing the parents of 'A' line with any popular variety

239. Cross - pollination in maize is mainly on account of which one of the following ?
(a) Dioecism
(b) Monoecism
(c) Protogyny
(d) Self - incompatibility

240. The gene - for - gene hypothesis regarding disease resistance in crop varieties has following features :
1. This hypothesis was proposed for rust in linseed by Flor.
2. For each gene for resistance in the host plant, there is correspond gene for virulence in the patho
Which of the features given above is/ correct ?
(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

241. Which of the statements given below are correct ?
(a) Additive genetic variance can utilized to develop a variety
(b) Dominance variance can be utili for developing hybrids
(c) Both (a) and (b)
(d) Neither (a) nor (b)

242. Which one of the following is simplest method for testing the Gen Combining Ability of an inbred li
(a) Single cross (b) Multiple cro
(c) Top cross (d) Test cross

243. Consider the following landmark ev in crop variety development in Ind
1. Development of transgenic crop
2. Semidwarf varieties of wheat and
3. Hybrid cotton
Which one of the following is the co chronological sequence of the al events ?
(a) 3 - 2 - 1 (b) 2 - 3 - 1
(c) 2 - 1 - 3 (d) 1 - 3 - 2

244. Which system is used for hybrid s production in Onion ?
(a) Self - incompatibility
(b) Dioecious
(c) Cytoplasmic male sterility
(d) Genetic male sterility

Answers			
	236. (a)	239. (b)	242. (c)
	237. (d)	240. (c)	243. (b)
	238. (a)	241. (c)	244. (c)

245. Which one of the following breeding methods is based on the competitiveness of the genotypes under adverse environmental conditions ?
(a) Mass selection
(b) Bulk selection
(c) Recurrent selection
(d) Pureline selection

246. A commercially cultivated plant species has tetraploid chromosome number that is 2n = 48. What will a plant developed from pollen culture of this species be ?
(a) Haploid (b) Dihaploid
(c) Monoploid (d) Diploid

247. Which one of the following mutagens is non-ionizing types ?
(a) X-rays (b) Gamma rays
(c) Ultra-violet rays
(d) Beta rays

248. Which one of the following pairs is not correctly matched ?
(a) Maize : Monoecious
(b) Papaya : Dioecious
(c) Rye : Self-incompatible
(d) Pearlmiliet : Protandrous

249. The factors responsible for cytoplasmic male sterility in plants are located in the
(a) RNA
(b) Nuclear DNA
(c) Chloroplast DNA
(d) Mitochondrial DNA

250. Which one of the following is not correctly matched ?

Plant species	Chromosome no.
(a) *Cajanus cajan*	22
(b) *Triticum aestivum*	24
(c) *Triticum durum*	28
(d) Zea mays	20

251. Which one of the following is not correctly matched ?

Type of gene interaction	Phenotypic ratio
(a) Inhibitory	13 : 3
(b) Epistasis	12 : 3 : 1
(c) Complementary	9 : 7
(d) Duplicate	14 : 2

252. The phenotype (P) is the function of genotype (G) and environment (E), but when individual genotype is subjected to multi-environmental testing, the phenotypic expression is the result of
(a) G alone (b) E alone
(c) G + E (d) G + E + (G × E)

253. Match List - I (Breeding objective) with List - II (Breeding method) and select the correct answer using the code given below the lists :

List - I	List - II
A. Addition of a single resistant gene into an adapted variety	1. Pure line breeding
B. Combining useful traits of two different varieties together	2. Heterosis
C. Creation of New variability	3. Back cross
D. Exploitation of non-additive genetic variance	4. Recombinant breeding
	5. Mutation

Code :

	A	B	C	D		A	B	C	D
(a)	4	1	2	5	(b)	3	4	2	5
(c)	4	1	5	2	(d)	3	4	5	2

Answers 245. (b) 246. (b) 247. (c) 248. (d) 249. (d) 250. (b) 251. (d) 252. (d) 253. (d)

254. The male gametic nuclei are the result of mitotic division from which one of the following ?
(a) Male gametophyte
(b) Microspores
(c) Microspore mother cell
(d) Generative nucleus

255. When both the alleles of a gene are fully expressed in a heterozygote, what is this phenomenon called ?
(a) Complete dominance
(b) Overdominance
(c) Codominance
(d) Pseudodominance

256. Which of the following cell organelle(s) cause(s) male sterility in mustard ?
(a) Golgi apparatus only
(b) Mitochondrian and Endoplasmic reticulum
(c) Lysosome and Golgi apparatus
(d) Mitochondrian only

257. Centre of diversity refers to the area where cultivated plant species and/or their wild relatives show :
(a) Highest variation
(b) High ecosystem diversity
(c) Both (a) and (b)
(d) Low competition with unrelated species

○○○○

Answers 254. (d) 255. (c) 256. (d) 257. (c)

EXPLANATIONS OF SOME QUESTIONS

10. b four; Mendel did not face the problem of linkage because the seven factors governing all the traits were not closely linked. Hence, assorted independently.

11. c Test cross ratio in duplicate gene action :-

Test Cross : AaBb × aabb →
AB | ab
Ab | ab } 3
aB | ab
ab | ab } 1
= 3 : 1 Ratio

14. c The endosperm is triploid (3n) in nature.
Hence number of chromosome in wheat endosperm = 3 × 21 = 63.

15. c As vegetatively propagated crop,
Cytoplasmic male sterile plants does not produce seed in next generation

37. d SSB protein is single strand binding protein, it keeps single strand separate. Ligase is the enzyme for joining the DNA, Helicase II is for unwinding.

38. a Okazaki fragments are formed on the lagging strand in the direction of 5' - 3'.

41. c Bar eye, due to heterochromatizatio on X chromosome.

44. d as only one 'X' chromosome is there.

78. c Mustard, wheat and cotton - autoaliopolyploid, Potato - autopolyploid.

80. b As the F_1 plant contains 3 pairs of contrasting genes, in test cross progenies there will be $2^3 = 8$ genotypes.

81. c Because both wheat and rice are self-pollinating crops.

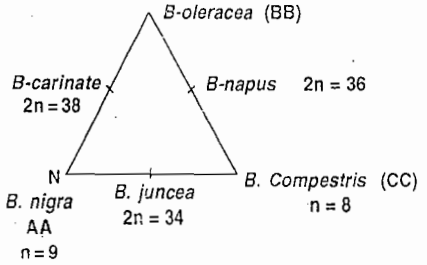
104. c Shaktiman is high proteinous quality protein maize (QPM) variety of maize.

111. b Norin 10-dwarfing gene of wheat is found in Japan
Dee-Gee-Woo-Gen dwarfing gene of rice is found in Taiwan.

116. b Vertical resistance governed by single gene - works against specific race, while horizontal resistance is polygenic in nature.

118. a 'A' genome of wheat = *T-urartu*, B = *T. tauschic.*

119. c Nagaheru 'U' - Triangle -



121. d BTT means balanced tertiary trisomic. This is the method of hybrid seed production in barley.

122. a Triploids are normally sterile, as the extra set of chromosomes has no homologous. Hence don't seprate properly or due to disjunction of chromosomes during anaphase.

128. c Single cross is highly uniform, as genotypes are same for the whole population.

129. a Inbred × OPV → Top cross and single cross × OPV is called double top cross.

131. d Apomixis vegetative production and polyploid, all are the method of hybrid seed production as there will be no segregation and the progenies will be true to the type.

139. b Operon concept is the model of prokaryotic gene regulation.

141. a Transcription → DNA to RNA, Translation → mRNA to protein.

142. b The performance of double cross hybrid (A × C) × (B × D) can be predicted from the average performance of single crosses made between four inbred lines excluding the parental single crosses.

143. a No. of single cross = n(n - 1)/2, no. of three way crosses = n(n - 1)(n - 2)/2, no. of double crosses = n(n - 1)(n - 2)(n - 3) / 8.

146. d VEERY was developed from spring × wheat cross. Sonalika from mutation of sonora 64 by λ-rays.

147. b The effect of pollen on the endosperm is xenia, while the effect of pollen on fruit tissue is called metaxenia.

148. a An individual with gametic chromosome no (n) is known as **haploid**. While a monoploid has the basic chromosome no 'x'
Polyploid - An individual with more than two identical or distinct genomes.
Dihaploid - Haploid derived from tetraploid i.e., monoploid for two distinct genomes.

149. b The individual with 2n ± 1 chromosomes - Aneuploids.

150. a In the Cleistogamy, flowers do not open at all, but in chasmogamy, flowers open after pollination. In both the mechanisms, self-pollinations are ensured, but in the latter case, some cross-pollination may occur.

152. b 2n - 1 - 1, it is double monosomic, as two chromosomes of different homologous pairs are absent. Monosomic → 2n - 1, disomic → 2n, double trisomic → 2n + 1.

154. c Triticale is a cross between wheat (*Triticum aestivum*) and Rye (*secale cereale*).

155. d Sporophytic type of self-incompatibility is found in brassica, so unable to produce seeds, when self-fertilized.

156. a Protoandry - Early maturity of male flower.
Protogyny - Early maturity of female flower.

157. c In small grain crops, selection of seed is comparatively difficult, hence bulking is easy.

164. c 8 types of gametes will be formed in trihybrid condition, $2^3 = 8$ and phenotypic ratio after selfing will be 27 : 9 : 9 : 9 : 3 : 3 : 3 : 1.

175. b Cybrid is a cytoplasmic hybrid where cytoplasms from both female and male gametes fuse.

184. b Flavr savr is the transgenic variety of tomato which has delayed ripening trait.

186. b When barley (*Hordeum Vulgare*) is crossed with *Hordeum bulbosum*, haploid plant of barley is produced.

193. a Reverse transcription means RNA → DNA.
194. b Restriction fragment length polymorphism, it employes restriction enzymes to cut DNA at specific points.
197. b In complementary gene action, two genes at different way complement each other means when the both genes will be present, the phenotype will be express. e.g. A - B - coloured, A - bB

214. b cDNA is complementary DNA, which is formed from mRNA.
215. c Substitution haploid means that one chromosome is substituted by another chromosome of different species or origin.
216. b I^AI^A or I^AI^O - A, I^BI^B or I^BI^O - B, I^AI^B - AB, I^OI^O - O.
218. d H-bond will break at the temperature of 94°C.
219. b SSR and RFLP markers, as both the markers can amplify the dominant as well as recessive allele from both strands.
220. d Genomic imprinting is a kind of epistasis which occurs due to DNA-methylation.
222. c Ribozyme is RNA molecule.
223. d Apical meristem is free of viruses
233. b Clonal selection is used in vegetatively propagated crops (Non-flowering species)
235. b Nucleus seed is produced under the supervision of breeder and produced in lowest quantity without any tag.
236. a The DNA synthesis take place in interphase (S phase) stage of cell division.
243. b Development of transgenic crops in 1990's, hybrid cotton in 1970 and semidwarf varieties of wheat and rice in 1960's were take place in India.
250. b *Triticum aestivum* have 42 chromosome number.
251. d Duplicate gene interaction produces phenotypic ratio of 15 : 1.

OOOOO

5) Entomology

1. *Earias vitella* is the pest of :
   (a) Brinjal (b) Citrus
   (c) Cotton (d) Sunflower
2. White grub beetles lay eggs :
   (a) On the underside of the leaf
   (b) Singly in loose soil up to the depth of 10 cm
   (c) On the plant stem at the level of ground
   (d) Within the floral parts
3. Which one is army worm (attack at milking stage) ?
   (a) *Chilo partellus*
   (b) *Pericallia ricini*
   (c) *Plutella xylostella*
   (d) *Mythimna separata*
4. Yellow mosaic virus disease of moong spreads by :
   (a) *Bemisia tabaci*
   (b) *Aphis craccivora*
   (c) *Nephotettix virescens*
   (d) *Amrasca bigultula*
5. *Virachola isocrates* is the fruit pest of :
   (a) Mango (b) Citrus
   (c) Apple (d) Pomegranate
6. *Callosobruchus chinensis* is storage pest of :
   (a) Wheat (b) Gram
   (c) Rice (d) Groundnut
7. *Dasineura lini* is the pest of
   (a) Castor (b) Sesamum
   (c) Linseed (d) Groundnut
8. Nozzle is a part of :
   (a) Rotary duster
   (b) Cynogas pump
   (c) Hand Compressor sprayer
   (d) None of these
9. Which of the following insecticide may be recommended for the control of termite ?
   (a) Dimethoate
   (b) Nimbicidine
   (c) Methyl - O - Demetone
   (d) Chlorpyriphos
10. The econfriendly insecticide is :
    (a) Malathion (b) Thiodan
    (c) Nimbicidine (d) Permethrin
11. Pink boll worm is a serious pest of :
    (a) Mustard (b) Cotton
    (c) Gram (d) Ladies finger
12. Pheromone trap attracts :
    (a) Female bugs (b) Caterpillars
    (c) Female Moths (d) Male Moths
13. Which of the following is not a bio pesticide ?
    (a) Bioneem (b) Biolep
    (c) Dipel (d) Carbaryl
14. Which one of the following is a carbamate pesticide ?
    (a) Aldicarb (b) Heptachlor
    (c) Malathion (d) Endosulfan

Answers

1. (c)	4. (b)	7. (a)	10. (c)	13. (d)	
2. (b)	5. (d)	8. (c)	11. (b)	14. (a)	
3. (d)	6. (b)	9. (d)	12. (d)		

15. Dimethoate is :
(a) Contact insecticide
(b) Systemic insecticide
(c) Fumigant
(d) Stomach poison

16. Erisilkworm is reared on
(a) Mulbery (b) Castor
(c) Coconut (d) Banana

17. The worker bee is
(a) Drone (b) Sterile male
(c) Sterile female (d) None of these

18. Following is one of the floral host plant recommended for apiary
(a) Rangoon Creeper
(b) Rose
(c) Jasmine (d) Chrysanthenum

19. One of the major insect enemy of honey bee is
(a) *Vesa cincta*
(b) *Galleria mellonella*
(c) *Acherontia styx*
(d) *Formicaria rufa*

20. *Trichogramma* parasitoid release is recommended for the management of
(a) *Gangora thyrsis*
(b) *Atherigona soccata*
(c) *Chilo infuscatellus*
(d) *Holotrichia serrata*

21. The major predator of lac insect is
(a) *Mantis religiosa*
(b) *Eublemma amabilis*
(c) *Coccinella septumpanata*
(d) *Chrysoperla carnea*

22. Which of the following laboratory host is used for the multiplication of egg parasitoids ?
(a) *Spodoptera litura*
(b) *Chilo partellus*
(c) *Corcyra cephalonica*
(d) *Helicoverpa armigera*

23. Following is an example of Bt transgenic cotton
(a) Jayadhar (b) Varalaxmi
(c) NH - 44 (d) Bollguard

24. An insecticide which is used as seed treatment for sucking pest management is
(a) Diazinon (b) Imidacloprid
(c) Endrin (d) Fenvalerate

25. Following is the insecticide which is having fumigant and penetrant action
(a) Lindane (b) DDVP
(c) Chlorpyriphos (d) Endosulfan

26. The following is the effective pathogen on *Helicoverpa armigera*
(a) Rickettsiae (b) *Bacillus popillae*
(c) Nuclear polyhedral virus
(d) *Metarrhizium anisopliae*

27. Use of light traps for the management of pest is an example of
(a) Culture control
(b) Mechanical method of control
(c) Legal method of control
(d) Biological control

28. The most widely used bacterium in insect control is
(a) *Fusarium sp.* (b) *Bacillus popillae*
(c) *Bacillus cereus*
(d) *Bacillus thuringiensis*

29. Use of resistant varieties in the IPM of insect is an example of
(a) Legal control (b) Cultural control
(c) Chemical control
(d) Biological control

Answers

15. (b)	18. (b)	21. (b)	24. (b)	27. (b)
16. (b)	19. (b)	22. (c)	25. (b)	28. (d)
17. (c)	20. (c)	23. (d)	26. (c)	29. (b)

30. Which one of the following is the example of insect hormone ?
(a) Lindane (b) Ecdysone
(c) Chitin (d) Allethrin

31. Certain secretions attract the opposite sex of the same species which are termed as :
(a) Hormones (b) Kairomones
(c) Synomones (d) Pheromones

32. The dwelling place of termites is also known as
(a) Canal (b) Tunnel
(c) Mound (d) Cave

33. The highest pesticide used crop in India is
(a) Rice (b) Sugarcane
(c) Maize (d) Cotton

34. The insecticide which is being opposed by environmentalist is
(a) DDVP (b) Chlorpyriphos
(c) Sulphur (d) Endosulfan

35. Following insecticide is safely recommended on vegetables
(a) Carbaryl (b) Aldicarb
(c) Endrin (d) Malathion

36. Stem injection or root feeding of Monocrotophos is recommended for the management of
(a) Cotton bollworm
(b) Tea mosquito
(c) Coffee stem borer
(d) Coconut black headed caterpillar

37. Following fungus is effective on root grubs
(a) *Fusarium sp.* (b) *Beauveria sp.*
(c) *Nomuraea rileyi*
(d) *Metarrhizium anisopliae*

38. Prickly pear weed has been effect controlled by
(a) *Zygogramma bicolorata*
(b) *Neochetina eichevniae*
(c) *Dactylopious tomentosus*
(d) None of these

39. Following is the acaricide wi recommended for mite manageme
(a) Kelthane (b) Rogor
(c) DDVP (d) Monocroto

40. Following is the pesticide which plant origin
(a) Spinoside (b) Bulldoc
(c) NSKE (d) Allethrin

41. Following granular insecticide is ha long residual effect
(a) Phorate (b) Carbofuran
(c) Aldicarb (d) Quinalphos

42. Following insecticide belongs organophosphate group
(a) Sulphur (b) Carbofuran
(c) Malathion (d) Endosulfan

43. The insecticide which is used mosquito mats is
(a) Endosulfan (b) Diazinon
(c) Malathion (d) Allethrin

44. Following anticoagulant is used for control
(a) Zinc phosphide (b) Al_2 Po
(c) Hydrogen Cyanide (d) Warfar

45. Aphids and white flies are effectiv controlled by
(a) Fumigants
(b) Stomach poisons
(c) Contact insecticides
(d) Systemic insecticide

Answers

30. (b)	33. (d)	36. (d)	39. (a)	42. (c)	45. (d
31. (d)	34. (d)	37. (d)	40. (c)	43. (d)	
32. (c)	35. (d)	38. (c)	41. (c)	44. (d)	

46. Following is an example of high volume sprayer
(a) ULV applicator
(b) Foot sprayer
(c) Hand sprayer
(d) Battery operated sprayer

47. The higher LD 50 value indicates the following
(a) Neutral (b) Less toxic
(c) Highly toxic (d) None of these

48. Following is used as a sticker along with insecticide for better spread
(a) Dettol (b) Coaltar
(c) Phenol (d) Teepol

49. Following insecticide has anti-cholinesterase action on insect nervous system
(a) Malathion (b) Sulphur
(c) Lindane (d) Endrin

50. Celphos tablets are used for the management of
(a) Coconut mites
(b) Cotton boll worm
(c) Rice stem borer
(d) Storage pests

51. IPM relies heavily on
(a) Economic threshold level
(b) Total loss of crops
(c) Resistant pest
(d) Susceptible pest

52. Project Directorate of Biological Control is located at
(a) Bangalore (b) New Delhi
(c) Faridabad (d) Jaipur

53. Red cotton bug lay its egg on/in
(a) Bolls (b) Leaf
(c) Soil (d) Flower

54. Sorghum shoot fly lays egg on
(a) Lower surface of leaf blades
(b) Upper surface of leaves
(c) Flowers
(d) Roots

55. Indicate which one is the ear head midge
(a) *Contarinia sorghicola*
(b) *Calocoris anguistata*
(c) *Orseolia oryzea*
(d) *Chilo partellus*

56. The spotted boll worm is
(a) *Earias vittella*
(b) *Earias insulana*
(c) *Helicoverpa armigera*
(d) *Pectinophora gossypiella*

57. The vector of rice tungro disease is
(a) *Nephotettix virescens*
(b) *Aphis craccivora*
(c) *Bemisia tabaci*
(d) *Toxoptera aurantii*

58. Which of the following crop has the outbreak of wooly aphid been noticed recently ?
(a) Maize (b) Barley
(c) Sugarcane (d) Cotton

59. Sugarcane is recently infested by following wooly aphid -
(a) *Ceratovacuno lanigera*
(b) *Eriosoma lanigera*
(c) *Aphis gossypii*
(d) *Lipaphis spp.*

60. *Cosmopolites sordidus* the banana rhizomes weevil belong to
(a) Pyralidae (b) Cucurlionidae
(c) Thripidae (d) Aphidae

Answers					
	46. (b)	49. (a)	52. (a)	55. (a)	58. (c)
	47. (b)	50. (d)	53. (c)	56. (a)	59. (a)
	48. (d)	51. (a)	54. (a)	57. (a)	60. (b)

61. Scientific name of sorghum aphid is
(a) *Melanaphis sacchari*
(b) *Hysteraneura setariae*
(c) Both (a) & (b)
(d) *Brevennia rehi*

62. The following is the most notorious polyphagous pest
(a) *Chilo incertulas*
(b) *Mythimna separata*
(c) *Helicoverpa armigera*
(d) *Gangara thyrsis*

63. The holes at the base of sorghum peduncle are due to
(a) *Chilo partellus*
(b) *Atherigona soccata*
(c) *Contarinia sorghicola*
(d) *Calocoris angustata*

64. The ladder shaped scrapping on the rice leaves is due to
(a) *Dicladispa armigera*
(b) *Cnapholocris medinalis*
(c) *Nymphula deptinctalis*
(d) None of these

65. The integument comprises of
(a) Cuticle, epidermis & basement
(b) Cuticle membrane + basement
(c) Epidermis + basement
(d) Cuticle + epidermis

66. Mellipedes fall under the following class of Arthropoda
(a) Insecta (b) Myriapoda
(c) Crustacea (d) Arachnida

67. Anamorphosis is encountered the following insect order
(a) Protura (b) Dictyoptera
(c) Ephemereptera (d) Coleoptera

68. Example of an insect order in which nymphs are called naids
(a) Thysanura (b) Odonata
(c) Diptera (d) Hymenoptera

69. The first longitudinal wing vein is
(a) Anal vein (b) Median vein
(c) Costal vein (d) Redial vein

70. The pronotum is ideally seen in the following insect
(a) Moth (b) Ants
(c) Termite (d) Cockroach

71. Stylets are present in the mouth parts of following
(a) Plant bug (b) Cockroach
(c) Cotton weevil
(d) Rhinoceros beetle

72. Sting in worker honey bee is a modified part of
(a) Antenna (b) Ovipositer
(c) Styli (d) Cerci

73. Supra oesophagial ganglion is also called
(a) Brain
(b) Abdominal ganglia
(c) Thoracicganglia
(d) None of these

74. Corpora cediaca secretes the following in insect
(a) Hormone (b) Pheromone
(c) Apheremone (d) Synomone

75. Following is an example for secondarily wingless insect
(a) Blister beetle (b) Head louse
(c) Collembolan (d) Silver fish

76. Hindgut of insect is also known
(a) Stomodaeum (b) Proctodaeum
(c) Gizzard (d) Mesenteron

Answers						
	61. (c)	64. (a)	67. (a)	70. (d)	73. (a)	76. (b)
	62. (c)	65. (a)	68. (b)	71. (a)	74. (a)	
	63. (a)	66. (b)	69. (c)	72. (b)	75. (b)	

77. Example of an exopterygote insect order with a pupal instar in its life cycle
(a) Thysanoptera (b) Heteroptera
(c) Odonata (d) Cepidoptera

78. The spider, ticks and mites belong to the Arthropod class
(a) Pauropoda (b) Unimeria
(c) Arachnida (d) Diptopoda

79. Example of a primarily wingless insect in which wing buds never develops
(a) Mallophga (b) Protura
(c) Coccids (d) Caterpillar

80. The cockroach belonging to order Dictyoptera as typical of an Orthoptera insect has
(a) Large anal lobe in hind wing
(b) Elytra
(c) Large anal lobe in forwing
(d) Few malpighian

81. The probosis in the mouth parts of the butterfly is formed from
(a) Labium
(b) Galea of maxillae
(c) Maxillary paip
(d) Galea of mandible

82. The last segment in the abdomen of male cockroach in addition of cerci will have a pair of
(a) Caudal filament (b) Anal styli
(c) Clasper (d) Paraprocts

83. Accessory gland of mesodermal origin in the male reproductive system of cockroach are
(a) Milk gland (b) Mesadenia
(c) Colleperial gland
(d) Vesicula seminalis

84. Earthworm has a circulatory system which is extensive and
(a) Haemocoelic (b) Open type
(c) Closed type
(d) Expended by typhlosole

85. Insect are the most abundant and diversified of all animal due to their
(a) Segmented body
(b) Antenae
(c) 3 pairs of legs
(d) Capacity of flight

86. The noctuid which is common pest to both pigeonpea and chickpea is
(a) *Spodoptera litura*
(b) *Adisura atkinsoni*
(c) *Helicoverpa armigera*
(d) *Sesamia inference*

87. Halfmoon shaped scarping or notching of the brinjal leaves are due to
(a) *Urentius sp*
(b) *Epilachna vigintioctopunctata*
(c) *Leucinodes orbonalis*
(d) *Myllocerus subfasciantus*

88. The spiralling white fly infesting the leaves of many crops is
(a) *Bemesia tabaci*
(b) *Aleurolobus sp.*
(c) *Aleurodicus dispersus*
(d) None of these

89. The noctuid borer on ragi is
(a) *Sesamia inferens*
(b) *Chilo partellus*
(c) *Chilo suppresalis*
(d) *Scirpophaga nivella*

90. The bushy appearance with dead heart in sugarcane at 6th inter-node is due to
(a) Excess irrigation (b) Top borer
(c) Excess nitrogen (d) Mealy bug

Answers					
	77. (a)	80. (a)	83. (b)	86. (c)	89. (a)
	78. (c)	81. (b)	84. (c)	87. (d)	90. (b)
	79. (b)	82. (b)	85. (d)	88. (c)	

91. Scientific name of banana aphid is
(a) *Thrips florum*
(b) *Pentalonia nigronervosa*
(c) *Cosmopolites sordidus*
(d) *Virachola isocrates*

92. White parallel streaks along leaf axis in rice is a characteristic symptoms of
(a) *Sciropophaga incertulas*
(b) *Dicladispa armigera*
(c) *Nephotettix nigropictus*
(d) None

93. In rice, which insect causes yellowing and drying of plant leading to condition known as "hopper burn"
(a) Brown plant hopper (*Nilaparvata lugens*)
(b) White backed plant hopper (*Sogatella furcifera*)
(c) Gundhi bug (*Leptocorisa acuta*)
(d) Both (a) & (b)

94. Nibbling of rice earhead and defoliation leaving midrib in rice is caused by
(a) *Hieroglyphus banian* (rice grass hopper)
(b) *Agrotis ipsilon* (Cut worm)
(c) *Lyphgma pygmoea* (rice blue beetle)
(d) None

95. In paddy, the elongation of leaf sheath, when infested by gall fly (*Orseolla oryzae*) is due to a chemical known as
(a) Allethrin (b) Ecdysone
(c) Cecidogen (d) Allomone

96. Jowar stem borer causes dead heart in early stage of crop, redning of sorghum midribs and holes on the whorl of newly opened leaves belongs to family
(a) Muscidae (b) Noctuidae
(c) Delphacidae (d) Crambidae

97. In rice, clipping of tip seedlings be transplanting is done to eliminate masses of
(a) Yellow stem borer
(b) Brown plant hopper
(c) Rice grass hopper
(d) Cut worm

98. Dead heart in the wheat central shoo a characteristic symptoms of
(a) Termites (*Odonototermes obesi*)
(b) Stem borer (*Sesamia inferens*)
(c) Green plant bug (*Nezara viruda*
(d) All of the above

99. Which insect feeds on silk a developing cobs of maize ?
(a) *Chilo zonellus*
(b) *Helicoverpa armigera*
(c) *Mythimna separata*
(d) *Calocoris angustatus*

100. In gram, circular bore holes on p plugged by the head of a larva is rela with
(a) Gram pod borer
(b) Red gram pod fly
(c) Gram cut worm
(d) Blister beetle

101. The pest which attack both in field a storage of pulses is
(a) Pulse beetle
(b) Gram pod borer
(c) Red gram pod fly
(d) Pod borer

102. Grubs which feed on the inner cont of seed in pulses belongs to
(a) *Aphis craccivora*
(b) *Callosobruchus chinesis*
(c) *Agrotis ipsilon*
(d) *Acerii cajani*

Answers				
	91. (b)	94. (a)	97. (a)	100. (a)
	92. (b)	95. (c)	98. (b)	101. (a)
	93. (d)	96. (d)	99. (b)	102. (b)

103. Eriophyid mite (*Aceria cajani*) belongs to family
(a) Bruchidae (b) Aphididae
(c) Eriophyidae (d) Noctuidae

104. Wilting of groundnut plants in patches with damaged roots is caused by
(a) *Holotrichia consanguinea*
(b) *Spodoptera litura*
(c) *Spilosoma obliqua*
(d) *Odontotermes obesus*

105. The mustard saw fly (*Athalia proxima*) lays eggs near
(a) Flower (b) Leaf margin
(c) Soil surface (d) Roots

106. Larvae of castor semi looper (*Achoea janata*) feed gregariously and defoliate the plants belongs to family
(a) Pyraustidae (b) Arctiidae
(c) Noctuidae (d) None

107. Curling of leaf upwards and yellowing of terminal cotton shoots is characteristic symptom of presence of
(a) Cotton Aphid (*Aphis gossypii*)
(b) Cotton leaf hopper (*Amrasca devastans*)
(c) Pink boll worm (*Pectinophora gossypiella*)
(d) Red cotton bug (*Dysdercus cingulatus*)

108. Which of the following pairs is not correctly matched ?

Insect	Family
(a) *Pectinophora gossypiella*	Pyrrhocoreidae
(b) *Earias vittella*	Noctuidae
(c) *Helicoverpa armigera*	Noctuidae
(d) *Bemisia tabaci*	Aleyrodidare

109. Flared squares (Flare-up) is the damage symptoms of
(a) *Earias vitella*
(b) *Helicoverpa armigera*
(c) *Pectinophora gossypiella*
(d) None of these

110. The boll worm which covers the opening once it enters into the boll is
(a) Cotton semi lopper
(b) Pink boll worm
(c) Spotted boll worm
(d) American boll worm

111. Which bacteria is responsible for staining of the cotton fiber ?
(a) *Azotobactor sp*
(b) *Clostridium botulinum*
(c) *Nematospora gossypii*
(d) *Bacillus sp.*

112. American boll worm controlled by release of predator
(a) *Chrysoperla carnea*
(b) *Trichogramma spp*
(c) *Nematospora gossypii*
(d) None

113. Bunchy top appearance in grown up sugarcane due to formation of side shoots is caused by
(a) Early shoot borer (*Chilo infuscatellus*)
(b) Top shoot borer (*Scirpophaga nivella*)
(c) Woolly aphid (*Ceratovacuma lanigera*)
(d) Pyrilla (*Pyrilla perpusilla*)

114. Stripping of sugarcane leaves minimizes the attack of
(a) Mealy bugs
(b) Pyrilla
(c) Early shoot borer
(d) Top shoot borer

Answers				
	103. (c)	106. (c)	109. (a)	112. (a)
	104. (a)	107. (a)	110. (b)	113. (b)
	105. (b)	108. (a)	111. (c)	114. (a)

115. Sugarcane leaf hopper (*Pyrilla perpusilla*) is controlled by release of lepidopteran parasitoid
(a) *Epiricania melanoleuca*
(b) Granulosis virus
(c) *Sturmiosis inferens*
(d) *Trichogramma chilonis*

116. Skeletanization of tobacco leaves is caused by
(a) Aphid (*Myzus persicae*)
(b) White fly (*Bemisia tabaci*)
(c) Tobacco caterpillar (*Spodoptera litura*)
(d) Tobacco stem gall (*Phthorimaea heliopa*)

117. T shaped marking on marble sized mango fruits and at later stages feeding on cotyledons is characteristic symptoms of
(a) *Amritodus atkinsoni*
(b) *Drosicha mangiferae*
(c) *Sternochetus mangiferae*
(d) *Oecophylla smaragdina*

118. Lemon butterfly is
(a) *Toxoptera citricida*
(b) *Phyllocnistis citrella*
(c) *Papilio demoleus*
(d) None of these

119. Bagging of anar fruits with polythene cover is done to avoid damage from
(a) Butterfly sucking moth
(b) Fruit borer
(c) Shoot hole borer
(d) Fruit fly

120. The infested region on bark turns into pink colour and pink colour encrustation on apple fruits are the characteristic damage symptoms of
(a) Apple woolly aphid (*Eriosoma lanigera*)
(b) San Jose Scale (*Quadraspidiotus perniciosus*)
(c) Apple stem borer (*Apriona cinerea*)
(d) Leaf webber (*Nephoteryx eugraphella*)

121. Which pest of potato attacks the tuber both in field and storage ?
(a) Potato aphid
(b) Lady bird beetle
(c) Potato tuber moth
(d) Potato black cut worm

122. Egg larval parasitoid *Chelonus blackburni* is used to check the population of
(a) *Agrotis ipsilon*
(b) *Phthorimaea operculella*
(c) *Myzus persicae*
(d) None of these

123. Mining and skeletanization of cabbage leaves are the characteristic damage symptoms of
(a) Diamond back moth (*Plutella xylostella*)
(b) Cabbage borer (*Hellula undalis*)
(c) Painted bug (*Bagrada cruciferarum*)
(d) None of these

124. Bt cabbage is developed against
(a) Diamond Back Moth
(b) Cabbage butterflies
(c) Aphid
(d) Painted bug

125. Gummosis and Crown toppling in coconut are due to
(a) Rhinoceros beetle
(b) Red palm weevil
(c) Black headed caterpillar
(d) Coconut mite

Answers				
	115. (a)	118. (c)	121. (c)	124. (a)
	116. (c)	119. (a)	122. (c)	125. (b)
	117. (c)	120. (b)	123. (c)	

126. Which one of the following pest is an introduced pest of coffee ?
(a) Green bug (b) Berry borer
(c) Stem borer (d) Mealy bug

127. Which of the following pairs is not correctly matched

Insect	Damaging stage
(a) Potato tuber moth	Grubs
(b) Rice weevil	Grubs and adults
(c) Pulse beetles	Grubs
(d) Lesser grain borer	Grubs and adults

128. Which one of the following pair is not correctly matched ?

Insect	Scientific name
(a) Rice weevil	*Sitophilus oryzae*
(b) Pulse beetle	*Helicoverpa armigera*
(c) Lesser grain borer	*Rhizopertha dominica*
(d) Khapra beetle borer	*Trogoderma granarium*

129. Which of the following is a secondary pest of storage ?
(a) Long headed flour beetle
(b) Flat grain beetle
(c) Saw toothed grain beetle
(d) All of these

130. In storage, grains can be mix with
(a) Chlorpyriphos
(b) Dichlorvos
(c) Malathion WP
(d) Deltamethrin

131. Which of the following pair is not correctly matched ?

Disease	Insect (Vector)
(a) Little leaf of Brinjal	: Aphid
(b) Rice dwarf	: Zig Zag leaf hopper
(c) Rice grassy stunt	: Green leaf hopper
(d) Rice yellow orange leaf	: Zig Zag leaf hopper

132. Which one of the following is not correctly matched ?

Disease	Insect (Vector)
(a) Sesamum phyllody	: Leaf hopper
(b) Pigeonpea Sterility mosaic	: Thrips
(c) Wheat streak mosaic	: Eriophyid mite
(d) Bhindi VMV	: White fly

133. Which one of the following pair is not correctly matched ?

Disease	Insect (Vector)
(a) Banana bunchy top	: Banana aphid
(b) Cotton leaf curl	: White fly
(c) Katte disease of cardamom	: Aphid
(d) Groundnut bud necrosis virus	: Moth

134. Which of the following pair is not correctly matched ?

Disease	Insect (Vector)
(a) Citrus greening	: Psyllid
(b) Citrus tristeza virus	: Citrus aphid
(c) Pine apple root wilt	: Mealy bug
(d) Groundnut rosette virus	: Butterflies

135. _____ is an important major pest species in the complex of pests attacking a crop.
(a) Sporadic pests (b) Regular pest
(c) Key pest (d) Endemic pest

Answers				
	126. (b)	129. (d)	132. (b)	135. (c)
	127. (a)	130. (c)	133. (d)	
	128. (b)	131. (a)	134. (d)	

136. Flooding of the fields will help in control of
(a) White grubs (b) Termites
(c) Cut worms (d) All of these

137. Destructive Insects Pest Act (DIPA) was passed on
(a) 1914 (b) 1920
(c) 1937 (d) 1968

138. Directorate of Plant Protection Quarantine and Storage (DPPQS) was established in 1946 with head quarters at
(a) Ghaziabad (b) Faisabad
(c) Faridabad (d) Faislabad

139. Sterile insect technique was first time proposed in the year 1937 by
(a) Knipling (b) H.S. Pruthi
(c) Lefroy (d) Frisch

140. Biocontrol agent for lantana weed (*Lantana camera*) is
(a) *Ophiomyia lantanae*
(b) *Neochetina eichorniae*
(c) *Crytobagus singularis*
(d) *Zygogramma bicolorata*

141. *Bacillus thuringiensis* was discovered by :
(a) S. Ishiwata (b) Berliner
(c) Flacher (d) Frisch

142. Which insect has evolved resistance to Bt in open field population ?
(a) Pink boll worm
(b) Diamond back moth
(c) Spotted boll worm
(d) None of these

143. Commercially granulosis virus (GV) used for the control of
(a) *Helicoverpa armigera*
(b) *Spodoptera litura*
(c) *Chilo infuscatellus*
(d) None of these

144. *Metarrhizium anisopiliae* targeted a sugarcane pyrilla and rhinoceros and commercially available unde trade name of
(a) Boverin (b) Mycar
(c) Biomax (d) Vertilec

145. Which of the following repellent is against termites ?
(a) Oil of citronella
(b) Deet
(c) Pentachlorophenol
(d) Bordeaux mixture

146. _____ are substance, which the plant distasteful to the in feeding on it
(a) Attractant (b) Repellent
(c) Chemosterilants (d) Antifeedan

147. _____ acts as precursor for ecdysone synthesis
(a) Arachidic acid (b) Cholesterol
(c) Methionine (d) Ergosterol

148. Juvenile hormone (JH) is a ter secreted by
(a) Corpora cardiaca
(b) Corpora allata
(c) Culticle
(d) Accessory glands

149. The term "third generation pestici is given for
(a) Juvenile hormone
(b) Moulting hormone
(c) Brain hormone
(d) Anti juvenile hormone

Answers					
	136. (d)	139. (a)	142. (b)	145. (c)	148. (b)
	137. (a)	140. (a)	143. (c)	146. (d)	149. (a)
	138. (c)	141. (a)	144. (c)	147. (b)	

150. Which of the following pairs is not correctly matched ?

Insect	Sex Pheromone
(a) Pink boll worm	Gossyplure
(b) American boll worm	Hetilure
(c) *Bombyx mori*	Bombykol
(d) Cotton boll weevil	Hexalure

151. An alleochemical beneficial to releaser only is called
(a) Allomone (b) Kairomone
(c) Synomone (d) Antimones

152. Which of the following statement is incorrect ?
(a) Kairomone is beneficial to receiver
(b) Synomone is beneficial to receiver & emitter
(c) Antimones are non advantageous to both receiver and releaser
(d) None of these

153. A substance released by a non living material which is favourable to a receiving organism but detrimental to an organism of another species that is found in or on the non living material is known as
(a) Aneumone (b) Synomone
(c) Pheromone (d) Kairomone

154. The non-preference plant resistance to insects is also known as
(a) Antibiosis (b) Antixenosis
(c) Tolerance (d) None

155. Father of host plant resistance is
(a) Kogan & Ortman (b) R.H. Painter
(c) Zeidler (d) Paul Muller

156. Gronim and Achook are commercial insecticides of _____ available in market.
(a) Neem (b) Rotenone
(c) Sabadilla (d) Pyrethrum

157. Rotenone is a broad spectrum contact and stomach poison and affect nerve and muscle cells in insects, derived from
(a) Seed (b) Flower
(c) Leaves (d) Roots

158. Nicotine cause failure of nervous system and commercially available as
(a) Nicotine sulphate
(b) Nicotine phosphate
(c) Nicotine
(d) Acetylcholine

159. _____ of congress grass (Active principle is parthenin) have the pesticial properties
(a) Seed (b) Leaf extracts
(c) Flower (d) Roots

160. Fumigant insecticides includes
(a) Methyl bromide
(b) Ethylene dichloride
(c) Chloropicrin
(d) All of these

161. Which of the following pairs is not correct ?

Insecticide	Trade name
(a) Endosulfan	Thiodan
(b) Chlorpyrifos	Dursban
(c) Dimethoate	Rogor
(d) Phorate	Nuvacron

162. Which one of the following pairs is not correctly matched ?

Insecticide	Trade name
(a) Phosphomidon	Dimecron
(b) Aldicarb	Temik
(c) Carbofuran	Furadan
(d) Carbaryl	Celphos

Answers					
	150. (d)	153. (a)	156. (a)	159. (b)	162. (d)
	151. (a)	154. (b)	157. (d)	160. (d)	
	152. (d)	155. (b)	158. (a)	161. (d)	

163. *Bacillus thuringiensis* is available in market as
(a) Vertilec (b) Dipel, Delfin
(c) Larvocel, Boverin
(d) Biomax

164. Extremely toxic class of pesticides have colour of lower triangle
(a) Bright red (b) Bright yellow
(c) Bright blue (d) Bright green

165. Atropine is a / an
(a) Repellent (b) Antifeedant
(c) Antidote (d) Pheromone

166. Central Insecticides Laboratory (CIL) is located at :
(a) Gurgaon (b) Faridabad
(c) Ghaziabad (d) Kanpur

167. Total no. of pesticides restricted for use in India is :
(a) 186 (b) 24
(c) 7 (d) 3

168. Which energy is utilized for making fog, smoke and vapor sprays ?
(a) Hydraulic
(b) Caseous
(c) Certrifugal / electrical
(d) Thermal

169. Which of the following pairs is not correctly matched ?

Spray	Volume median diameter (µm or u)
(a) Mist spray	51 - 100
(b) Aerosol/fog	1 - 50
(c) Smoke	0.01 - 1
(d) Vapor	> 400

170. Which of the following statement is correct ?
(a) Flat fan spray nozzles are widely used for broadcast spraying of herbicides and insecticides
(b) Flooding fan nozzle " turbo floodjet" is designed for use with soil incorporated herbicides and liquid fertilizers.
(c) Cone nozzles is a low drift nozzle and is used to apply soil incorporated herbicides
(d) All of these

171. In world, first field release of Bt cotton was in :
(a) 1990 (b) 1994
(c) 1996 (d) 2000

172. In India the Bt cotton was released for commercial cultivation in year :
(a) 2000 (b) 2002
(c) 2004 (d) None of these

173. Transgenic crop which have highest area in world is :
(a) Soybean (b) Maize
(c) Cotton (d) Mustard

174. Barnase, barstar and bar genes are used for developing genetically modified :
(a) Cotton (b) Mustard
(c) Maize (d) Potato

175. The area under Bt cotton in India is about :
(a) 50,000 ha (b) 60,00,000 ha
(c) 1,50,000 ha (d) 2,00,000 ha

176. In India Genetic Engineering Approval Committee (GEAC) is responsible for monitering of GM crops come under ministry of :
(a) Agriculture
(b) Environment and forest
(c) Information and broadcasting
(d) Rural development

Answers					
	163. (b)	166. (b)	169. (d)	172. (b)	175. (b)
	164. (a)	167. (c)	170. (d)	173. (a)	176. (b)
	165. (c)	168. (d)	171. (c)	174. (a)	

177. Work on GM mustard is carried out by :
(a) Monsanto (b) Syngenta
(c) Mahyco (d) Proagro

178. Indian mole rat is zoologically known as :
(a) *Rattus rattus*
(b) *Mus musculus*
(c) *Bandicota bengalensis*
(d) *Bandicota indica*

179. Leishmaniasis or kalla azar disease caused by Protozoan (*Leishmania donovani*) and spread by :
(a) Black files (b) Sand flies
(c) Horse flies (d) Tsetse flies

180. Insect vector of African sleeping sickness (caused by *Trypanosoma gambiense*) is:
(a) House flies (b) Sand flies
(c) Human lice (d) Tsetse flies

181. The causative agent of malaria fever in man is :
(a) *Pasterulla pestis*
(b) *Ricketsia mooseri*
(c) *Bacillus sp.*
(d) *Plasmodium sp.*

182. Dengue disease (caused by virus) is transmitted by :
(a) *Culex sp.* (b) *Aedes aegypti*
(c) *Anopheles sp.*
(d) *Phlebotomus spp*

183. Nodus wing is present in the order :
(a) Protura (b) Coleoptera
(c) Diptera (d) Odonata

184. Chitin inhibitor compound is :
(a) Dipel (b) Dimilin
(c) Mimic (d) Romdan

185. Silk gland is a modified part of labial gland and _____ in origin :
(a) Ectodermal (b) Mesodermal
(c) Epidermal (d) Endodermal

186. The newly hatched silk worms are known as :
(a) Kegs (b) Ants
(c) Chawaki (d) All of these

187. The process of killing pupa without changing the cocoon shell layer is known as :
(a) Stiffling (b) Denier
(c) Dupion (d) Hatching

188. The state which rank first in raw silk production is :
(a) A.P. (b) W.B.
(c) Bihar (d) Karnataka

189. The stage of silk worm when it synthesizes silk is :
(a) IVth instar larvae
(b) Vth instar larvae
(c) Pre pupal stage
(d) Both (a) and (b)

190. Which of the following pair is not correct ?

Silk worm	Species
(a) Tasar silk worm	*Antheraea mylitta*
(b) Munga silk worm	*Antheraea assame*
(c) Eri silk worm	*Sanja cynthia ricini*
(d) Mulberry silk worm	*Antheraea spp*

191. The number of generations an insect completes in one year in its natural condition is known as :
(a) Voltinism (b) Denier
(c) Grainage (d) None

Answers					
	177. (d)	180. (d)	183. (d)	186. (d)	189. (d)
	178. (c)	181. (d)	184. (b)	187. (a)	190. (d)
	179. (b)	182. (b)	185. (a)	188. (d)	191. (a)

192. Scientific name of the Dammer bee is:
(a) *Apis dorsata*
(b) *Melipona irridipennis*
(c) *Apis mellifera*
(d) *Apis indica*

193. Which of the following pair is not correct ?

(a) Little bee	*Apis florea*
(b) Indian bee	*Apis cerana indica*
(c) Giant or rock bee	*Apis dorsata*
(d) Italian bee	*Melipona irridipennis*

194. Nosema disease of bee is caused by :
(a) Protozoa
(b) Virus
(c) Mite
(d) *Asperigillus flavus*

195. The process of leaving off the colony by queen is known as :
(a) Absconding (b) Swarming
(c) Supersedure (d) Queen excluder

196. The first abdominal segment when fused with metathorax in bees is known as :
(a) Propodeum (b) Mandibles
(c) Basitarsus (d) Mesopodeum

197. Major pests of honey bee is / are
(a) Bee eater- *Vespa cincta*
(b) Bee hunter wasp - *Palerus orientalis*
(c) Greater wax moth - *Galleria melonella*
(d) All of these

198. Safest chemical for honey bee is :
(a) Malathion
(b) Methyl parathion
(c) Endosulfan
(d) None of these

199. Bee venom is used for
and released from acid
(a) Curing pains at joi
(b) Repellent against gre wax
(c) Pollinization
(d) None of these

200. In honey bees, the quee
secreted by
(a) Mandibular glands
(b) Acid glands
(c) Pharyngeal glands
(d) Wax glands

201. Type of mouth parts present in h
bee is
(a) Rapsing and sucking
(b) Chewing & lapping type
(c) Chewing and biting
(d) None of these

202. Which scientist studied the meth
communication in honey bees ?
(a) Karl Von Frisch
(b) H.M. Lefroy
(c) H.S. Pruthi
(d) Ronald Ross

203. Scientifically lac insect is known
(a) *Laccifera lacca*
(b) *Apis dorsata*
(c) *Artocarpus heterophyllus*
(d) *Zizyphus spp*

204. The glands that help in secretion
is
(a) Filip gland (b) Ishiwata's
(c) Resin gland (d) Lyonett

205. Rangeeni strain is related to
(a) Bee (b) Sil
(c) Lac insect (d) No

Answers					
	192. (b)	195. (b)	198. (c)	201. (b)	204. (c)
	193. (d)	196. (a)	199. (a)	202. (a)	205. (c)
	194. (a)	197. (d)	200. (a)	203. (a)	

206. Father of insect physiology is
(a) Starling (b) R.H. Painter
(c) Wigglesworth (d) Snodgrass

207. Which one of the following is a polyphagous pest ?
(a) Rice stem borer
(b) Mango hopper
(c) Mango nut weevil
(d) Termite

208. Excreta of earth worm is
(a) Vermicompost (b) Vermi manure
(c) Vermicastin (d) None

209. In India more honey is obtained from which bee ?
(a) Little bee (b) Indian bee
(c) Italian bee (d) Rock bee

210. Indundative release is associated with
(a) Biological control
(b) Physical control
(c) Mechanical control
(d) Cultural control

211. Crease painting in mango trees is done to control
(a) Mango hoppers
(b) Mealy bug
(c) Fruit fly
(d) Stone weevil

212. Which insect of mango has quarantine importance ?
(a) Stone or nut weevil
(b) Fruit fly
(c) Mealy bug
(d) None

213. Silver fish belonging to the order
(a) Protura (b) Hymenoptera
(c) Thysanura (d) None

214. Number of nymphal stages is Acarina is
(a) 3 (b) 4
(c) 5 (d) 6

215. Bad odour feeding symptom in flour is due to
(a) Lesser grain borer
(b) Cockroach
(c) Khapra beetle
(d) Pulse beetle

216. Sterile insect release method is best suited for
(a) Fruit fly (b) Termites
(c) Grass hopper (d) Cockroach

217. Pest which occurs regularly and in serious manner is known as
(a) Epidemic (b) Pandemic
(c) Endemic (d) Sporadic

218. Study of animal behaviour is called as
(a) Ethology (b) Etiology
(c) Ontology (d) Paleontology

219. Munga silk worm belongs to the family
(a) Curculionidae (b) Formicidae
(c) Saturniidae (d) None

220. In which insect, Ovipositor is modified into spine
(a) Hoppers (b) Thrips
(c) Wasp (d) Termites

221. In honey bee pollen basket is present in
(a) Foreleg (b) Hindleg
(c) Both (a) & (b) (d) None

222. Common molluscicide is
(a) Chlorpyriphos (b) Atropine
(c) Endosulfan (d) Meta aldehyde

223. *Bovicola caprae* is a serious pest of
(a) Goat (b) Sheep
(c) Buffalo (d) Pig

Answers						
	206. (c)	209. (d)	212. (a)	215. (b)	218. (a)	221. (b)
	207. (d)	210. (a)	213. (c)	216. (a)	219. (c)	222. (d)
	208. (c)	211. (b)	214. (a)	217. (a)	220. (c)	223. (a)

224. The light producing substance in Glow worm / fire fly is
(a) Luciferin (b) Allethrin
(c) Pyrethrin (d) BOAA

225. The egg colour of *Earias sp.* is
(a) Sky blue (b) Yellow
(c) White (d) Creamy

226. The pebrine disease of silk worm is caused by
(a) Bacteria (b) Fungi
(c) Virus (d) Protozoa

227. *Emmelocera depresella* attack roots only of
(a) Cotton (b) Sugarcane
(c) Tobacco (d) Mustard

228. Pterostigma is a character of the order
(a) Protura (b) Coleoptera
(c) Odonata (d) None

229. Cervix is located between
(a) Head and prothorax
(b) Head and mesothorax
(c) Antennae and prothorax
(d) None of these

230. Highly evolved insect order is
(a) Hymenoptera (b) Coleoptera
(c) Hemiptera (d) Diptera

231. Degenerated ocelli of cockroach is called as
(a) Glossa (b) Fenestra
(c) Acrotergite (d) None of these

232. Number of chambers in heart of cockroach is
(a) 10 (b) 11
(c) 12 (d) 13

233. Number of insect order by common entomologist is
(a) 20 (b) 24
(c) 27 (d) 29

234. Most serious pest of wheat is
(a) Termite (b) Thrips
(c) Cut worms (d) Leaf hoppers

235. What is optimum moisture content fo storing wheat ?
(a) 10% (b) 12%
(c) 14% (d) 16%

236. Major waste of terrestrial insect is
(a) Uric acid (b) Ammoina
(c) H_2S (d) None

237. Most cosmopolitan polyphagus insect i
(a) Locust
(b) RHC
(c) Mango mealy bug
(d) Sorghum midge

238. Damage in woolen garments is due to enzyme
(a) Aldolase (b) Keratinase
(c) Kinase (d) Ligases

239. The inner core of silk filament, fibrion is a/an
(a) Protein (b) Amino acid
(c) Carbohydrate (d) Lipid

240. India have monopoly in which silk
(a) Munga (b) Tasar
(c) Eri silk worm (d) Mulberry

241. Light producing insect family is
(a) Lampyridae (b) Cecidomyidae
(c) Curculionidae (d) None

242. Halters present in which order
(a) Strepsiptera (b) Diptera
(c) Hymenoptera (d) Hemiptera

Answers					
	224. (a)	228. (c)	232. (d)	236. (a)	240. (a)
	225. (a)	229. (a)	233. (d)	237. (a)	241. (a)
	226. (d)	230. (a)	234. (a)	238. (b)	242. (b)
	227. (b)	231. (b)	235. (b)	239. (a)	

243. Body and wings covered by overlapping scales found in order
(a) Lepidoptora (b) Coleoptera
(c) Hymenoptera (d) Diptera

244. Plague is transmitted by
(a) *Xenopsylla cheopsis*
(b) *Sesamia inferens*
(c) *Bemisia tabaci*
(d) None

245. Blood sucking species is
(a) Anopheles male
(b) Anopheles female
(c) Both (a) & (b)
(d) None

246. Pertrophic membrane is present in
(a) Fore gut (b) Mid gut
(c) Hind gut (d) None of these

247. Linker of Apterygotes and pterygotes is
(a) Odonata (b) Protura
(c) Thysanura (d) Coleoptora

248. Completely parasitic order is
(a) Coleoptera (b) Strepsiptera
(c) Protura (d) Hymenoptera

249. Which of the following pairs is not correct

Insect	Type of mouth parts
(a) Bee	Chewing type
(b) Bug	Piercing and sucking
(c) Butter fly	Siphoning mouth part
(d) House fly	Sponging mouth part

250. Which pesticide is suitable for controlling the white grub ?
(a) Malathion (b) Chlorpyriphos
(c) Phorate (d) Aldicarb

251. In cotton, the serious sucking pest is
(a) Leaf hopper
(b) Spotted boll worm
(c) Pink boll worm
(d) American boll worm

252. Antennae is absent in
(a) Odonata (b) Protura
(c) Thysanura (d) Coleoptera

253. NCIPM is located at
(a) Faridabad (b) New Delhi
(c) Bangalore (d) Udaipur

254. Malaria was first identified in
(a) Kolkata (b) Hyderabad
(c) Bangalore (d) Mysore

255. Nutritional studies is carried out by use of
(a) House fly (b) Fruit flies
(c) Cockroaches (d) None

256. 1st plant protection advisor to the Govt. of India was
(a) H.S. Pruthi (b) H.M. Lefroy
(c) Ronald Ross (d) S. Pradhan

❑❑❑❑❑

Answers					
	243. (a)	246. (b)	249. (a)	252. (b)	255. (c)
	244. (a)	247. (c)	250. (c)	253. (b)	256. (a)
	245. (b)	248. (b)	251. (a)	254. (b)	

6 Plant Patholog

1. In 1845, the late blight of potato destroyed the potato crop of Ireland was caused by
(a) *Phytophthora infestans*
(b) *Alternaria solani*
(c) *Pythium aphanidermatum*
(d) *Pseudomonas solanacearum*

2. In 1943, Bengal had faced a serious famine which cause a great loss in rice yield was caused by
(a) *Helminthosporium oryzae*
(b) *Pyricularia oryzae*
(c) *Colletotrichum falcatum*
(d) *Fusarium udum*

3. Tick out the wrong pair
(a) Endemic - Confined to a particular country, district or location,
(b) Epidemic - The diseases which appear very virulently among the people
(c) Epiphytotic - The diseases which occurs widely but periodically
(d) Sporadic - Diseases which occurs at very irregular interval and location
(e) Pandemic - Disease not prevalent throughout the country, continent or the world

4. Select the correct order of events
(a) Incubation period - invasion - colonization - infection,
(b) Invasion - incubation period - colonization - infection,
(c) Colonization - infection - incubation period - Invasion,
(d) Infection - incubation peric invasion - colonization

5. Who is father of plant pathology
(a) TJ Burill (b) Needham
(c) Anton de Bary (d) EJ Butler

6. Who advanced the gene for gene cor of disease resistance and susceptib in 1946 ?
(a) Flor (b) Vanderplan
(c) Gaumann (d) Muller

7. Who described the first plant nema disease, the seed gall caused by *Ang tritici* in 1743 AD ?
(a) Berkeley (b) Kuhn
(c) Needham (d) NA Cobb

8. Who is the father of Amer Nematology ?
(a) Kuhn (b) H Schmidt
(c) NA Cobb (d) TJ Burill

9. For the first time who reported th plant disease (fire blight of pear) caused by a bacterium (*Erw amylovora*) in 1882
(a) Robert Koch (b) EF Smith
(c) Kuhn (d) TJ Burill

10. Who is considered founder of virol
(a) Beijerinck (b) AF Mayer
(c) WM Stanley (d) TO Diener

11. The first Indian scientist wh coll and identified fungi in Indi
(a) EJ Butler (b) KR Kirtik a
(c) JF Dastur (d) KC Mehta

Answers									
	1.	(a)	4.	(d)	7.	(c)	10.	(a)	
	2.	(a)	5.	(c)	8.	(c)	11.	(b)	
	3.	(e)	6.	(a)	9.	(d)			

12. 'Fungi and Disease in Plants' was written in 1918 by
(a) JF Dastur (b) BB Mundakur
(c) EJ Butler (d) R. Prasad

13. 'Fungi and Plant Diseases' was written by
(a) BB Mundakur (b) JF Dastur
(c) G Rangaswami (d) KC Mehta

14. Select the wrong pair
(a) Hypertrophy: abnormal increase in size of organ,
(b) Hyperplasia: abnormal increase in number of cells of the organ,
(c) Atrophy: inhibition of growth or dwarfing,
(d) Necrosis: death of plant

15. A bacteria which have a large number of flagella all over the cell is categorized in
(a) Atrichous (b) Amphitrichous
(c) Lophotrichous (d) Peritrichous

16. In bacteria, variability is caused by
(a) Conjugation (b) Transformation
(c) Transduction (d) All of these

17. The scientific name of potato blackleg pathogen is
(a) *Erwinia amylovora*
(b) *Erwinia carotovora*
(c) *Agrobacterium tumefaciens*
(d) *Pseudomonas solanacearum*

18. JC Luthra and his associates developed the solar heat treatment of wheat seeds for the control of
(a) Black rust (b) Loose smut
(c) Seed gall (d) Brown rust

19. Who done most of his work on rust diseases in India
(a) R Prasad (b) KC Mehta
(c) BB Mundakur (d) EJ Butler

20. Citrus canker (lesions), which originated from China is caused by pathogen
(a) *Xanthomonas campestris* pv. *citri*
(b) *Albugo candida*
(c) *Erwinia amylovora*
(d) *Claviceps fusiformis*

21. Select the wrong pair :
(a) Black arm of cotton : *X. campestris* pv. *malvacearum*,
(b) Bacterial leaf blight of rice : *Xanthomonas campestris* pv. *oryzae*,
(c) Red stripe of sugarcane : *Pseudomonas rubrilineans*,
(d) Ergot of bajra : *Erwinia carotovora*

22. Common scab of potato can be controlled by reducing pH below 5.2 is caused by the pathogen
(a) *Streptomyces scabies*
(b) *Streptomyces griseus*
(c) *Streptomyces aureofaciens*
(d) *Streptomyces flaveolus*

23. Citrus greening disease mainly confined to
(a) North India (b) South India
(c) East India (d) West India

24. Select the disease(s) caused by Mycoplasma like organisms (MLO)
(a) Brinjal little leaf
(b) Rice yellow dwarf
(c) Sugarcane grassy shoot
(d) *Sesamum phyllody*
(e) All of these

25. Select the organism which can not synthesize protein by own enzymes
(a) Bacteria (b) Mycoplasma
(c) RLO (d) Virus

Answers					
	12. (c)	15. (d)	18. (b)	21. (d)	24. (e)
	13. (a)	16. (d)	19. (b)	22. (a)	25. (d)
	14. (d)	17. (b)	20. (a)	23. (a)	

26. Bacteria leaf blight of rice caused by *Xanthomonas oryzae* is commonly controlled by seed treatment and foliar spray of the chemical in India
(a) Streptocycline (b) Agrimycin
(c) Aretan (d) RH - 893

27. Tundu disease (yellow ear rot) of wheat caused by *Clavibacter tritici* is usually associated with
(a) *Heterodera avenae*
(b) *Anguina tritici*
(c) *Meloidogyne incognita*
(d) *Pratylenchulus* sp.

28. Sandal spike disease of sandal (*Santalum album*) is caused by
(a) Bacteria (b) Fungi
(c) MLO (d) Virus

29. The adjacent cells of the same fungal hypha brought into communication with each other by means of loops is known as
(a) Transduction (b) Transformation
(c) Clamp connection
(d) Conjugation

30. Tick out the sexual spores of fungi
(a) Chlamydospores (b) Sporangiospores
(c) Zoospores (d) Zygospores

31. How many ascospores are enclosed in the mother cell, the ascus in ascomycetes ?
(a) 4 (b) 6 (c) 8 (d) 10

32. The ascus is a sexual fruit of ascomycetes having a globose shape but no ostile (opening) is known as
(a) Cleistothecia (b) Perithecia
(c) Apothecia (d) All of these

33. The perfect (sexual) stage not seen in
(a) Zygomycotina (b) Ascomycotina
(c) Basidiomycotina
(d) Deuteromycotina

34. The black wart disease of potato specially confined to Darjeeling hills is caused by pathogen
(a) *Synchytrium endobioticum*
(b) *Plasmodiophora brassicae*
(c) *Sclerospora sorghi*
(d) *Plasmopora viticola*

35. 'White blisters of crucifers' is caused by pathogen
(a) *Pythium debarynam*
(b) *Albugo candida*
(c) *Sclerospora sorghi*
(d) *Plasmopora viticola*

36. The perfect stage of *Colletotrichum falcatum* (causes red rot of sugarcane) is
(a) *Glomerella tucumanensis*
(b) *Glomerella cingulata*
(c) *Glomerella lindemuthianum*
(d) None of these

37. Select the wrong pair
(a) Ergot of bajra : *Claviceps fusiformis*
(b) False smut of rice : *C. oryzae*
(c) Ergot of rye : *C. purpurea*
(d) Red rot of sugarcane : *Colletotrichum gloeosporioides*

38. In uredinales (rust fungi) basidia usually bearing how many numbers of basidiospores ?
(a) 2 (b) 4 (c) 6 (d) 8

39. Select the wrong pair
(a) Father of European Nematology : Bastian,
(b) Father of World Nematology : NA Cobb,
(c) Father of Indian Nematology : MM Alam,
(d) Father of Plant Pathology : EJ Butler

Answers					
	26. (a)	29. (c)	32. (a)	35. (a)	38. (b)
	27. (b)	30. (d)	33. (d)	36. (a)	39. (d)
	28. (c)	31. (c)	34. (a)	37. (c)	

40. Who is the father of plant pathology in India ?
(a) EJ Butler (b) KC Mehta
(c) BB Mundakur (d) R Prasad

41. *Plasmodiophora brassicae* causes the club root disease of crucifers can be controlled by
(a) Raising pH of soil
(b) Decreasing pH of soil
(c) Both (a) and (b)
(d) None of these

42. The Downey mildew of bajra is caused by
(a) *Sclerospora sorghi*
(b) *Sclerospora sacchari*
(c) *S. graminicola*
(d) *Perenospora parasitica*

43. The rust fungi completing their life cycle on one host are called
(a) Polymorphic (b) Autoecious
(c) Heteroecious (d) None of these

44. The spores which are produced typically by the binucleate mycelium and mainly function as repeating spores for the spread of rust disease in wheat is called
(a) Aeciospores (b) Basidiospores
(c) Urediospores (d) Teleutospores

45. *Promycelium* in rust fungi bears
(a) Basidiospores (b) Aeciospores
(c) Uredia (d) Telia

46. The disease damping off seedlings during nursery stage is caused by the pathogen
(a) *Physoderma maydis*
(b) *Pythium aphanidermatum*
(c) *Pythium debaryanum*
(d) Both (b) and (c)

47. The optimum temperature for the attack of foot rot of papaya (*Pythium aphanidermatum*) is :
(a) 22 °C (b) 28 °C
(c) 32 °C (d) 36 °C

48. The effective control of late blight of potato is possible by use of
(a) Sanitation measures
(b) Spray of metalaxyl
(c) Bordeaux mixture
(d) All of these

49. The bacterial colony is known as
(a) Spore (b) Mycelium
(c) Ooze (d) Hypha

50. The gummosis disease of citrus which is caused by *Phytophthora palmivora* is identified by observing
(a) Death of shoot tip
(b) Root knot
(c) Chlorosis (d) Oozing of gum

51. *Albugo candida* causes white blisters or white rust of crucifers is a/an
(a) Obligate parasite
(b) Obligate saprophite
(c) Facultative parasites
(d) Facultative saprophite

52. *Albugo candida* produces
(a) Basidiospores (b) Ascospores
(c) Zoospores (d) Oospores

53. The green ear or downey mildew of pearlmillet was first time reported in India by
(a) KC Mehta (b) EJ Butler
(c) Mundakur (d) R. Prasad

54. The downey mildew disease of pearlmillet is primarily a
(a) Seed borne (b) Air borne
(c) Soil borne (d) Water borne

Answers					
	40. (a)	43. (b)	46. (d)	49. (c)	52. (d)
	41. (a)	44. (c)	47. (d)	50. (d)	53. (b)
	42. (c)	45. (a)	48. (d)	51. (a)	54. (c)

55. Stem galls of coriander (*Coriandrum sativum*) is caused by
(a) *Protomyces macrosporus*
(b) *Plasmopara viticola*
(c) *Peronospora pisi*
(d) None of these

56. The symptoms of powdery mildew of pea (caused by *Erysiphe polygoni*) first appears on
(a) Stem (b) Roots
(c) Leaves (d) Flowers

57. The powdery mildew of wheat is associated with fungi
(a) *Erysiphe graminis* sp. *tritici*
(b) *E. graminis* sp. *hordei*
(c) *Erysiphe polygoni*
(d) None of these

58. The causal organism *Erysiphe graminis* sp. *tritici* produces
(a) Apothecia (b) Cleistothecia
(c) Perithecia (d) Telia

59. The disease caused by *Leptosphaeria sacchari* in sugarcane is
(a) Red rot (b) Black rot
(c) Ring spot (d) None of these

60. The disease ergot of rye produces sclerotia is caused by
(a) *Claviceps purpurea*
(b) *C. fusiformis*
(c) *Claviceps sativae*
(d) All of these

61. Select the disease in which small droplets of pinks or light honey coloured fluid (the honeydew stage) exudes from the spikelets
(a) Citrus canker
(b) Green ear diseases of bajra
(c) Ergot of bajra
(d) Bacterial blight of rice

62. The management of ergot of bajra m be possible by adopting
(a) Long crop rotations
(b) Keeping seed in 20% salt solutio
(c) Spray of oxychlorid + zineb
(d) All of these

63. The most striking symptom of false sm of rice (*Claviceps oryzae-sativae*) is/a
(a) Transformation of individual kern into large, velvety, green balls,
(b) Sometimes the size of kernel are mo than twice the diameter of norm grain
(c) The colour of kernels finally chang to greenish black
(d) All of these

64. Loose smut of wheat is
(a) Internally seed borne
(b) Externally seed borne
(c) Both (a) and (b)
(d) Not clearly defined

65. Covered smut of barley (caused *Ustilago hordei*) is/are
(a) Internally seed borne
(b) Externally seed borne
(c) Both (a) and (b)
(d) Not clearly defined

66. Which fungicide give effective control covered smut of barley ?
(a) Vitavax (b) Ceresan
(c) Agrosan 5W (d) Sulphur dust

67. Loose smut of barley is/are
(a) Internally seed borne
(b) Externally seed borne
(c) Soil borne
(d) All of these

Answers					
	55. (a)	58. (b)	61. (c)	64. (a)	67. (a)
	56. (c)	59. (c)	62. (d)	65. (b)	
	57. (a)	60. (a)	63. (d)	66. (a)	

68. The plants produce a whip like black shoot, often very long and much curved on itself in smut of sugarcane is caused by pathogen
(a) *Ustilago nuda*
(b) *Ustilago tritici*
(c) *Ustilago scitaminea*
(d) *Ustilago hordei*

69. The false smut of sugarcane can be controlled by adopting
(a) Avoid the practice of ratooning
(b) Disinfection of setts before planting
(c) Removal of smutted whips from the field
(d) All of these

70. Infection of smut of maize (*Ustilago maydis*) occurs during
(a) Vegetative stage
(b) Reproductive stage
(c) After flowering
(d) Before sowing

71. Grain smut of sorghum is externally seed borne disease caused by pathogen
(a) *Sphacelotheca reiliana*
(b) *Sphaelotheca cruenta*
(c) *Sphacelotheca sorghi*
(d) *Tolyposporium eurenbergii*

72. The smut of pearlmillet (caused by *Tolyposporium penicillariae*) is a
(a) Internally seed borne
(b) Externally seed borne
(c) Soil borne
(d) All of these

73. The common bunt, stinking smut or hill bunt of wheat is caused by pathogen
(a) *Tilletia tritici*
(b) *Tilletia foetida*
(c) Both (a) and (b)
(d) *Neovossia indica*

74. Karnal bunt of wheat first time reported in Karnal by Mitra in
(a) 1929 (b) 1931
(c) 1941 (d) 1951

75. The Karnal bunt of wheat is caused by
(a) *Neovossia indica*
(b) *Tilletia horrida*
(c) *Urocystis tritici*
(d) *Ustilago tritici*

76. Karnal bunt of wheat gives foul smell in the field due to presence of volatile compound
(a) Tetramethyl amine
(b) Trimethyl amine
(c) Diallyl propyl sulphide
(d) Allyl propyl disulphide

77. The causal organism *Neovossia indica* produces
(a) Urediospores (b) Zoospores
(c) Oospores (d) Teliospores

78. The causal organism of bunt of rice is
(a) *Urocystis tritici* (b) *Tilletia foetida*
(c) *Neovossia horrida* (d) None of these

79. The effective control of flag smut of wheat (*Urocystis tritici*) can be done by adopting of
(a) Use of resistant varieties
(b) Seed treatment
(c) Crop rotation
(d) All of these

80. Black rust or stem rust of wheat is caused by
(a) *Puccinia graminis tritici*
(b) *Puccinia striformis*
(c) *Puccinia recondita*
(d) *Melampsora lini*

Answers					
	68. (c)	71. (c)	74. (b)	77. (d)	80. (a)
	69. (d)	72. (c)	75. (a)	78. (c)	
	70. (a)	73. (c)	76. (b)	79. (d)	

81. Which type of spores of *Puccinia graminis tritici* infect the barberry plant ?
(a) Teliospores (b) Urediospores
(c) Aeciospores (d) Basidiospores

82. In rust cycle the cereal host is infected by
(a) Urediospores (b) Aeciospores
(c) Teliospores (d) Basidiospores

83. The yellow rust of wheat is caused by
(a) *Puccinia striformis*
(b) *Puccinia recondita*
(c) *P. graminis tritici*
(d) *Puccinia hordei*

84. In India the leaf rust of coffee was first time recorded in
(a) 1856 (b) 1870
(c) 1880 (d) 1943

85. Rust of linseed and flax (autoecious rust) is caused by
(a) *Puccinia recondita*
(b) *P. striformis*
(c) *P. graminis tritici*
(d) *Melampsora lini*

86. The rust of linseed and flax can be completely controlled by spray of
(a) Borax (b) Dithane M-45
(c) Vitavax (d) Agrosan GN

87. Early blight of potato produces
(a) Conidia (b) Telia
(c) Uredia (d) Aecia

88. For the effective control of early blight of potato, which fungicide is most suitable
(a) Zineb (b) Dithane M-45
(c) Blitox-50 (d) Difolatan

89. Early blight of potato is
(a) Soil borne disease
(b) Air borne
(c) Seed borne (d) All of the above

90. Leaf spot or tikka disease of groundnut is/are caused by
(a) *Cercospora arachidicola*
(b) *Cercosporidium personatum*
(c) Both (a) and (b)
(d) *Drechslera graminea*

91. Brown leaf spot disease of rice is caused by
(a) *Drechslera oryzae*
(b) *Cercospora arachidicola*
(c) *Xanthomonas oryzae*
(d) *Pyricularia oryzae*

92. The fungus of *Drechslera oryzae* produces toxins which are highly toxic to rice seedling, name of such toxin is
(a) ABA (b) Trimethyl amine
(c) Isobutylene (d) Cochliobolin

93. The pathogen of rice blast or 'rotten neck' is
(a) *Ustilago tritici*
(b) *Pyricularia oryzae*
(c) *Alternaria alternata*
(d) None of these

94. Tea rust is caused by
(a) MLO (b) Virus
(c) Bacteria (d) Algae

95. The *Colletotrichum falcatum* produces
(a) Zygospores (b) Oospores
(c) Ascospores (d) Conidiospores

96. Wilt of pigeonpea is caused by
(a) *Fusarium udum*
(b) *Gibberella indica*
(c) *Rhizopus nigricans*
(d) *Aspergillus flavus*

Answers					
	81. (d)	84. (b)	87. (a)	90. (c)	93. (b) 96. (a)
	82. (b)	85. (d)	88. (b)	91. (a)	94. (d)
	83. (a)	86. (a)	89. (a)	92. (d)	95. (d)

97. For the effective control of wilt, pigeonpea should be intercropped with
(a) Maize (b) Pearlmillet
(c) Sorghum (d) Mung

98. The most important symptom of wilt of cotton (caused by *Fusarium oxysporum* sp. *vasinfectum*) is
(a) Necrosis
(b) Yellowing of tissues
(c) Discolouration of tissues and plugging of vessels by hyphae
(d) All of these

99. Wilt disease of sugarcane was first time reported in India from
(a) Punjab (b) Tamil Nadu
(c) Bihar (d) Uttar Pradesh

100. The pathogen responsible for charcoal rot of soybean is
(a) *Ascochyta rabiei*
(b) *Macrophomina phaseolina*
(c) *Rhizoctonia solani*
(d) *Penicillium*

101. The incidence of black scurf of potato is more in
(a) Sandy soil (b) Clay soil
(c) Alluvial soil (d) Loam soil

102. The attack of sheath blight of rice (caused by *Rhizoctonia solani*) is more during
(a) Germination
(b) Active tillering stage
(c) Flowering
(d) All of these

103. The scientific name of burrowing nematode is
(a) *Xiphinema sp.* (b) *Longidorus sp.*
(c) *Meloidogyne sp.*
(d) *Radopholus sp.*

104. The nematodes are
(a) Monoblastic (b) Duoblastic
(c) Triploblastic (d) All of these

105. The nematodes lack organs for
(a) Circulation (b) Respiration
(c) Both (a) & (b) (d) Excretory

106. Which genus of nematodes has special types of nurse cell systems which serve as source of continuous supply of nutrients to the nematodes ?
(a) *Meloidogyne* (b) *Heterodera*
(c) *Globodera* (d) All of these

107. In the attack of which class of nematodes, presence of white to brown cysts projecting on the root surface is a characteristic symptom
(a) *Longidorus* (b) *Globodera*
(c) *Meloidogyne* (d) *Trichodorus*

108. Select the nematode(s) which act as vectors of plant viruses
(a) *Xiphinema index*
(b) *Longidorus*
(c) *Trichodorus*
(d) All of these

109. Mycoplasma cell membranes have how many layers
(a) One layer (b) Two layers
(c) Three layers (d) Four layers

110. Citrus greening caused by the
(a) Fastidious bacteria
(b) Fungi
(c) Virus
(d) MLO

111. The uredospores of *Puccinia graminis* are disseminated by
(a) Wind (b) Animals
(c) Insect (d) Birds

Answers					
	97. (c)	100. (b)	103. (d)	106. (d)	109. (c)
	98. (c)	101. (a)	104. (c)	107. (b)	110. (a)
	99. (c)	102. (b)	105. (c)	108. (d)	111. (a)

112. G + C content of prokaryotes is
(a) 20 % (b) 30 %
(c) 50 % (d) 70 %

113. Bacterial cell division mainly by
(a) Binary fission (b) Fragment
(c) Budding (d) None of these

114. Shape of MLO is
(a) Rigid (b) Cuboid
(c) Circular (d) Polymorphic

115. Cell wall lack microorganism
(a) Bacteria (b) Virus
(c) Fungi (d) MLO

116. Teichoic acid found in
(a) Fungi
(b) Gram (+) bacteria
(c) Gram (-) bacteria
(d) Protozoa

117. Father of microbiology
(a) Louis Pasteur (b) Leuvanhoeck
(c) Kuch (d) Mendal

118. MLO first discovered by
(a) Louis Pasteur (b) Kuch
(c) Doi (d) Anupam Verma

119. 'Plant Pathology' written by
(a) RS Singh (b) Agrios
(c) VS Singh (d) AP Sinha

120. 'Plant disease' written by
(a) RS Singh (b) Agrios
(c) BB Mundakur (d) KC Mehta

121. RSD is caused by
(a) Gram (-) fastidious bacteria
(b) Gram (+) fastidious bacteria
(c) Clavibacter xyli
(d) Both (b) and (c)

122. MLO disease transmitted by
(a) Leaf hopper (b) Aphid
(c) Whitefly (d) Animals

123. In north India and central India, black rust inoculum cause from
(a) South (b) Hilly area
(c) From USA (d) From Nepal

124. Teliospore of rust have germpores number
(a) 1 (b) 2
(c) 3 (d) 4

125. Alternate host of black rust is
(a) Barberi (b) Bajra
(c) Jowar (d) Wheat

126. Rice blast pathogen perfect stage i
(a) *Pyricularia oryzae*
(b) *Magnaporthe grisea*
(c) *Helminthosporium*
(d) *Rhizoctonia*

127. Hot water treatment of seed is usefu control of
(a) Loose smut (b) Covered sm
(c) Rust
(d) Powdery mildew

128. Smut of maize caused by
(a) *Ustilago tritici* (b) *Ustilago ma*
(c) *Ustilago hordei* (d) None of the

129. Sterility mosaic disease of pigeon spread by
(a) Virus (b) Aphid
(c) Whitefly (d) Mites

130. Virus capsid is made up of
(a) Protein (b) Carbohydrat
(c) Lipid (d) Nucleic acid

131. Phyllody disease of sesamum spread
(a) Leaf hopper (b) Jassid
(c) Aphid (d) Whitefly

Answers					
	112. (a)	116. (b)	120. (a)	124. (b)	128. (b)
	113. (a)	117. (a)	121. (d)	125. (a)	129. (d)
	114. (d)	118. (c)	122. (a)	126. (b)	130. (a)
	115. (d)	119. (b)	123. (a)	127. (a)	131. (c)

132. Fungi imperfecti includes in
(a) Deuteromycotina
(b) Basidiomycotina
(c) Ascomycotina
(d) Oomycetes

133. Rust includes in
(a) Deuteromycotina
(b) Basidiomycotina
(c) Ascomycotina
(d) Oomycetes

134. Smut includes in
(a) Deuteromycotina
(b) Basidiomycotina
(c) Ascomycotina
(d) Oomycetes

135. Powdery mildew include in
(a) Deuteromycotina
(b) Basidiomycotina
(c) Ascomycotina
(d) Oomycetes

136. Downy mildew include in
(a) Oomycetes
(b) Chytridiomycetes
(c) Zygomycetes
(d) Hypochytridiomycetes

137. Downy mildew of pea caused by
(a) *Perenospora pisi*
(b) *Albugo candida*
(c) *Erysiphae polygoni*
(d) None of these

138. Father of Indian Mycology
(a) EJ Butler (b) KC Mehta
(c) Mundakur (d) RS Singh

139. Renowned scientist Dr. N.E. Borlaug belongs to
(a) Agronomy (b) Genetics
(c) Entomology (d) Plant Pathology

140. In 2005 which pathological scientist got Borlaug award
(a) Rattan Lal (b) VL Chopra
(c) CD Mayee (d) S Nagarajan

141. Which of the following bacteria generally used in genetic engineering for transfer of character from one organism to another ?
(a) *Bacillus thuringinesis*
(b) *Pseudomonas syringe*
(c) *Rhizobium meliloti*
(d) *Agrobacterium tumefaciens*

142. Micrografting is used to produce plants free from
(a) Virus (b) RLO's
(c) MLO's (d) Bacteria

143. Black heart is a physiological disorder of
(a) Tomato (b) Chilli
(c) Potato (d) Cabbage

144. Which of the following is not correctly matched ?
(a) Mustard - white rust
(b) Paddy - brown spot
(c) Wheat - red rust
(d) Groundnut - tikka

145. Tungro disease of rice is spread by
(a) *Nephotettix virescens*
(b) *Sogatella furcifera*
(c) *Nilaparvata lugens*
(d) *Thrips tabacci*

146. Panama wilt is a disease of
(a) Bamboo (b) Mango
(c) Pineapple (d) Banana

147. Soil micro-organisms are most active at
(a) 18 - 20 °C (b) 26 - 28 °C
(c) 30 - 32 °C (d) 34 - 36 °C

Answers						
	132. (a)	135. (c)	138. (a)	141. (d)	144. (c)	147. (d)
	133. (b)	136. (a)	139. (d)	142. (a)	145. (a)	
	134. (b)	137. (a)	140. (d)	143. (c)	146. (d)	

148. VAM is
(a) Bacteria (b) Fungi
(c) Virus (d) Algae

149. Which of the following is not a disease of apple ?
(a) Bird eye
(b) Powdery mildew
(c) Downey mildew
(d) Bunchy top

150. 'Buck eye rot' is a disease of which crop
(a) Water chestnut
(b) Sweet potato
(c) Pods of garden pea
(d) Tomato fruits

151. The major storage fungi that effects the food grain is
(a) *Rhizobium* (b) Mucor
(c) *Cercospora* (d) *Aspergillus*

152. Loose smut is controlled by
(a) Soil treatment
(b) Seed treatment
(c) Chemical spray
(d) None of these

153. Yellow leaf mosaic of bhindi crop spreads by
(a) Jassids
(b) Borers
(c) Jassid and borers
(d) None of these

154. Yellow vein mosaic of *Abelmoschus esculanta* (okra) is spreads by
(a) *Bemisia tabaci* (b) Aphids
(c) Leaf hopper (d) Animals

155. Yellow mosaic virus disease of moong spreads by
(a) *Bemisia tabaci*
(b) *Aphir crassivora*
(c) *Nephotettix viruscens*
(d) *Amrasca bigulitula*

156. *Heterodera avenue* is
(a) Root knot nematode
(b) Cyst nematode
(c) Lesion nematode
(d) Lance nematode

157. Which of the disease(s) induce flor abnormalities ?
(a) Downey mildew of mustard
(b) Green ear of bajra
(c) White rust of crucifers
(d) Both (b) and (c)

158. Which one of the following microbial agents is being commercially exploited as biocontrol agent ?
(a) *Bacillus subtilis*
(b) *Penicillium notatum*
(c) *Sclerotium rolfsi*
(d) *Trichoderma viride*

159. Panama disease of banana is prevente by
(a) Spraying zinc carrier
(b) Spraying copper fungicide
(c) Application of lime to the soil
(d) Providing adequate irrigation

160. Which one of the following fungicides not systemic in nature ?
(a) Vitavax (b) Thiram
(c) Benlate (d) Topsin

161. Which one of the following is/are entomopathogenic fungi ?
(a) *Beauveria bassiana*
(b) *Metarhizium anisopliae*
(c) *Trichoderma harzianum*
(d) Both (a) and (b)

Answers					
	148. (b)	151. (d)	154. (a)	157. (d)	160. (b)
	149. (d)	152. (b)	155. (b)	158. (d)	161. (d)
	150. (a)	153. (c)	156. (b)	159. (c)	

162. Which *Penicillium* species used in 'Cheese' making ?
(a) *Penicillium notatum*
(b) *Penicillium roqueforti*
(c) *Penicillium divaricatum*
(d) *Penicillium crysogenum*

163. 'Little leaf' in brinjal is caused by a
(a) Fungus (b) Bacteria
(c) Virus (d) Mycoplasma

164. Bacterial diseases are controlled by use of chemicals
(a) Kelthane (b) Fungicide
(c) Antibiotics (d) Viricides

165. Application of potash increases
(a) Resistance to water logging
(b) Frost resistance in plants
(c) Disease resistance in plants
(d) None of these

166. Decomposition of organic matter in submerged soil is carried out by
(a) Bacteria (b) Actinomycetes
(c) Fungi (d) Earthworm

167. Select the pair which is not correctly matched
(a) *Longidorus* - Needle nematode
(b) *Pratylenchus* - Lesion nematode
(c) *Ditylenchus* - Bulb nematode
(d) *Tylenchulus* - Cyst nematode

168. The root - knot nematode generally have interaction with
(a) *Pseudomonas solanacearum*
(b) *Xanthomonas citri*
(c) *Bacillus subtilis*
(d) *Streptomyces scabies*

169. The leaves of *Pongamia glabra* and *Azadirachta indica* reduces the population of
(a) Root - knot nematode
(b) Cyst nematode
(c) Burrowing nematode
(d) Bulb nematode

170. Margosa is a highly effective product in reducing root-knot population belongs to
(a) *Acacia arabica*
(b) *Azadirachta indica*
(c) *Citrullus colosynthes*
(d) *Pongamia glabra*

171. The nematode *Heterodera avenae* is confined to the gramineae family except one single legume
(a) *Pisum sativum*
(b) *Cajanus cajan*
(c) *Vigna mungo*
(d) *Senebiera pinnatifolia*

172. The term virus was first time coined by
(a) Kuhn (b) Beijerinck
(c) Stanley (d) None of these

173. Viruses contain
(a) RNA
(b) DNA
(c) Both RNA and DNA
(d) Either RNA or DNA, never both

174. The mature particle of a plant virus in generally known as
(a) Capsid (b) Viroid
(c) Virion (d) Nucleocapsid

175. The cauliflower mosaic virus particles contain
(a) RNA
(b) DNA
(c) Both (a) and (b)
(d) Either RNA or DNA

Answers					
	162. (b)	165. (c)	168. (a)	171. (d)	174. (c)
	163. (d)	166. (a)	169. (a)	172. (b)	175. (b)
	164. (c)	167. (d)	170. (b)	173. (d)	

176. All plant viruses (except cauliflower mosaic virus) contain
(a) DNA
(b) RNA
(c) Both RNA and DNA
(d) Either RNA or DNA

177. The viruses which are usually helped or accompanied by smaller spherical particles of another serologically unrelated virus known as
(a) Satellite virus (b) Gemini viruses
(c) Virid (d) Capsid

178. Select the correct pair from the following
(a) Hypotrophy - decrease in size
(b) Hypertrophy - increase in size
(c) Hyperplasia - increase in number
(d) All of these

179. In plants buckling, puckering and blistering symptoms are produced by
(a) Bacteria (b) Fungi
(c) Viruses (d) Mycoplasma

180. The fungi which transmit plant viruses belong to class
(a) Basidiomycetes
(b) Oomycetes
(c) Zygomyctes
(d) Plasmodiophoromycetes

181. For quick and accurate detection of viruses can be done by
(a) ELISA (b) HADAS
(c) IEM (d) All of these

182. Potato virus diseases are spread by
(a) Aphids (b) Jassids
(c) Nematodes (d) Tuber moth

183. Leaf curl of tomato is spread by
(a) Jassids (b) White fly
(c) Aphids (d) Nematodes

184. Bunchy top of papaya (ca... ...d by is spread by
(a) Nematodes (b) ...
(c) White fly (d) ...

185. Yellow mosaic of legum... wa... reported in India from
(a) Shimla (b) S...
(c) Delhi (d) K...

186. The causal organism of bu...hy ... banana is transmitted by
(a) *Pentalonia nigronervosa*
(b) *Bemisia tabaci*
(c) *Lipaphis erisimi*
(d) Pollen

187. Potato spindle tuber disea... transmitted
(a) Mechanically (b) Biol...ical
(c) Water (d) All of th...

188. Select the correct pair from the fol... matched items :
(a) Holo stem porosite - *Cuscuta*
(b) Stem semiparasite - *Dendroph... fo...*
(c) Holo root parasite - *Orobanc...*
(d) All of these

189. Sucidal germination take pla...
(a) Dodder (b) *Striga*
(c) *Loranthus* (d) *Dendrophthoe*

190. Ozone is toxic to expanding le... almost all types of pl... concentration of equal or mo...
(a) 0.1 ppm (b) 0.2 ppm
(c) 0.3 ppm (d) 0.5 ppm

191. Sulphur dioxide is toxic to pla... above
(a) 0.1 - 0.3 ppm (b) 0.3 - 0.5
(c) 0.5 - 0.7 ppm (d) 1 ppm

Answers					
	176. (b)	179. (c)	182. (a)	185. (c)	188. (c)
	177. (a)	180. (d)	183. (b)	186. (a)	189. (b)
	178. (d)	181. (d)	184. (d)	187. (a)	190. (a)

192. Black heart of potato is the result of
(a) High temperature during transit
(b) Poor ventilation in the store
(c) High temperature of soil during growth and maturation of tubers in the crop field
(d) All of these

193. The Bordeaux mixture was discovered by Millardet at Boardeaux in France in year
(a) 1807 (b) 1885
(c) 1905 (d) 1936

194. The Bordeaux mixture was first time used for the control of
(a) Downey mildew of grape vines
(b) Powdery mildew of pea
(c) Root rot of beet
(d) Damping of pea

195. Burgundy mixture contains sodium carbonate in place of $CaCO_3$ as in Bordeaux mixture was discovered in
(a) 1885 (b) 1887
(c) 1890 (d) 1947

196. Damping off and leaf blights are very effectively checked by
(a) Bordeaux mixture
(b) Burgundy mixture
(c) Thiram
(d) Copper oxychloride

197. The organo-mercurials fungicides used for dry seed treatment usually contain mercury
(a) 0.5 % (b) 1.0 %
(c) 2.0 % (d) 4.0 %

198. Dinocap (methyl heptyl dinitrophenyl crotonate) is sold in market as
(a) Bravo (b) Dexon
(c) Botron (d) Karathane

199. Von Schmeling and Kulka first time demonstrated the systemic activity of fungicides in
(a) 1956 (b) 1966
(c) 1972 (d) 1976

200. Select the systemic fungicides
(a) Pyrimidines (b) Triazoles
(c) Metalaxyl (d) All of these

201. Which systemic fungicide was first time discovered by Von Schmeling and Kulka ?
(a) Oxathiin (b) Pyrimidines
(c) Benzimidazoles (d) Quinones

202. Tick out the pair which is wrongly matched
(a) Oxycarboxin - Plantvax
(b) Carboxin - Benlate
(c) MBC - Bavistin
(d) Benomyl - Benlate

203. Which antibiotic was first time demonstrated by Fleming (1929) ?
(a) Penicillin (b) Streptomycin
(c) Tetracycline (d) Cliotioxin

204. Select the nematicides group which are non-fumigant in nature
(a) Methyl bromide
(b) Nemagon (DBCP)
(c) Vapam
(d) Aldicarb and Phorate

205. Tick out the pair which is not correctly matched.
(a) Dazomet - Mylone
(b) Phorate - Nemachur
(c) Aldicarb - Temik
(d) Carbofuran - Furadan

Answers					
	192. (d)	195. (b)	198. (d)	201. (a)	204. (d)
	193. (b)	196. (d)	199. (b)	202. (b)	205. (b)
	194. (a)	197. (b)	200. (d)	203. (a)	

206. Nematicides inhibits which enzyme of nervous system in killing of nematodes
(a) Kinase
(b) Isomerase
(c) Phosphatase
(d) Acetyl cholinesterase

207. Major genes contributes disease resistance in the form of
(a) Vertical resistance
(b) Horizontal resistance
(c) Both (a) and (b)
(d) None of these

208. A virus that infects bacteria and destroys them is called as
(a) Bactericide
(b) Bacteriophase
(c) Appressorium
(d) Agglutination

209. The science which deals with cause of the plant diseases and nature of the causal agent
(a) Fertilization (b) Etiology
(c) Aetiology (d) Both (b) & (c)

210. The sexual, thick walled and resting spores of the rust fungi is known as
(a) Basidiospores
(b) Uediospores
(c) Teliospores
(d) Aeciospores

211. Who discovered the downey mildew for the first time in India ?
(a) EJ Butler (b) JF Dastur
(c) BB Mundakur (d) KR Kirtikar

212. Which one of the following is a single cell fungi ?
(a) Yeast (b) *Aspergillus*
(c) *Penicillium* (d) *Alternaria*

213. What is the source of Agar Agar ?
(a) Bacteria (b) Fungi
(c) Mycoplasma (d) Algae

214. Tick out the weed fungi for lab
(a) *Aspergillus* (b) *Alternaria*
(c) *Penicillium* (d) *Protomyces*

215. MLO and spiroplasma are mostly
(a) Xylem inhibiting
(b) Phloem inhibiting
(c) Both (a) and (b)
(d) Stomata inhibiting

216. Who is the father of Mycology ?
(a) EJ Butler (b) AP Michelli
(c) Woronine (d) Anton de Bar

217. Mad cow disease is caused by
(a) Virion (b) Pirion
(c) Bacteria (d) MLO

218. Most widely used biocontrol agent is
(a) *Pseudomonas florescence*
(b) *P. putida*
(c) *Bacillus subtilis*
(d) *Clostridium*

219. Most widely used fungicide for rust fungi is
(a) Vitavax (b) Plantvax
(c) Bavistin (d) Dithane M-45

220. Most widely used fungicide for smut fungi is
(a) Vitavax (b) Plantvax
(c) Dithane M-45 (d) Dithane Z-78

221. Race specific resistance called
(a) Vertical resistance
(b) Horizontal resistance
(c) Adult plant resistance
(d) Apparent resistance

Answers						
	206. (d)	209. (d)	212. (a)	215. (b)	218. (a)	221. (a)
	207. (a)	210. (c)	213. (d)	216. (b)	219. (a)	
	208. (b)	211. (a)	214. (a)	217. (b)	220. (a)	

222. When plant showed the partial resistance against all the races of pathogen then it is a type of ?
(a) Horizontal resistance
(b) Vertical resistance
(c) Induced resistance
(d) Non-host resistance

223. Which is most recent widely used fungicide for the control of powdery mildew ?
(a) Calaxin (b) Sulphur dust
(c) Dithan M-45 (d) Apron SD-35

224. Which fungicide is used against downey mildew ?
(a) Metalaxyl (b) Karathane
(c) Oxathin (d) Streptomycin

225. Which one of the following cannot be detected by ELISA technique ?
(a) Virus (b) Bacteria
(c) Viroid (d) Fungus

226. Which one of the following is the primary source of inoculum for stem rust of wheat for southern and central India ?
(a) Uredospores produced in Nilgiri and Palney hills during off season of the crop
(b) Uredospores produced on wild grasses in the plain
(c) Aeciospores produced on alternate host Berberis in Himalaya
(d) Teliospores produced on previous wheat crop

227. Match list 1 (virus genera) with list 2 (member) and select the correct answer using the codes given below :

List 1 (virus genera)	List 2 (member)
A. Badna	1. Potato leaf roll virus
B. Luteo	2. Tomato spotted wilt virus
C. Poty	3. Potato virus Y
D. Tospo	4. Rice tungro virus (Bacilliform virus)

	A	B	C	D		A	B	C	D
(a)	4	1	2	3	(b)	4	1	3	2
(c)	1	4	3	2	(d)	4	1	2	3

228. Nuclear polyhedrosis virus (NPV) is the most effective for control of
(a) *Chilo partellus*
(b) *Pectionophora gossypiella*
(c) *Helicoverpa armigera*
(d) *Diacrasia obliqua*

229. Consider the following processes on host plant occurring during pathogenesis
(1) Landing of inoculum
(2) Penetration
(3) Germination
(4) Recognition
(5) Establishment and sporulation

The correct sequence of these processes is :
(a) 1, 2, 3, 4, 5 (b) 2, 3, 1, 5, 4
(c) 1, 3, 2, 4, 5 (d) 4, 1, 2, 3, 5

❑❑❑❑❑

Answers

222. (a)	225. (c)	228. (c)
223. (a)	226. (a)	229. (c)
224. (a)	227. (b)	

7 Plant Physiolog

1. 'Plant Physiology' book was written by
(a) Singh & Purohit
(b) Salisbury & Ross
(c) Wiebe (d) Albert

2. Enzyme for conversion of ammonia to amino acid is
(a) Nitrate reductase
(b) Nitrite reductase
(c) Alanine transferase
(d) Glutamine synthetase

3. Important function of leghaemoglobin in root nodules is
(a) O_2 regulation (b) N_2 fixation
(c) Water regulation (d) All of these

4. The externally thin strands of cytoplasm is termed as
(a) Primary cell wall
(b) Secondary cell wall
(c) Middle lamella
(d) Plasmodesmata

5. In plants, the genetic material is present in
(a) Nucleus and mitochondria
(b) Nucleus only
(c) Mitochondria and chloroplast
(d) Nucleus, chloroplast & mitochondria

6. The main function of endoplasmic reticulum (rough ER) is
(a) Fat synthesis
(b) Protein synthesis
(c) Disease resistance
(d) Chlorophyll synthesis

7. An enzyme associated with decarboxylation reaction photosynthetic reaction of C_4 plant
(a) Pyruvate dikinase
(b) Malic acid dehydrogenase
(c) PEP carboxylase
(d) Malic enzyme

8. Golgi bodies was discovered in 1898
(a) Camillio Golgi
(b) Stanley
(c) Farmer and Moori
(d) Fleming

9. RNA synthesis in nucleus participate protein synthesis in
(a) Nucleus (b) Cytosol
(c) Chloroplast (d) Spherosome

10. Which cell organelle is the site chemical activity, in cells, perhaps half of the cell's metabolism ?
(a) Chloroplast (b) Nucleus
(c) Mitochondria (d) ER

11. Photorespiration is high in
(a) Maize (b) Sugarcane
(c) Pineapple (d) Ric

12. Tick out which is not correctly matche
(a) Chloroplast - chlorophyll
(b) Chromoplast - red pigments
(c) Leucoplast - storage protei
(d) Nucleolus - fat

Answers

1. (b)	4. (d)	7. (d)	10. (c)		
2. (d)	5. (d)	8. (a)	11. (d)		
3. (a)	6. (b)	9. (b)	12. (d)		

13. Spherosomes are related with
(a) Chlorophyll (b) Red pigments
(c) Power (d) Fat

14. Theoretically possible quantum yield in photosynthesis is
(a) 0.12 (b) 0.9
(c) 0.8 (d) 0.4

15. Ribosomes are produced in
(a) ER (rough) (b) Nucleolus
(c) Mitochondria (d) Chloroplast

16. The pigments which produce the colour of many flowers or the red of red maple leaves are generally stored in
(a) Vacuole (b) Chromoplast
(c) Lysosome (d) Dictyosome

17. Ultimate electron donor in mitochondrial e⁻ transport chain is
(a) Cytochrome A (b) Cytochrome B
(c) Ubiquinon (d) Plastoquinone

18. The hydrogen atoms on the surface of the oxygen atom are distributed apart at a right angle of
(a) 90° (b) 105°
(c) 120° (d) 180°

19. The strongest bond is
(a) Ionic bond
(b) Covalent bond
(c) Hydrogen bond
(d) Van der Waals

20. The weakest bond is
(a) Covalent bond (b) Van der Waals
(c) Ionic bond (d) Hydrogen bond

21. Latent heat of vaporization (water to vapour) is
(a) 80 cal (b) 540 cal
(c) 586 cal (d) 620 cal

22. Latent heat of fusion (ice to water) is
(a) 540 cal (b) 620 cal
(c) 80 cal (d) 40 cal

23. Important radiant generated in pentose phosphate pathway of glucose degradation is
(a) NADH (b) ATP
(c) Ferridoxin (d) NADPH

24. Glyoxysomes functions in breakdown of
(a) Acetyl CoA (b) Amino acids
(c) Sugars (d) Fatty acids

25. The Brownian movement was discovered in 1827 by the Scottish botanist
(a) Tyndall (b) Robert Brown
(c) Murrfy (d) Statyer

26. Water potential of soil at field capacity is
(a) - 0.3 bars (b) - 4 bars
(c) - 6 bars (d) - 8 bars

27. Calcium is an important constituent of
(a) Protein (b) Cell wall
(c) Chloroplast (d) Nucleic acid

28. Maximum free radicals production is take place in
(a) Germination (b) Flowering
(c) Fruiting (d) Senescence

29. Precursor for ethylene biosynthesis is
(a) Methionine (b) Alanine
(c) Ornithine (d) Tryptophan

30. In a rapidly transpiring plant the water column in xylem will be in
(a) Positive pressure
(b) Negative pressure
(c) High root pressure
(d) No pressure

Answers						
	13. (d)	16. (a)	19. (a)	22. (c)	25. (b)	28. (d)
	14. (a)	17. (c)	20. (b)	23. (d)	26. (a)	29. (a)
	15. (b)	18. (b)	21. (c)	24. (d)	27. (b)	30. (b)

31. Transpiration is measured by
(a) Lysimeter (b) Potometer
(c) Tensiometer (d) Auxanometer

32. Stomata are regulated by
(a) N (b) P
(c) K (d) Ca

33. Maximum density of water exists at
(a) 0°C (b) 4°C
(c) 40°C (d) 100°C

34. Plant lost water in transpiration upto the extent of
(a) 80% (b) 90%
(c) 95% (d) 99%

35. The world taliest tree is
(a) *Sequoia sempervirens*
(b) *Eucalyptus regans*
(c) *Pseudotsuga menziesii*
(d) *Alianthus excelsa*

36. Proteins that bind to TATA box in promoters region are
(a) Coactivators
(b) Coregulators
(c) Enhancers
(d) Transcriptional factors

37. The chemical nature of GA_3 is
(a) Phenolic (b) Terpene
(c) Purine (d) Indole

38. Site of oxidative electron transport in cell is
(a) Mitochondria (b) Chloroplast
(c) Nucleus (d) Cytoplasm

39. Guttation is not favoured under
(a) Low humidity
(b) High humidity
(c) Low root pressure
(d) High humidity and low root pressure

40. The basic elements of the cohesic theory for the ascent of sa are
(a) Driving force
(b) Hydration
(c) Cohesion of water
(d) All of these

41. The xylem and phloem elements in the plant are surrounded by a layer of living cells called
(a) Casparian strips
(b) Pericycle
(c) Stele
(d) Endodermis

42. Which part of root absorb water and minerals ?
(a) Root cap (b) Root hairs
(c) Epidermis (d) Endodermis

43. Fluid mosaic model of cell membrane is given by
(a) Daniel and Davson
(b) Robertson
(c) Robercook
(d) Singer and Nicholson

44. The stage of seeds showing no germination because of internal conditions of seed is termed as
(a) Dormancy (b) Quinscence
(c) Recalcitran- (d) Longevity

45. A plant hormone, which is primary regulator of abscission process is
(a) Ethylene (b) Auxin
(c) ABA (d) Gibberellins

46. Growing of plant in soilless nutrient solution is referred as
(a) Aeroponics (b) Hydroponics
(c) Xeroponics (d) None of these

Answers						
	31. (b)	34. (d)	37. (b)	40. (d)	43. (d)	46. (b)
	32. (c)	35. (a)	38. (a)	41. (b)	44. (a)	
	33. (b)	36. (d)	39. (c)	42. (b)	45. (c)	

47. Most of the wheat cultivars are
(a) Day neutral
(b) Short day plants
(c) Qualitative long day plants
(d) Quantitative long day plants

48. Rice grain is deficient in
(a) Lysine (b) Glysine
(c) Isoleucine (d) Alanine

49. The critical concentration of micronutrients needed in tissue is equal to or less than
(a) 1 ppm (b) 10 ppm
(c) 100 ppm (d) 1000 ppm

50. Storage of elements in vacuoles occurs under
(a) Deficient zone
(b) Critical zone
(c) Luxury consumption
(d) Toxic zone

51. Chelate are
(a) Organic in nature
(b) Inorganic in nature
(c) Both (a) and (b)
(d) None of these

52. Siderophores produced by fungi and bacteria in soil are the source of
(a) Zn (b) Fe
(c) Cu (d) Mn

53. The young leaves of terminal bud at first typically hooked, finally dying back at tips and margins are the deficiency symptoms of
(a) Potassium (b) Iron
(c) Calcium (d) Copper

54. The young leaves chlorotic, principal veins remain typically green, stalks slender and short are the deficiency symptoms of
(a) Fe (b) Cu
(c) Mn (d) Boron

55. Iron stored in chloroplast as an iron protein complex is called
(a) Calmodulin (b) Phytoferritin
(c) Chloroferritin (d) Chromoferritin

56. Initiation of protein synthesis in eukaryotic mRNA requires
(a) a 3′ poly-A tail (b) a 5′ poly-A tail
(c) a 5′ cap (d) a 3′ cap

57. The first sign of switch over from vegetative stage to reproductive stage in wheat is
(a) Ear emergence stage
(b) Double ridge stage
(c) Terminal spikelet stage
(d) Anthesis stage

58. Abundant phosphorus in plants is related with
(a) Early maturity
(b) Delay maturity
(c) Accumulation of anthocyanin pigments
(d) Both (b) and (c)

59. Increase in temperature at anthesis stage in wheat results in
(a) Increased grain size
(b) Decreased grain size
(c) Increased duration of grain growth
(d) No effect

60. An ideal type of rice with small, thick and erect leaf was proposed by
(a) Tsunoda (b) Tanaka
(c) Yoshida (d) Murata

Answers

47. (c)	50. (c)	53. (c)	56. (c)	59. (b)
48. (a)	51. (a)	54. (a)	57. (b)	60. (c)
49. (c)	52. (b)	55. (b)	58. (d)	

61. Increase in wheat yield potential so far results from
(a) Increase in HI
(b) Increase in dry matter production
(c) Increase in stem weight
(d) Increase in leaf weight

62. Most commonly grown crop plants are included in
(a) Halophytes (b) Glycophytes
(c) Sciophytes (d) Xerophytes

63. Acetylene reduction to ethylene is measured as
(a) Nitrate reduction
(b) Glutamate synthase activity
(c) Nitrite reduction
(d) N_2 fixation

64. The gray speck of oats, 'marsh spot' of peas, and speckled yellows of sugar beets are the deficiency symptoms of
(a) Cu (b) Mn
(c) Fe (d) Zn

65. The 'heart rot' of beets, 'stem crack' of celery, 'water core' of turnip and 'drought spot' of apples are the deficiency symptoms of
(a) B (b) Ca
(c) Zn (d) Cu

66. Optimum temperature for maximum crop development in wheat is
(a) 10 - 15°C (b) 20 - 25°C
(c) 25 - 30°C (d) 30 - 35°C

67. Water potential of chemically pure water is
(a) - 0.1 MPa (b) - 0.5 MPa
(c) - 1.0 MPa (d) Zero

68. 'Little leaf' and 'rosette' of apple, 'white bud' of maize are the deficiency symptoms of
(a) Fe (b) Zn
(c) Cl (d) Mo

69. Under an excessive light level synthesis of which of the followir found to be increased ?
(a) Antheraxanthin (b) Violaxanthi
(c) Zeaxanthin (d) All of these

70. In citrus plant, die back disease is result of deficiency of
(a) N (b) P
(c) Boron (d) Copper

71. Which micronutrient is essential for synthesis of 'auxin' ?
(a) Cu (b) Mn
(c) Zn (d) Silicon

72. 'Whiptail' disease of cauliflower is to deficiency of
(a) Copper (b) Chlorine
(c) Calcium (d) Molybdenum

73. Direct reduction of O_2 by photosyste I leads to the formation of
(a) H_2O_2
(b) Superoxide anion radical
(c) Singlet oxygen
(d) Singlet exited state of O_2

74. Which of the following is not a colligat property ?
(a) Depression of freezing point
(b) Refractive index
(c) Lowering of vapour pressure
(d) Elevation of boiling point

75. The optimum pH of nutrient solution nutrient solution culture is
(a) 4 (b) 6
(c) 8 (d) 9

Answers

61. (a)	64. (b)	67. (d)	70. (d)	73. (a)
62. (b)	65. (a)	68. (b)	71. (c)	74. (b)
63. (d)	66. (b)	69. (c)	72. (d)	75. (b)

76. Acid rains are due to which of the following gases ?
(a) CO_2 and CO (b) Ozone and CO_2
(c) NO_2 and SO_2 (d) NH_3 and CO_2

77. Tumor inducing principle in *Agrobacterium* is in
(a) T-DNA (b) T_1-plasmid
(c) t-RNA (d) None

78. Mycorrhiza (association of fungi with roots of higher plants) increased the availability of
(a) Fe (b) N
(c) P (d) B

79. VAM (vesicular arbuscular mycorrhiaze) is mostly used in
(a) Perennial trees (b) Annual crops
(c) Biennial crops (d) All of these

80. If the accumulation ratio in absorption of nutrients is greater than one then it is known as
(a) Active absorption
(b) Passive absorption
(c) Adsorption
(d) None of these

81. Which one of the following is a most harmful pollutant by automobiles ?
(a) SO_2 (b) CO
(c) N_2O (d) CO_2

82. ^{14}C has a half life of
(a) 14 days (b) 100 years
(c) 5730 years (d) 6000 years

83. Mass flow mechanism was proposed by
(a) Darwin (b) Munch
(c) Hugo de Vries (d) Banda

84. hn RNA stands for
(a) Homogeneous nuclear RNA
(b) Heterogenous nuclear RNA
(c) Heterocyclic nuclear RNA
(d) All of these

85. Isotopes differs in
(a) Electrons and protons
(b) Protons and neutrons
(c) Neutrons only
(d) Electrons and neutrons

86. The process in which sugars (carbohydrates) are raised to high concentration in phloem cells close to a source is known as
(a) Xylem loading
(b) Phloem loading
(c) Phloem concentration
(d) Phloem deloading

87. ..... is the break down of large molecules to small molecules, and this process often releases energy
(a) Anabolism
(b) Catabolism
(c) Both (a) and (b)
(d) None of these

88. One curie of activity is equivalent to
(a) 3.7×10^4 disintegration per sec.
(b) 3.7×10^1 disintegration per sec.
(c) 3.7×10^{10} disintegration per sec.
(d) 3.7×10^7 disintegration per sec.

89. Climatric rise in respiration is observed in
(a) Mango (b) Citrus
(c) Grapes (d) Cherries

90. Callus is induced to form roots in the medium of
(a) Auxin only
(b) Cytokinins only
(c) More cytokinins than auxin
(d) More auxin than cytokinins

Answers					
	76. (c)	79. (a)	82. (c)	85. (c)	88. (c)
	77. (a)	80. (a)	83. (b)	86. (b)	89. (a)
	78. (c)	81. (b)	84. (b)	87. (b)	90. (d)

91. Sulphur containing amino acids is/are
(a) Cysteine (b) Methionine
(c) lysine (d) Both (a) and (b)

92. Which group of enzymes form double bonds by elimination of a chemical group ?
(a) Kinases (b) Lyases
(c) Polymerases (d) Ligases

93. Electrophoresis was developed to separate
(a) Fats (b) Carbohydrates
(c) Vitamins (d) Proteins

94. Ripening is delayed by synthesis of antisense ACC synthetase RNA in which fruit ?
(a) Tomato (b) Grapes
(c) Citrus (d) Cherries

95. Blue light is always less efficient in photosynthesis than
(a) White (b) Red
(c) Orange (d) Violet

96. Recognition site of t-RNA is
(a) Anticodon (b) Loop I
(c) Loop IV (d) 3' OH end

97. Chlorophyll are green because they
(a) Reflect green light
(b) Absorb green light
(c) Transmit green light
(d) None of these

98. RNA-DNA hybridization to quantify gene expression at mRNA level is called as
(a) Southern blotting
(b) Slot-blot technique
(c) Western blotting
(d) Northern blotting

99. Wavelength of visible light is
(a) 260 - 350 nm (b) 360 - 760 nm
(c) 390 - 780 nm (d) 400 - 700 nm

100. Plastocyanin protein contains
(a) Fe (b) Cu
(c) P (d) Mo

101. Z-scheme of electron transport was firs proposed by
(a) Hill and Bendall
(b) Hatch and Boardman
(c) Haliwell
(d) Calvin

102. How many photons are required to produce one molecule of oxygen ?
(a) 4 (b) 8
(c) 12 (d) 16

103. Brassino steroid is present in
(a) Mustard (b) Cotton
(c) Wheat (d) Sunflower

104. In C_3 plant, which enzyme first react with CO_2 to form PGA
(a) Invertases (b) Rubisco
(c) Oxaloacetate (d) PEP

105. Hormone associated with 'acid growth theory' is
(a) GA_3 (b) Cytokinin
(c) Auxin (d) Ethylene

106. Nitrate reductase is found in
(a) Chloroplast (b) Golgibodies
(c) Mitochondria (d) Cytoplasm

107. Protein content in pulses ranges from
(a) 10 - 15% (b) 20 - 25%
(c) 25 - 30% (d) 40 - 45%

108. Protein content of cereals ranges from
(a) 8 - 12% (b) 12 - 15%
(c) 15 - 20% (d) 20 - 25%

Answers					
	91. (d)	94. (a)	97. (b)	100. (b)	103. (a)	106. (d)
	92. (b)	95. (b)	98. (d)	101. (a)	104. (b)	107. (b)
	93. (d)	96. (a)	99. (c)	102. (b)	105. (c)	108. (a)

109. Natural inhibitor of IAA oxidases is
(a) Caffeic acid (b) Coumaric acid
(c) ABA (d) Lactic acid

110. In C_4 plant, the first stable product of photosynthesis is
(a) PGA (b) Malic acid
(c) Oxalic acid (d) Tartaric acid

111. Close association of chloroplast, peroxosomes and mitochondria in a leaf cell are related with
(a) Photosynthesis (b) Respiration
(c) Photorespiration
(d) None of these

112. How many ATP are required to produce 1 mole of hexose in photosynthesis ?
(a) 8 (b) 18
(c) 28 (d) 38

113. Instrument used for measuring 'stomatal pressure' is
(a) Porometer (b) Calipers
(c) Potometer (d) Micronare

114. Who coined the term 'biological clock' ?
(a) Went (b) Borthwick
(c) Salisburry (d) Bunning

115. Most dangerous gas for depletion of ozone layer is
(a) Chlorine (b) CFC
(c) Benzene (d) CO_2

116. Which process is also known as glycolate pathway ?
(a) Photosynthesis (b) Respiration
(c) β - oxidation
(d) Photorespiration

117. The present level of CO_2 in atmosphere is
(a) 210 - 250 ppm (b) 295 - 300 ppm
(c) 360 - 370 ppm (d) 420 - 460 ppm

118. In C_4 plant, enzyme responsible for the synthesis of malic acid is
(a) PEP carboxylase (b) Rubisco
(c) Isomerase (d) Kinase

119. Element for most of dehydrogenase is
(a) Ca (b) Mo
(c) Mg (d) Zn

120. Lysimeter is used in measurement of
(a) Light (b) Transpiration
(c) Lysine content (d) Water potential

121. *Agave americana* is a
(a) C_3 plant (b) C_4 plant
(c) CAM plant (d) Not classified

122. The most striking feature of CAM plants is formation of malic acid at
(a) Morning (b) Afternoon
(c) Evening (d) Night

123. Select the families to which CAM plants belong.
(a) Bromeliaceae (b) Cactaceae
(c) Orchidaceae (d) All of these

124. Photosynthetic inhibition by O_2 is called as
(a) Hill reaction
(b) Warburg's effect
(c) Feed back inhibition
(d) Competitive effect

125. Among the following statements which one is not correct about photosynthesis
(a) Light captured by PS - I and electron passed to PS - II
(b) O_2 is released from photolysis of water
(c) ATP from electron transport chain with PS - I, PS - II
(d) Light independent reactions uses energy rich molecules to reduce CO_2

Answers						
	109. (b)	112. (b)	115. (b)	118. (a)	121. (c)	124. (b)
	110. (c)	113. (a)	116. (d)	119. (d)	122. (d)	125. (a)
	111. (c)	114. (d)	117. (c)	120. (b)	123. (d)	

126. Among following which is antioxidant ?
(a) Quinones (b) Tocopherols
(c) Phenols (d) Sorbitols

127. Which ecosystem has highest net primary productivity per unit area ?
(a) Tropical seasonal forest
(b) Tropical rain forest
(c) Cultivated lands
(d) Savanna

128. At the outer boundry of the atmosphere and at the earth's mean distance from the sun, the total irradiance (solar constant) is
(a) 1060 $Jm^{-2}s^{-1}$
(b) 1360 $Jm^{-2}s^{-1}$
(c) 1060 cal $m^{-2}s^{-1}$
(d) 1360 cal $m^{-2}s^{-1}$

129. The irradiance at which photosynthesis is equal to respiration rate (net CO_2 exchange is zero) is called
(a) Light compensation point
(b) Light saturation point
(c) Solar constant
(d) PAR

130. The CO_2 concentration at which photosynthetic fixation just balances respiratory loss is known as the
(a) O_2 compensation point
(b) O_2 saturation point
(c) CO_2 compensation point
(d) CO_2 saturation point

131. The transpiration ratio is highest for
(a) C_3 plants (b) C_4 plants
(c) CAM plants (d) None of these

132. Photosynthesis inhibited by 21% O_2 in
(a) C_3 plants (b) C_4 plants
(c) CAM plant (d) None of these

133. For C_3 plants, the optimum temperat for photosynthesis is
(a) 15 - 25 °C (b) 25 - 30 °C
(c) 30 - 47 °C (d) 35 °C

134. Respiratory quotient (RQ) carbohydrates is approximately
(a) 0.5 (b) 1.0
(c) 1.33 (d) 0.7

135. Respiratory quotient (RQ) for fatty ac is
(a) 0.7 (b) 0.5
(c) 1.33 (d) 2.0

136. Respiratory quotient (RQ) for organic a is
(a) 0.7 (b) 1.0
(c) 1.33 (d) > 1.0

137. The end product of glycolysis is
(a) Glucose (b) Sucrose
(c) Pyruvic acid (d) NADH

138. Glycolysis take place in
(a) Mitochondria (b) Cytoplasm
(c) Chloroplast (d) Nucleus

139. Electron - transport system take place which part of mitochondria ?
(a) Matrix
(b) Cristae
(c) Outer membrane
(d) Inner membrane

140. Krebs cycle produces
(a) 18 ATP (b) 30 ATP
(c) 32 ATP (d) 36 ATP

141. First time IAA from human urine w isolated by
(a) Kogl (b) Went
(c) Adns (d) Miller

Answers						
	126. (b)	129. (a)	132. (b)	135. (a)	138. (b)	141. (
	127. (b)	130. (c)	133. (a)	136. (c)	139. (b)	
	128. (b)	131. (a)	134. (b)	137. (c)	140. (b)	

142. The term 'skototropism' is associated with :
(a) Jumper and Jones
(b) Mayber and Mayer
(c) Strong and Ray
(d) Hans and Knot

143. Pollen germination requires which of the following element ?
(a) B (b) K
(c) Ca (d) Si

144. Who first isolated 'zeatin' from corn seed ?
(a) Wiesner (b) Miller
(c) Zeigler (d) Letham

145. Storage protein in beans is
(a) Insulin (b) Globulins
(c) Phaseoline (d) Tripsin

146. Main organic acid in pineapple is
(a) Citric acid (b) Pyruvic acid
(c) Malic acid (d) Acetic acid

147. Sulphate reduction in leaves take place in
(a) Mitochondria (b) Chloroplast
(c) Glyoxisomes (d) Peroxisomes

148. Polymer of cellulose is
(a) β-D glucose (b) α-D glucose
(c) Fructose (d) Glucose

149. In which cell organelle, PEP carboxylation is taking place in C_4 plants
(a) Epidermal cells
(b) Mesophyll cells
(c) Xylem cells
(d) Bundle sheath cells

150. Cyanide-resistant respiration follow
(a) Pentose phosphate pathway
(b) Krebs cycle
(c) Glycolysis
(d) None of these

151. Green house gas for global warming is
(a) O_2 (b) CH_4
(c) SO_2 (d) CO_2

152. ..... amino acid produced in photorespiration
(a) Serine (b) Arginine
(c) Tryptophan (d) Methionine

153. In monocots and dicots accumulation of which hormone causes collapse and lysis of mature cortical cells in the root, leading to a tissue with large air spaces
(a) Auxin (b) Gibberellin
(c) Ethylene (d) ABA

154. Aerenchyma is related with
(a) ABA (b) Ethylene
(c) Cytokinin (d) Auxin

155. When starch reacts with iodine produces colour
(a) Yellow (b) Blue
(c) Green (d) Red

156. Under aerobic conditions microbes grow slower but uses more sugar and produces more CO_2 and ethanol, this phenomenon known as
(a) Warburg's effect
(b) Pasteur effect
(c) Both (a) and (b)
(d) None of these

157. Enzyme used to cut double stranded RNA is
(a) DNAase
(b) Reverse transcriptase
(c) Restriction endonuclease
(d) Lipase

Answers						
	142. (c)	145. (c)	148. (a)	151. (d)	154. (b)	157. (c)
	143. (a)	146. (c)	149. (b)	152. (a)	155. (b)	
	144. (d)	147. (b)	150. (a)	153. (c)	156. (b)	

158. Which one can not pass across membrane by diffusion ?
(a) CO_2 (b) O_2
(c) H_2O (d) H^+

159. In many species, the gradual decrease in respiration is reversed by a sharp increase, known as
(a) Non climacteric
(b) Climacteric
(c) Both
(d) None

160. Conversion of organic nitrogen to NH_4 by soil microbes is called
(a) Amminization (b) Ammonification
(c) Nitrification (d) Mineralization

161. Denitrification occurs in
(a) Water logged soils
(b) Well aerated soils
(c) Alkali soils
(d) Acidic soils

162. C_3 cycle of carbon fixation takes place in
(a) Nucleus
(b) Thylakoid of chloroplast
(c) Stroma of chloroplast
(d) Cytosol

163. The process by which N_2 is reduced to ammonium (NH_4^+) is called
(a) Nitrification
(b) Nitrogen fixation
(c) Denitrification
(d) Ammonia volatilization

164. How many electrons are required for conversion of NO_2^- to NH_4^+
(a) 4 (b) 6
(c) 8 (d) 10

165. Mature root nodule made largely of
(a) Diploid cells (b) Tetraploid cells
(c) Hexaploid cells (d) None

166. The main function of leghaemoglobin is
(a) Fe supply (b) Water supply
(c) O_2 supply (d) All of these

167. Nitrogen fixation is carried out by enzyme
(a) Nitrate reductase
(b) Nitrite reductase
(c) Nitrogenase
(d) Rubisco

168. Nitrogenase consists of
(a) Fe protein (b) Mo protein
(c) Fe-Mo protein (d) None

169. Which one of the following is a phosphorus mobilizer ?
(a) VAM (b) *Rhizobium*
(c) BGA (d) *Clostridium*

170. 'Dormin' is coined by
(a) Skoog (b) Wareig
(c) Addicot (d) Wilkins

171. Kranz type of anatomy is found in
(a) Sunflower (b) Soybean
(c) Sorghum (d) Spinach

172. How many Calvin cycles are needed to produce one molecule of glucose ?
(a) 1 (b) 3
(c) 6 (d) 9

173. The ureides (allantoin and allantoic acids) is the major nitrogen compound transported from root nodules to other parts of plant in
(a) Soybean (b) Wheat
(c) Sugarcane (d) Sugarbeet

Answers						
	158. (d)	161. (a)	164. (b)	167. (c)	170. (b)	173. (a)
	159. (b)	162. (c)	165. (b)	168. (c)	171. (c)	
	160. (b)	163. (b)	166. (c)	169. (a)	172. (c)	

174. How many quanta are there in 1 μ Einstein ?
(a) 5.074×10^{23} (b) 6.02×10^{17}
(c) 6.02×10^{-23} (d) 6.02×10^{23}

175. Unit of pressure in SI system
(a) Atmosphere (b) Dynes / cm^2
(c) Pascal (d) mm of mercury

176. One millimole of $CaCO_3$ weight is
(a) 100 g (b) 1 g
(c) 1.0 mg (d) 0.1 g

177. In process of nitrate reduction, the oxidation number of nitrogen changes from
(a) +3 to -5 (b) +5 to -3
(c) +6 to -3 (d) -2 to +5

178. Reduction of nitrite to ammonium ions is catalyzed by nitrite reductase in
(a) Chloroplast (b) Proplastids of roots
(c) Both a & b (d) Cytoplasm

179. Flowering stimulus is perceived by
(a) Shoot apex (b) Leaves
(c) Buds (d) Flowers

180. 1-amino-cyclopropane-1-carboxyiic acid (ACC) is a close precursor of
(a) ABA (b) Ethylene
(c) Salicylic acid (d) GA

181. The first step of assimilation of sulphate is catalyzed by
(a) ATP sulfurylase
(b) APS sulfotransferase
(c) Pyrophosphatase
(d) Cysteine synthetase

182. Coconut fat is a rich source of
(a) Palmitic acid (b) Stearic acid
(c) Lauric acid (d) Ricinoleic acid

183. Phytoalexins includes
(a) Pisatin (b) Phaseolin
(c) Isocoumarin (d) All of these

184. In simple system at constant temperature, water potential is equal to
(a) $\psi_S + OP$ (b) $\psi = TP$
(c) $\psi_P + \psi_W$ (d) $\psi_S + \psi_P$

185. Antimicrobial compounds synthesized by plants when infected with microbes are
(a) Betalin (b) Phytoalexins
(c) Flavones (d) Flavonols

186. Flavonoides includes
(a) Anthocyanins (b) Flavonols
(c) Flavones (d) All of these

187. Betalains have role in
(a) Germination (b) Pollination
(c) Fruit setting (d) Ripening

188. The first alkaloid to be isolated and crystallized was the
(a) Nicotine (b) Cocaine
(c) Morphine (d) Caffeine

189. Nicotine is produced only in
(a) Roots (b) Leaves
(c) Seed (d) Stem

190. A cell lacking cell wall is also lack in
(a) Biomembrane (b) Chloroplast
(c) Endoplasmic reticulum
(d) Mitochondria

191. cDNA stands for
(a) Copy DNA (b) Cyclic DNA
(c) Complementary DNA
(d) Both (a) and (b)

192. Dry weight is commonly obtained by drying the freshly harvested plant material at
(a) 60 - 70 °C (b) 70 - 80 °C
(c) 90 - 100 °C (d) 100 - 105 °C

Answers						
	174. (b)	177. (b)	180. (b)	183. (d)	186. (d)	**189. (a)**
	175. (c)	178. (c)	181. (a)	184. (d)	187. (b)	**190. (b)**
	176. (d)	179. (b)	182. (c)	185. (b)	188. (c)	**191. (c)**
						192. (b)

193. In bamboos (*Bambusa*), which live more than half century, flowering occurs only
(a) Once (b) Twice
(c) Thrice (d) Not countable

194. Fluorescence which is sensitive to the conditions of photothermal traps are said to be
(a) Constant fluorescence
(b) Dead fluorescence
(c) Background fluorescence
(d) Variable fluorescence

195. The century plant (*Agave americana*) exist for a decade or more before flowering ..... and dying
(a) Once (b) Twice
(c) Thrice (d) Not countable

196. Grana stacks of thylakoid membranes are high in
(a) PS-I (b) PS-II
(c) Cyt b (or) f
(d) Chloroplast a (or) b

197. In the great majority of plant species, seed germination begins with
(a) Radicle
(b) Epicotyl
(c) Both (a) and (b)
(d) None

198. Phyllotaxis is related with arrangement of
(a) Roots (b) Branches
(c) Leaves (d) Flower

199. Oxygenase function of Rubisco was first shown by
(a) Andrews and Lorimer
(b) Ogren and Bowes
(c) Guttendge
(d) Went

200. Major form of carbon transfer in pl is by
(a) Sucrose (b) Glucose
(c) Fructose (d) Maltose

201. The term auxin was first used in 1 by
(a) Frits Went (b) Darwin
(c) Goldsmith (d) Kabuta

202. Photorespiration increases at w temperature due to
(a) Ratio of dissolved chloroplast O CO_2 is lower
(b) Ratio of dissolved chloroplast O CO_2 is higher
(c) Ratio of dissolved chloroplast O CO_2 is not affected
(d) Ratio of dissolved chloroplast O CO_2 is equal

203. IAA is chemically similar to the ami acid
(a) Methionine (b) Tryptophan
(c) Serine (d) Proline

204. Apical dominance is the result of
(a) Auxins (b) Cytokinins
(c) Ethylene (d) GA

205. The bakanae (foolish seedling) disea of rice is caused by
(a) *Gibberella fujikuroi*
(b) *Claviceps fusiformis*
(c) *Xanthomonas oryzae*
(d) None

206. The compound, gibberellin was isolate from fungus in 1930s by
(a) Went
(b) Yabuta and Hayashi
(c) Anthony Trewavas
(d) Crozier

Answers					
	193. (a)	196. (b)	199. (b)	202. (b)	205. (a)
	194. (d)	197. (a)	200. (a)	203. (b)	206. (b)
	195. (a)	198. (c)	201. (a)	204. (a)	

207. Which nutrient is related with water oxidizing enzyme complex ?
(a) P (b) Mn
(c) Cu (d) Fe

208. Activator of carbonic anhydrase is
(a) Mn (b) P
(c) Cu (d) Zn

209. Which element is related with cytochrome ?
(a) P (b) Zn
(c) Cu (d) Fe

210. The precursor of gibberellic acid is
(a) Mevalonic acid (b) Kaurene
(c) Violaxanthin (d) None of these

211. Which plant hormone promote germination of dormant seeds and growth of dormant buds ?
(a) Auxin (b) GA
(c) Cytokinins (d) ABA

212. During germination, embryo normally provides which hormone to the aleurone layer for the manufacturing of hydrolytic enzymes (á-amylase)
(a) IAA (b) ABA
(c) Cytokinins (d) GA_3

213. Zeatin had first been identified by
(a) Letham
(b) Gottlieb Haberlandt
(c) Steward
(d) Skoog

214. Natural occurring cytokinins is/are
(a) Zeatin (b) Kinetin
(c) Both (a) & (b) (d) Benzyl adenine

215. The precursor of cytokinins is
(a) Violaxanthin
(b) Isopentenyl adenine
(c) Campastrall (d) Kaurene

216. Which one of the following delay senescence and increase nutrient sink activity ?
(a) Auxin (b) GA
(c) ABA (d) Cytokinins

217. Which plant hormone is a volatile hormone ?
(a) ABA (b) Ethylene
(c) Cytokinins (d) Auxin

218. Which gas is considered as antagonist to ethylene action ?
(a) O_2 (b) N_2
(c) CO_2 (d) CH_4

219. Precursor of abscisic acid (ABA) is
(a) Violaxanthin (b) Xanthoxin
(c) Isopentenyl adenine
(d) Methionine

220. The hormone ABA was first identified and characterized chemically in 1963 by
(a) Frederick T. Addicott
(b) Milborrow
(c) Bradford (d) None

221. The major functions of ABA is/are
(a) Inhibition of RNA synthesis
(b) Inhibition of translation
(c) Effect on plasma membrane
(d) All of these

222. The precursor of brassinosteroids is
(a) Adenine (b) Campastrall
(c) Violaxanthin (d) Kaurene

223. Growth movement toward (positive) or away (negative) from the earth's gravitational pull is known as
(a) Photoperiodism (b) Phototropism
(c) Gravitropism (d) Plagiotropism

Answers						
	207. (b)	210. (b)	213. (a)	216. (d)	219. (a)	222. (b)
	208. (d)	211. (b)	214. (c)	217. (b)	220. (a)	223. (c)
	209. (d)	212. (d)	215. (b)	218. (c)	221. (d)	

224. Aminoethoxyvinylglycine (AVG) inhibits
(a) Alternate bearing in mango
(b) Photosynthetic e^- transport
(c) Ethylene biosynthesis
(d) Cyanide resistant respiration

225. Which one of the following is not correctly matched ?
(a) TIBA - inhibit polar transport of IAA
(b) SHAM - inhibit cyanide resistant respiration
(c) Atrazine - inhibit photosynthetic e^- transport
(d) None

226. Law of inhibitory factor was given by
(a) VH Blackman (b) RF Blackman
(c) RD Asana (d) CM Donald

227. Which scientist worked on drought tolerance ?
(a) RD Asana (b) CM Donald
(c) HA Borthwick (d) VH Blackman

228. Select the pair which is not correctly matched.
(a) LAR - leaf area per unit plant dry weight
(b) SLA - leaf area per unit leaf dry weight
(c) SLW - leaf dry weight per unit leaf area
(d) None

229. The main function of jasmic acid is
(a) Promote leaf senescence
(b) Steroid growth promoter
(c) Control nastic movements
(d) Decrease senescence

230. The major function of salicylic acid is
(a) Control nastic movements
(b) Promote leaf senescence
(c) Increase resistance to plant pathogen's infection
(d) Reduces water stress

231. Select the pair which is not correctly matched.
(a) Transamination- Brassin and Kriman
(b) Photoperiodism- Garner and Allar
(c) Ascorbic acid- Chinoy
(d) None

232. The main function of turgorins is
(a) Control nastic movement
(b) Promotes leaf senescence
(c) Increase resistance to plar pathogen's infection
(d) Steroid growth promoter

233. The term vernalization relates
(a) To low temperature promotion c flowering
(b) To low temperature promotion c early germination
(c) To high temperature for earl ripening
(d) None

234. Which of the following is/are day neutral plants ?
(a) Cotton (b) buckwheat
(c) Sunflower (d) All of these

235. Who named the florigen ?
(a) Skoog (b) Knott
(c) Chailakhyan (d) Salisbury

236. In vernalization the seeds are allowed to germinate for some time and then are given cold temperature treatments by keeping them at
(a) 0 to 5 °C (b) 0 to 20 °C
(c) 15 - 20 °C (d) 20 - 25 °C

Answers					
	224. (c)	227. (a)	230. (c)	233. (a)	236. (a)
	225. (d)	228. (d)	231. (d)	234. (d)	
	226. (b)	229. (a)	232. (a)	235. (c)	

237. The movement of secondary branches of roots and stem growing at right angle is known as
(a) Plagiogeotropic (b) Apogeotropic
(c) Diageotropic (d) None

238. Parthenocarpy means formation of fruits without seed is found in
(a) Bananas (b) Pineapple
(c) Melons (d) All of these

239. The example of non - climacteric fruits is/are
(a) Oranges (b) Lemons
(c) Pepper (d) All of these

240. When dormancy occurs due to unfavourable environmental conditions is known as
(a) Innate dormancy
(b) Imposed dormancy
(c) Induced dormancy
(d) All of these

241. The phenomenon in which germination of seeds is affected by light, such seeds are known as
(a) Photoperiodic (b) Thermoperiodic
(c) Photoblastic (d) Vernalized

242. Positive photoblastic plants includes
(a) *Nicotiana tabacum*
(b) *Nigella damascena*
(c) *Silene armeria*
(d) *Nemophila insignis*

243. Off season flowering in plants is positive by giving treatment of
(a) Photoperiodism
(b) Vernalization
(c) Both (a) and (b)
(d) Thermoperiodism

244. Maleic hydrazide (MH) is used to
(a) Suppress flowering and emergence of suckers
(b) Induce seed germination
(c) Enhance ripening
(d) All of these

245. Pomato (a hybrid of potato and tomato) is produced by
(a) Cytoplasmic fusion
(b) Protoplasmic fusion
(c) Nuclear fusion
(d) None

246. The principle of electrophoresis were first time made in 1807 by
(a) Alexander Reuss
(b) Michael Faraday
(c) EH Du Bosi Raymond
(d) Lambert

247. In year 1906, who initiated the idea of chromatography
(a) Michael Faraday (b) AJP Martin
(c) Michael Tswett (d) RLM Synge

248. The term protoplasm was introduced by
(a) Purkinje (1840)
(b) Purkinje (1860)
(c) Von Mohl (1846)
(d) Virchow (1855)

249. Who first time reported the presence of ribosomes in cell ?
(a) Palade
(b) Haguenau
(c) Robinson and Brown
(d) Benda

250. Intracellular digestion, autophagy, aging and autolysis are the functions of
(a) Mitochondria (b) Lysosomes
(c) Peroxisomes (d) Spherosomes

Answers					
	237. (c)	240. (b)	243. (c)	246. (a)	249. (a)
	238. (d)	241. (c)	244. (a)	247. (c)	250. (b)
	239. (d)	242. (a)	245. (b)	248. (a)	

251. Vacuoles are surrounded by
(a) Plasma membrane
(b) Cell wall
(c) Tonoplast
(d) Lipid layer

252. Which cell organelle is concerned with glyoxylate metabolism ?
(a) Spherosomes (b) Lysosomes
(c) Ribosomes (d) Glyoxysomes

253. Diffusion of liquid into gas results in the formation of
(a) Foam (b) Precious stones
(c) Clouds (d) Smoke

254. The adsorption of water by hydrophilic colloids is called
(a) Diffusion (b) Imbibition
(c) Plasmolysis (d) Mass flow

255. The total amount of water present in soil is called as
(a) Holard (b) Chesard
(c) Echard (d) Water table

256. Who gave the transpiration pull or cohesion tension theory of ascent of sap ?
(a) Unger
(b) Dixon and Jolly
(c) Milburn and Johnson
(d) Stephan Hales

257. Guttation takes place through
(a) Stomata (b) Hydathode
(c) Leaf veins (d) Guard cells

258. Which instrument is used to measu stomatal opening ?
(a) Porometer (b) Potometer
(c) IRGA (d) Manometer

259. 'Tea yellow' disease is caused by deficiency of
(a) N (b) P
(c) S (d) Boron

260. General starvation is the deficien symptoms of
(a) N (b) P
(c) K (d) Ca

261. Blossom end rot (BER) is the deficien symptoms of
(a) Ca (b) Mg
(c) Bo (d) Mo

262. In tobacco, 'sand drown' disease is fou due to the deficiency of
(a) Ca (b) Mg
(c) Fe (d) Cu

263. Copper deficiency in cereals, oats, be and pulses causes
(a) Exanthema or die back
(b) White tip disease
(c) Rosette
(d) Frenching

Answers					
	251. (c)	254. (b)	257. (b)	260. (a)	263. (b)
	252. (d)	255. (a)	258. (a)	261. (a)	
	253. (c)	256. (b)	259. (c)	262. (b)	

8 Agricultural Economics

1. In principle of increasing risk, the non-equity capital used will be
   (a) At increasing rate
   (b) At decreasing rate
   (c) At constant rate
   (d) None

2. Choose the best measure to find worthiness of investment
   (a) Pay back period (b) B-C ratio
   (c) NPV (d) IRR

3. Principle of substitution is used in
   (a) Product min.
   (b) Selection of enterprise
   (c) Selection of practice
   (d) None of these

4. Least cost principle is used in
   (a) What to produce
   (b) How much to produce
   (c) How to produce
   (d) When to produce

5. Demand for agricultural products is relatively
   (a) Less elastic (b) More elastic
   (c) More inelastic (d) Less inelastic

6. When total product remains constant, the marginal product will be
   (a) Zero (b) Negative
   (c) Positive (d) Constant

7. When AP < MP, AP is
   (a) Remains constant
   (b) At maximum
   (c) Increasing (d) Decreasing

8. A production function with unitary elasticity indicates
   (a) Increasing returns
   (b) Decreasing returns
   (c) Nothing
   (d) Constant returns

9. In the rational region of production function, choice of indicator is
   (a) Factor - factor price ratio
   (b) Factor - product prices
   (c) Product - product price ratio
   (d) Factor - product quantity

10. The relationship between TP and TC is
    (a) Directly proportional
    (b) No relationship
    (c) Inversely related
    (d) None

11. When MC is at lowest, MP will be
    (a) Decreasing (b) Maximum
    (c) Increasing (d) Minimum

12. In rational zone
    (a) MC = AC (b) MC > AC
    (c) MC < AC (d) None

13. If $Px_1 . x_1 > Px_2 . x_2$
    (a) x_1 should be replaced by x_2
    (b) x_2 should be replaced by x_1
    (c) Used same quantity
    (d) None

Answers

1.	(a)	4.	(c)	7.	(c)	10.	(c)	13. (a)
2.	(d)	5.	(c)	8.	(d)	11.	(b)	
3.	(a)	6.	(a)	9.	(b)	12.	(b)	

14. On the ridge lines, MPP of input, will be
    (a) Constant (b) Positive
    (c) Negative (d) Zero

15. If MRS between 2 products is negative, then 2 goods are
    (a) Substituting (b) Complementing
    (c) Supplementing (d) No relationship

16. The optimum product combination at given level of resources will be where
    (a) $\Delta y_1 / \Delta y_2 = Py_1 / Py_2$
    (b) $\Delta y_2 / \Delta y_1 = Py_1 / Py_2$
    (c) $\Delta x_1 / \Delta x_2 = Px_1 / Px_2$
    (d) $\Delta x_2 / \Delta x_1 = Px_1 / Px_2$

17. In case of diminishing rate of substitution the curve will be
    (a) Convex to origin
    (b) Straight line
    (c) Concave to origin
    (d) Vertical or horizontal

18. Optimum choices of enterprises or combination of enterprises is made based on
    (a) Principle of least cost
    (b) Principle of variable proportions
    (c) Principle of opportunity cost
    (d) Principle of cost

19. In LP, the availability and input-output coefficients as well as prices are known with certainty then assumption is
    (a) Linearity (b) Additivity
    (c) Finiteness
    (d) Single value expectations

20. In maximizing returns interaction, the out going column will be located with the help of
    (a) Highest positive value
    (b) Lowest positive value
    (c) Lowest negative value
    (d) Highest negative value

21. List of all the physical property of a business along with their values at a specified date is
    (a) Farm inventory records
    (b) Farm income record
    (c) Farm business analysis
    (d) Farm financial account

22. Which method(s) is employed fo calculating depreciation of tractors and livestock ?
    (a) Annual revaluation and reducing fraction
    (b) Diminishing balance and straight line
    (c) Straight line and annual revaluation
    (d) Diminishing balance and reducing fraction

23. Marketable surplus is given by
    (a) MS = P + C (b) MS = P + C / 2
    (c) MS = P - C (d) MS = C - P

24. DMI headquarter is located at
    (a) Hyderabad (b) Faisalabad
    (c) Ghaziabad (d) Faridabad

25. The first regulated market Karanjia cotton market established in
    (a) 1806 (b) 1828
    (c) 1870 (d) 1886

26. World Standard Day is celebrated on
    (a) 14th January (b) 14th November
    (c) 14th October (d) 14th December

27. Property that is pledged to secure a loan is
    (a) Mortgage (b) Chattel loan
    (c) Personal security
    (d) Collateral security

Answers

14.	(d)	17.	(a)	20.	(d)	23.	(c)	26. (c)
15.	(a)	18.	(d)	21.	(a)	24.	(d)	27. (d)
15.	(b)	19.	(a)	22.	(c)	25.	(d)	

28. Cooperative Credit Societies Act was passed in
(a) 1902 (b) 1903
(c) 1904 (d) 1912

29. First land Mortgage bank in 1920 established at
(a) Karnataka (b) Bihar
(c) West Bengal (d) Punjab

30. Single window system was recommended by
(a) Marashimhan (b) DR Gadgil
(c) Mohan Kanda (d) Mohan Prakash

31. Nationalization of banks was carried out on
(a) 19th June, 1969
(b) 19th July, 1969
(c) 19th August 1969
(d) 2nd October, 1969

32. ..... will encourage village industries, artesians, carpenters, etc. in rural areas
(a) PACS (b) RRB
(c) FSS (d) PLDB

33. In case of amortized even repayment plan, the interest rate
(a) Increases (b) Declines
(c) Remains constant (d) Not related

34. If liabilities > assets, then networth is placed at
(a) Liabilities side (b) Assets side
(c) Income side (d) Not clear

35. Book value of durable assets refers to
(a) Market price of assets
(b) Purchase price of assets
(c) Production price of assets
(d) Value at cost

36. Debt-equity ratio is
(a) Differed liabilities / Net worth
(b) Net worth / Differed liabilities
(c) Net worth / Total assets
(d) None of these

37. Equity value of the firm is known/ derived from
(a) Balance sheet
(b) Income statement
(c) Cash flow statement
(d) Budgeting

38. If farmer's liquidity is less, then current ratio is
(a) More than 1 (b) Less than 1
(c) Equal to 1
(d) Cannot be determined

39. When operating, fixed and gross ratios are less than one, then enterprise is under
(a) Loss (b) Profit
(c) Heavy loss (d) No change

40. To assess the time at which funds are required for farming is known with the help of
(a) Income statement
(b) Cash flow
(c) Balance sheet
(d) Can not be assessed

41. Break even analysis is carried out by
(a) BEP = P/F-V (b) BEP = F/P-V
(c) BEP = T/F-V (d) BEP = P-V/F

42. Marginal value products of scarce resources is known by
(a) Linear programming
(b) Production function
(c) Budgeting
(d) Planning
(e) Both (a) and (b)

Answers					
	28. (c)	31. (b)	34. (b)	37. (a)	40 (b)
	29. (d)	32. (c)	35. (d)	38. (b)	41. (b)
	30. (c)	33. (b)	36. (a)	39. (b)	42. (e)

43. The decision rule in linear programming is that the response use is to be continued whose
(a) MVP is negative
(b) MVP is zero
(c) MVP is positive
(d) None of these

44. Tangible benefit of project is
(a) Income distribution
(b) Standard of living
(c) National prosperity
(d) Higher yield level

45. Present value of future money is calculated by use of :
(a) $\frac{P}{(1+i)^t}$ (b) $\frac{P}{(1+t)^t}$
(c) $P(1+i)^t$ (d) $P\left(1+\frac{1}{i}\right)^t$

46. Shadow prices of resources are used in
(a) Economic analysis
(b) Financial analysis
(c) Econometric analysis
(d) Technical analysis

47. B-C ratio is used to evaluate mostly
(a) Construction of dam
(b) Construction of building
(c) Construction of house
(d) Construction of cattle shed

48. What is bullet loan ?
(a) Single repayment loan, having amortization
(b) Single repayment loan, having no amortization
(c) Multi repayment loan, having amortization
(d) Multi repayment loan, having amortization

49. For $y = b_0 + b_1X$, if supply is elastic t
(a) b_0 is negative
(b) b_0 is zero
(c) b_0 is positive
(d) None

50. Elasticity can not be explained by
(a) Regression (b) GLS
(c) OLS (d) Correlation

51. ..... is considered as mar lifeblood
(a) Buyers
(b) Sellers
(c) Market information
(d) Market organization

52. 'Economics is what economist do' gi by
(a) Alfred Marshall
(b) Lord Robbins
(c) J M Keynes
(d) Jacob Viner

53. With progress in technology, the will shift
(a) Toward right (b) Toward left
(c) Remains same (d) None

54. Marginal utility of money can not
(a) Positive (b) Negative
(c) Zero
(d) Both (c) and (b)

55. In the SNOB effect, the demand cu shifts
(a) Left to original
(b) Right to original
(c) Remains same
(d) None

Answers					
	43. (c)	46. (a)	49. (a)	52. (d)	55. (a)
	44. (d)	47. (a)	50. (d)	53. (a)	
	45. (a)	48. (b)	51. (c)	54. (c)	

56. Indifference curves for perfect substitutes will be
(a) Convex to origin
(b) Concave to origin
(c) Perpendicular to origin
(d) Straight line

57. Consumers equilibrium is attained at
(a) $\Delta x/\Delta y = Px/Py$
(b) $MRS_{xy} = Px/Py$
(c) $\Delta y/\Delta x = Py/Px$
(d) $MRS_{yx} = Px/Py$

58. If income consumption curve is bending towards Y axis then commodity X is
(a) Inferior (b) Luxury
(c) Normal (d) None

59. Pick out the odd one
(a) Death duty (b) Wealth tax
(c) Income tax (d) Excise duty

60. Income effect is stronger than substitution effect for
(a) Inferior goods (b) Giffen goods
(c) Normal goods (d) None

61. For Giffen goods price consumption curve will be
(a) Backward sloping
(b) Horizontal
(c) Downward sloping
(d) Upward sloping

62. Quantity purchased will vary inversely with price when income effect is ..... for normal goods
(a) Zero (b) Positive
(c) Negative (d) None

63. If income effect is positive for both X and Y goods, the ICC will be
(a) Slope upward to right
(b) Slope upward to left
(c) Slope downward to right
(d) Slope downward to left

64. Consumer is neither worse off nor better off than before in
(a) Hicks substitution effect
(b) Marshall substitution effect
(c) Shitsky substitution effect
(d) None of these

65. When with a change in price the total outlay on commodity remains constant, it is a case of
(a) Perfect elasticity
(b) Unit elasticity
(c) Perfect inelasticity
(d) Zero elasticity

66. Change in quantity demanded refers to
(a) Upward shift of demand
(b) Downward shift of demand
(c) Movement on same curve
(d) None

67. When both the price of a substitute and price of a component of commodity X rise, demand for X
(a) Falls (b) Rises
(c) No change (d) All are possible

68. Cross elasticity of demand between petrol and automobiles is
(a) Negative (b) Zero
(c) High (d) Infinite

69. For inelastic goods, fall in the price leads to
(a) Increase in TE
(b) No change in TE
(c) Decrease in TE
(d) Not related

Answers					
	56. (d)	59. (d)	62. (b)	65. (b)	68. (a)
	57. (b)	60. (b)	63. (a)	66. (c)	69. (c)
	58. (a)	61. (a)	64. (a)	67. (b)	

70. The cross elasticity of demand between 2 products is infinite, it is case of
(a) Monopoly
(b) Oligopoly slope
(c) Monopolistic
(d) Perfect competition

71. The Engel curve has ..... for all goods
(a) Positive slope
(b) Constant
(c) Negative slope
(d) All of these

72. The differences between value in use and value in exchange is
(a) Consumer surplus
(b) Marketing surplus
(c) Farm production
(d) None of these

73. MRS on the isoclines will be
(a) Positive (b) Zero
(c) Negative (d) Constant

74. Elasticity of substitution for CES production function ranges from
(a) 0 to 1 (b) 0 to μ
(c) -1 to $+1$ (d) $-\mu$ to $+\mu$

75. Choose the correct one
(a) $MR = AR\left(\frac{e}{e+1}\right)$
(b) $AR = MR\left(\frac{e}{e+1}\right)$
(c) $MR = AR\left(\frac{e-1}{e}\right)$
(d) $AR = MR\left(\frac{e+1}{e}\right)$

76. Profit mark up price is calculated as
(a) MR - P (b) AR - P
(c) AC - P (d) MC - P

77. Shut down point in short run for firm, even if it does not cover
(a) Marginal returns
(b) Average cost
(c) Variable cost
(d) Marginal cost

78. In the long run, perfectly competeting firms, will have
(a) Zero economic profits
(b) Constant economic profits
(c) Positive economic profits
(d) Negative economic profits

79. MC = MR = AC = AR shows the long run, equilibrium positive of the
(a) Monopolist firm
(b) Oligopolist firm
(c) Competitive firm
(d) None

80. The concept of 'reserve army of labour' is due to
(a) David Richardo
(b) JS Mill
(c) Adam Smith
(d) Karl Marx

81. PQLI of Morris D. Morris does not include
(a) Infant mortality
(b) Life expectancy
(c) Literacy
(d) Standard of living

Answers				
	70. (d)	73. (d)	76. (c)	79. (c)
	71. (a)	74. (b)	77. (c)	80. (d)
	72. (a)	75. (c)	78. (a)	81. (d)

82. HDI uses the scale of
(a) 0 to 10 (b) 0 to 1
(c) 0 to 100 (d) -1 to +1

83. ICOR is ..... in less developed countries
(a) Low (b) High
(c) Constant (d) Zero

84. 'Choice of technique' written by
(a) Amartya Sen
(b) AK Dasgupta
(c) DR Gadgil
(d) Manmohan Singh

85. A constant capital - labour ratio in neutral technical change is given by
(a) Hicks (b) Solow
(c) Robinson (d) Acharya

86. Arrange the following demographic transition theory given by Blackur (in ascending order).
(1) Declining phase with low mortality, lower fertility
(2) Low stationary phases with low fertility and low mortality
(3) Early expanding phase marked by high fertility
(4) High stationary phase marked by high fertility and mortality
(a) 1, 2, 3, 4 (b) 4, 3, 2, 1
(c) 3, 4, 2, 1 (d) 1, 3, 2, 4

87. Estimates of national income in India are annually prepared by
(a) RBI
(b) CSO
(c) National Income Committer
(d) Planning Commission

88. Deficit financing means
(a) Relying on foreign aid
(b) Spending by borrowing
(c) Not spending for development
(d) Spending excess of revenue

89. Objective of mercantilists was against to
(a) Free trade
(b) Restricting imports
(c) Stimulating exports
(d) Accumulation of gold by their natives

90. Ricardo's trade theory assumed, production is subject to
(a) Increasing returns
(b) Decreasing returns
(c) Constant returns
(d) Any of the above

91. If a nation gains from trade, its consumption point is
(a) On its PPF
(b) Inside its PPF
(c) Outside its PPF
(d) Any of them

92. Decreasing cost will has the shape of
(a) Concave PP curve
(b) Convex PP curve
(c) Straight line PP curve
(d) None

93. Which of the following are supply version ?
(1) Adam Smith's (2) David Ricardo's
(3) H - C theory (4) Mill's theory
(a) 1 and 2 (b) 3 and 4
(c) 1 and 3 (d) 2 and 4

94. Ricardo's law of comparative advantage is based on
(a) Opportunity cost
(b) Labour theory of value
(c) Law of diminishing returns
(d) All of these

Answers					
	82. (b)	85. (a)	88. (d)	91. (c)	94. (b)
	83. (b)	86. (b)	89. (a)	92. (b)	
	84. (a)	87. (b)	90. (c)	93. (a)	

95. Immaturing growth theory refers to a country
(a) Grows rapidly with trade
(b) Gains of growth are more than terms of trade
(c) Terms of trade improve with economic growth
(d) None

96. Stolper-Samuelsoni theory for LDC's suggests
(a) Export expansion
(b) Export substitution
(c) Import expansion
(d) Import substitution

97. Effective rate of protection for domestic country is calculated by
(a) $e = \frac{t - ar}{1 + a}$ (b) $e = \frac{1 + a}{t - ar}$
(c) $e = \frac{t - ar}{1 - a}$ (d) $e = \frac{1 - a}{t - ar}$

98. Intangible transactions are recorded in
(a) Service account
(b) Goods account
(c) Unilateral transfers
(d) Tangible account

99. Snake in the tunnel system is followed in
(a) USA (b) SE Asia
(c) African nations (d) European union

100. SDR's came into effect from
(a) 1950 (b) 1960
(c) 1970 (d) 1990

101. Keynes is related to which inflation theory
(a) Cost push
(b) Demand pull
(c) Structural theory
(d) Not at all related

102. Stagflation is referred to
(a) High unemployment and high gr
(b) High employment and high gr
(c) High unemployment and low gr
(d) None

103. Investment is not a function of inc in case
(a) Pigon's (b) Keyne's
(c) Classical's (d) None

104. If C = 200 + 0.84, I = 600, wh national income ?
(a) 40 (b) 400
(c) 4000 (d) 40000

105. Average propensity to save varies .... with income
(a) Proportional (b) Inversely
(c) Constant (d) No relation

106. When income of individuals falls, t consumption expenditure does not much. This is .....
(a) Demonstration effect
(b) Keynes effect
(c) Ratchet effect
(d) Pigons effect

107. In relative income theory of consump APC will
(a) Decreases (b) Increases
(c) Constant (d) None

108. If liberal monetary policy is underta then
(a) LM curve shifts right
(b) LM curve shifts left
(c) IS curve shifts right
(d) IS curve shifts left

Answers					
	95. (b)	98. (a)	101. (b)	104. (c)	107. (c
	96. (a)	99. (d)	102. (c)	105. (a)	108. (a
	97. (c)	100. (c)	103. (b)	106. (c)	

109. Aggregate supply of labour in case of classical is
(a) Horizontal line
(b) Vertical line
(c) Both horizontal and vertical
(d) Intermediate

110. The difference between national income and domestic product is accounted by
(a) Net factor income from abroad
(b) Budgetary surplus/deficit
(c) Export surplus/deficit
(d) Inflow of capital

111. Predominant source of net domestic product in India over the years is
(a) Industry (b) Agriculture
(c) Service sector (d) None

112. GNP deflator is
(a) Nominal GNP/Nominal GDP
(b) Nominal GNP/Real GNP
(c) Nominal GNP/Real GDP
(d) Real GNP/Nominal GDP

113. National income generated by agriculture is calculated by using
(a) Income method
(b) Out put method
(c) Both (a) and (b)
(d) Expenditure method

114. Which one of the following is not a source of aggregate demand ?
(a) Consumption
(b) Export - imports
(c) Government expenditure
(d) Savings

115. The demand for capital in essence is a
(a) Direct demand
(b) Derived demand
(c) Reciprocal demand
(d) Complementary demand

116. Capital formation in agriculture over the years
(a) Decreasing (b) Increasing
(c) Both (a) & (b) (d) Constant

117. Private investment is ..... to public investment in agriculture
(a) Less than (b) More than
(c) Equal (d) Can't say

118. In which year cooperation become state subject ?
(a) 1912 (b) 1919
(c) 1920 (d) 1924

119. Deflated gross returns are used to know
(a) Common sense of farmer
(b) Repayment capacity
(c) Returns from investment
(d) Risk bearing ability

120. Which of repayment plan is used for high income variability of farms ?
(a) Straight end repayment
(b) Reserve repayment plan
(c) Amortized plan
(d) Variable repayment

121. Which one you consider most important phase of product cycle ?
(a) Preparation (b) Appraisal
(c) Implementation (d) Evaluation

122. Project planning and budgeting are used to know
(a) Commercial aspect
(b) Financial aspects
(c) Economic aspects
(d) Technical aspects of project

Answers					
	109. (b)	112. (b)	115. (b)	118. (b)	121. (c)
	110. (a)	113. (b)	116. (a)	119. (d)	122. (b)
	111. (b)	114. (d)	117. (b)	120. (b)	

123. Sensitivity analysis is used in
(a) Preparation of project
(b) Appraisal
(c) Implementation
(d) Forecasting/evaluation

124. Mahalwari system was introduced by
(a) William Bentinck
(b) Lord Curzon
(c) Thomas Munro
(d) Dalhousie

125. 'Economica' is written by
(a) Marshall (b) Aristotle
(c) Smith (d) Mill

126. Nature of economic laws is
(a) Normative (b) Destructive
(c) Exactness (d) Positive

127. Price of sugar is
(a) Issue price (b) Levy price
(c) MSP (d) Ceiling price

128. Law of substitution is given by
(a) Marshall (b) Smith
(c) Gossen (d) Pigou

129. Increase in the price of a commodity leads to
(a) Movement on same curve from right to left
(b) Movement on same curve from left to right
(c) Shift of demand curve to upward
(d) Shift in demand to left/downward

130. Monopoly receives entire consumer surplus
(a) First degree (b) Second degree
(c) Third degree (d) Fourth degree

131. Concept of 'crystallized labour' given by
(a) Marshall (b) Keynes
(c) Mill (d) Karl Marx

132. Qd = 170 - 20 P and P = 4, at equilibrium
(a) Qs = 150 (b) Qs = 50
(c) Qs = 900 (d) Qs = 90

133. When MPP is zero
(a) MC is maximum
(b) MC become vertical
(c) MC is minimum
(d) MC becomes horizontal

134. If the demand is elastic, for monopoly
(a) Higher prices, more profit
(b) Lower price, more profits
(c) Higher price, lower profit
(d) Lower price, lower profit

135. When the demand curve is relatively flatter, then demand is
(a) Relatively inelastic
(b) Relatively elastic
(c) Unitary elastic
(d) All

136. The 'Drain theory' about poverty in India is associated with
(a) Baldeo Ram Mirdha
(b) VKRV Rao
(c) Dada Bhai Naoroji
(d) C Bose

137. The production function Y = LK is
(a) Homogenous of degree 1
(b) Homogenous of degree 2
(c) Homogenous of degree 0
(d) Heterogenous

138. If two factors are perfect substitutes, isoquants will be
(a) A straight line
(b) A parabola
(c) A rectangular hyperbola
(d) L shaped curve

Answers						
	123. (d)	126. (d)	129. (a)	132. (c)	135. (b)	138. (a)
	124. (a)	127. (b)	130. (a)	133. (c)	136. (c)	
	125. (b)	128. (a)	131. (b)	134. (b)	137. (a)	

139. 0.8 y = 20 i - 120 = 0 is a
(a) Investment function
(b) Consumption function
(c) LM function
(d) IS function

140. Rent theory of profit was given by
(a) Hawley (b) Tanssig
(c) CP Blacker (d) FA Walker

141. Demographic transition theory of population was proposed by
(a) JA Schumpter (b) Malthus
(c) FA Walker (d) C Blacker

142. Money is 'anything which is widely acceptable in discharge of obligations' given by
(a) AC Pigon
(b) Joan Robinson
(c) Lord Robinson
(d) Robertson

143. Keynes is associated with
(a) Structural unemployment
(b) Seasonal unemployment
(c) Frictional unemployment
(d) Cyclical unemployment

144. Full employed is noticed in
(a) Recession (b) Depression
(c) Both (a) & (b) (d) None

145. Income elasticity, for normal goods is
(a) Zero (b) Positive
(c) Negative (d) Infinity

146. What are regrettable costs ?
(a) Transfer payment
(b) Depreciation payment
(c) Interest payment
(d) Defence, police and law payment

147. $MC = MR_1 = MR_2$, this condition is used in
(a) Price discrimination
(b) Cartel
(c) Monopoly
(d) Monopolistic competition

148. Speculative demand, depends on
(a) Income (b) Profit
(c) Interest rate (d) Autonomous

149. If MPC = O, the consumption function will be
(a) Vertical shape
(b) Horizontal shape
(c) Both (a) & (b)
(d) None

150. Average propensity to consume will be constant in
(a) Keynes theory (b) Modigliani
(c) JS Duesenberry (d) None

151. B - C ratio is used to evaluate
(a) Social project (b) Public project
(c) Both (a) & (b) (d) None

152. if the new variable improves R^2, then it is
(a) Useful (b) Superfluous
(c) Detrimental (d) All

153. In multicollinearity, 'F' test is used for
(a) Presence and severity
(b) Pattern
(c) Location
(d) No usage

154. If E(u) = 0, the estimated line lies
(a) Below true line
(b) Above true line
(c) Both (a) and (b)
(d) On true line

Answers						
	139. (d)	142. (d)	145. (b)	148. (c)	151. (c)	152. (a)
	140. (d)	143. (d)	146. (d)	149. (b)		153. (c)
	141. (d)	144. (a)	147. (a)	150. (c)		154. (d)

155. Select the odd one from the following
(a) Spearman test
(b) Goldfeld and Quandt test
(c) Glejser test
(d) Von Neumann test

156. Omitted explanatory variables will cause
(a) Auto correlation
(b) Multicollinearity
(c) Heteroscedacity
(d) Quasi autocorrelation

157. In following formula which one indicates the least cost combination point
(a) MR = Me
(b) $\Delta y / \Delta x$
(c) $\Delta y_1 / \Delta y_2$
(d) $\Delta x_2 / \Delta x_1 = Px_1 / Px_2$

158. Price discrimination means
(a) High price of goods
(b) Low price of goods
(c) Charging different prices from different customers of a similar commodity
(d) Different prices at a time for same goods

159. 'Giffen' goods refer to
(a) Stock of goods (b) Lack of goods
(c) Inferior goods (d) Superior goods

160. Y = f(a + bx) refers to
(a) A cost curve
(b) A supply curve
(c) A demand curve
(d) A production function

161. According to law of diminishing return the optimum profit will be at the point where
(a) MP > AP (b) AP > MP
(c) MP = AP (d) MC = MP

162. Perfect elasticity is shown
(a) Vertical straight line
(b) Horizontal straight line
(c) Slopping curve from le... ri...
(d) Slopping curve from ri... to l...

163. Production is a function of
(a) Profit (b) Fac...
(c) Price (d) Cos...

164. Level of optimum production is avai... in
(a) I stage of production
(b) II stage of production
(c) III stage of production
(d) None of these

165. The elasticity of production (EP) a... starting point of stage II in la... diminishing return would be
(a) > 1.0 (b) < 1.0
(c) 1.0 (d) 0.0

166. The marginal cost curve intersect... average cost curve when the ave... cost is
(a) Maximum (b) Minimum
(c) Rising (d) Falling

167. Price theory is a part of
(a) Micro economics
(b) Macro economics
(c) Farm management
(d) Marketing

168. The cost of production of the crop ... be minimized by using econ... principle
(a) Cost principle
(b) Law of opportunity cost
(c) Law of diminishing
(d) Principle of least cost ...

Answers					
	155. (d)	158. (d)	161. (d)	164. (b)	167
	156. (d)	159. (c)	162. (b)	165. (c)	168
	157. (d)	160. (d)	163. (b)	166. (b)	

169. The overhead cost is also known as
(a) Variable cost (b) Total cost
(c) Marginal cost (d) Fixed cost

170. The vertical demand curve for a commodity shows that this commodity is
(a) Highly elastic
(b) Perfectly inelastic
(c) Unit elastic
(d) Perfectly elastic

171. In pure competitive market the demand curve is
(a) Downward slopping
(b) Upward slopping
(c) Straight slopping to X-axis
(d) Straight parallel to Y-axis

172. The gap between the average total cost and average variable cost goes along with the increasing in unit of production
(a) Decreasing
(b) Increasing
(c) Constant
(d) Initially increasing then decreasing

173. The cost of tractor decreases 10% and the demand of the tractor increases by 30%, the elasticity of demand will be
(a) Inelastic
(b) Constant elastic
(c) Highly elastic
(d) Perfectly inelastic

174. The ultimate aim of farm management is to
(a) Increase gross income
(b) Reduce total cost
(c) Optimize factor utilization
(d) None of the above

175. Which one is considered as a 'gift of nature' ?
(a) Land (b) Labour
(c) Capital (d) None

176. The chief function of money is
(a) Medium of exchange
(b) Reserve base of credit expansion
(c) Providing liquidity
(d) All the above

177. What is "support price" for an agriculture commodity ?
(a) Subsidy paid by the government over the price already available in the market
(b) The floor price below which it can not be sold
(c) The minimum price at which the government is prepared to buy it
(d) Money paid to agriculturists for case of drought damaging their crops

178. Government of India signed WTO agreement in
(a) 1981 (b) 1994
(c) 1995 (d) 1996

179. Low productivity in agriculture in India is the result of
(a) Lack of advanced agricultural technology
(b) Financial weakness of farmers
(c) Uneconomical size of holdings
(d) All of these

180. The causes of inflation is
(a) Increase in money supply
(b) Fall in production
(c) Increase in money supply and fall in production
(d) Decrease in money supply and fall in production

Answers				
	169. (d)	172. (d)	175. (a)	178. (b)
	170. (b)	173. (c)	176. (a)	179. (d)
	171. (c)	174. (c)	177. (c)	180. (c)

181. Which one of the following is a competitive market ?
(a) Perfect market
(b) Primary market
(c) Capital market
(d) Wholesale market

182. Line passing through the least cost points in the isoquants map is called
(a) Isocline (b) Ridge line
(c) Expansion path (d) Isoquant curve

183. The price which necessarily covers the variable cost and also the fixed price is
(a) The long run price
(b) The short run price
(c) The market price
(d) The equilibrium price

184. The Central Agmark Lab is locate at
(a) Mumbai (b) Nagpur
(c) Bangalore (d) Kolkata

185. MPP (marginal physical products) of a variable input is negative
(a) Only in 1st stage
(b) Only in 2nd stage
(c) Only in 3rd stage
(d) In 2nd and 3rd stage

186. IBRD is synonymous to
(a) World Bank
(b) Asian Development Bank
(c) International Monetary Fund
(d) WTO

187. With reference to the principle of economics as applied to agriculture, when marginal product increases, average product
(a) Increases
(b) Increases initially and then decreases
(c) Decreases
(d) Remain constant

188. The law of variable proportion is generally referred to as the
(a) Law of absolute advantage
(b) Law of equimarginal returns
(c) Law of diminishing returns
(d) Law of comparative advantage

189. With reference to farm planning and optimum resource use, consider the following :
(1) Monopolistic competition
(2) Oligopoly
(3) Perfect competition
(4) Monopoly

What is the correct arrangement of these markets as per the number of seliers in ascending order ?
(a) 4, 2, 1, 3 (b) 3, 1, 2, 4
(c) 1, 2, 3, 4 (d) 4, 1, 2, 3

190. With reference to farm planning and optimum resource use efficiency consider the following :
(1) Cost of manures
(2) Rental value of owned land
(3) Interest on value of owned capital assets
(4) Imputed value of family labour

Which of these are included in working out cost B_2 ?
(a) 1, 3 and 4 (b) 1, 2 and 3
(c) 2, 3 and 4 (d) 1, 2 and 4

191. In the second stage of the classical production function, the elasticity of production is
(a) Greater than one
(b) Equal to one
(c) Less than one but greater than zero
(d) Equal to zero

Answers				
	181. (a)	184. (b)	187. (c)	190. (b)
	182. (c)	185. (c)	188. (c)	191. (c)
	183. (a)	186. (a)	189. (a)	

192. The principal which dictates that the resources should be used not where they bring the highest average return but yield the highest marginal returns is called
(a) Principle of least cost combination
(b) Principle of substitution
(c) Principle of equimarginal return
(d) Principle of optimum combination

193. Consider the following statements :
Diversification of farm production helps the farmers in
(1) Stabilizing agricultural prices
(2) Stabilizing farm incomes
(3) Stabilizing agricultural production
Which of these statements are correct ?
(a) 1 and 2 (b) 2 and 3
(c) 1 and 3 (d) 1, 2 and 3

194. Consider the following statements :
With limited amount of fertilizer, allocation of fertilizer to different crops to get maximum profit depends on
(1) Price of product
(2) Marginal physical products of crops
(3) Cost of fertilizer
(4) Average products of crops
Which of these statements are correct ?
(a) 1 and 2 (b) 2 and 3
(c) 1 and 4 (d) 1 and 3

195. Which of the following is not a system of farming ?
(a) State farming
(b) Collective farming
(c) Rainfed farming
(d) Cooperative farming

196. Which system of farming does not involve farmer ?
(a) Collective farming
(b) Dry farming
(c) State farming
(d) Diversified farming

197. Livestock insurance is included in
(a) Variable cost (b) Special cost
(c) Fixed cost (d) Marginal cost

198. Farm management is an
(a) Intra farm science
(b) Inter farm science
(c) Inter regional farm science
(d) International farm science

199. Which one is not a tool of farm management ?
(a) Farm planning
(b) Farm budgeting
(c) Farm book keeping
(d) Production and cost function

200. One of the important fixed costs on a farm is
(a) Seed cost (b) Land rent
(c) Irrigation cost (d) Feed cost

201. If the marginal product is more than marginal cost, then further investment in production is :
(a) Profitable (b) Harmful
(c) No effect (d) Equal

202. If the substitution ratio is less than the price ratio, then the cost
(a) Remains the same (b) Increases
(c) Decreases
(d) None of the above

203. Principle of equimarginal return is applied when
(a) The resources are unlimited
(b) The price of resources is high
(c) The prices of resources vary
(d) The resources are limited

Answers				
	192. (c)	195. (c)	198. (a)	201. (a)
	193. (d)	196. (c)	199. (c)	202. (a)
	194. (a)	197. (c)	200. (b)	203. (d)

204. The law of diminishing return refers to an eventual fall in
(a) Marginal product of the variable factor
(b) Average income of the farm
(c) Total production of all factors
(d) Total earning of the farm

205. Which of the following is not correctly matched ?

	Type of market	Basis of classification
(a)	Unorganized market	Organization
(b)	Regulated market	Control
(c)	Perfect market	Competition
(d)	Terminal market	Area

206. Which of the following is also referred to as 'opportunity cost' ?
(a) Money cost (b) Alternative cost
(c) Social cost (d) Fixed cost

207. If marginal rate of substitution ($\Delta y_1/\Delta y_2$ or $\Delta y_2/\Delta y_1$) is equal to zero, then enterprise relation is said to be
(a) Competitive (b) Supplementary
(c) Complementary (d) None

208. Type of farming is based on
(a) The law of substitution
(b) The law of diminishing returns
(c) The law of comparative advantage
(d) The law of equimarginal return

209. Which of the following cost is subtracted from gross income (GI) to get the value of family labour income ?
(a) Cost A_1 (b) Cost A_2
(c) Cost B (d) Cost C

210. Which of the following cost is subtracted from gross income (GI) to get the value of net income ?
(a) Cost A_1 (b) Cost A_2
(c) Cost B (d) Cost C

211. Cost B_2 includes
(a) Cost B_1 + rent paid for leased in lan
(b) Cost B_1 + imputed value of famil labour
(c) Cost B_1 + rental value of owned lan
(d) Cost B_1 + interest on value of owne capital assets

212. Marketing surplus is
(a) Total production minus Total famil requirement
(b) Total consumption minus Margina consumption
(c) Total cost minus Marginal cost
(d) Total production minus Total cost

213. Which of the following cost is subtracte from gross income (GI) to get farr business income (owner) ?
(a) Cost A_1 (b) Cost A_2
(c) Cost B (d) Cost C

214. The concept of farming is best explaine by
(a) Sectoral planning approach
(b) Mixed farming approach
(c) Holistic farming approach
(d) Diversified farming approach

215. Who profounded the population theor first ?
(a) Adam Smith (b) Ricardo
(c) Malthus (d) Marshall

216. When MPP is zero, TPP is at its maximum because
(a) Further addition to MPP is negati
(b) Further addition to MPP is positi
(c) MC = MR
(d) Elasticity of production is more than one

Answers					
	204. (a)	207. (c)	210. (d)	213. (a)	216. (a)
	205. (d)	208. (d)	211. (c)	214. (c)	
	206. (b)	209. (c)	212. (a)	215. (c)	

247. Match list I with list II and select the correct answer using code given below :

List I (Organization) List II (Leading person)

A.	FSS	1.	B Shivaraman
B.	NABARD	2.	BK Hazare
C.	DRI	3.	M Narasimhan
D.	RRB	4.	Bawa

	A	B	C	D
(a)	1	2	3	4
(b)	4	1	3	2
(c)	3	1	2	4
(d)	4	3	2	1

248. Internal economy refers to
(a) Transport (b) Banks
(c) Communication (d) Specialization

249. Input - output relationship is called
(a) Cost function
(b) Production function
(c) Price function
(d) None of these

250. National Bank for Agriculture and Rural Development came into existence on
(a) July 12, 1982
(b) July 22, 1984
(c) October 15, 1986
(d) August 10, 1983

251. Targeted annual growth rate of Indian economy in 10th five year plan is
(a) 6% (b) 8%
(c) 9% (d) 10%

252. Green GDP is
(a) Net value of GDP after discounting the cost incurred due to environmental degradation
(b) Net value of GDP after discounting the cost incurred due to natural calamities
(c) Net value of GDP after discounting the money earn by NRI
(d) None of these

253. Value Added Tax is a/an
(a) Direct tax
(b) Indirect tax
(c) Both (a) and (b)
(d) Can not be classified

254. ..... and ..... were only states to have completed the 'land reforms' successfully in country
(a) Kerala, West Bengal
(b) West Bengal, Bihar
(c) Tamil Nadu, Andhra Pradesh
(d) U.P., Bihar

255. Which one of the following pairs is/are correctly matched ?
(a) Ecomark : Environmental friendly
(b) Rugmark : Child labour not used
(c) ISO 9000/14000 : Quality control monitored
(d) All of above

256. Which system had no intermediate between the farmer and the state ?
(a) Ryotwari (b) Zamindari
(c) Mahalwari (d) None

257. Inflation is measured by
(a) WPI (b) CPI
(c) Both (a) & (b) (d) None

258. Ryotwari system was initially introduced (1872) in
(a) U.P. (b) M.P.
(c) W.B. (d) Tamil Nadu

Answers				
	247. (b)	250. (a)	253. (b)	256. (a)
	248. (d)	251. (b)	254. (a)	257. (c)
	249. (b)	252. (a)	255. (d)	258. (d)

259. Mahalwari system was introduced (1883) by William Bentinck in
(a) Agra & Oudh
(b) Calcutta
(c) Chennai
(d) Mumbai

260. Zamindari system of land revenue was initiated in 1793 by Lord Cornwallis, prevalent in
(a) Tamil Nadu
(b) West Bengal
(c) Kerala
(d) Karnataka

261. Which one of the following pairs is not correctly matched ?
(a) Complementary products : Wheat and dairy
(b) Competitive products : Wheat and barley
(c) Supplementary products : Wheat and gram
(d) Joint products : Wheat grain and straw

262. The demand for agriculture commodity will tend to be elastic with respect to a change in its price if
(a) Its price is low in relation to income
(b) It has several substitutes
(c) Its consumption develops into a habit
(d) It is properly priced

263 Which one of the following principles is not applicable in farm management economics ?
(a) Law of equimarginal principle
(b) Cost principle
(c) Principle of substitution
(d) Law of population

264. Which one of the following is not a cause for small size of holdings in India ?
(a) The decline in joint family system
(b) The law of inheritance
(c) Growing population
(d) Diminishing marginal returns

265. Which one of the following refers to 'system of farming' ?
(a) Economic
(b) Operational
(c) Organizational
(d) Cultural

❑❑❑❑❑

Answers			
	259. (a)	262. (b)	265. (b)
	260. (b)	263. (d)	
	261. (c)	264. (d)	

9 Agriculture Extension

QUESTIONS :

1. Principle of Extension Education is:
   (a) Learning by doing
   (b) Learning by seeing
   (c) Learning by reading
   (d) Learning by hearing

2. Goal of Extension Education is :
   (a) To promote income of farmers
   (b) To promote production of the crops
   (c) To promote new crops
   (d) To promote scientific out look

3. Which one of the following is correctly matched ?
   (a) Etawah pilot project - Albert Mayer
   (b) Grow more food campaign - J. L. Nehru
   (c) Co-operative movement - M. K. Gandhi
   (d) Sewagram Project - Vinoba Bhave

4. The first KVK was established in 1974 at :
   (a) Nagpur (b) Nilokheri
   (c) Ludhiana (d) Pondichery

5. Which of the following rural development project was launched before independence ?
   (a) Etawah pilot project
   (b) Co - operative movement
   (c) Community development
   (d) National Extension service

6. Television broadcast for rural development in India, started in :
   (a) 1947 (b) 1957
   (c) 1967 (d) 1977

7. Cooperative society is basic institution for :
   (a) Political growth of the villagers
   (b) Social growth of the villagers
   (c) Cultural growth of the villagers
   (d) Socio-economic growth of the villagers

8. Radio mass medium is characterised by :
   (a) One way with immediate feedback
   (b) One way without instant audience response
   (c) One way and colourful
   (d) One way and timeless

9. Which one of the following is not correctly matched ?

	Approach	Technique
(a)	Mass	Exhibition
(b)	Individual	Farm visit
(c)	Group	Mela
(d)	Mass	Newspaper

10. Purpose of extension evaluation :
    (a) To identify the weak points
    (b) To identify the strong points
    (c) To identify the gaps and errors
    (d) To identify all the above

Answers

1.	(a)	4.	(d)	7.	(d)	10.	(d)
2.	(a)	5.	(b)	8.	(b)		
3.	(a)	6.	(b)	9.	(c)		

11. Read the following statements and mark your answers according to the code given below :
    I. Newspaper is popular medium of communication in rural areas
    II. Newspaper is written form of communication
    III. Film show is audio visual form of communication
    IV. Film show is popular medium of communication in rural areas.
    (a) I and III are correct
    (b) II and III are correct
    (c) III and IV are correct
    (d) I and IV are correct

12. Consider the following statements and select the correct answer using the codes given below :
    Assertion (A) : Film is not effective medium in rural areas.
    Reason (R) : Film can not be projected with low voltage power.
    (a) A is true but R is false
    (b) R is true but A is false
    (c) Both A and R are correct and R is correct explanation of A
    (d) Both A and R are correct but R is not the correct explanation of A

13. Match list I with list II and select the correct answer using the code given below :

List I (Form)	List II (Technique)
A. Spoken	1. Folder
B. Written	2. Tape recorder
C. Projected	3. Film
D. Non projected	4. Puppet

	A	B	C	D		A	B	C	D
(a)	2	1	3	4	(b)	1	2	3	4
(c)	2	3	1	4	(d)	4	3	2	1

14. Match list I with list II and select correct answer :

List I (Aids)	List II (Method of contact
A. Model	1. Group con
B. Slide	2. Mass conta
C. Telephone	3. Personal co
D. Poster	4. Mass conta

	A	B	C	D		A	B	C
(a)	2	3	4	1	(b)	1	2	3
(c)	3	4	2	1	(d)	3	2	4

15. Lab to Land programme was started
    (a) NBSSLUP (b) Govt. of U.
    (c) Smt. Indira Gandhi
    (d) ICAR

16. Which of the following is not a me of group communication ?
    (a) Demonstration (b) Symposium
    (c) Flannel graph (d) Circular lett

17. People's participation in an exten programme is significant when :
    (a) Local leaders participate
    (b) Literate section of villa participate
    (c) Gram panchayat mem participate
    (d) Majority of villagers participate

18. Which of the following statem represents true concepts of exten evaluation ?
    (a) Extension evaluation begins b the start of an extension progra
    (b) Extension evaluation begins at mid step of the programme
    (c) Extension evaluation begins at last step of the programme
    (d) Extension evaluation begins in in each step of programme.

Answers

11.	(b)	14.	(b)	17.	(d)
12.	(b)	15.	(d)	18.	(b)
13.	(a)	16.	(d)		

19. Which one of the following is *not* correctly matched ?

Approach	Technique
(a) Mass	Television
(b) Mass	Film
(c) Mass	Tape recorder
(d) Mass	Demonstration

20. Success in rural development project depends upon :
(a) Regular training of workers
(b) Regular contact of workers
(c) Amount of subsidy
(d) Participation of beneficiaries

21. National Academy of Agriculture Research Management is located at:
(a) New Delhi (b) Hyderabad
(c) Bangalore (d) Cuttack

22. For a study of farming system, the best PRA exercise is :
(a) Transect walk
(b) Resource mapping
(c) Time line
(d) Chapati diagram

23. Community development project was started in India in :
(a) 1947 (b) 1949
(c) 1952 (d) 1953

24. Which source of interview is the best in a rural society ?
(a) Key informant (b) Group
(c) Focussed group
(d) None of the above

25. The full form of A.T.M.A. is :
(a) Agriculture Technology Management Association
(b) Agriculture Technology Management Agency
(c) Agriculture Technology Mission Agency
(d) None of the above

26. Method of mass communication is :
(a) Demonstration (b) Farm visit
(c) Group discussion (d) News paper

27. T and V systems of extension was started by :
(a) D. Benor (b) M. Jackson
(c) M. Anderson (d) O. P. Dhama

28. Which one is not the part of communication module ?
(a) Communicator (b) Message
(c) Advice (d) Audience

29. High yielding variety programme was started in the year :
(a) 1960 (b) 1963
(c) 1966 (d) 1968

30. "Kisan Bharti" periodical is published from :
(a) Delhi (b) Lucknow
(c) Hisar (d) Pant Nagar

31. Role of different agencies for village development is included in :
(a) Resources mapping
(b) Time line
(c) Transect walk
(d) Chapati diagram

32. Gurgaon project was organised by :
(a) Mahatama Gandhi
(b) F. L. Bryne
(c) Hatch (d) Albert Mayer

33. Sevagarm attempt was started under the supervision of :
(a) F. L. Bryne (b) R. N. Tagore
(c) J. L. Nehru (d) M. K. Gandhi

Answers				
19. (d)	22. (b)	25. (b)	28. (c)	31. (d)
20. (d)	23. (c)	26. (d)	29. (c)	32. (b)
21. (b)	24. (c)	27. (a)	30. (d)	33. (d)

34. Shriniketan attempt was started by R. N. Tagore in collaboration with Elmhirst in
(a) Uttar Pradesh (b) Bengal
(c) Travancore (d) Etawah

35. Martandum attempt was started by :
(a) Howard (b) Hatch
(c) Albert Mayer (d) F. L. Bryne

36. Which one of the following pairs is not correct ?

Attempt	Year of start
(a) Gurgaon	1920
(b) Sevagram	1920
(c) Martandum	1921
(d) Etawah	1950

37. The fundamental objective of extension education is :
(a) To provide the farmer knowledge and help that will enable him to increase his income.
(b) To encourage the farmer to grow his own food, eat well and live well.
(c) The development of the people.
(d) None of these

38. T & V system is a good example of :
(a) Extension approach
(b) Training approach
(c) Co-operative self help approach
(d) Integrated development approach

39. The main objectives of the community development programme are :
(a) Area development
(b) Self help programme
(c) Development of the whole community
(d) All of these

40. According to Balwantrai Mehta committee, Panchayati Raj should be a :
(a) Two tier structure of local self government bodies from village to district
(b) Three tier structure of local self government bodies from village to district
(c) Two tier structure of local self government bodies from village to block
(d) Three tier structure of local self government bodies from village to block.

41. Panchayati Raj was first time started on 2nd October, 1959 in :
(a) Bombay (Maharastra)
(b) Nagaur (Rajasthan)
(c) Shimla (Himachal Pradesh)
(d) Patna (Bihar)

42. To get the intelligence quotient (I.Q.) of the individual, the formula will be :
(a) $\text{I.Q.} = \frac{\text{Chronological age}}{\text{Mental age}} \times 100$
(b) $\text{I.Q.} = \frac{\text{Mental age}}{\text{Chronological age}} \times 100$
(c) $\text{I.Q.} = \frac{\text{Chronological age}}{\text{Mental age}}$
(d) $\text{I.Q.} = \frac{\text{Mental age}}{\text{Chronological age}}$

43. Correct sequence of steps in extension teaching is
(a) Attention - Interest - Desire - Conviction - Action - Satisfaction
(b) Desire - Interest - Attention - Conviction - Action - Satisfaction
(c) Interest - Attention - Desire - Conviction - Action - Satisfaction
(d) Action - Attention - Interest - Conviction - Desire - Satisfaction

Answers				
34. (b)	37. (c)	40. (b)	43. (a)	
35. (b)	38. (b)	41. (b)		
36. (d)	39. (d)	42. (b)		

44. Which is not a principle of learning?
(a) Learning is growth like and continuous
(b) Learning should be meaningful
(c) Learning should be challenging and satisfying
(d) Learning should not develop functional understanding of learners

45. Which one of the following is not an element of good learning situation ?
(a) Physical facilities
(b) Extension worker
(c) Subject matter
(d) Transfer process

46. Communication is the process by which messages are transferred from source to :
(a) Channel (b) Message
(c) Receiver (d) Effects

47. The correct sequence of innovation - decision process or adoption process is :
(a) Interest - awareness - evaluation - trial - adoption
(b) Evaluation - awareness - interest - trial - adoption
(c) Awareness - interest - evaluation - adoption - trial
(d) Awareness - interest - evaluation - trial - adoption

48. _____ are the first farmers to adopt a new idea
(a) Innovators (b) Early adopters
(c) Early majority (d) Laggards

49. _____ are the last to adopt new idea
(a) Innovators (b) Laggards
(c) Early adopters (d) Early majority

50. Which one of the following pair is not correctly matched ?

	Adopter Category	Percentage
(a)	Innovators	2.5
(b)	Early adopters	13.5
(c)	Early majority	40
(d)	Laggards	16

51. Normal rate of adoption requires how many years from the introduction of the innovation to its adoption throughout the community
(a) 2 - 6 (b) 6 - 10
(c) 10 - 14 (d) 14 - 18

52. Which one of the following is not a method of mass contacts ?
(a) Circular letters
(b) Television
(c) Leaflets
(d) Result demonstration

53. Which one of the following is a method of group contacts ?
(a) Farms and home visits
(b) Office calls
(c) Personal letters
(d) Tours

54. Which one of the following is an audio-visual method of extension teaching ?
(a) Drama
(b) Recordings
(c) Flash board
(d) Tape recorder

55. Which one is a non-projected aids ?
(a) Cinema
(b) Slide
(c) Over head projector
(d) Pictures

Answers				
	44. (d)	47. (d)	50. (c)	53. (d)
	45. (d)	48. (a)	51. (b)	54. (a)
	46. (c)	49. (b)	52. (d)	55. (d)

56. Which methods of extension teaching is a way of showing people the value of an improved practice ?
(a) Result demonstration
(b) Method demonstration
(c) Newspaper
(d) Circular letter

57. Leaflet is a single sheet of paper folded to make a _____ page piece of printed matter.
(a) 4 (b) 6
(c) 8 (d) 10

58. For one talk, how many flash cards should be used.
(a) 10 - 12 (b) 12 - 14
(c) 14 - 18 (d) 20 - 22

59. Which one of the step is not included in programme planning ?
(a) Collect facts
(b) Analyse situation
(c) Identify problems
(d) Execute plan

60. _____ is the primary institution of society.
(a) Family (b) Village
(c) Individual (d) Block

61. The word Extension is derived from
(a) Latin (b) Greek
(c) Both (a) & (b) (d) None of these

62. Rural development depends on :
(a) Research
(b) Research - Extension
(c) Research - Teaching - Extension
(d) None of these

63. Extension is a/an
(a) Informal education
(b) Out of school systems of educati
(c) Both (a) and (b)
(d) Formal education

64. _____ is that of working wi rural people through out of scho education along with their curre interest and needs for getting overa development of rural families.
(a) Extension education
(b) Extension process
(c) Extension jobs
(d) Extension service

65. Extension is :
(a) education for all village people
(b) teaching through learning by doi and seeing is believing
(c) two way channel
(d) all of these

66. Education cause :
(a) Change in knowledge
(b) Change in attitude
(b) Change in skills
(d) All of these

67. Which of the following extensi approaches has got the highest intensi of influence ?
(a) Mass approach
(b) Group approach
(c) Community approach
(d) Individual approach

68. Which of the following scheme exclusively meant for self-employme for rural youths ?
(a) NREP (b) TRYSEM
(c) IRDP (d) DPAP

Answers					
	56. (a)	59. (d)	62. (c)	65. (d)	68. (b)
	57. (a)	60. (a)	63. (c)	66. (d)	
	58. (a)	61. (a)	64. (b)	67. (d)	

69. Which of the following 4 sources of communication do you consider most credible for non progressive/remote village situation ?
(a) Radio (b) Demonstration
(c) Print media (d) Exhibition

70. The basic unit of development under IRD program is :
(a) A village
(b) A community development block
(c) A family
(d) A district

71. National extension service (NES) in India was initiated on
(a) October 2, 1952
(b) October 2, 1953
(c) January 26, 1950
(d) August 15, 1947

72. First Agricultural University in India was established at :
(a) New Delhi (b) Hyderabad
(c) Bikaner (d) Pant Nagar

73. From among the following identify one which is three-tier system of the local self- government :
(a) Gram panchayat - khand samiti - Zila parishad
(b) Gram panchayat - village school - village cooperative
(c) IRD programme - TRYSEM - NREP
(d) Lab to land - KVK - KGK

74. Which of the following are the elements of communication process ?
(a) Source - message - channel - receiver
(b) Production process - farmers - farm - farm business
(c) Research - education - extension - training
(d) Information - instruction - evaluation - persuasion

75. Extension education is :
(a) a discipline
(b) a profession
(c) Discipline and profession both
(d) none

76. Which one is not the mode of radio broadcast ?
(a) Straight talks (b) Interviews
(c) Songs (d) Lecture

77. Which of the following is not the form of social interaction ?
(a) Competition (b) Cooperation
(c) Coordination (d) Conflict

78. Which of the following pair is not matched ?
(a) Communication : Berlo
(b) Rural weakers : Small farmers
(c) Mass media : Demonstration
(d) Helping poorest of the poor first : IRD programme

79. In case of diffusion of innovation, the overt behaviour means :
(a) Adoption or rejection
(b) Remembering or forgetting
(c) Fooding or lodging
(d) Mental weighing or field trial

80. Which is the traditional media of Communication ?
(a) Print (b) Tape recorder
(c) Radio (d) Ram Leela

81. General meetings are broadly, the meeting of :
(a) Heterogeneous participation
(b) Homogenous participation
(c) Community participation
(d) Society participation

Answers

69. (a)	72. (d)	75. (c)	78. (c)	81. (a)
70. (c)	73. (a)	76. (d)	79. (a)	
71. (b)	74. (a)	77. (c)	80. (d)	

82. Campaign is an
(a) Intensive teaching
(b) Extensive teaching
(c) Invasive teaching
(d) None

83. Programme planning is a procedure of
(a) Working by the people
(b) Working for the people
(c) Working with the people
(d) None of these

84. A series of still pictures on one roll is called
(a) Channel (b) Film strip
(c) Mock - up (d) Black board

85. A bulletin should contain
(a) 4 - 12 pages (b) 12 - 24 pages
(c) 24 - 48 pages (d) None

86. _____ is a unit of two or more people in reciprocal communication and interaction with each other.
(a) Family
(b) Group
(c) Society
(d) Social stratification

87. In India, slightly less than half the villages are inhabited by < _____ persons
(a) 500 (b) 800
(c) 1000 (d) 1500

88. About ¾ Indian villages have a human population of less than
(a) 600 (b) 700
(c) 800 (d) 1000

89. NREP was started in the year
(a) 1977 (b) 1978
(c) 1979 (d) 1982

90. The government sponsored Firka development scheme of Madras state was launched in :
(a) 1956 (b) 1966
(c) 1976 (d) 1980

91. The first KVK, Pondicherry was established in 1974 related with
(a) RAU, Pusa
(b) TNU, Coimbatore
(c) AAU, Hyderabad
(d) ICAR

92. The Village Panchayat Act came into existence in
(a) 1958 (b) 1959
(c) 1960 (d) 1961

93. Lab to land programme was launched by the ICAR as a part of its _____ jubilee celebrations in 1979.
(a) Centenary
(b) Platinum
(c) Golden
(d) Silver

94. The University Education Commission was headed by Dr. S. Radha Krishanan, recommended the establishment of
(a) Urban Universities
(b) Rural Universities
(c) Both (a) and (b)
(d) None of these

95. The Rural Systems Research idea was motivated by M. S. Swaminathan in
(a) 1978 (b) 1986
(c) 1998 (d) 2004

96. The Government of India set up Planning Commission in
(a) 1948 (b) 1950
(c) 1952 (d) 1954

Answers

82. (a)	85. (c)	88. (d)	91. (b)	94. (b)
83. (c)	86. (b)	89. (a)	92. (a)	95. (b)
84. (b)	87. (a)	90. (b)	93. (c)	96. (b)

97. The Chairman of Planning Commission is
(a) President
(b) Prime Minister
(c) Finance Minister
(d) Speaker of Lok Sabha

98. Operational Research Projects (ORP) were initiates in
(a) 1960 - 61 (b) 1966 - 67
(c) 1970 - 71 (d) 1975 - 76

99. State Agricultural Universities in India were set up on the pattern of Land Grant College of
(a) U. K. (b) France
(c) Italy (d) U. S. A

100. The term community development appears to have originated from _____ in England in 1946.
(a) London (b) Manchester
(c) Cambridge (d) Belfast

101. There are _____ development blocks in India.
(a) 5000 (b) 6000
(c) 7000 (d) 8000

102. Among the community, voluntary agencies are characterized by :
(a) Less intensity
(b) Greater continuity
(c) Greater commitment
(d) Less accountability

103. According to CACP, sugarcane prices announced is :
(a) MSP
(b) Procurement prices
(c) Statuary
(d) Flat prices

104. The objectives of education are decided by :
(a) Social sciences
(b) Physical sciences
(c) Normative sciences
(d) Biological sciences

105. B. R. Mehta team stimulated an active consideration of _____ through democratic bodies in India.
(a) Decentralization
(b) Stabilization
(c) Centralization
(d) Mobilization

106. The key village scheme was initiated in August 1952 comprising first systematic attempt to improve the
(a) quality and productivity of buffaloes and cattle in India
(b) quality and productivity of sheep and goat in India
(c) quality of pigs
(d) All of the above

107. Most people retain _____% of what they read.
(a) 5 - 10 (b) 10 - 15
(c) 20 - 25 (d) 30 - 35

108. Most people kept in mind _____ % of what they seen.
(a) 10 - 15 (b) 20 - 25
(c) 30 - 35 (d) 50 - 55

109. Up to _____% of what is taught is kept in mind by majority of people, if they participate actively, and if all the senses (read, hear and seen) are involved.
(a) 50 (b) 65
(c) 80 (d) 90

Answers					
	97. (b)	100. (c)	103. (c)	106. (a)	109. (d)
	98. (c)	101. (a)	104. (c)	107. (b)	
	99. (d)	102. (b)	105. (a)	108. (c)	

110. Symposium is a short series of lectures; usually by _____ speakers
(a) 1 - 2 (b) 2 - 5
(c) 5 - 7 (d) 7 - 10

111. Phillips 66 format or hurdle system is related with
(a) Panel
(b) Form
(c) Buzz sessions
(d) Work shop

112. Small group interaction designed to encourage the free introduction of ideas on an unrestricted basis without any limitations to feasibility is known as
(a) Conference (b) Seminar
(c) Buzz session (d) Brain storming

113. _____ essentially follow the seminar method and the focus is on any particular subject or problem
(a) Work shop
(b) Syndicate Studies
(c) Institute (d) None

114. News paper articles are included in which method of extension
(a) Individual (b) Group
(c) Mass (d) None of these

115. "Stay at home" type of people can be contacted by which method of extension
(a) Individual (b) Group
(c) Mass (d) None of these

116. Less intensive and less effective method of extension is
(a) Individual (b) Group
(c) Mass (d) Both (a) & (b)

117. Puppet shows are included in
(a) Audio aids
(b) Visual aids
(c) Audio - visual aids
(d) None of these

118. Flash cards, pull charts, slides and f strips are the type of aids
(a) Audio
(b) Visual
(c) Audio - visual
(d) Cannot be classified

119. _____ is essentially a recogniza imitation or replica of the origi whether workable or not
(a) Model (b) Specimens
(c) Mock - up (d) Objects

120. A working model is known as
(a) Objects (b) Model
(c) Mock - up (d) Poster

121. Real objects taken out of their natu settings is called as
(a) Objects (b) Specimens
(c) Model (d) Mock-up

122. Sound can be recorded in _____ ways
(a) 1 (b) 2
(c) 3 (d) 4

123. The disc recording is made by _____ process.
(a) Mechanical (b) Magnetic
(c) Optical (d) None of the

124. Tape and wire recording are made _____ process.
(a) Magnetic (b) Mechanical
(c) Optical (d) None of the

125. The movie film recording is made
(a) Magnetic (b) Mechanical
(c) Optical (d) None of the

Answers						
	110. (b)	113. (b)	116. (c)	119. (a)	122. (c)	125. (
	111. (c)	114. (c)	117. (c)	120. (c)	123. (a)	
	112. (d)	115. (a)	118. (c)	121. (b)	124. (a)	

126. Which one of the following is not a example of still pictures ?
(a) Drawing (b) Painting
(c) Etching (d) None of these

127. Visual teaching aid flannel graph is also known as
(a) Chalk board
(b) Bulletin board
(c) Khadder graph
(d) None of these

128. Flash cards are a series of illustrated cards when flashed or presented before a group in proper sequence tell a
(a) Part of story
(b) Complete story
(c) Incomplete story
(d) None of these

129. A B C of posters means
(a) Attractive, Brief and Complete
(b) Attractive, Brief and Clear
(c) Attractive, Brief and Creative
(d) None of these

130. _____ consist of a series of individual charts which are bound together and hung on a supporting stand.
(a) Bar Charts (b) Job charts
(c) Flip charts (d) Tree charts

131. _____ is the process by which two or more people exchange ideas, facts, feelings or impressions.
(a) Adoption
(b) Teaching
(c) Learning
(d) Communication

132. "The communication process in Rural development" is written by
(a) Leagans (b) Berlo
(c) A.A. Reddy (d) Ray

133. Leagans model of communication process is
(a) Communication - Message - Channel - Treatment - Audience - Audience response
(b) Sender - Encoding - Channel - Decoding - Receiver
(c) Communication source - Encoder - Message - Channel - Decoder - Communication receiver
(d) None of these

134. _____ is a statement of situation, objectives, problems and solutions
(a) A plan of work
(b) Extension programme
(c) A calendar of work
(d) A project

135. _____ is a plan of work arranged chronologically.
(a) A project
(b) A calendar of work
(c) A plan of work
(d) Programme planning.

136. A sound extension programme building based on
(a) Analysis of the facts in the situation
(b) Select problems based on needs
(c) Determine objective and solutions
(d) All of these

137. _____ are expressions of the ends towards which our efforts are directed.
(a) Goal
(b) Objectives
(c) Communication
(d) None of these

Answers				
	126. (d)	129. (b)	132. (a)	135. (b)
	127. (c)	130. (c)	133. (a)	136. (d)
	128. (b)	131. (d)	134. (b)	137. (b)

138. _____ is defined as the distance in any given direction one expects to go during a given period of time.
(a) Goal (b) Objectives
(c) Needs (d) Message

139. The ultimate objective of extension work is the full development of _____ .
(a) Individual (b) Group
(c) Mass (d) Village

140. The gap between the situation and objective is the area of _____ .
(a) Goal (b) Needs
(c) Interest (d) None

141. Panchayat Raj came after
(a) Pre-determined programme
(b) Self determined programme
(c) Fact determined programme
(d) None of these

142. First step for making a programme planning includes
(a) Evaluation
(b) Analysis of the situation and determining problems
(c) Deciding on objectives
(d) Teaching

143. The main objective of evaluation in extension is
(a) To facilitate effective decision making directly goes to conclusion
(b) To facilitate effective decision making without jumping to conclusion
(c) To see weak points in programme
(d) None of these

144. In good administration the offices of a _____ are arranged in a pyramid of authority and responsibility
(a) Autocracy (b) Monarchy
(c) Bureaucracy (d) Democracy

145. Farm demonstration work began in _____ in USA by Dr. Seaman.
(a) 1903 (b) 1908
(c) 1955 (d) 1960

146. Extension work in Japan was first started by
(a) Government organisation
(b) Farmer's organisation
(c) Labour's organisation
(d) Business's organisation

147. Which of the following is not correct ?
(a) Department of revenue, agriculture and commerce - 1871
(b) The famine commission - 1880
(c) The famine commission - 1901
(d) None of these

148. The Royal commission's report came in
(a) 1920 (b) 1924
(c) 1928 (d) 1931

149. "Grow more food campaign" was started in
(a) 1944 (b) 1947
(c) 1952 (d) 1953

150. Intensive Agricultural Development Programme (IADP) popularly also known as package programme started originally in 7 districts in
(a) 1959 (b) 1960 - 61
(c) 1964 (d) 1970

Answers					
	138. (a)	141. (c)	144. (c)	147. (d)	150. (b)
	139. (a)	142. (b)	145. (a)	148. (c)	
	140. (b)	143. (b)	146. (b)	149. (b)	

151. Intensive Agriculture Area Programme came into operation in
(a) March, 1964
(b) March, 1969
(c) October, 1969
(d) None

152. Which Five year plan aimed at attaining self sufficiency in food ?
(a) 3rd (b) 4th
(c) 5th (d) 6th

153. For social justice government started new programme
(a) Small farmers development Agency (SFDA)
(b) Marginal Farmers and Agriculture Laborers Scheme (MFAL)
(c) Drought Prone Area Programme
(d) All of these

154. _____ is a dominant social institution permeating social and economic relations.
(a) Society (b) Creed
(c) Caste (d) Customs

155. Rural community differ from urban community in relation to
(a) Population density
(b) Culture
(c) Environment
(d) All of these

156. _____ believes that if you leave workers alone the work will be done.
(a) Autocratic leader
(b) Democratic leader
(c) Laissez - faire leader
(d) None of these

157. _____ is one who has received specialized training in the field in which he work as full time and paid for his work.
(a) Operational leader
(b) Nominal leader
(c) Professional leader
(d) Prominent talent leader

158. Best method for selection of leader is
(a) Sociometry
(b) Election
(c) Discussion method
(d) Key informants

159. _____ are those things which person ought or ought not to do in society
(a) Taboo (b) Mores
(c) Folkways (d) Ritual

160. At the adoption stage, information sources is
(a) Village level change agent and to some extent mass media.
(b) Extension agency and other farmers
(c) Informal personal sources including family members
(d) Self-experience gained at the trial stage.

161. Adopter category which respect and regarded by many others in the social system as a role model are
(a) Innovators
(b) Early adopters
(c) Late majority
(d) Laggards

162. The leader of the Bhoodan movement was
(a) Achary Vinoba Bhave
(b) Spencer Hatch
(c) F. L. Bryne
(d) T. Prakasam

Answers				
	151. (a)	154. (c)	157. (c)	160. (d)
	152. (b)	155. (d)	158. (a)	161. (b)
	153. (d)	156. (c)	159. (b)	162. (a)

163. Young Farmers Association was formed in India under the guidance of Dr. P. S. Deshmukh in
(a) April, 1956 (b) April, 1966
(c) April, 1976 (d) April, 1980

164. National commission on farmers was set up in India in
(a) March, 1999 (b) March, 2002
(c) February, 2004 (d) June, 2004

165. Who was the first chairman of National Commission on Farmers ?
(a) M. S. Swaminathan
(b) Sompal
(c) Bal Ram Jakhar
(d) V. L. Chopra

166. National Agricultural Science Museum was inaugurated on 3rd Nov, 2004 by
(a) Dr. Man Mohan Singh
(b) Dr. A. P. J. Abdul Kalam
(c) A. B. Vajpayee
(d) Sonia Gandhi

167. National Agricultural Science Museum is located at
(a) New Delhi (b) Bangalore
(c) Kolkatta (d) Chennai

168. National food for work programme was launched on
(a) November 14, 2000
(b) November 14, 2004
(c) October 2, 2000
(d) October 2, 2004

169. National food for work programme implemented as a
(a) 100% centrally sponsored scheme
(b) 80 : 20 center state sponsored scheme
(c) 50 : 50 center state sponsored scheme
(d) None of these

170. Swaranjayanti Gram Swarozgar Yojan (SGSY) was launched in
(a) April, 1999 (b) October, 1999
(c) January, 2000 (d) January, 2002

171. Which one of the following pairs no correct ?
(a) Sampoorna Grameen Rozgar Yojana - 200
(b) Pradhan Mantri Gramodaya Yojan (PMGY) - 2000-0
(c) Rural Employment Generatio Programme (REGP) - 199
(d) Pradhan Mantri Gram Sadak Yojana (PMGSY) - 199

172. The government sponsored Firk development scheme was launche under the guidance of
(a) T. Prakasam (b) Jayachandran
(c) Spencer Hatch (d) Murlidharan

173. In India _____ of the tot population lives in villages
(a) One third (b) Half
(c) Two third (d) Three fourths

174. National Agriculture Technology Proje was started in :
(a) 1995 - 96 (b) 1998 - 99
(c) 2000 - 01 (d) 2002 - 2003

175. NATP was funded from
(a) USA (b) World Bank
(c) GOI (d) ICAR

176. National Institute of Agricultu Marketing (NIAM) is located at
(a) New Delhi (b) Jaipur
(c) Hisar (d) Meerut

OOOO

Answers					
	163. (a)	166. (b)	169. (a)	172. (a)	175. (b)
	164. (c)	167. (a)	170. (a)	173. (d)	176. (b)
	165. (b)	168. (b)	171. (d)	174. (b)	

10 Animal Husbandry

1. Cattle and buffalo belongs to family
   (a) Bovidae (b) Suidae
   (c) Equidae (d) Cammelidae
2. Genus of goat is
   (a) *Ovis* (b) *Capra*
   (c) *Bos* (d) *Bubalus*
3. Total livestock population in India is
   (a) 470 m (b) 490 m
   (c) 380 m (d) 420 m
4. Blue revolution is related to
   (a) Crops (b) Oilseeds
   (c) Fisheries (d) Energy source
5. India's rank in livestock population
   (a) I (b) II
   (c) III (d) IV
6. Buffalo population in India is
   (a) 85 m (b) 95 m
   (c) 142 m (d) 105 m
7. Surathi buffalo breed is a native of
   (a) Orissa (b) W.B.
   (c) U.P. (d) Gujarat
8. Toda is a breed of
   (a) Sheep (b) Goat
   (c) Cattle (d) Buffalo
9. Maximum fat (%) in milk of
   (a) Murrah (b) Mehsana
   (c) Bhadawari (d) Zafrabadi
10. Highest milk yielder is
    (a) Murrah (b) Mehsana
    (c) Zafrabadi (d) Bhadawari
11. FMD is caused by
    (a) Virus (b) Bacteria
    (c) Fungus (d) None of these
12. Spleenic fever is another name for
    (a) FMD (b) Anthrax
    (c) Cow pox (d) Mastitis
13. Dual purpose breed of cow is
    (a) Tharparkar (b) Sahiwal
    (c) Sindhi (d) Gir
14. Cattle plague another name for
    (a) Anthrax (b) Rinderpest
    (c) FMD (d) Cowpox
15. Yellow colour of cow milk is due to presence of
    (a) Carotene (b) Anthocyanin
    (c) Vitamin B (d) None
16. Cow milk's protein is called
    (a) Zein (b) Lactalbumin
    (c) Casein (d) Albumin
17. Milk sugar is
    (a) Lactose (b) Maltose
    (c) Glucose (d) Sucrose
18. Which element is deficient in milk ?
    (a) Mg (b) Ca
    (c) Fe (d) P
19. Rathi is a common breed in
    (a) Bihar (b) Punjab
    (c) Rajasthan (d) U.P.

Answers

1. (a)	5. (a)	9. (c)	13. (a)	17. (a)
2. (b)	6. (a)	10. (a)	14. (b)	18. (c)
3. (a)	7. (d)	11. (a)	15. (a)	19. (c)
4. (c)	8. (d)	12. (b)	16. (c)	

20. Milk share consumed for whole milk purpose is
    (a) 1/2 (b) 3/4
    (c) 2/3 (d) 1/3
21. First clone Dolly was made in
    (a) Sheep (b) Goat
    (c) Cow (d) Buffalo
22. Dolly created by
    (a) Wilmont (b) BP Pal
    (c) William Godd (d) Swaminathan
23. Cattle disease transferred to man is
    (a) FMD (b) Anthrax
    (c) Rinderpest (d) Foot rot
24. Maximum producer of wool
    (a) Rajasthan (b) Haryana
    (c) U.P. (d) Punjab
25. Total wool production in India is
    (a) 25 m kg (b) 72 m kg
    (c) 95 m kg (d) 48 m kg
26. Total egg production in India is
    (a) 40 b (b) 60 b
    (c) 80 b (d) 100 b
27. Temperature for LTLT pasteurization
    (a) 61 - 63 °C (b) 42 - 49 °C
    (c) 62 - 65 °C (d) 51 - 65 °C
28. Female lamb is
    (a) Heifer (b) Ewe
    (c) Ram (d) Grimmer
29. Maximum sheep population in
    (a) USA (b) Australia
    (c) UK (d) India
30. Merino developed in
    (a) France (b) USA
    (c) Denmark (d) Holland
31. Dorset horn is native of
    (a) USA (b) England
    (c) France (d) Denmark
32. Stiff lamb disease caused by deficiency of
    (a) Vitamin E (b) Vitamin D
    (c) Vitamin B_2 (d) Vitamin B_{12}
33. Morocco leather produced from skin of
    (a) Camel (b) Horse
    (c) Sheep (d) Goat
34. Goat population in India
    (a) 142 m (b) 115 m
    (c) 150 m (d) 110 m
35. Angora is a native of
    (a) Europe (b) Turkey
    (c) Holland (d) India
36. Toggenberg is native of
    (a) Europe (b) Switzerland
    (c) Africa (d) USA
37. Pashmina wool obtained from
    (a) Yak (b) Cattle
    (c) Sheep (d) Goat
38. Dual purpose breed of goat
    (a) Barbari (b) Jamnapari
    (c) Marwari (d) Beetal
39. Salted meat of pig is known as
    (a) Bacon (b) Beef
    (c) Pork (d) Chicken
40. Rickets is due to deficiency of
    (a) Vitamin C (b) Vitamin D
    (c) Vitamin A (d) Vitamin B_{12}
41. Ranikhet is a ..... disease.
    (a) Viral (b) Nematode
    (c) Bacterial (d) Fungal

Answers

20. (d)	24. (a)	28. (b)	32. (a)	36. (b)	40. (b)
21. (a)	25. (d)	29. (b)	33. (d)	37. (d)	41. (a)
22. (a)	26. (a)	30. (a)	34. (b)	38. (b)	
23. (b)	27. (a)	31. (b)	35. (b)	39. (a)	

42. Curled toe paralysis caused due to
(a) Vitamin A (b) Vitamin C
(c) Vitamin B_2 (d) Vitamin B_{12}

43. Maximum fish production in
(a) West Bengal (b) Uttar Pradesh
(c) Kerala (d) Tamil Nadu

44. Egg shell made up of
(a) $Ca(OH)_2$ (b) $Ca_3(PO_4)_2$
(c) $CaCO_3$ (d) CaO

45. Quality of egg can be judged by
(a) Candling (b) Annealing
(c) Temperature test (d) pH

46. Yellow colour of egg is due to
(a) Carotene (b) Anthocyanin
(c) Vitamin B (d) Xanthophyll

47. Meat production in India
(a) 6 mt (b) 8 mt
(c) 10 mt (d) 12 mt

48. Body temperature of cow is
(a) 98.2 °F (b) 45.6 °F
(c) 101 °F (d) 34 °F

49. Gestation period of cow is ..... days.
(a) 283 - 285 (b) 290 - 292
(c) 142 - 145 (d) 152 - 154

50. Body temperature of hen is
(a) 34 °F (b) 51 °F
(c) 107 °F (d) 120 °F

51. Meat of sheep is known as
(a) Mutton (b) Chicken
(c) Pork (d) Beef

52. 'White revolution' is related to
(a) Cotton (b) Milk
(c) Rice (d) Sheep

53. 'Operation flood' is related to
(a) Opium (b) Cotton
(c) Rice (d) Milk

54. Per capita milk availability per day in year 2007 - 08 is
(a) 132 g (b) 121 g
(c) 252 g (d) 231 g

55. Total milk production in (2007-08) India is
(a) 104.8 MT (b) 97.1 MT
(c) 80 MT (d) 60 MT

56. Most successful example of cooperative in milk is
(a) Anand (b) Syngenta
(c) Proagro (d) Raksha

57. Maximum population of poultry in
(a) Rajasthan (b) M. P.
(c) Andhra Pradesh (d) U. P.

58. Marek's disease found in
(a) Cattle (b) Poultry
(c) Sheep (d) Goat

59. Alpine is a breed of
(a) Goat (b) Poultry
(c) Sheep (d) Cattle

60. Tallest breed of sheep
(a) Deccani (b) Bikaneri
(c) Nellore (d) Nilgiri

61. Merino wool's share in world
(a) 90 % (b) 25 %
(c) 50 % (d) 80 %

62. Pasteurization kills
(a) Bacteria along spores
(b) Bacteria spores alive
(c) Bacteria + fungi kill
(d) Bacteria + virus

63. Casein form ..... of total milk proteins
(a) 60 - 65 % (b) 70 - 71 %
(c) 42 - 45 % (d) 80 - 83 %

Answers

42. (c)	46. (d)	50. (c)	54. (c)	58. (b)	62. (b)
43. (a)	47. (a)	51. (a)	55. (a)	59. (a)	63. (d)
44. (c)	48. (c)	52. (b)	56. (a)	60. (c)	
45. (a)	49. (a)	53. (d)	57. (c)	61. (d)	

64. Tharparkar is native of
(a) Haryana (b) Rajasthan
(c) Pakistan (d) Gujarat

65. World's ..... % buffalo are found in India
(a) 30 (b) 20
(c) 40 (d) 50

66. National Dairy Research Institute is located at
(a) Karnal (b) New Delhi
(c) Varanasi (d) Jhansi

67. Indian Veterinary Research Institute is located at
(a) Delhi (b) Karnal
(c) Izatnagar (d) Jhansi

68. NRC for Horses is located at
(a) Hisar (b) Ludhiana
(c) Karnal (d) New Delhi

69. Ruminants stomach divided into ..... parts
(a) 1 (b) 2
(c) 3 (d) 4

70. Which part of ruminants stomach resembles true stomach ?
(a) Omasum (b) Abomasum
(c) Rumen (d) Reticulum

71. Largest part of ruminant stomach
(a) Omasum (b) Abomasum
(c) Rumen (d) Reticulum

72. Which of the following is non-ruminant ?
(a) Horse (b) Sheep
(c) Both (a) and (b) (d) None

73. Jersy is native of
(a) Denmark (b) England
(c) Holland (d) USA

74. Wallowing is the characteristics of
(a) Cow (b) Buffalo
(c) Sheep (d) Horse

75. Buffalo share in total milk production in India
(a) 55 % (b) 42 %
(c) 60 % (d) 65 %

76. Separating calf from its mother is called
(a) Wallowing (b) Weaning
(c) Castration (d) None

77. Ovarian cycle in cow and buffalo is
(a) 30 days (b) 27 days
(c) 21 days (d) 28 days

78. Gestation period in buffalo is
(a) 280 days (b) 310 days
(c) 270 days (d) 420 days

79. The stage when animal comes in heat
(a) Proestrus (b) Estrus
(c) Metestrus (d) Diestrus

80. Longest phase of oestrus cycle
(a) Proestrus (b) Estrus
(c) Metestrus (d) Diestrus

81. Expulsion of foetus in cow is known as
(a) Calving (b) Farrowing
(c) Kidding (d) Pupping

82. Parturition in ewe known as
(a) Calving (b) Lambing
(c) Farrowing (d) Pupping

83. Expulsion of placenta should be with
(a) 2 - 3 hr (b) 4 - 8 hr
(c) 6 - 8 hr (d) 10 - 12 hr

84. Undescended condition of the testes in the scrotal sac is known as
(a) Cryptorchidism (b) Free martin
(c) Scrotal hernia
(d) *Importantia coeundi*

Answers

64. (c)	68. (a)	72. (a)	76. (b)	80. (d)	84. (a)
65. (d)	69. (d)	73. (b)	77. (c)	81. (a)	
66. (a)	70. (b)	74. (b)	78. (b)	82. (b)	
67. (c)	71. (c)	75. (a)	79. (a)	83. (c)	

85. Mammary glands are modified
(a) Cutinous gland (b) Oil gland
(c) Dermis gland (d) Sudoriferous

86. For production of 1 ml of milk .... ml of blood passes through udder
(a) 200 (b) 100 - 120
(c) 400 - 500 (d) 300 - 450

87. Mammary glands originate from
(a) Endoderm (b) Ectoderm
(c) Mesoderm (d) All of these

88. Initiation of milk secretion is called
(a) Lactogenesis (b) Galactogenesis
(c) Galactopiosis (d) None

89. Galactopiosis is
(a) Milk secretion
(b) Maintenance of lactation
(c) Milk let down
(d) Ceasing of lactation

90. Hormone responsible for milk let down
(a) Oxytocin (b) ACH
(c) LH (d) PTH

91. Hormone for milk secretion
(a) Oxytocin (b) ACH
(c) Prolactin (d) TSH

92. Best method of milking is
(a) Stripping (b) Full hand
(c) Knuckling (d) All

93. Mating of related individual with 4-6 generation is known as
(a) Inbreeding (b) Line breeding
(c) Close breeding (d) Out crossing

94. Mating of unrelated pure bred animals within the same breed is
(a) Cross breeding (b) Out crossing
(c) Close breeding (d) Inbreeding

95. Mating of animals of different breeds known as
(a) Line breeding (b) Cross breeding
(c) Out crossing (d) Inbreeding

96. When two breeds are crossed alternatively is known as
(a) Criss crossing (b) Triple crossing
(c) Back crossing (d) None

97. When three breeds are crossed in a rotational manner
(a) Triple crossing (b) Back crossing
(c) Criss crossing (d) None

98. Mating of a cross bred animal back to one of the pure parent is
(a) Inbreeding (b) Triple crossing
(c) Back crossing (d) Line breeding

99. Roughage contain moisture upto
(a) 15 - 20 % (b) 5 - 10 %
(c) 10 - 15 % (d) 20 - 25 %

100. Crude fibre in roughages
(a) > 18 % (b) > 30 %
(c) > 25 % (d) > 35 %

101. TDN in crude fibre is
(a) < 60 % (b) < 65 %
(c) < 50 % (d) < 52 %

102. Succulent feed contain moisture upto
(a) 40 - 60 % (b) 45 - 55 %
(c) 30 - 40 % (d) 60 - 90 %

103. Digestible crude protein (DCP) in legume fodder is
(a) 4 - 5 % (b) 6 - 9 %
(c) 2.5 - 3 % (d) 3 - 4 %

104. DCP in non legume crop is
(a) 3 - 5 % (b) 0.5 - 1 %
(c) 1 - 2 % (d) 2 - 3 %

Answers

85. (d)	89. (b)	93. (a)	97. (a)	101. (a)
86. (c)	90. (a)	94. (b)	98. (c)	102. (a)
87. (b)	91. (c)	95. (b)	99. (c)	103. (c)
88. (a)	92. (b)	96. (a)	100. (a)	104. (b)

105. Moisture content in hay
(a) 10 - 12 % (b) 15 - 20 %
(c) 20 - 25 % (d) 60 - 65 %

106. TDN in legume fodder is
(a) 10 - 15 % (b) 15 - 30 %
(c) 30 - 40 % (d) 40 - 50 %

107. Size of calving box is
(a) 200 - 250 sq ft (b) 100 - 150 sq ft
(c) 50 - 100 sq ft (d) 150 - 200 sq ft

108. Goat's share in milk production in India is
(a) 2.9 % (b) 5 %
(c) 10 % (d) 15 %

109. Biggest and majestic goat breed in India
(a) Beetal (b) Jamnapari
(c) Barbari (d) Surti

110. Jamunapari is native of
(a) Haryana (b) Punjab
(c) West Bengal (d) U. P.

111. Saanen breed is native of
(a) U. S. A. (b) Switzerland
(c) Africa (d) U. K.

112. Duration of oestrus in goat is
(a) 12 - 15 hr (b) 15 - 18 hr
(c) 48 - 36 hr (d) 24 - 48 hr

113. Nutrient conversion efficiency for milk production of a dairy cow is
(a) 40 % (b) 45 %
(c) 38 % (d) 42 %

114. Nutrient conversion efficiency for goat
(a) 38 % (b) 42 %
(c) 45 - 71 % (d) 40 - 45 %

115. Castration done at the age of ..... in goat
(a) 2 - 4 weeks (b) 3 - 5 weeks
(c) 4 - 6 weeks (d) 3 - 4 weeks

116. Chemical used for dehorning is
(a) Na Cl (b) Caustic potash
(c) Oxalic acid (d) Na OH

117. Feed conversion ratio (kg feed/kg live wt. gain) in pig is
(a) 3 kg (b) 5 kg
(c) 4 kg (d) 7 kg

118. Large white Yorkshire is breed of
(a) Sheep (b) Goat
(c) Pig (d) Horse

119. Puberty in pigs comes at
(a) 1 yr (b) 6 - 8 months
(c) 1 - 1.5 yr (d) 16 - 19 months

120. Oestrus cycle in pig
(a) 21 days (b) 42 days
(c) 19 days (d) 15 days

121. Gestation period for swine
(a) 120 days (b) 105 days
(c) 114 days (d) 100 days

122. Rhode Island Red is native of
(a) France (b) Italy
(c) USA (d) England

123. Most popular poultry in USA
(a) Plymouth Rock
(b) New Hempshire
(c) Rhode Island Red
(d) Brahma

124. Leghorn is
(a) Mediterranean class
(b) Asiatic class
(c) English class
(d) None

Answers

105. (b)	109. (b)	113. (c)	117. (a)	121. (c)
106. (c)	110. (d)	114. (c)	118. (c)	122. (d)
107. (b)	111. (b)	115. (a)	119. (b)	123. (a)
108. (a)	112. (d)	116. (b)	120. (a)	124. (a)

125. World's No. 1 egg producer
(a) New Hempshire
(b) Leghorn
(c) English class
(d) Rhode Island Red

126. Crop is equivalent to
(a) Stomach (b) Gizzard
(c) Small intestine (d) Cloaca

127. Largest organ of the body of poultry
(a) Crop (b) Gizzard
(c) Cloaca (d) Duodenum

128. Largest gland in the body of fowl is
(a) Ovary (b) Liver
(c) Spleen (d) Pancreas

129. Egg production starts in poultry at the age of
(a) 5 ½ months (b) 3 ½ months
(c) 4 months (d) 6 months

130. Age of broiler
(a) 8 - 12 weeks (b) 4 - 6 weeks
(c) 10 - 12 weeks (d) 1 - 2 weeks

131. Finest wool in Rajasthan produced by
(a) Magra (b) Sonadi
(c) Nali (d) Chokla

132. Tallest breed of sheep in India
(a) Nellore (b) Deccani
(c) Sonadi (d) Nali

133. Dual purpose breed of sheep
(a) Nali (b) Magra
(c) Mandya (d) Chokla

134. Most popular fine wool breed of world
(a) Rambouillet (b) Lincoln
(c) Corriedale (d) Merino

135. Lincoln is native of
(a) Switzerland (b) Australia
(c) Libya (d) Mexico

136. Sheep breeding depends mainly on
(a) Season (b) Age
(c) Environment (d) None

137. Sheep is
(a) Polyestrus (b) Monoestrus
(c) Biestrus (d) None

138. Ringing practiced in
(a) Sheep (b) Goat
(c) Camel (d) Poultry

139. Two humped camel is known as
(a) *Camelus bacterianus*
(b) *Camelus lamr*
(c) *C. dromedarius*
(d) None

140. Heat in camel is known as
(a) Musth (b) Heat
(c) Goulla (d) Pali

141. Gestation period in horse is
(a) 336 days (b) 310 days
(c) 140 days (d) 145 days

142. Which part lacking in stomach of camel ?
(a) Abomasum (b) Omasum
(c) Rumen (d) All

143. Stomach of camel has how many parts ?
(a) 3 (b) 2
(c) 4 (d) 1

144. Horse is a
(a) Ruminant hoofed
(b) Non ruminant hoofed
(c) Even toed hoofed
(d) Odd toed hoofed

145. Most common grass for animal feeding in Rajasthan
(a) Sewan (b) Dhaman
(c) Boor (d) Makra Grass

Answers						
	125. (b)	129. (a)	133. (c)	137. (a)	141. (a)	145. (a)
	126. (a)	130. (a)	134. (d)	138. (a)	142. (b)	
	127. (b)	131. (d)	135. (a)	139. (a)	143. (a)	
	128. (b)	132. (a)	136. (a)	140. (a)	144. (b)	

146. Browsing is common feature of
(a) Horse (b) Sheep
(c) Cow (d) Goat

147. Gestation period of sheep is
(a) 120 - 140 days (b) 112 - 120 days
(c) 135 days (d) 145 days

148. Life span of cattle
(a) 10 - 15 yr (b) 15 - 20 yr
(c) 20 - 25 yr (d) 25 - 30 yr

149. Life span of horse
(a) 10 - 15 yr (b) 15 - 20 yr
(c) 20 - 30 yr (d) 30 - 40 yr

150. Seasonal breeders are
(a) Cow (b) Goat
(c) Buffalo (d) Sheep

151. CSWRI located at
(a) Jaipur (b) Varanasi
(c) Avikanagar (d) New Delhi

152. Maximum number of yaks are found in
(a) India (b) USA
(c) China (d) Greenland

153. Shape of RBC is
(a) Round (b) Biconcave
(c) Sickle shaped (d) Rectangular

154. Immunity is caused by
(a) Lymphocytes (b) Basophils
(c) Eosinophils (d) All

155. Ongole is a breed of
(a) Cow (b) Buffalo
(c) Goat (d) Sheep

156. Mainly draught breed of cattle is
(a) Gir (b) Sahiwal
(c) Amrit Mahal (d) Kankrej

157. Siri mostly found in
(a) Darjeeling (b) Rajasthan
(c) J & K (d) A.P.

158. Mechanism of heat tolerance is fou
(a) Goat (b) Buffalo
(c) Cow (d) Fish

159. Buffalo meat contain white fat a
(a) Carotene converted to Vitami
(b) RBC
(c) Xanthophyll dominant
(d) Yellow pigment

160. Silent heat dominant in
(a) Goat (b) Sheep
(c) Buffalo (d) Cow

161. Colostrum feeding necessary for
(a) Increasing protein
(b) Easy to digest
(c) Disease resistance
(d) All

162. Colostrum prevent against
(a) Calf scour (b) Night blin
(c) Navel ill (d) All

163. Temperature required for artificial
in buffalo
(a) 41 °C (b) 39 °C
(c) 45 °C (d) 32 °C

164. Temperature for artificial vagina i
(a) 41 °C (b) 39 °C
(c) 32 °C (d) 45 °C

165. Diluent for preservation of buffalo
is
(a) Alcohol (b) Aceto
(c) Citric acid whey (d) All

166. Best pH for semen preservation
(a) 6.4 (b) 7.4
(c) 7.2 (d) 6.8

Answers						
	146. (d)	150. (d)	154. (a)	158. (b)	162. (d)	166
	147. (d)	151. (c)	155. (a)	159. (a)	163. (b)	
	148. (c)	152. (c)	156. (c)	160. (c)	164. (a)	
	149. (c)	153. (b)	157. (a)	161. (d)	165. (c)	

167. Conception rate in A.I.
(a) 35 % (b) 55 %
(c) 58 - 75 % (d) 100 %

168. Average period of lactation in buffalo
(a) 145 days (b) 175 days
(c) 281 days (d) 332 days

169. Conversion of spermatid into spermatozoa is
(a) Spermatogenesis
(b) Spermiogenesis
(c) Oogenesis
(d) All

170. Number of egg formed from 1 pri oocyte is
(a) 1 (b) 2
(c) 3 (d) 4

171. Nurse cells for sperm is called
(a) RBC
(b) Sertoli cells
(c) WBC
(d) All

172. Puberty in calf at age of
(a) 8 months (b) 6 months
(c) 1 year (d) 1.5 year

173. Corpus luteum starts to regress in
(a) Estrus (b) Proestrus
(c) Metestrus (d) Diestrus

174. Shortest period of estrous cycle is
(a) Estrus (b) Procesturs
(c) Metestrus (d) Diestrus

175. Average fertile life of an egg
(a) 12 - 24 hr (b) 1 - 2 days
(c) 3 - 4 days (d) ½ day

176. Ovum produce
(a) Fertilizin (b) Zona lysin
(c) Hyaluronidase (d) All

177. The most suitable temperature for separation of cream by centrifugal cream separator is
(a) 15 °C (b) 20 °C
(c) 30 °C (d) 40 °C

178. The moisture content of paneer is not less than
(a) 70 % (b) 65 %
(c) 60 % (d) 55 %

179. Legal standard for SNF (solid not fat) content of sheep and goat milk is
(a) 8.0 % (b) 8.5 %
(c) 9.0 % (d) 9.5 %

180. Specific gravity of milk fat is
(a) 0.85 (b) 0.93
(c) 1.03 (d) 1.05

181. The fat content of double toned milk is
(a) 0.5 % (b) 1.5 %
(c) 3.0 % (d) 4.5 %

182. The fat content of cream should to be less than
(a) 25 % (b) 35 %
(c) 45 % (d) 55 %

183. The fat content of plain ice cream is
(a) 8 % (b) 10 %
(c) 12 % (d) 14 %

184. Protein in milk exists in the form of
(a) Emulsion (b) Solution
(c) Colloidal (d) None of these

185. Curd tension of dahi
(a) Remains constant
(b) Is higher than milk
(c) Is lower than milk
(d) None of the above

Answers					
	167. (c)	171. (b)	175. (a)	179. (c)	183. (b)
	168. (c)	172. (c)	176. (a)	180. (b)	184. (c)
	169. (b)	173. (d)	177. (d)	181. (b)	185. (c)
	170. (a)	174. (a)	178. (a)	182. (a)	

186. The time temperature combination in plate pasteurization is
(a) 63 °C for 30 minutes
(b) 72 °C for 15 seconds
(c) 72 °C for 15 minutes
(d) 121 °C for 15 minutes

187. Enzyme coagulated milk product is
(a) Paneer (b) Dahi
(c) Cheese (d) Chhana

188. UHT milk is heated to a temperature
(a) 110 °C (b) 120 °C
(c) 145 °C (d) 160 °C

189. Ash content of human milk is
(a) 0.2 % (b) 0.5 %
(c) 0.7 % (d) 0.8 %

190. Lactic acid content in fresh milk is
(a) 0.10 % (b) 0.15 %
(c) 0.20 % (d) None of these

191. Flavouring compound for butter is
(a) Lactic acid
(b) Diacetyl
(c) Acetyl methyl carbinol
(d) None of these

192. Paneer is a
(a) Concentrated milk product
(b) Fermented milk product
(c) Coagulated milk product
(d) Dried milk product

193. Better quality chhana is prepared from
(a) Buffalo milk
(b) Cow milk
(c) Sheep milk
(d) Camel milk

194. Better quality khoa is prepared from
(a) Buffalo milk
(b) Cow milk
(c) Sheep milk
(d) Camel milk

195. Lactose in milk exists in the form of
(a) Colloidal (b) Emulsion
(c) Solution (d) None of these

196. Fat in separated milk is not more than
(a) 0.1 % (b) 0.5 %
(c) 1.0 % (d) 1.5 %

197. Khoa contains milk fat not less than
(a) 20 % (b) 25 %
(c) 30 % (d) 35 %

198. The solid not fat (SNF) content of toned milk is
(a) 6.0 % (b) 7.0 %
(c) 8.5 % (d) 9.0 %

199. Methylene Blue Reduction Test (MBRT) is conducted to know the efficiency of
(a) Toned milk
(b) Double toned milk
(c) Sterilized milk
(d) Pasteurized milk

200. The optimum temperature for making dahi is
(a) 10 °C (b) 18 °C
(c) 22 °C (d) 28 °C

201. Gerber method is used for ..... testing
(a) Fat (b) Protein
(c) Lactose (d) Vitamins

202. A good quality dahi should have acidity less than
(a) 0.8 % (b) 1.0 %
(c) 1.5 % (d) 2.0 %

203. To remove milk stone, ... is used.
(a) Alkali (b) Alcchol
(c) Acids (d) Acetone

Answers					
	186. (b)	190. (a)	194. (a)	198. (c)	202. (a)
	187. (c)	191. (b)	195. (c)	199. (d)	203. (c)
	188. (c)	192. (c)	196. (a)	200. (c)	
	189. (a)	193. (b)	197. (a)	201. (a)	

204. Buffalo milk is rich source of following minerals
(a) Iron and copper
(b) Phosphorus and copper
(c) Calcium and iron
(d) Calcium and phosphorus

205. Buffer value of milk is due to
(a) Protein (b) Fat
(c) Lipid (d) Carbohydrate

206. Polenske value of milk fat is due to
(a) Water soluble fatty acids
(b) Water insoluble fatty acids
(c) Protein nitrogen
(d) Fats

207. Lactose is a disaccharide made of
(a) Glucose and fructose
(b) Glucose and glucose
(c) Maltose and glucose
(d) Galactose and glucose

208. Average pH of normal milk is
(a) 4.6 (b) 5.6
(c) 6.6 (d) 7.6

209. Most variable of all constituent present in milk is
(a) Protein (b) Fat
(c) Carbohydrate (d) Minerals

210. Which of the following vitamins remains most resistant on heat treatment of milk
(a) Vitamin A (b) Vitamin C
(c) Vitamin B_1 (d) Vitamin B_{12}

211. Humpless cattle belong to group
(a) *Bos tauras* (b) *Bos indicus*
(c) *Bos bubalis* (d) *Bos arni*

212. Thick horns, broad dished forehead and short face are present in
(a) Haryana (b) Kankrej
(c) Tharparkar (d) Nagori

213. Nasal septum in bull calves be punctured for pulling a rope or nose ring at the age of
(a) 12 months (b) 18 months
(c) 24 months (d) 30 months

214. The number of pre molar teeth in cattle is
(a) 6 (b) 8
(c) 10 (d) 12

215. The major advantage of weaning in cows is
(a) To get clean milk
(b) To get strong calves
(c) To get continuous milk
(d) Increase milking efficiency

216. The best age of dehorning is
(a) 1 week (b) 4 weeks
(c) 8 weeks (d) 16 weeks

217. Strip cup is used
(a) Just before milking
(b) Just after milking
(c) At the middle of milking
(d) Any time during milking

218. For breeding, the number of ewes per ram is
(a) 20 - 30 (b) 40 - 50
(c) 60 - 80 (d) 80 - 100

219. Docking in sheep is done at the age of :
(a) 7 - 14 days (b) 1 month
(c) 1½ months (d) 2 months

220. Beetal goats are found in
(a) Uttar Pradesh (b) Rajasthan
(c) Punjab (d) Gujarat

Answers					
	204. (d)	208. (c)	212. (b)	216. (a)	220. (c)
	205. (a)	209. (b)	213. (a)	217. (a)	
	206. (b)	210. (a)	214. (d)	218. (b)	
	207. (d)	211. (b)	215. (a)	219. (a)	

221. The lightest body weight goat is
(a) Jamnapari (b) Beetal
(c) Togganburg (d) Barbari

222. Castration of male pigs is done by which method
(a) Elastrator (b) Knife
(c) Burdizzo (d) Hot iron

223. Minimum weight of extra large A grade eggs is
(a) 45 gms (b) 55 gms
(c) 60 gms (d) 70 gms

224. Austerlop birds come in category
(a) American (b) Mediterranean
(c) Asiatic (d) English

225. Rinderpest is caused by
(a) Bacteria (b) Virus
(c) Parasite (d) Mould

226. The animal gets swelling on hind quarters, shoulders and neck, limps and on pressing the affected parts, makes crepitating sound in the disease
(a) Black quarter
(b) Haemorrhagic septicaemia
(c) FMD
(d) Rinderpest

227. Milk vein in cows contains
(a) Water (b) Milk
(c) Blood (d) Milk and blood

228. One buck is sufficient to breed ..... does
(a) 20 - 30 (b) 30 - 40
(c) 50 - 60 (d) 80 - 100

229. The egg should be candled on ..... day of incubation
(a) 2nd (b) 3rd
(c) 4th (d) 5th

230. Ringworm is caused by
(a) Bacteria (b) Fungi
(c) Algae (d) Virus

231. Goat tissue vaccine (GTV) is against
(a) FMD (b) Rinderpest
(c) HS (d) Black quart

232. Which of the following is a non redu carbohydrate ?
(a) Glucose (b) Maltose
(c) Lactose (d) Sucrose

233. What is the chemical nature of Estrog
(a) Fatty acid (b) Amino acid
(c) Protein (d) Steroid

234. Minerals in the feed are
(a) Feed supplement
(b) Concentrates
(c) Medicine
(d) None of these

235. Which of the following glands sec oxytocin ?
(a) Thyroid (b) Ovary
(c) Pituitary (d) Adrenal

236. Estrogen, progestron and rel hormones are secreted from
(a) Ovary (b) Adrenal
(c) Pituitary (d) Thyroid

237. What are cowper's glands ?
(a) Primary sex glands
(b) Accessory sex glands
(c) Both are correct
(d) None is correct

238. Which one of the hormone con carbohydrates ?
(a) FSH (b) Prolactin
(c) Oxytocin (d) Androgen

Answers					
	221. (c)	225. (b)	229. (b)	233. (d)	237. (b)
	222. (b)	226. (a)	230. (b)	234. (a)	238. (a)
	223. (c)	227. (c)	231. (b)	235. (c)	
	224. (d)	228. (c)	232. (d)	236. (a)	

239. What is the shape of ovary in buffaloes ?
(a) Almond shaped
(b) Berry shaped
(c) Kidney shaped
(d) Oval shaped

240. Dagnala disease in animals is caused due to the deficiency of :
(a) Sodium
(b) Silicon
(c) Selenium
(d) Magnesium

241. Which one of the following is not correctly matched ?

	Animal	Zoological name
(a)	Sheep	*Ovis aries*
(b)	Buffalo	*Bubalus bubalis*
(c)	Swine	*Sus domesticus*
(d)	Camel	*Equus caballus*

242. Which one of the following is not correctly matched ?

	Animal	Family
(a)	Bovidae	Sheep, goat cattle, bufallo
(b)	Suidae	Swine
(c)	Equidae	Horse
(d)	Camnelidae	Ass

243. Which animal have single stomach with large caecum, unable to ruminate ?
(a) Sheep (b) Camel
(c) Buffalo (d) Donkey

244. Livestock census is done after every ..... years.
(a) 5 (b) 10
(c) 12 (d) 14

245. Which one of the following is not correctly matched ?

	Animal	Act of giving new birth
(a)	Goat	Kidding
(b)	Horse	Foaling
(c)	Sheep	Lambing
(d)	Buffalo	Farrowing

246. Average heart beats per minute of cow is
(a) 72 (b) 90
(c) 55 (d) 75

247. Oogenesis and spermatogenesis are a major physiological action of (hormone released from pituitary gland)
(a) Thyrotropin
(b) Prolactin
(c) Follicle stimulating hormone
(d) Oxytocin

248. Thyroxine and calcitocin help in increased rate of cellular metabolism and decreased blood calcium, respectively are released from
(a) Pituitary (b) Thyroid
(c) Parathyroid (d) Kidney

249. Hormone secreted from pancreas and lower blood sugar levels is
(a) Glucagon (b) Insulin
(c) Epinephrine (d) Relaxin

250. Wallowing is a common behaviour of
(a) Cow (b) Buffalo
(c) Goat (d) Sheep

251. Which of the following is not correctly matched ?

	Mammal/bird	Chromosome number (2n)
(a)	Cattle, goat	60
(b)	Buffalo	50
(c)	Fowl	78
(d)	Ass	64

Answers

239. (c)	243. (d)	247. (c)	251. (d)	
240. (c)	244. (a)	248. (b)		
241. (d)	245. (d)	249. (b)		
242. (d)	246. (c)	250. (b)		

252. Ovulation may be defined as the discharge of the egg from
(a) Graafian follicle
(b) Corpus luteum
(c) Uterus
(d) Vagina

253. The uterine glands secrete 'Uterine milk' under the influence of estrogen and progesterone hormone, composed of
(a) Protein (b) Fat
(c) Glycogen (d) All of these

254. ..... refers to the undescended condition of the testes into the scrotal sac
(a) Cryptorchidism
(b) Scrotal hernia
(c) Free martin
(d) White heifer disease

255. When a female calf is born as a twin to a male calf, a sterile female known as a
(a) Impertentia coeundi
(b) Free martin (neuter)
(c) Rigs
(d) White heifer disease

256. Failure of the retractor penis muscles to relax and to allow the penis to extend from the sheath is known as
(a) Cyptorchidism
(b) Scrotal hernia
(c) Impertentia coeundi
(d) Free martin (neuter)

257. The condition of persistent hymen is known as
(a) Metritis
(b) Vaginitis
(c) Pyometra
(d) White heifer disease

258. Which one of the following is not correctly matched ?

(a)	Salpingitis	Inflammation of the fallopian tube
(b)	Vaginitis	Inflammation of vagina
(c)	Metritis	Inflammation of the uterus
(d)	Cervictis	Inflammation of the lever

259. Which type of the ligament is primarily responsible for the udder 'breaking down' ?
(a) Lateral suspensory
(b) Median suspensory
(c) Both (a) and (b)
(d) None of these

260. Initiation of milk secretion is known as
(a) Lactogenesis
(b) Galactogenesis
(c) Milk let down
(d) Involution

261. Ergosterol is a precursor of vitamin
(a) A (b) B_1
(c) D_2 (d) E

262. Out of total body calcium, bone and teeth have
(a) 79 % (b) 89 %
(c) 95 % (d) 99 %

263. Fat soluble vitamins includes
(a) A, D, E & K (b) A and D
(c) E and C (d) A, D and C

264. Length of dry period in well fed cows should be ..... days
(a) 20 - 40 (b) 40 - 80
(c) 60 - 100 (d) 90 - 120

Answers

252. (a)	256. (c)	260. (a)	264. (b)
253. (d)	257. (d)	261. (c)	
254. (a)	258. (d)	262. (d)	
255. (b)	259. (b)	263. (a)	

265. Which one of the following is not a bacterial disease ?
(a) Rinderpest
(b) Haemorrhagic septicaemia
(c) Anthrax
(d) Black quarter

266. Barbari breed of goat is a native of
(a) East Africa (b) Punjab
(c) Barmer (d) Surat

267. Pashmina is produced from
(a) Chegu
(b) Changthangi
(c) Both (a) and (b)
(d) Gaddi

268. Minorca breed of fowl includes in class
(a) American
(b) English
(c) Mediterranean
(d) Asiatic

269. Incubation period (days) in chicken (*Gallus gallus*) is
(a) 11 (b) 21
(c) 24 (d) 28

270. Synchronisation of heat (controlling heat) is desired in
(a) Goat (b) Sheep
(c) Cow (d) Buffalo

○○○○○

Answers

265. (a) 268. (c)
266. (a) 269. (b)
267. (c) 270. (b)

11 Agricultural Statistics

1. Who is considered as father of statistics ?
(a) RA Fisher (b) Pearson
(c) AL Bowley (d) Boddington

2. When statistics is used in plural sense it means
(a) Statistical methods
(b) Collect statistics
(c) Both (a) and (b)
(d) None of the these

3. Select the two dimension diagrams of data representation
(a) Squares (b) Rectangular bodies
(c) Cubes (d) Pictures

4. Which measure of central tendency is applied for calculation of regression and correlation coefficient ?
(a) Arithmetic mean
(b) Mode
(c) Median
(d) Geometric mean

5. Which measure of central tendency requires data arrangement in ascending or descending order for its estimation ?
(a) Arithmetic mean
(b) Median
(c) Mode
(d) Harmonic mean

6. The intelligency, ability or efficiency can be measured by use of
(a) Median (b) Mode
(c) Weighted HM (d) Geometric mea

7. The most frequent occurred value data or whose frequency is maximum known as
(a) Arithmetic mean (b) Mode
(c) Median (d) GM

8. Which measure of central tendency especially suited in the field of business
(a) Median
(b) Arithmetic mean
(c) Harmonic mean
(d) Mode

9. In a symmetrical distribution of da which pair is correct
(a) Mean = Median = Mode
(b) Mean > Median > Mode
(c) Mean < Median < Mode
(d) Mean = Median > Mode

10. Geometric mean of a given series always less than its
(a) Harmonic mean
(b) Weighted mean
(c) Arithmetic mean
(d) Weighed harmonic mean

11. If any items of the series is zero, whi mean of central tendency become ze
(a) Harmonic mean
(b) Geometric mean
(c) Arithmetic mean
(d) Weighed harmonic mean

Answers

1. (a) 4. (a) 7. (b) 10. (c)
2. (b) 5. (b) 8. (d) 11. (b)
3. (a) 6. (a) 9. (a)

12. When we want average of rates of change or ratios or index number, which measure of central tendency is suitable
(a) Geometric mean (b) Mode
(c) Arithmetic mean (d) Median

13. To calculate the average speed, which item of central tendency is most suited
(a) Mode (b) Median
(c) Weighted HM (d) GM

14. Which type of average would be suitable to calculate the size of agricultural holding
(a) Mode (b) Median
(c) Weighted HM (d) Weighed AM

15. Which is the simplest measure of dispersion ?
(a) Variance (b) Mean deviation
(c) Range (d) Standard deviation

16. The variance is the square of
(a) Mean deviation
(b) Standard deviation
(c) Range
(d) Correlation

17. Mean deviation is the least when calculated about (minimal property)
(a) Arithmetic mean
(b) Median
(c) Mode
(d) Geometric mean

18. If all the variate values are the same (e.g. 8, 8, 8), the standard deviation will be
(a) 4 (b) 8
(c) 16 (d) 0

19. The coefficient of variation can be calculated by using the formula
(a) Standard deviation/arithmetic mean × 100
(b) Arithmetic mean/standard deviation × 100
(c) Square root of standard deviation/arithmetic mean × 100
(d) Standard deviation/geometric mean × 100

20. Unit less measure of dispersion is
(a) Standard deviation
(b) Mean deviation
(c) Range
(d) CV

21. The second central moment (about the arithmetic mean) is always equal to
(a) Variance
(b) Mean deviation
(c) Standard deviation
(d) None of these

22. The first central moment (μ_1) is always
(a) 0 (b) 2
(c) 4 (d) 6

23. When a frequency distribution is not symmetrical about the mean it is said to be
(a) Kurtosis (b) Moment
(c) Skewed (d) None of these

24. The curves which are very highly peaked and have the value of $b_2 > 3$ are called
(a) Mesokurtic (b) Leptokurtic
(c) Platykurtic (d) All of these

25. When the distribution of data is continuous, which distribution is applicable
(a) Normal distribution
(b) Binomial
(c) Poisson
(d) None of these

Answers

12. (a)	15. (c)	18. (d)	21. (a)	24. (b)
13. (c)	16. (b)	19. (a)	22. (a)	25. (a)
14. (a)	17. (b)	20. (d)	23. (c)	

26. Normal distribution is due to the work of
(a) James Bernoulli
(b) SD Poisson
(c) Laplace and Gauss
(d) Demoivre

27. Binomial distribution is a very useful distribution for dealing with ..... variates
(a) Continuous (b) Discrete
(c) Both (a) & (b) (d) None of these

28. The mean of the binomial distribution is
(a) np (b) npq
(c) $\sqrt{npq}$ (d) None of these

29. The first and third moments about the mean of normal distribution is
(a) 0 (b) s^2
(c) $3s^4$ (d) None of these

30. β_1 and β_2 constants of the normal distribution are ..... respectively
(a) 0,3 (b) 3,0
(c) 0,0 (d) 3,3

31. The arithmetic mean of the Poisson distribution is
(a) $3m^2+m$ (b) $\sqrt{m}$
(c) m (d) $1/m$

32. Arithmetic mean and variance are always equal in
(a) Normal distribution
(b) Poisson distribution
(c) Binomial
(d) All of these

33. The hypothesis of no difference is known as
(a) Simple hypothesis
(b) Null hypothesis
(c) Composite hypothesis
(d) Alternative hypothesis

34. The probability of committing type I error is known as
(a) Test of significance
(b) Level of significance
(c) Composite hypothesis
(d) None of these

35. The statistical procedure for estimating whether the difference under study is significant or non significant is known as
(a) Test of significance
(b) Standard error
(c) Level of significance
(d) Sampling

36. Which test is used to test of significance of the difference between two means
(a) t-test (b) F-test
(c) z-test (d) χ^2-test

37. Student's t-test is used when sample size is ..... and population standard deviation is not known
(a) Large (b) Small
(c) Both (d) None of these

38. For paired observation, which test is used for testing the significance of a mean difference
(a) Paired t-test (b) t-test
(c) F-test (d) χ^2-test

39. For comparison of two means from independent samples which test is applicable
(a) t-test (b) χ^2-test
(c) F-test (d) z-test

Answers

26. (d)	29. (a)	32. (b)	35. (a)	38. (a)
27. (b)	30. (a)	33. (b)	36. (c)	39. (a)
28. (a)	31. (c)	34. (b)	37. (b)	

40. For test of goodness of fit, which statistical test is applied
(a) χ^2-test (b) F-test
(c) z-test (d) t-test

41. The value of χ^2 ranges from ..... and is always positive
(a) -1 to +1 (b) 0 to 2
(c) 0 to ∞ (d) None of these

42. χ^2 is calculated by the help of formula
(a) $\chi^2 = \Sigma(O-E)^2/E$
(b) $\chi^2 = \Sigma(O-E)/(E)^2$
(c) $\chi^2 = \Sigma(O-E)^2/\Sigma O$
(d) $\chi^2 = \Sigma(E-O)^2/\Sigma(O)^2$

43. For calculation of χ^2, N should be at least
(a) 20 (b) 30
(c) 40 (d) 50

44. For χ^2 test no theoretical cell frequency should be small, it should be at least
(a) 2 (b) 5
(c) 8 (d) 12

45. χ^2 test is applied for
(a) Testing of independence of attributes
(b) Genetic problem and detection of linkages
(c) Testing the expectation of a ratio
(d) All of these

46. The validity of correlation coefficient is tested by
(a) z-test (b) t-test
(c) χ^2-test (d) f-test

47. The range of correlation coefficient lies between
(a) -1 to +1 (b) 0 to 1
(c) 0 to ∞ (d) 0 to 100

48. The validity of regression coefficient is tested by
(a) z-test (b) t-test
(c) χ^2-test (d) Both a and b

49. Coefficient of determination is a square of
(a) Correlation coefficient
(b) Regression coefficient
(c) Both (a) and (b)
(d) None of these

50. The range of multiple correlation coefficient lies between
(a) 0 to +1 (b) -1 to +1
(c) 0 to ∞ (d) -∞ to +∞

51. The significance of multiple correlation (R) is tested by
(a) t-test (b) F-test
(c) z-test (d) Paired t-test

52. The repetition of the treatment under investigation is known as
(a) Randomization (b) Replication
(c) Local control (d) None of these

53. The allocation of the treatments to the different experimental units in a random manner is known as
(a) Randomization (b) Replication
(c) Local control (d) Sampling

54. The principle of making use of greater homogeneity in groups of experimental units to reduce the experimental error is referred as
(a) Replication (b) Randomization
(c) Local control (d) None of these

55. For the expression of standard error of mean, which formula is applicable
(a) $\frac{S}{\sqrt{n}}$ (b) $\frac{2S}{\sqrt{n}}$
(c) $\sqrt{\frac{S}{n}}$ (d) $\frac{n}{\sqrt{S}}$

Answers

40. (a)	43. (d)	46. (b)	49. (a)	52. (b)	55. (a)	
41. (c)	44. (b)	47. (a)	50. (a)	53. (a)		
42. (a)	45. (d)	48. (d)	51. (b)	54. (c)		

56. What is/are the basic principles of field experimentation ?
(a) Randomization (b) Replication
(c) Local control (d) All of these

57. The completely randomized design is appropriate when the experimental material is
(a) Limited and homogenous
(b) Unlimited and heterogeneous
(c) Limited and heterogeneous
(d) Unlimited and homogenous

58. Local control is not applied for the design
(a) RBD (b) CRD
(c) LSD (d) SPD

59. When the fertility gradient of the field is in one direction, which design is appropriate
(a) CRD (b) LSD
(c) RBD (d) SPD

60. When the fertility gradient of the field goes in two directions, which design is most appropriate
(a) Augmented design (b) CRD
(c) LSD (d) SPD

61. In randomized block design, how many treatments can be adopted without any loss of efficiency
(a) 10 (b) 15
(c) 18 (d) 20

62. How many number of treatments can be adopted in LSD
(a) 5 to 8 (b) 5 to 12
(c) Both (a) & (b) (d) Not estimated

63. When there are several factors with different levels to be experimented simultaneously with the same level of precision, which design is mo appropriate
(a) CRD (b) LSD
(c) RBD (d) Factorial sche

64. When the experimental material is ve less and number of genotypes are ve large, which design is most suited
(a) Split plot design
(b) LSD
(c) RBD
(d) Augmented design

65. In a experiment, a treatment requi large area and b treatment requi smaller area (different precision), whi design is most appropriate
(a) Split plot design
(b) LSD
(c) RBD
(d) Strip plot design

66. The minimum error degree of freed should be at least
(a) 6 (b) 12
(c) 18 (d) 20

67. The ANOVA is a tool by which to variation may be split up into seve physically assignable components w defined by
(a) Karl Pearson (b) RA Fisher
(c) Horace Secrist (d) AL Bowley

68. The values of regression coefficient l between
(a) -∞ to +∞ (b) 0 to 1
(c) -1 to +1 (d) 0 to ∞

69. The correlation coefficient remai unaffected by change of
(a) Origin (b) Scale
(c) Both (a) & (b) (d) None of thes

Answers

56. (d)	59. (c)	62. (c)	65. (a)	68. (a)	
57. (a)	60. (c)	63. (d)	66. (b)	69. (c)	
58. (b)	61. (d)	64. (d)	67. (b)		

70. The regression coefficient are independent of change of
(a) Origin (b) Scale
(c) Both (a) & (b) (d) None of these

71. When the value of correlation coefficient is 1 then two variables are
(a) Uncorrelated
(b) Partially correlated
(c) Perfectly correlated
(d) Highly correlated

72. The correlation coefficient is the geometric mean between two
(a) Median
(b) Standard deviation
(c) Regression coefficient
(d) Mode

73. The R rank correlation was suggested by
(a) James Bernoulli
(b) SD Poisson
(c) C Spearman
(d) Laplace and Gauss

74. Poisson distribution deals with
(a) Discrete variables
(b) Continuous
(c) Both (a) and (b)
(d) None of these

75. The variation due to uncontrolled factors is spoken as
(a) Standard error
(b) Experimental error
(c) Treatment effects
(d) All of these

76. In the field experimentation, local control is used for
(a) Validity of estimate of error
(b) Validity of treatment effects
(c) Diminution of error
(d) All of these

77. The accuracy of a measurement signifies the closeness with which a estimate approaches the
(a) True value
(b) Average value
(c) Both (a) and (b)
(d) None of these

78. For the field experimentation the accurate idea of the fertility variation can be had by the help of
(a) Experimental field
(b) Uniformity trial
(c) Coordinated trials
(d) All of these

79. Which test is applied for the test of significance between the two variances
(a) t - test (b) z - test
(c) χ^2 - test (d) F - test

80. If some of the counts are very small or zeros, the most appropriate transformed variate will be
(a) $\sqrt{x+\frac{1}{2}}$ (b) $\sqrt{x}$
(c) $\frac{\sqrt{x+1}}{2}$ (d) $\sqrt{x+1}$

81. Which transformation is most appropriate for percentages ?
(a) Square root (b) Arc sine
(c) Logarithmic (d) All of these

82. If there are 5 treatments with 4 replication to each, the error degree of freedom for CRD will be
(a) 15 (b) 20
(c) 12 (d) 9

Answers

70. (a)	73. (c)	76. (c)	79. (d)	82. (a)
71. (c)	74. (a)	77. (a)	80. (a)	
72. (c)	75. (b)	78. (b)	81. (b)	

83. Which design provides maximum number of degrees of freedom for the estimation of error as compared with other design for the given number of experimental units ?
(a) RBD (b) LSD
(c) Augmented design (d) CRD

84. Which design is most appropriate for the laboratory experiments ?
(a) CRBD (b) CRD
(c) LSD (d) Factorial RBD

85. If there are 5 varieties and 4 replications to each, the error degree of freedom for RBD will be
(a) 20 (b) 19
(c) 12 (d) 9

86. Which design follow the number of rows = number of columns = Number of treatments ?
(a) SPD (b) Strip plot design
(c) LSD (d) RBD

87. If there are 6 levels of moisture regime and 6 replications each, the error degree of freedom for LSD will be
(a) 25 (b) 35
(c) 36 (d) 20

88. When we want to conduct a experiment on a long strip of land, which design will be preferred
(a) RBD (b) CRD
(c) SPD (d) LSD

89. Which design gives precision high enough to reduce the standard error to less than 1% ?
(a) SPD (b) Strip plot design
(c) RBD (d) LSD

90. In confounding, the precision on the main effects and certain interactions of lower order
(a) Increases (b) Decreases
(c) Remain same (d) None of these

91. When the same interaction is confounded in all the replications, it is known as
(a) Partial confounding
(b) Complete confounding
(c) Both (a) and (b)
(d) None of these

92. In confounding, generally which order of interactions is confounded
(a) Lower order (b) First order
(c) Higher order (d) All of these

93. If 4 levels of sowing dates are laid out in main plot, 5 levels of nitrogen applied in subplot and they are replicated three times, then what will be the degree of freedom for error (b)
(a) 32 (b) 6
(c) 20 (d) 60

94. Select the most appropriate design when all factors are not of equal importance in experimentation
(a) Augmented (b) Strip plot design
(c) LSD (d) Split plot design

95. During experimentation, we lost some information and we want to get idea about these values, which technique will be useful
(a) Field plot technique
(b) Missing plot technique
(c) Seed plot technique
(d) Uniformity trial

96. Indian Agricultural Statistical Research Institute is established at
(a) Lucknow (b) Jaipur
(c) New Delhi (d) Kolkata

Answers

83. (d)	86. (c)	89. (d)	92. (c)	95. (b)	
84. (b)	87. (d)	90. (a)	93. (a)	96. (c)	
85. (c)	88. (d)	91. (b)	94. (d)		

97. 'Annawari' procedure is a
(a) Traditional method for estimation of crop yield
(b) Method for weather forecasting
(c) Method for rainfall forecasting
(d) All of these

98. Crop cutting survey on sugarcane recommended the plot size for estimation of crop yield is :
(a) 20 m × 10 m (b) 10 m × 10 m
(c) 10 m × 5 m (d) 5 m × 5 m

99. Indian Livestock Census is conducted after every
(a) 2 years (b) 5 years
(c) 10 years (d) 20 years

100. In India the available acreage statistics for the total geographical area is
(a) 51% (b) 61%
(c) 71% (d) 100%

101. At present time how many number of forecasts issued by Government of India on 34 important crops
(a) 50 (b) 60
(c) 70 (d) 80

102. Which measure of central tendency is appropriate for index numbers ?
(a) Harmonic mean
(b) Arithmetic mean
(c) Mode
(d) Geometric mean

103. Ogive is a method of
(a) Diagrammatic representation
(b) Graphical representation
(c) Both (a) and (b)
(d) None of these

104. Pie diagram is a type of
(a) One dimensional diagram
(b) Two dimensional diagram
(c) Three dimensional diagram
(d) None of these

105. The χ^2 (chi-square) test for goodness of fit and independence of attributes come under
(a) Parametric tests
(b) Non-parametric test
(c) Both (a) and (b)
(d) Not classified

106. The non-parametric test used for two independent samples is
(a) t-test (b) z-test
(c) F-test
(d) Mann-Whitney U-test

107. For the comparison of two correlated samples under non-parametric alternative to paired F-test is
(a) z-test (b) F-test
(c) Wilcoxon Signed - rank test
(d) Kruskal - Wallis H test

108. Comparison of several independent samples is tested by
(a) Quade test
(b) Friedmann test
(c) Wilcoxon Signed-rank test
(d) Kruskal-Wallis H test

109. Under non-parametric the comparison of several related samples is tested by
(a) Quade test (b) Friedmann test
(c) F-test (d) Both (a) and (b)

110. When both the variables are not normally distributed, in such case we may use
(a) Partial correlation
(b) Multiple correlation
(c) Rank correlation
(d) Both (a) and (b)

Answers					
	97. (a)	100. (c)	103. (b)	106. (d)	109. (d)
	98. (d)	101. (c)	104. (b)	107. (c)	110. (c)
	99. (b)	102. (d)	105. (b)	108. (d)	

111. Rank correlation is tested by
(a) Quade test (b) Friedmann test
(c) t-test (d) F-test

112. The relationship between independent and dependent variables is computed by
(a) Regression coefficient
(b) Correlation coefficient
(c) Both (a) and (b)
(d) None of these

113. The optimum plot size in the experiment is/are determined by
(a) Maximum curvative method
(b) Fair field Smith's variance law
(c) Both (a) and (b)
(d) Uniformity trial

114. The critical difference (CD) is a form of t-test and its formula is given by
(a) CD= t.SE(d) (b) CD = t + SE(d)
(c) CD= t/SE(d) (d) CD = F.SE(d)

115. If two factors are involved in experimentation and both the factors requires long plot sizes, the design suited for this will be
(a) Split plot (b) Strip plot
(c) CRD (d) RBD

116. If four levels of depth of ploughing is applied to vertical strip, five levels of moisture regimes is applied to horizontal strip and replicated three times, then what will be the degree of freedom for error (c).[(r-1),(a-1) (b-1)]
(a) 8 (b) 6
(c) 10 (d) 24

117. When 4 levels of sowing dates is appli to vertical strip, five levels of irrigati is applied to horizontal strip, four lev of nitrogen randomly allocated with the intersection plots of vertical a horizontal strip and replicated th times, then what will be the degree freedom for error (d).[ab(r-1),(c-1)] (St split plot design)
(a) 72 (b) 120
(c) 24 (d) 8

118. The square of the standard deviation known as the
(a) Variance
(b) Standard deviation
(c) Mean deviation
(d) Coefficient of variance

119. A measure of the peakedness convexity of a curve is known as
(a) Skewness (b) Kurtosis
(c) Ogive (d) Histogram

120. A distribution is said to be symmetri if the values are uniformly distribut around the
(a) Mean (b) Mode
(c) Median (d) Mean deviati

Answers				
	111. (c)	114. (a)	117. (b)	120. (a)
	112. (a)	115. (b)	118. (a)	
	113. (c)	116. (d)	119. (b)	

12 Environmental Science

Among the following which gas is found in maximum concentration in atmosphere ?
(a) Rn (b) Xe
(c) Kr (d) Ar

Ventilation coefficient is :
(a) Maximum mixing depth divided by average wind speed.
(b) Product of maximum mixing depth and maximum wind speed.
(c) Maximum mixing height divided by maximum wind speed
(d) Product of maximum mixing depth and average wind speed.

Mosquito repellent coils / mats contain
(a) Paraquat (b) BHC
(c) Toxaphene
(d) Derivatives of Allethrin

The concentration of CO_2 in atmosphere is increasing at the rate of about
(a) 4 % (b) 2 %
(c) 0.4 % (d) 0.2 %

1 Dobson unit at standard temperature and pressure is equal to ozone column thickness of
(a) 1 mm (b) 10 mm
(c) 100 mm (d) 0.01 mm

Who is the director of Centre for Science and Environment ?
(a) Anil Agarwal (b) Sunita Narayan
(c) Menka Gandhi (d) Medha Patekar

7. Which CFC was discovered first ?
(a) CFC - 11 (b) CFC - 12
(c) CFC - 114 (d) CFC - 115

8. The concentration of ozone is found maximum in :
(a) Troposphere
(b) Upper Stratosphere
(c) Lower Stratosphere
(d) Mesosphere

9. The National Institute of Oceanography is presently situated at
(a) Kerala (b) Calicut
(c) Goa (d) Cochin

10. Mycorrhiza help in the uptake of
(a) Potassium (b) Phosphorus
(c) Nitrate (d) Boron

11. Chaparral vegetation is found in which area ?
(a) Deccan plateau
(b) Coastal India
(c) Mediterranean areas
(d) Between equator & temperate

12. The residence time of N_2O in atmosphere is approximately
(a) 15 years (b) 150 years
(c) 15 weeks (d) 15 days

13. Which elemental cycle has no atmospheric reservoir ?
(a) Sulphur (b) Carbon
(c) Nitrogen (d) Phosphorus

Answers

1. (d)	4. (c)	7. (b)	10. (b)	13. (d)	
2. (d)	5. (d)	8. (c)	11. (c)		
3. (d)	6. (b)	9. (c)	12. (b)		

14. Muscovite is example of which group of minerals ?
(a) Feldspar (b) Ferromagnesium
(c) Quartz (d) Mica

15. Highest porosity is found in
(a) Sand (b) Clay
(c) Gravel (d) Silt

16. Solubility of gases in water can be calculated by using
(a) Darcy's law (b) Henry's law
(c) Avagadro's law (d) Stoke's law

17. The main constituent of biogas is
(a) H_2 (b) H_2S
(c) N_2 (d) CH_4

18. The actual global average surface air temperature is about
(a) 331 K (b) 288 K
(c) 18 °C (d) 21 °C

19. The ministry of Environment was set up in
(a) 1970 (b) 1975
(c) 1980 (d) 1985

20. Age of earth is approximately
(a) 3.5 billion (b) 4.5 billion
(c) 45 million (d) 3.5 million

21. After methane and carbon dioxide which gas in found in highest concentration in biogas ?
(a) CO (b) H_2
(c) N_2 (d) H_2S

22. The target Organ of cadmium toxicity :
(a) Lung (b) Liver
(c) Kidney (d) Bones

23. Nalgonda technique is used for
(a) Chloride (b) Fluoride
(c) Bromide (d) Cadmium

24. The process used for removal of water hardness is
(a) Zeolite process
(b) Haber's process
(c) Ostwald process
(d) None of the above

25. Who gave the term ecosystem and when?
(a) A.G. Tansley (1935)
(b) A.G. Tansley (1925)
(c) E.P. Odum (1935)
(d) E.P. Odum (1925)

26. IPCC came into exist in
(a) 1978 (b) 1968
(c) 1988 (d) 1998

27. The first international conference on Environment Education held in
(a) Tbilisi (b) New Delhi
(c) Bombay (d) Turkey

28. Kyoto Protocol came into force on
(a) 16 Feb 2004 (b) 16 Feb 2005
(c) 16 Feb 2002 (d) 16 Feb 2000

29. Indian Institute of Petroleum in situated at
(a) New Delhi (b) Goa
(c) Dehradun (d) Mumbai

30. Which of the following is mainly responsible for eutrophication ?
(a) Phosphate (b) Nitrate
(c) Carbonate (d) Sulphate

31. The normal lapse rate of temperature per kilometer is
(a) 6.4 °C (b) 4.6 °C
(c) 10 °C (d) 9 °C

32. The albedo of the earth as a whole is
(a) 25 % (b) 50 %
(c) 30 % (d) 10 %

Answers

14. (d)	17. (d)	20. (b)	23. (b)	26. (c)	**29. (c)**
15. (b)	18. (b)	21. (b)	24. (a)	27. (b)	**30. (a)**
16. (b)	19. (c)	22. (c)	25. (a)	28. (b)	**31. (a)**
					32. (c)

33. Atmospheric humidity is measured by
(a) Radiometer (b) Hygrometer
(c) Hydrometer (d) Micrometer

34. The origin of simplest life is attributed to
(a) Proteozoic Era
(b) Cambrian Era
(c) Archaezoic Era
(d) None of the above

35. The maximum permissible limit of free residual Chlorine in water is
(a) 2 ppm (b) 0.02 ppm
(c) 0.2 ppm (d) 20 ppm

36. Radiosonde is used to study
(a) Earth's albedo at Surface
(b) Estimate pollutants in air
(c) Atmospheric moisture content
(d) Upper atmosphere's conditions

37. Which of the following enzymes is involved in the primary carboxylation in C_4 plants ?
(a) RUBP Carboxylase
(b) PEP
(c) Oxygenase
(d) None of the above

38. The compound used for artificial rain making / cloud seeding is :
(a) Dry ice (b) Ag I
(c) $HgCl_2$ (d) Both (a) & (b)

39. How many agro-climatic zones are found in India ?
(a) 15 (b) 16
(c) 17 (d) 18

40. About 50% of the atmosphere lies below
(a) 5.6 km (b) 10 km
(c) 15 km (d) 30 km

41. The atmospheric layer reflecting radio waves is called
(a) Homosphere (b) Ionosphere
(c) Ozonosphere (d) None of these

42. The specific heat of water is :
(a) 1 cal/gm/°C (b) 4.18 cal/gm/°C
(c) 1 Joule/gm/°C (d) 10 cal/gm/°C

43. The first Biosphere Reserve in India was
(a) Sundarban (b) Nanda Devi
(c) Nilgiri (d) Nokrek

44. In which year Biodiversity act was Proposed ?
(a) 2000 (b) 2002
(c) 2004 (d) 1998

45. Headquater of UNEP is situated at
(a) Kenya (b) Switzerland
(c) U.S.A. (d) Britain

46. At which temp. density of water is found maximum ?
(a) 0°C (b) 100°C
(c) 15°C (d) 4°C

47. The important GHG mainly released from paddy field is :
(a) CO_2 (b) N_2O
(c) CH_4 (d) All of above

48. What is the studies of trees as individuals in relation to their environment known as ?
(a) Forest ecology
(b) Forest Synecology
(c) Forest Autecology
(d) All of the above.

49. Demography is the statistical study of
(a) Human Society
(b) Human Population
(c) Human Settlement
(d) Human life

Answers

33. (b)	36. (d)	39. (a)	42. (a)	45. (a)	48. (c)
34. (c)	37. (b)	40. (a)	43. (c)	46. (d)	49. (b)
35. (c)	38. (d)	41. (b)	44. (a)	47. (c)	

50. The pH of normal rain is
(a) 6.5 (b) 5.6
(c) 4.6 (d) 3.6

51. Which term represents the sum total of life on earth ?
(a) Biomass (b) Gaia
(c) Biosphere (d) Biome

52. Any living thing that successfully competes with people for food space, or other essential needs is called :
(a) Virus (b) Bug
(c) Parasite (d) Pest

53. Of the following environmental assessment terms, tell which one deals exclusively with the carbon content of the environment ?
(a) BOD (b) COD
(c) TOC (d) POC

54. The dominance of a new genetic form as a result of environment change is called :
(a) Adaptation
(b) Natural selection
(c) Succession
(d) Synergism

55. What does the term overkill deal with ?
(a) Pesticidal poisoning
(b) Soil erosion
(c) Nuclear holocaust
(d) Global warming

56. What is a chemical substance or physical agent capable of inducing inheritable genetic change called ?
(a) Carcinogen (b) Mutagen
(c) Teratogen (d) Tumorogen

57. When lakes become acidic due to acid rain, this is added to counteract the acidity in
(a) Soil
(b) Sand
(c) lime
(d) None of the above

58. Which technique can map concentration of SO_2 over a whole t by operating Gadget from one locat
(a) LIDAR
(b) Spectrophotometer
(c) Gas Chromatography
(d) Mass Spectroscopy

59. Air pollution can be controlled & redu considerably, but which one of following factors comes in its way
(a) Politics (b) Economics
(c) Manpower (d) Geography

60. Photocopying & other electr equipment produce one of the follov pollutants ?
(a) Methane (b) Ozone
(c) Hydrogen (d) Nitrogen ox

61. Which harmful gas is emitted masonry building materials, even gro water ?
(a) H_2S (b) Radon
(c) Ammonia (d) CO_2

62. Which is the most abundant of all hydrocarbon pollutants in atmosphere ?
(a) Propane (b) Methane
(c) Butane (d) Benzene

63. Which oil - tanker accident first ale the public of the grave problem o spills in oceans ?
(a) Agro merchant (b) Ocean Eag
(c) Exxon Valdez (d) Torrey Can

Answers

50. (b)	53. (c)	56. (b)	59. (b)	62. (b)
51. (c)	54. (b)	57. (c)	60. (b)	63. (d)
52. (d)	55. (c)	58. (a)	61. (b)	

64. The process of preparing compost with the help of earth worm is known as
(a) Composting
(b) Bioslury
(c) Vermi composting
(d) Maturing

65. Mycorrhizae is the association of
(a) Higher plants & fungi
(b) Algae & fungi
(c) Lower plants & fungi
(d) Both (a) & (c)

66. When was Ganga action plan launched ?
(a) June 1985 (b) December 1985
(c) May 1984 (d) July 1984

67. Largest salt water lake in India is :
(a) Lonar (b) Chilka
(c) Sambhar (d) Wullar

68. The main pollutant of London smog was
(a) SO_2 (b) NO_2
(c) PAN (d) Ozone

69. Which detector for DDT should be used in Gas chromatography ?
(a) Electron Capture detector
(b) Flame ionised detector
(c) Thermal Conductivity detector
(d) None of the above

70. In which of the following, inverted pyramid of biomass is found ?
(a) Grassland ecosystem
(b) Pond ecosystem
(c) Desert ecosystem
(d) Forest ecosystem

71. In denitrification process the nitrogen is released in the form of
(a) NH_3 (b) N_2
(c) N_2O (d) Both (b) & (c)

72. Who coined the term symbiosis ?
(a) A.G. Tansley (b) De Bary
(c) Clements (d) McDougall

73. Which type of symbiosis is obligatory ?
(a) Mutualism
(b) Protocooperation
(c) Commensalism
(d) Amensalism

74. Concept of Hypervolume Niche was given by
(a) Grinnel (b) Clement
(c) Hutchinson (d) Odum

75. Vehicular pollution emits mainly
(a) SO_2 (b) CO
(c) NO (d) Ozone

76. Of the following classes of beings, tell which one is least sensitive to nuclear radiation's
(a) Single Celled organism
(b) Amphibians
(c) Reptiles
(d) Birds

77. Which region of the seas & oceans are the most polluted ?
(a) Estuarine (b) Coastal
(c) Sea depths (d) Coral

78. Of the following types of nuclear bombs, tell which one was tested on a pacific atoll ?
(a) Atom bomb
(b) Hydrogen bomb
(c) Neutron bomb
(d) None of the above

79. Which were the first living beings to establish themselves on rocky slopes ?
(a) Toads (d) Grasses
(c) Lichens (d) Frogs

Answers

64. (c)	67. (b)	70. (b)	73. (a)	76. (a)	79. (c)
65. (a)	68. (a)	71. (d)	74. (c)	77. (b)	
66. (a)	69. (a)	72. (b)	75. (b)	78. (b)	

80. What is lost when one organism consume other ?
(a) Food (b) Water
(c) Energy (d) Chemicals

81. Who formulated the ecological concept of the pyramid of numbers ?
(a) Charles Elton (b) Paul R. Ehrlich
(c) Paul Colivaux (d) All of the above

82. Where was the Mitti bachao (save the soil) movement launched in India ?
(a) Thane, Maharashtra
(b) Mysore, Karnataka
(c) Darbhanga, Bihar
(d) Hoshangabad, M.P.

83. When was the use of DDT banned for agricultural purposes in India ?
(a) 1962 (b) 1985
(c) 1974 (d) 1971

84. For the production of biogas, the Indian biogas plant need :
(a) Fire wood (b) Cattle dung
(c) Agricultural Waste
(d) Kerosene

85. Which forest area in India was first brought under control & protection ?
(a) Malabar (b) Konkan
(c) Garhwal (d) Sunderbans

86. When was the first National Forest Policy formulated ?
(a) 1948 (b) 1980
(c) 1964 (d) 1952

87. Which plant is known as the gasoline plant ?
(a) *Salvadora persica*
(b) *Sterculia feetida*
(c) *Thevetia peraviana*
(d) *Euphoribia lathyris*

88. When did the Three mile island disaster occur ?
(a) 1972 (b) 1979
(c) 1980 (d) 1976

89. Flyash is the environmental pollutant generated by :
(a) Thermal Power Plant
(b) Oil refinery
(c) Fertilizer plant
(d) Strip mining

90. Which of the following is known as liquid gold ?
(a) Water (b) Petroleum
(c) Mercury (d) Mustard oil.

91. Which category of wastewater dosen't require seeding during a BOD test ?
(a) Distillery spentwash
(b) Dyeing unit effluent
(c) Domestic sewage
(d) Pulp & Papermill effluent

92. Permanent hardness of water is caused by :
(a) Carbonates & chlorides
(b) Bicarbonates & sulphates
(c) Carbonates & Bicarbonates
(d) Chlorides & Sulphates

93. The most commonly used method for desalination of water is
(a) Distillation
(b) Reverse osmosis
(c) Electrodialysis
(d) Flash evaporation

94. Elemental chlorine is widely used in
(a) Metallurgy
(b) Water purification
(c) Process industry
(d) Deodrants

Answers

80. (c)	83. (b)	86. (d)	89. (a)	92. (d)
81. (a)	84. (c)	87. (d)	90. (b)	93. (b)
82. (d)	85. (a)	88. (b)	91. (c)	94. (c)

95. The single largest class of insecticides of total registered pesticides in the world is
(a) Organochlorine
(b) Organophosphate
(c) Carbamate
(d) Pyrethroids

96. Cup anemometer is used for measuring :
(a) Water evaporation
(b) Wind speed
(c) Wind direction
(d) Water flow

97. Which type of humus is acidic in nature ?
(a) Mor (b) Mull
(c) Moder (d) All of the above

98. Lambert's & Beer's law is used in
(a) Spectrophotometer
(b) Chromatography
(c) Potentiometer
(d) pH meter

99. Law of minimum was given by
(a) Shelford (b) Liebig
(c) Blackman (d) Clement

100. When was project tiger launched in India ?
(a) 1972 (b) 1973
(c) 1978 (d) 1974

101. When was the Jawaharlal Nehru Community Biodiversity movement launched in India ?
(a) 1988 (b) 1989
(c) 1969 (d) 1985

OOOOO

Answers 95. (b) 98. (a) 101. (b)
96. (b) 99. (b)
97. (a) 100. (b)

13 Agricultural Engineering

1. The size of a seedrill is expressed by :
(a) amount of seed sown per unit time
(b) length × width of the machine
(c) the number of furrow openers × distance between two furrow openers
(d) Area covered per unit time

2. Anthropometric data refers to :
(a) Machine – crop system
(b) Machine – environment system
(c) Body part movement
(d) None of the above

3. The size of the planter is given by :
(a) Area covered per unit time
(b) Number of furrow openers × spacing between them
(c) Length × Width of the machine
(d) Amount of seed sown per unit time

4. Working life of a tractor drawn cultivator is usually :
(a) 10000 hrs. (b) 7500 hrs.
(c) 5000 hrs. (d) 2500 hrs.

5. In precession planter the height of drop of a seed from hopper to ground should be about :
(a) 30 cm (b) 25 cm
(c) As close to the ground as possible
(d) None

6. The type of furrow opener recommended for use in hard and trashy ground and also in wet, dry soil in :
(a) single disc type
(b) curved runner type
(c) hoe type
(d) stub runner type

7. The cutter bar of a tractor operate onower makes _____ strokes / min.
(a) 400 - 500 (b) 500 - 750
(c) 800 - 1200 (d) 1250 - 1500

8. Horizontal plate seed metering device used in :
(a) Seed drill
(b) Planter
(c) Seed - Cum - Fertilizer drill
(d) Transplanter

9. Most suitable furrow opener for seedi in a trashy and hard seed bed is :
(a) hoe type (b) shovel type
(c) disc type (d) runner type

10. Accurate and inclined placement seeds to provide rows in tw perpendicular direction is known as
(a) Drilling
(b) Planting
(c) Precision Seeding
(d) Check - row Planting

11. In mould board plough, Soft Centre stell is used for making of _____
(a) Share (b) Mould Board
(c) Land Side (d) Frog

12. Fly wheel type Chaff Cutters used
(a) Spur gear (b) Bevel gear
(c) Worm gear (d) Spiral gear

Answers 1. (c) 4. (d) 7. (c) 10. (d)
2. (c) 5. (c) 8. (b) 11. (b)
3. (b) 6. (a) 9. (c) 12. (c)

13. Power operated Paddy transplanter is being manufactured in India by
(a) M/s Escorts Ltd.
(b) M/s Mitsubishi Ltd.
(c) M/s Eicher tractors Ltd.
(d) None of the above

14. In an offset harrow, the number of gang is
(a) 1 (b) 2
(c) 3 (d) 4

15. The recommended peripheral speed of a spiketooth cylinder for wheat crop is ____ m/s.
(a) < 20 (b) 20 - 25
(c) 25 - 30 (d) 30 - 35

16. Hand operated sprayers are operated at ____ kg/cm^2.
(a) 1 - 7 (b) 7 - 10
(c) 10 - 20 (d) 20 - 25

17. For spray application, the quantity to be applied in a field will depend upon
(a) Forward speed
(b) No. of nozzles
(c) Pressure
(d) All of the above

18. Specific fuel consumption of tractor diesel engine is from ____ to ____ kg/bhp-hr.
(a) 0·10 - 0·15 (b) 0·18 - 0·25
(c) 0·26 - 0·3 (d) 0·33 - 0·4

19. Calorific value of high speed diesel is _____ kcal / kg.
(a) 9,500 (b) 10,550
(c) 11,550 (d) 12,500

20. A tractor seat suspension should have its natural frequency in the range of _____ cpc.
(a) 0·5 - 2 (b) 2 - 4
(c) 4 - 6 (d) None

21. Moving C.G. of a tractor towards its front wheel creates a problem of
(a) instability (b) steering
(c) overturning (d) none

22. The most commonly used pumps in tractor hydraulic system are
(a) Piston type (b) Gear type
(c) Vane type (d) Centrifugal type

23. With increase in stroke - bore ratio of an engine, the frictional horse - power of the engine :
(a) increases (b) decreases
(c) remain same (d) none

24. The requirement of air for full combustion of 1 kg fuel in S.I. engine is about _____ kg.
(a) 12·5 (b) 14·2
(c) 15·1 (d) 17·6

25. The lowest temperature at which the fuel ceases to flow is known as
(a) Pour point (b) Flash point
(c) Cloud point (d) none

26. The maximum overall efficiency of a hydrostatic drive is _____.
(a) 60 % (b) 70 %
(c) 80 % (d) 90 %

27. In the hydrostatic transmission drive having a variable displacement pump and a fixed displacement motor, the output torque
(a) increases with motor speed
(b) decreases with motor speed
(c) is almost constant with motor speed
(d) first increases and then decreases with motor speed

Answers					
	13. (b)	16. (a)	19. (b)	22. (b)	25. (a)
	14. (b)	17. (d)	20. (b)	23. (d)	26. (c)
	15. (c)	18. (b)	21. (b)	24. (c)	27. (d)

28. The maximum torque can be increased by
(a) increasing the stroke - bore ratio
(b) increasing the volumetric efficiency
(c) decreasing the stroke - bore ratio
(d) decreasing the volumetric efficiency

29. Negative slip of tractor is obtained in field operation of
(a) ploughing (b) interculture
(c) spraying (d) rotatilling

30. While designing the tractor seat suspension, the ratio of the tractor frequency to seat frequency is kept :
(a) 0·5 (b) 1
(c) 1·4 (d) none

31. In a combine harvestor, the ratio of reel peripheral speed to forward speed (reel speed index) should normally be in the range of :
(a) 1·25 to 1·50 (b) 1·50 to 1·75
(c) 1·75 to 2·00 (d) None of these

32. An indigenous plough is :
(a) a multipurpose implement
(b) a primary tillage implement
(c) a secondary tillage implement
(d) a wetland puddler

33. A reciprocating type mower is fitted with
(a) a rotary blade
(b) fixed knives
(c) a reciprocating cutter bar
(d) free swinging knives

34. The purpose of registration in a mower is :
(a) To get uniform length of cut of grass
(b) To run the mower at uniform torque
(c) To run the mower at minimum power
(d) To reduce the occurence of overload

35. The use of tractor is considered economical when it is utilised for
(a) 800 hrs/year (b) 1000 hrs/year
(c) 1200 hrs/year (d) 1400 hrs/year

36. Normal consumption of fuel in litres/hour by a 35 hp tractor is :
(a) 2·5 (b) 3·0
(c) 3·5 (d) 4·0

37. Land plane is ideally suited for :
(a) Land levelling (b) Earth moving
(c) Final grading (d) Top finishing

38. Vertical suction of a plough influences :
(a) Pulverization (b) Depth of cut
(c) Width of cut (d) Direction of pull

39. The differential lock in tractor is used to give :
(a) high speed to outer wheel on turn
(b) lower speed to inner wheel on turn
(c) different speed to drive
(d) when two wheels have different traction

40. If S is slip and V_a is the actual travel speed and V_t is theoretical wheel speed then
(a) $S = (V_t - V_a)/V_t$
(b) $S = 1 - V_t/V_a$
(c) $S = V_a/V_t$
(d) None of the above

41. Maximum number of tractor being manufactured in India are in the hp range of
(a) 15 - 24 (b) 25 - 36
(c) 37 - 50 (d) 51 - 60

42. The smallest size of economical gobar gas plant is :
(a) 30 cu. ft. (b) 70 cu. ft.
(c) 120 cu. ft. (d) 150 cu. ft.

Answers					
	28. (b)	31. (a)	34. (c)	37. (d)	40. (b)
	29. (d)	32. (b)	35. (b)	38. (b)	41. (b)
	30. (a)	33. (a)	36. (b)	39. (a)	42. (b)

43. Most mechanized crop in India is presently
(a) Paddy (b) Wheat
(c) Maize (d) Sugarcane

44. LVDT can be used to measure :
(a) Torque (b) Displacement
(c) Acceleration (d) Velocity

45. Proving ring is used to measure
(a) Force (b) Displacement
(c) Acceleration (d) Velocity

46. Tilt angle of a disc plough is generally
(a) 0° (b) 15°
(c) 20° (d) 45°

47. The throat of a reaper cutter bar is :
(a) 5 cm (b) 6 cm
(c) 7·5 cm (d) 10 cm

48. Disc angle in disc plough is :
(a) 30 - 35 (b) 34 - 37
(c) 38 - 40 (d) 42 - 45

49. Specific gravity of fully charged battery is
(a) 0·95 (b) 1·10
(c) 1·28 (d) 1·32

50. Land scraper is an equipement best used for
(a) Reclamation (b) Cultivation
(c) Soil movement (d) None

51. If size of a seed drill is doubled and speed is halved, then coverage will be
(a) Doubled (b) Halved
(c) Unchanged (d) None

52. Type of threshing drum in paddy thresher is
(a) Peg type (b) Rasp bar type
(c) Hammer mill type
(d) None

53. If the exact speed ratio does not require, which combination of teeth on a spur gear be preferred ?
(a) 16 : 32 (b) 14 : 32
(c) 15 : 31 (d) 14 : 30

54. Length of stroke in engine is 1000 mm, running at 1000 rpm, piston of engine will be ____ m/min.
(a) 200 (b) 300
(c) 400 (d) 500

55. Most commonly transmission system used in India is :
(a) Synchronoesh (b) Planetary gear
(c) Selective gear (d) Hydrostatic

56. The four cylinder engine at 180 rpm, the firing interval will be as :
(a) 1/60 S (b) 1/45 S
(c) 1/90 S (d) 1/10 S

57. The size of MB plough is expressed in terms of its :
(a) Width of cut
(b) Depth of cut
(c) Length of share
(d) None

58. Per hectare application rate of a ULV sprayer is :
(a) upto 5 litres (b) 5-100 litres
(c) 400 litres (d) None

59. A reaper is used for :
(a) cutting crop
(b) cutting and windrowing
(c) cutting and threshing
(d) None

60. The upper safe noise level for machine operator is :
(a) 85 db (b) 100 db
(c) 110 db (d) 115 db

Answers

43. (b)	46. (b)	49. (c)	52. (a)	55. (c)	58. (a)
44. (a)	47. (a)	50. (c)	53. (a)	56. (a)	59. (a)
45. (b)	48. (d)	51. (c)	54. (a)	57. (a)	60. (a)

61. Speed of a belt is 12 M/s and it transmitting 80 hp, the difference of tension on the sides of the belt will be :
(a) 400 kg (b) 425 kg
(c) 475 kg (d) 500 kg

62. The Lowest unit draft is obtained in a disc plough, when disc is operated at ..... depth of its diameter.
(a) 1/3 (b) 1/2
(c) 1/4 (d) 3/4

63. In combines straw racks generally oscillate at ..... strokes/min.
(a) 100 - 200 (b) 200 - 300
(c) 300 - 350 (d) 350 - 400

64. The depth of penetration of a disc harrow is increased by :
(a) Tilt angle (b) Disc angle
(c) Gang angle (d) All of the above

65. The two types of cylinders used on power wheat threshers are :
(a) Spike tooth and wire loop type
(b) Serrated disc and rasp bar
(c) Spike tooth and hammer mill
(d) Hammer mill and flails

66. Sub soiler plough is best suited for :
(a) Deep ploughing
(b) Breaking hard fan
(c) Making ditches
(d) Inter cultivation

67. In check rowing, the seed spacing is :
(a) Constant (b) Continuous
(c) Same as rows (d) None

68. An implement attached to swinging draw bar of the tractor will offer :
(a) Increase in turning radius
(b) Decrease in turning radius
(c) Increase in side draft
(d) None

69. The unit draft of an indigenous plou making a 20 cm wide and 10 cm de V shaped furrow in 70 kg per sq. c The draft is :
(a) 50 kg (b) 60 kg
(c) 70 kg (d) 80 kg

70. The plough used for maximum moistu conservation is :
(a) MB plough
(b) Cultivator
(c) Chisel plough
(d) Disc harrow

71. Material used for manufacturing power chaff cutter blade is :
(a) Soft Centre iron
(b) High carbon steel
(c) Mild steel
(d) Cast iron

72. Total grain losses in a combine increa with :
(a) Increase in forward speed
(b) Decrease in stubble height
(c) Increase in concave clearance
(d) All of the above

73. Spiral gear is used to transmit pow between two shafts placed at :
(a) An angle to each other
(b) In different planes
(c) Both (a) and (b)
(d) None

74. Width of cutof disc plough is increas by :
(a) Increasing disc angle
(b) Increasing tilt angle
(c) Addition of more weight
(d) Decreasing disc angle

Answers

61. (d)	64. (c)	67. (c)	70. (c)	73. (c)
62. (d)	65. (c)	68. (b)	71. (b)	74. (a)
63. (b)	66. (b)	69. (c)	72. (d)	

75. Sub soilers are operated at maximum depth of :
(a) 30 - 40 cm (b) 45 - 75 cm
(c) 75 - 90 cm (d) 10 - 20 cm

76. Horizontal component of pull perpendicular to the line of motion is called :
(a) Draft
(b) Side draft
(c) Transverse component
(d) Pull

77. For operating rotavator in trashy soils, which lines are better ?
(a) L - shaped
(b) Hook shaped
(c) Backward curved
(d) Straight blade

78. Soil strength is determined by :
(a) Penetrometer (b) Micrometer
(c) Hydrometer (d) Dynamometer

79. Power sprayers are operated at a pressure of :
(a) 5 - 10 kg/m^2 (b) 10 - 20 kg/m^2
(c) 20 - 55 kg/m^2 (a) > 55 kg/m^2

80. In electrostatic spraying, the total volume of liquid to be sprayed over one hectare is :
(a) < 1 litres (b) 50 litres
(c) 100 litres (d) > 100 litres

81. Gears commonly used on fuel injection pumps are :
(a) Spur gears (b) Helical gears
(c) Rack and pinion (d) Spiral

82. Tandem wheels are preferred over dual wheels because :
(a) They tend to reduce load on an area by 50%
(b) They tend to reduce soil contact pressure
(c) Reduces subsoil compactness pressure
(d) None

83. Turning space and turning circle of the tractor test must be preferred at a tractor speed of :
(a) 2 km/hr
(b) not exceeding 2 km/hr
(c) exceeding 2 km/hr
(d) at any speed

84. The power required to operate a country plough at a speed of 3 km/hr with 90 kg pull 30° angle from the horizontal is :
(a) 1·5 hp (b) 1 hp
(c) 0·5 hp (d) 0·75 hp

85. The water horse power required to discharge the liquid through a sprayer at 30 lit/min. rate and 30 kg/cm^2 pressure will be :
(a) 3·5 hp (b) 3 hp
(c) 2 hp (d) 1·5 hp

86. % of wheel slip allowed for field operation of steel is in the range of :
(a) 5 - 10 (b) 10 - 15
(c) 15 - 20 (d) 20 - 25

87. The lower value of the ratio of drawbar height to length of tractor is better :
(a) variation in weight transfer increased
(b) variation in weight transfer decreased
(c) risk increases while ascending a gradient
(d) variation in lateral stability is reduced

Answers					
	75. (b)	78. (a)	81. (c)	84. (d)	87. (b)
	76. (b)	79. (c)	82. (a)	85. (c)	
	77. (a)	80. (a)	83. (b)	86. (a)	

88. Inflation pressure in rear wheel of tractor is :
(a) 0·8 - 1·2 kg/cm^2
(b) 1·2 - 2·0 kg/cm^2
(c) 2·0 - 2·5 kg/cm^2
(d) > 2·5 kg/cm^2

89. Turbo chargers are driven by :
(a) Direct connection with engine power
(b) Exhaust gases from engine
(c) Electric current from battery
(d) None

90. Number of piston rings on piston varies between :
(a) 1 - 3 (b) 3 - 7
(c) 7 - 12 (d) 12 - 15

91. Centre of resistance of a mould board plough lies at distance equal to :
(a) 1/4th the size of plough from the share wing
(b) 3/4th the size of plough from the share wing
(c) 2/3rd the size of plough from the share wing
(d) 1/3rd the size of plough from the share wing

92. Improved uniformity is obtained if seed tube is inclined rear ward at ..... with vertical.
(a) 5 - 15° (b) 15 - 30°
(c) 30 - 40° (d) 40 - 50°

93. Compression pressure in diesel engine cylinder is :
(a) 6 - 10 kg/cm^2
(b) 10 - 20 kg/cm^2
(c) 35 - 45 kg/cm^2
(d) None

94. Compression pressure in petrol engine cylinder is :
(a) 6 - 10 kg/cm^2
(b) 10 - 20 kg/cm^2
(c) 20 - 35 kg/cm^2
(d) 35 - 45 kg/cm^2

95. Injection pressure of the fuel nozzle in diesel engine is :
(a) 35 - 45 kg/cm^2
(b) 50 - 100 kg/cm^2
(c) 100 - 200 kg/cm^2
(d) 200 kg/cm^2

96. Drillability of fertilizers is ..... proportional to the kinetic angle of repose.
(a) Inversely (b) Directly
(c) Unaffected (d) None of these

97. Nozzle spacing on the boom in power operated sprayer depends upon :
(a) Spray angle
(b) Height of the boom from the target
(c) Diameter of spray pattern
(d) All of the above

98. Size of tyre is generally represented as :
(a) Sectional width × rim dia.
(b) Sectional dia. × rim width
(c) Tyre width × tyre dia.
(d) None

99. Gears generally used in the transmission box are :
(a) Spur gear only
(b) Helical gear only
(c) Helical and spur gears
(d) Bevel gear

100. Length of cutter bar for the tractor operated mower or vertical conveyor reaper is
(a) 1·5 - 3·0 m (b) 3·0 - 4·5 m
(c) 4·5 - 5·5 m (d) > 5·5 m

Answers					
	88. (a)	91. (b)	94. (a)	97. (d)	100. (a)
	89. (b)	92. (b)	95. (c)	98. (a)	
	90. (b)	93. (c)	96. (a)	99. (c)	

101. To overcome rearward deflection the load given to outer end of the cutter bar is about :
(a) 1·5 cm/m (b) 2·0 cm/m
(c) 3·0 cm/m (d) 3·5 cm/m

102. The ratio of reel peripheral speed to forward speed of combine is called :
(a) Velocity index
(b) Angular velocity index
(c) Reel speed index
(d) Kinematic index

103. Speed of the cutter bar in case of combine (grain) is :
(a) 400 - 550 rpm
(b) 500 - 800 rpm
(c) 800 - 1000 rpm
(d) 1000 - 1200 rpm

104. Unthreshed seed discharged from the rear of the machine either in straw or in the materiai from the cleaning shoe is called :
(a) Cylinder loss (b) Walker loss
(c) Shoe loss (d) Gathering loss

105. Free seed carried over the walker or rack in straw and discharged from the rear of machine is called :
(a) Cylinder loss (b) Walker loss
(c) Shoe loss (d) Gathering loss

106. Free seed carried over the straw discharge from the rear of shoe is called :
(a) Cylinder loss (b) Walker loss
(c) Shoe loss (d) Gathering loss

107. Axial flow rasp bar cylinder gives better threshing efficiency than cross-flow rasp bar due to :
(a) Axial path increases residence time and number of impact on material
(b) Greater peripheral speed results in higher threshing efficiency
(c) Lesser concave clearance residence time
(d) All of the above

108. Kinematic index of straw walker should lies between ..... for minimum straw walker losses
(a) 1·2 - 2·2 (b) 2·2 - 2·6
(c) 2·6 - 3·2 (d) 3·2 - 3·6

109. A combine harvestor with 4 m cutter bar and 4 km/hr speed of operation will harvest ..... ha/hr.
(a) 1·2 (b) 1·5
(c) 1·6 (d) 1·7

110. The radius of curvature of a disc with 60 cm dia, 10 cm concavity will be :
(a) 70 cm (b) 60 cm
(c) 35 cm (d) 50 cm

111. Optical pyrometer is used to measure :
(a) Light intensity
(b) Low temperature
(c) High temperature
(d) Light intensity and high temperature

112. Plough generally used for breaking impervious layer just below ploughing layers with help of number of tynes is called :
(a) Sub soiler
(b) Chisel plough
(c) Disc plough
(d) Indigenous plough

113. Rotavator working in reverse direction for compacting the soil and giving good touch to inter culturing is called :
(a) Rotary tiller (b) Power tiller
(c) Power harrow (d) Treader

Answers					
	101. (b)	104. (a)	107. (a)	110. (b)	113. (d)
	102. (c)	105. (b)	108. (b)	111. (c)	
	103. (a)	106. (c)	109. (c)	112. (b)	

114. The rotary or oscillating tool which does not turn the soil upside down is :
(a) Power tiller
(b) Rotavator
(c) Power harrow
(d) Treader or rotary tiller

115. V-shaped sweeps are best suited for :
(a) Primary tillage
(b) Stubble mulch tillage
(c) Rotary tillage
(d) Minimum tillage

116. Which stage represents optimum conditions for tillage ?
(a) Sticky
(b) Plastic
(c) Friable (Crumbly)
(d) Hard (Cemented)

117. Rotary tiller are wide adopted in rice cultivation due to :
(a) Excessive pulverisation
(b) Suitability for puddling paddy field
(c) Reduced draft requirement
(d) Complete inversion of soil

118. Electrical resistance of a thermistor :
(a) Increases as the temperature increases
(b) Decreases as the temperature increases
(c) Remains unaffected with change in temperature
(d) Increases at low temperature and decreases at high temperature

119. What refers to the surface roughness of the tool ?
(a) Micro shape (b) Edge shape
(c) Macro shape (d) Gross shape

120. The movement of soil across a surface without sticking is called
(a) Pulverisation (b) Inversion
(c) Scouring (d) Turning

121. Penetration of disc plough can improved by :
(a) Increasing disc angle
(b) Decreasing tilt angle
(c) Both (a) and (b)
(d) None of the above

122. Large tilt angle is best for :
(a) Hard soil
(b) Sticky and non scouring soil
(c) Dry and cemented soil
(d) None of the above

123. Maximum noise level from a tractor the operator's ear should not exce
(a) 85 dB (b) 90 dB
(c) 95 dB (d) 100 dB

124. Thermal efficiency of a diesel en varies between :
(a) 18 - 24 % (b) 25 - 31 %
(c) 32 - 38 % (d) 38 - 45 %

125. The compression ratio of diesel eng are in the order of :
(a) 4 to 8 : 1 (b) 9 to 13 : 1
(c) 1 to 20 : 1 (d) 21 to 30 :

126. Standard PTO speed is :
(a) 536 rev/min.
(b) 1000 rev/min.
(c) 1440 rev/min.
(d) 2000 rev/min.

127. The undamped natural frequency wheel of tractors lies in the range
(a) 5 to 10 Hz (b) 10 to 15 H
(c) 15 to 20 Hz (d) 20 to 25 H

Answers					
	114. (c)	117. (b)	120. (c)	123. (a)	126. (b)
	115. (b)	118. (b)	121. (b)	124. (c)	127. (a)
	116. (c)	119. (a)	122. (b)	125. (c)	

128. The lateral stability of a four wheel tractor in a turning situation can be increased by :
(a) Increasing the radius of turn
(b) Increasing the height of the centre of gravity
(c) Attaching a front end loader
(d) Increasing the total weight of the tractor

129. A tractor seat suspension should have its natural frequency in the range of :
(a) 0·5 to 2·0 cycles/s
(b) 2·0 to 4·0 cycles/s
(c) 4·0 to 6·0 cycles/s
(d) None of the above

130. Moving the centre of gravity of a tractor towards its front wheel creates the problem of :
(a) Instability (b) Steering
(c) Over turning (d) None

131. The main difference between flywheel and governer is :
(a) Flywheel is heavier than governer
(b) Flywheel is fixed to the crankshaft while governer is not
(c) Flywheel absorbs energy and governer controls engine speed
(d) None of the above

132. Ballast are sometimes used on front tyres of a 4-wheel tractor to
(a) Increase traction
(b) Increase stability
(c) Decrease front wheel stability
(d) Decrease tractor vibration

133. Tractive and transmission co-efficient is :
(a) Ratio of bhp and Ihp
(b) dbhp and Ihp
(c) Drawbar power to PTO power
(d) None of these

134. The temperature (in °C) within the cylinder of an internal combustion engine of a tractor ranges between :
(a) 800 to 1200 (b) 1200 to 1600
(b) 1650 to 2200 (d) 2200 to 2800

135. According to occupational safety and health act, a worker should not be exposed to the 90 dB for more than :
(a) 15 min. (b) 1 hour
(c) 4 hours (d) 8 hours

136. Specific fuel consumption of diesel engine is :
(a) Less than in petrol engine
(b) More than in petrol engine
(c) Same as of petrol engine
(d) Incomparable with petrol engine

137. Pressure due to radiator cap :
(a) Raises boiling temperature
(b) Reduces boiling temperature
(c) Cools the water
(d) None of these

138. The voltage in a spark plug at the time of spark is :
(a) 300 - 400 V (b) 100 - 200 V
(c) 1000 - 10,000 V (d) 20,000 V

139. Photovoltaic solar cells are made of :
(a) Gun metal (b) Carbon
(c) Silicon (d) Aluminium

140. In a forced feed lubrication system of an IC engine, the oil pump is operated by :
(a) Cam shaft (b) Crank shaft
(c) Transmission shaft
(d) Fan belt

141. The choke in carburetor is provided to :
(a) cut off fuel supply
(b) control air supply
(c) cut off air fuel mixture
(d) control fuel mixture

Answers					
	128. (a)	131. (c)	134. (c)	137. (a)	140. (a)
	129. (a)	132. (b)	135. (d)	138. (d)	141. (b)
	130. (b)	133. (c)	136. (a)	139. (c)	

142. BHP of an engine indicates :
(a) Power in cylinder
(b) Power on flywheel
(c) Frictional power
(d) Power at PTO pulley

143. Which of the following is a transmission dynamometer ?
(a) Torsion dynamometer
(b) Froude's hydraulic dynamometer
(c) Belt dynamometer
(d) Prony brake dynamometer

144. Turbo chargers are driven by :
(a) Engine (b) Dynamo
(c) Exhaust gas (d) PTO

145. The PTO HP of a tractor is :
(a) Less than drawbar horsepower
(b) More than engine hp
(c) More than drawbar hp
(d) Less than friction hp

146. The basic function of a governor in an engine is to regulate
(a) Engine speed
(b) Fuel consumption
(c) Power developed
(d) None

147. The power developed by average pair of bullocks varies from :
(a) 0 - 0·5 hp (b) 0·5 - 1·0 hp
(c) 1·0 - 1·5 hp (d) 1·5 - 2·0 hp

148. Multiple Universal joints are preferred over single joints because they :
(a) Provide higher strength
(b) Minimize speed fluctuation
(c) Are lighter in weight
(d) Are more flexible

149. In diesel cycle, heat is added at :
(a) Constant pressure
(b) Constant volume
(c) Constant temperature
(d) Adiabatically

150. The operation of surface finishing of the engine cylinder is called :
(a) Scavenging (b) Scuffing
(c) Honing (d) Reboring

151. The injection pressure of CI engine used on tractor is in the range of :
(a) 0 - 6 kg/cm²
(b) 60 - 120 kg/cm²
(c) 120 - 200 kg/cm²
(d) 200 - 300 kg/cm²

152. A six cylinder engine can have ..... possible number of firing orders.
(a) 2 (b) 3
(c) 4 (d) 6

153. Thermal efficiency ..... with increase in stroke : bore ratio.
(a) Decreases
(b) Increases
(c) Remains the same
(d) None of the above

154. Cold spark plug is used on :
(a) Heavy engines (b) Small engines
(c) IC engines (d) All of the above

155. Traction and transmission co-efficient is defined as :
(a) Ratio of drawbar hp to PTO hp
(b) Ratio of input hp to axels to drawbar hp
(c) Ratio of pull developed to normal load on traction member
(d) None of the above

Answers					
	142. (b)	145. (c)	148. (b)	151. (c)	154. (a)
	143. (c)	146. (a)	149. (a)	152. (a)	155. (a)
	144. (c)	147. (b)	150. (c)	153. (b)	

156. Traction and transmission co-efficient is maximum for :
(a) Two - wheel drive tractor
(b) Four - wheel drive tractor
(c) Track type tractor
(d) None of the above

157. Valve timing diagram is a function of :
(a) Engine speed
(b) Torque
(c) Compression ratio
(d) B. M. E. P.

158. Seed drill have slip equal to :
(a) Zero
(b) Positive slip
(c) Negative slip
(d) None of the above

159. Pressure angle in spur gears ranges :
(a) 0 - 5° (b) 5 - 10°
(c) $14\frac{1}{2}$ - 20° (d) 20 - 25°

160. Best speed to get minimum brake specific fuel consumption is :
(a) Minimum (b) Maximum
(c) Average (d) None

161. Brake testing is done at :
(a) Maximum speed
(b) Minimum speed
(c) 25 kmph
(d) None

162. White smoke indicates :
(a) Burning of lubricating oil in cylinder
(b) Presence of water in the fuel
(c) That engine is over loaded
(d) Richer mixture of fuel and air

163. Blue smoke indicates :
(a) Burning of lubricating oil in cylinder
(b) Presence of water in the fuel
(c) That engine is over loaded
(d) Richer mixture of fuel and air

164. Efficiency of a pair of bullocks is ..... the efficiency of a single bullock in field.
(a) Less than (b) Greater than
(c) Equal to (d) Twice

165. Thermal efficiency of a tractor is in ..... proportion to specific fuel consumption.
(a) Direct (b) Inverse
(c) Unaffected (d) None

166. Weight transfer is denoted as :
(a) $W = \frac{(P \times h)}{X}$ (b) $W = \frac{(P \times X)}{h}$
(c) $W = \frac{(X \times h)}{P}$ (d) None

167. Traction of wheel can be improved by :
(a) Using high hitch point
(b) Ballasting rear wheels
(c) Using high hitch point as well as ballasting rear wheels
(d) None of the above

168. The traction co-efficient is maximum in the field when :
(a) it is ploughed
(b) it is irrigated
(c) it is dry
(d) it is ploughed irrigated

169. The most used and least efficient power outlet of a tractor is :
(a) PTO shaft in the front
(b) PTO shaft in the rear
(c) Drawbar in the rear
(d) None

Answers					
	156. (c)	159. (c)	162. (b)	165. (b)	168. (c)
	157. (a)	160. (b)	163. (a)	166. (a)	169. (c)
	158. (b)	161. (c)	164. (a)	167. (c)	

170. In a C. I. engine, the compressor pressure inside the cylinder normally in the range of ..... kg/cm^2 :
(a) 15 - 25 (b) 25 - 35
(c) 35 - 45 (d) 45 - 55

171. The calorific value of HSD is .... Kcal/kg :
(a) 10,000 (b) 10,550
(c) 11,100 (d) 11,650

172. The type of starting aid generally used in diesel power tiller is :
(a) Glow plug
(b) Thermostart
(c) Decompression lever
(d) Intake manifold surrounded by exhaust manifold

173. For a wheeled tractor with mass M and velocity V, the expression for total kinetic energy resulting from the linear motion of the tractor is given by :
(a) $KE = (1/2)\ MV^2$
(b) $KE = MV^2$
(c) $KE = (11/20)\ MV^2$
(d) None

174. The firing order of a 4-stroke 4-cylinder engine is given as :
(a) 1 - 2 - 3 - 4 (b) 1 - 3 - 2 - 4
(c) 1 - 3 - 4 - 2 (d) 1 - 4 - 3 - 2

175. Main combustible constituent of biogas is :
(a) Methane (b) Ethane
(c) Butane (d) Carbon dioxide

176. The anti-knock quality of petrol fuels is given by :
(a) Octane number (b) Cetane number
(c) SAE number (d) Butane number

177. Tractor operation in a lower gear causes :
(a) More pull (b) Reduced pull
(c) Less torque (d) All of these

178. In a tractor, the centre of gravity shoul be located approximately ..... a hea of rear axle.
(a) 1/4 of the wheel base
(b) 1/3 of the wheel base
(c) 2/3 of the wheel base
(d) 3/4 of the wheel base

179. Clutch in the tractors is designed on th basis of :
(a) Constant torque (b) Road
(c) Constant pressure
(d) Constant power

180. Ballasting is done when the whe slippage exceeds under normal workin conditions :
(a) 10 % (b) 18 %
(c) 30 % (d) None

181. The dynamometer required for indo testing is :
(a) Absorption (b) Torsion
(c) Brake (d) Chasis

182. Air pressure in the front tyres of a tract is ..... than in rear wheels.
(a) Higher (b) Lower
(c) Equal
(d) May be higher sometimes lower

183. Towed force can be given by :
(a) $\frac{T_f}{W} = \left(\frac{1.21}{C_n}\right) + 0.04$
(b) $T_f = \left(\frac{1.21}{C_n}\right) + 0.04$
(c) $T_f = \left(\frac{1.21}{C_n}\right) + 0.046$
(d) $T_f = 1.24\,W + 0.046$

Answers					
	170. (c)	173. (c)	176. (a)	179. (c)	182. (a)
	171. (b)	174. (c)	177. (a)	180. (b)	183. (a)
	172. (c)	175. (a)	178. (b)	181. (d)	

184. An adiabatic process takes place at :
(a) Constant heat
(b) Constant enthalpy
(c) Constant temperature
(d) Constant pressure

185. Heavy draft of a disc plough is due to :
(a) Blunt disc
(b) Furrows too wide
(c) Loose bearings
(d) None

186. Puddling is done to :
(a) Reduce percolation of water
(b) Kill weeds
(c) Pulverise soil
(d) Level the field

187. A stubble type mould board gives :
(a) Medium pulverisation
(b) Through pulverisation
(c) Little pulverisation
(d) None

188. Farm yard manure contains about ..... percentage of nitrogen.
(a) 0·50 (b) 0·75
(c) 1·00 (d) 1·25

189. Which is not a measure of Central tendency ?
(a) Mean
(b) Mode
(c) Median
(d) Standard deviation

190. Which of the following is not a measure of dispersion ?
(a) Mode
(b) Standard deviation
(c) Mean deviation
(d) Variance

191. Correlation coefficient :
(a) is less than -1
(b) is more than +1
(c) lies between -1 and +1
(d) lies between 0 and 1

192. In a normal distribution,
(a) Mean = Mode = Median
(b) Mean = Mode
(c) Mean = Median
(d) Mode = Median

193. The mean of first 'n' natural numbers is :
(a) $n(n+1)$ (b) $\frac{n(n+1)}{2}$
(c) $\frac{(n+1)}{2}$ (d) $\frac{(n+1)}{4}$

□□□□□□

Answers

184. (b)	187. (b)	190. (a)	193. (c)
185. (b)	188. (b)	191. (c)	
186. (a)	189. (d)	192. (a)	

14) Veterinary Science

1. Match the following :

Product	Protein
(A) Milk	(i) Keratin
(B) Egg	(ii) Myosin
(C) Meat	(iii) Casein
(D) Wool	(iv) Albumen

(a) A - iv B - ii C - iii D - i
(b) A - i B - iii C - iv D - ii
(c) A - iii B - iv C - ii D - i
(d) A - ii B - iv C - iii D - i

2. Price fixing in milk is based on
(a) Fat content
(b) Protein content
(c) Lactose content
(d) None of the above

3. Highest milk producing country in the world is
(a) USA (b) CIS
(c) Switzerland (d) India

4. Highest milk producing state in India is
(a) Punjab (b) Karnataka
(c) Uttar Pradesh (d) Gujarat

5. Match the following :

Revolutions	Related to
(A) White	(i) Fishery
(B) Blue	(ii) Agriculture
(C) Yellow	(iii) Milk
(D) Green	(iv) Oil seeds

(a) A - iii B - iv C - ii D - i
(b) A - ii B - iii C - i D - iv
(c) A - iv B - ii C - i D - iii
(d) A - iii B - i C - iv D - ii

6. Nutritionally egg is a rich source of
(a) Protein
(b) Fe and P
(c) Unsaturated fatty acids
(d) All of the above

7. Meat is a good source of
(a) Protein
(b) Iron
(c) B complex vitamins
(d) All of the above

8. In India cattle slaughter is permissible in which of the following states ?
(a) Tamilnadu and Karnataka
(b) Kerala and West Bengal
(c) Uttar Pradesh and Bihar
(d) Punjab and Haryana

9. First milk of parturited cattle/buffalo is known as colostrum.
(a) True (b) False

10. Red color of blood is due to
(a) Haemoglobin (b) Myoglobin
(c) Ferritin (d) Calsequestrin

11. Major component of biogas is
(a) Methane (b) Carbon dioxide
(c) Sulphur dioxide
(d) Carbon monoxide

12. Vermicompost is prepared using
(a) Tape worm (b) Round worm
(c) Flat worm (d) Earth worm

Answers

1.	(c)	4.	(c)	7.	(d)	10.	(a)
2.	(a)	5.	(d)	8.	(b)	11.	(a)
3.	(d)	6.	(d)	9.	(a)	12.	(d)

13. DNA contains ribose sugar and RNA contains deoxy ribose sugar.
(a) True (b) False

14. Match the following :

Hormone	Source
(A) Growth hormone	(i) Ovary
(B) Oestrogen	(ii) Thyroid
(C) Thyroxine	(iii) Pituitary
(D) Adrenaline	(iv) Supra renal gland

Codes :
(a) A - iv B - iii C - ii D - i
(b) A - iii B - i C - ii D - iv
(c) A - i B - iv C - ii D - iii
(d) A - iii B - iv C - ii D - i

15. Ruminants have _____ number of compartments in their stomach
(a) One (b) Two
(c) Three (d) Four

16. Match the following :

Type	Breeds
(A) Milch	(i) Amritmahal
(B) Draught	(ii) Sahiwal
(C) Dual purpose	(iii) Holstein Freisian
(D) Exotic	(iv) Deoni

Codes :
(a) A - i B - iv C - ii D - iii
(b) A - ii B - iii C - iv D - i
(c) A - ii B - iv C - i D - iii
(d) A - ii B - i C - iv D - iii

17. Highest producing state in India is
(a) Punjab (b) Tamilnadu
(c) Uttar Pradesh (d) Andhra Pradesh

18. Diseases transmitted from animal to man and vice - versa are known as
(a) Contagious diseases
(b) Zoonotic diseases
(c) Infectious diseases
(d) None of the above

19. Who is the father of white revolution ?
(a) Swaminathan
(b) C. Subramanyan
(c) V. Kurien
(d) None of the above

20. Which of the following are deemed universities under ICAR ?
(a) IVRI, IISR, IARI, CIFE
(b) IARI, NDRI, CIFE, IVRI
(c) NDRI, CIFE, IVRI, IARI
(d) IIHR, CIFE, IVRI, IARI

21. Which of the following known as 'poor man's cow'
(a) Sheep (b) Buffalo
(c) Chicken (d) Goat

22. Breed of cattle mainly for physical work is known as _____ type
(a) Milch (b) Draught
(c) Dual purpose (d) None of these

23. Concept of pasteurization was first given by
(a) Nicholas Appert (b) Louis Pasteur
(c) Edward Jenner (d) None of these

24. Which of the following is not a viral disease ?
(a) Foot and mouth disease
(b) Rinder Pest
(c) Paratuberculosis
(d) Pox disease

25. Human form of mad cow disease is known as,
(a) Scrapie (b) CJD
(c) AIDS (d) Rabies

Answers					
	13. (b)	16. (d)	19. (c)	22. (b)	25. (b)
	14. (b)	17. (d)	20. (b)	23. (b)	
	15. (d)	18. (b)	21. (d)	24. (c)	

26. Rabies is transmitted to human beings by
(a) Water (b) Food
(c) Air (d) Dog bite

27. Which of the following is taken as indicator for faecal contamination of water bodies ?
(a) Staphylococcus
(b) Bacillus
(c) Streptococcus faecalis
(d) None of the above

28. Match the following :

Disease	Vector
(A) Malaria	(i) Culex
(B) Cholera	(ii) Aedes
(C) Dengue	(iii) Anopheles
(D) Elephentiasis	(iv) House fly

Codes :
(a) A - iv B - iii C - i D - ii
(b) A - iii B - i C - ii D - iv
(c) A - i B - iv C - iii D - ii
(d) A - iii B - iv C - ii D - i

29. First Veterinary college in India was started at
(a) Bombay (b) Kolkata
(c) Chennai (d) Bangalore

30. Polymerase chain reaction was invented by
(a) H. G. Khorana
(b) Karry Mullis
(c) Watson and Crick
(d) Johanns

31. First somatically cloned animal in the world is
(a) Polly (b) Dolly
(c) Silly (d) None of these

32. Penicillin was discovered by
(a) JC Bose
(b) Louis Pasteur
(c) Edward Jenner
(d) Alexander Flemming

33. Camels is
(a) Ruminant
(b) Non ruminant
(c) Pseudoruminant
(d) None of the above

34. Double ceaca are present in
(a) Pig (b) Fowl
(c) Horse (d) Cow

35. Site of fiber digestion in Horse
(a) Rumen (b) Small intestine
(c) Stomach (d) Large intestine

36. Acid insoluble ash is chemically
(a) Silicon sulphate
(b) Pure Silicon
(c) Sillicon Oxide
(d) Mixture of A, B and C

37. Feeding of tender sorghum fodder results in
(a) Nitrate poisoning
(b) Cyanide poisoning
(c) Saponin poisoning
(d) Oxalate poisoning

38. Silage has a Dry matter of around
(a) 10-15 % (b) 20-30 %
(c) 40-50 % (d) 60-70 %

39. Who is considered as Father of Microbiology and Immunology ?
(a) Louis Pasteur
(b) Antony van Leeuwenhoek
(c) Joseph Lister
(d) Robert Koch

Answers					
	26. (d)	29. (b)	32. (d)	35. (d)	38. (c)
	27. (c)	30. (b)	33. (c)	36. (c)	39. (a)
	28. (d)	31. (b)	34. (b)	37. (b)	

40. Which of the following is not a zoonotic disease ?
(a) Hydatidosis (b) Glanders
(c) Toxoplasmosis (d) Giardiasis

41. Tobacco mosaic virus was discovered by
(a) M.W.Beijeirinck (b) Louis Pasteur
(c) Edward Jenner (d) Robert Koch

42. Edward Jenner was the first man to develop
(a) Rabies vaccine
(b) Smallpox vaccine
(c) Foot and mouth disease vaccine
(d) None of the above

43. Mycology is a study of
(a) Bacteria (b) Virus
(c) Fungi (d) Parasites

44. Pier Antonio Mucheli is considered as father of
(a) Virology (b) Bacteriology
(c) Parasitology (d) Mycology

45. Which of the following is caused by acid fast bacteria ?
(a) Tuberculosis (b) Brucellosis
(c) Haemorrhagic septicemia
(d) Black quarter

46. Bacteria overcome unfavorable conditions with the help of
(a) Capsule (b) L phase
(c) Flagella (d) Spore

47. Antibiotics are products of
(a) Bacteria and fungi
(b) Fungi and parasites
(c) Parasites and bacteria
(d) Fungi and viruses

48. Lyophilization is one of the important method to
(a) Select bacteria
(b) Kill the bacteria
(c) Grow the bacteria
(d) Store bacteria

49. Transfer of genetic material between the bacteria occurs by
(a) Transformation (b) Transduction
(c) Cell conjugation (d) All of the above

50. Which of the following infection is sexually transmitted in animals ?
(a) Camphylobacter
(b) Clostridia
(c) Mycobacteria (d) Pasteurella

51. Which of the following disease is transmitted by biting insects ?
(a) Black quarter (b) Blue tongue
(c) Brucellosis
(d) Foot and mouth disease

52. Tubercullin test is one of the
(a) Molecular biological test
(b) Serological test
(c) Histopathological test
(d) Allergic test

53. Intradermal allergic test is commonly used in diagnosis of
(a) Anthrax (b) Tuberculosis
(c) Rabies
(d) Foot and mouth disease

54. Genetic material of the virus is generally
(a) DNA or RNA (b) DNA and RNA
(c) DNA only (d) RNA only

55. Animal viruses are commonly grown in
(a) Embryonated eggs
(b) Cell culture
(c) Laboratory animals
(d) All of the above

Answers

40. (d)	43. (c)	46. (d)	49. (d)	52. (d)	55. (a)	
41. (a)	44. (d)	47. (a)	50. (a)	53. (b)		
42. (b)	45. (a)	48. (d)	51. (b)	54. (a)		

56. Which one of the following diseases is a chronic wasting disease ?
(a) Black quarter
(b) Foot and mouth disease
(c) Mad cow disease
(d) Haemorrhagic septicemia

57. Which of the following viruses mainly cause tumors in animals ?
(a) Retroviruses (b) Adenoviruses
(c) Poxviruses (d) Myxoviruses

58. Viruses that grow on bacteria are called
(a) Virions (b) Viroids
(c) Prions (d) Phages

59. Strangles is economically important disease of
(a) Horses (b) Cattle
(c) Sheep & goat (d) Dogs

60. Mastitis in cattle is commonly caused by
(a) Bacteria (b) Virus
(c) Fungi (d) Mycoplasma

61. Which of the cattle disease eradicated recently from India ?
(a) Black quarter
(b) Foot and mouth disease
(c) Rinderpest
(d) Haemorrhagic septicemia

62. Common clinical manifestation of brucellosis in animals is
(a) Chronic debility
(b) Diarrhea
(c) Lameness (d) Abortions

63. Oozing of blood from all natural orifices is important clinical outcome of
(a) Black quarter
(b) Haemorrhagic septicemia
(c) Anthrax (d) Tuberculosis

64. Which of the following disease is acute disease ?
(a) Tuberculosis (b) Johne's disease
(c) Mad cow disease
(d) Anthrax

65. Bovine spongiform encephalopathy/mad cow disease caused by
(a) Virus (b) Bacteria
(c) Prions (d) Fungi

66. Which of the following is not a zoonotic disease ?
(a) Anthrax (b) Rabies
(c) Tuberculosis (d) Black quarter

67. Bird flu is caused by
(a) Avian adenovirus
(b) Avian influenza virus
(c) Avian poxvirus
(d) Avian leucosis virus

68. Which of the following is smallest free living organism ?
(a) Mycoplasma (b) Bacteria
(c) Fungi (d) Virus

69. Severe Acute Respiratory Syndrome (SARS) in man is related to
(a) Infectious bronchitis of poultry
(b) Blue tongue of sheep
(c) Strangle of horse
(d) Infectious bovine rhinotracheitis of cattle

70. Infectious agent of mad cow disease contains
(a) Proteins only
(b) Nucleic acid only
(c) Both proteins and nucleic acid
(d) Proteins and Carbohydrates

71. Ring worm infection in cattle is caused by
(a) Virus (b) Bacteria
(c) Fungi (d) Parasite

Answers

56. (c)	59. (a)	62. (d)	65. (c)	68. (a)	71. (c)	
57. (a)	60. (a)	63. (c)	66. (d)	69. (a)		
58. (d)	61. (c)	64. (d)	67. (b)	70. (a)		

72. Aspergillosis is a economically important disease of
(a) Poultry (b) Cattle
(c) Sheep & Goats (d) Dogs

73. In which of the following disease central nervous system is involved ?
(a) Foot and mouth disease
(b) Anthrax
(c) Tuberculosis
(d) Rabies

74. Which one of the following is the most common viral disease of animals ?
(a) Foot and mouth disease
(b) Black quarter
(c) Hemorrhagic septicemia
(d) Antrhax

75. Structural and functional unit of kidney is
(a) Nephron (b) Neuron
(c) Salivon (d) Ganglion

76. Neurotransmitter substance present at neuromuscular junction is
(a) Dopamine (b) Epinephrine
(c) Nor epinephrine
(d) Acetyl choline

77. Photoreceptors (Rods and Cones) of eye are present in
(a) Sclera (b) Cornea
(c) Retina (d) Pupil

78. Cerebrospinal fluid (CSF) is formed at
(a) Arachnoid villi
(b) Aqueduct of sylvius
(c) Choroid plexus
(d) Sub arachonid space

79. In blood, the oxygen is carried in chemical combination with
(a) Myoglobin
(b) Methhemoglobin
(c) Hemoglobin
(d) Immunoglobin

80. Recording of electrical activity of heart is called
(a) Electrocardiography
(b) Electroencephalography
(c) Angiography
(d) Ultrasonography

81. "Let down of milk" is initiated by the hormone
(a) Prolactin (b) Lactogen
(c) Oxytocin (d) Lactopoietin

82. Production of red blood cells (RBC) in the adult occurs in
(a) Heart (b) Pancreas
(c) Spleen (d) Bone marrow

83. Major site of fermentative digestion in cattle and buffaloes is
(a) Reticulum (b) Rumen
(c) Omasum (d) Abomasum

84. About 60-80% of energy needs of ruminants are provided by
(a) Aminoacids
(b) Glucose
(c) Volatile fatty acids
(d) Long chain fatty acids

85. Growth hormone is synthesized in
(a) Hypothalamus
(b) Anterior pituitary
(c) Posterior pituitary
(d) Cerebral cortex

86. Hormone required for maintenance of pregnancy is
(a) Estrogen (b) Prostaglandins
(c) Progesterone (d) Cortisol

Answers

72. (a)	75. (a)	78. (c)	81. (c)	84. (c)
73. (d)	76. (d)	79. (c)	82. (d)	85. (b)
74. (a)	77. (c)	80. (a)	83. (b)	86. (c)

87. Respiratory centre is located in
(a) Hypothalamus
(b) Medulla oblangatga
(c) Cerebellum (d) Cerebral cortex

88. Site of fertilization in cow is
(a) Uterus (b) Cervix
(c) Vagina (d) Oviduct

89. Feeding of excess grains to ruminants may lead to
(a) Ruminal alkalosis
(b) Ruminal acidosis
(c) Respiratory acidosis
(d) Respiratory alkalosis

90. Gall bladder is absent in
(a) Cattle (b) Buffalo
(c) Horse (d) Sheep

91. Acclimatization to high altitude is brought about by
(a) Increased number of red blood cells
(b) Increased hemoglobin
(c) Increased respiratory rate
(d) All of the above

92. Myopia is
(a) Shortsightedness (b) Farsightedness
(c) Normal vision (d) Squint eye

93. Even toed hoofed animals come under the order,
(a) Perissodactyla (b) Artiodactyla
(c) Homeodactyla (d) None

94. Match the following :

Animal	Family
(A) Cattle	(i) Equidae
(B) Horse	(ii) Capridae
(C) Sheep	(iii) Bovidae
(D) Goat	(iv) Ovidae

(a) A - i B - iii C - ii D - iv
(b) A - iv B - ii C - i D - iii
(c) A - iii B - i C - iv D -
(d) A - iii B - iv C - i D -

95. Match the following :

Species	Meat
(A) Cattle	(i) Venison
(B) Deer	(ii) Mutton
(C) Sheep	(iii) Chevon
(D) Goat	(iv) Beef

Codes :
(a) A - i B - iv C - ii D -
(b) A - iii B - iv C - ii D -
(c) A - iv B - i C - ii D -
(d) A - ii B - i C - iv D -

96. Fat supplies _____ times mo energy than that of carbohydrates,
(a) 2.25 (b) 3.5
(c) 9 (d) 4

97. Which of the following is a fine wo breed ?
(a) Merino (b) Rambouillet
(c) Polworth (d) All of the abo

98. Name of the first invitro calf produc by NDRI is,
(a) Param (b) Pratham
(c) Kamadhenu (d) Ksheera

99. Match the following :

Common name	Scientific nam
(A) Cattle	(i) Bubalus buba
(B) Buffalo	(ii) Capra hircus
(C) Sheep	(iii) Bos indicus
(D) Goat	(iv) Ovis aries

Codes :
(a) A - iii B - iv C - i D -
(b) A - ii B - iv C - i D -
(c) A - i B - iii C - iv D -
(d) A - iii B - i C - iv D -

Answers

87. (b)	90. (c)	93. (b)	96. (a)	99. (d)
88. (d)	91. (d)	94. (c)	97. (d)	
89. (b)	92. (a)	95. (c)	98. (b)	

100. The larval form of Taenia solium is,
(a) Cysticercoide
(b) Coenurus
(c) Cysticercus cellulose
(d) Cercocystis

101. Trematodes are,
(a) Flat worm (b) Round worm
(c) Unicellular (d) Pin worm

102. The zoonotic disease transmitted through pork is
(a) *Trichinella spiralis*
(b) *Ascaris suum*
(c) *Entamoeba histolytica*
(d) *Eimeria scabra*

103. Elephantiasis is transmitted through,
(a) Ticks (b) House fly
(c) Bititng flies (d) Mosquitoes

104. Leishmaniasis is transmitted by,
(a) Sand fly (b) Horn fly
(c) Stable fly (d) March fly

105. The organism with plant and animal characters are placed in,
(a) Protoza (b) Protophyta
(c) Protista (d) Fungi

106. Schizogony is,
(a) Asexual form of reproduction
(b) Sexual form of reproduction
(c) Parthenogenesis
(d) None of the above

107. Sleeping sickness is caused by,
(a) *Trypanosoma evansi*
(b) *Trypanosoma gambiensi*
(c) *Trypanosoma foetus*
(d) *Trypanosoma cruzii*

108. Coccidia belongs to,
(a) Acanthocephala
(b) Protozoa
(c) Protista
(d) Protophyta

109. Which of the following is not a legume fodder ?
(a) Sun-hemp (b) Stylo hemata
(c) Oat (d) Lucena

110. Which of the following is the classical Mendelian dihybrid ratio ?
(a) 8 : 4 : 3 : 1 (b) 9 : 3 : 3 : 1
(c) 8 : 3 : 3 : 2 (d) 4 : 3 : 3 : 6

111. Match the following :

Animal	Pairs of chromosome
(A) Cattle and Goat	(i) 27
(B) Sheep	(ii) 23
(C) Man	(iii) 30

Codes :
(a) A – iii B – i C – ii
(b) A – i B – ii C – iii
(c) A – i B – iii C – ii
(d) A – ii B – iii C – i

112. Match the following :

Animal	Type of placenta
(A) Horse	(i) Syndesmochorial
(B) Dog	(ii) Hemoendothelial
(C) Cow	(iii) Endotheliochorial
(D) Rabbit	(iv) Epitheliochorial

Codes :
(a) A – ii B – iii C – i D – iv
(b) A – iv B – i C – iii D – ii
(c) A – iv B – iii C – i D – ii
(d) A – iii B – ii C – iv D – I

113. Mule is a cross between,
(a) Horse × Ass (b) Horse × Zebra
(c) Ass × Zebra (d) None of these

Answers

100. (c)	103. (d)	106. (a)	109. (c)	112. (c)
101. (a)	104. (a)	107. (b)	110. (b)	113. (a)
102. (a)	105. (c)	108. (b)	111. (a)	

114. Match the following :

Terminology	Female of
(A) Sheep	(i) Sow
(B) Goat	(ii) Jennet
(C) Donkey	(iii) Nanny
(D) Pig	(iv) Ewe

(a) A – ii B – iii C – i D – iv
(b) A – iv B – iii C – ii D – i
(c) A – iv B – iii C – i D – ii
(d) A – iii B – ii C – iv D – i

115. Which of the following combination is wrong ?
(a) Bones - Osteology
(b) Esthesiology - Muscles
(c) Joints - Arthrology
(d) Ductless glands - Endocrinology

116. Hardest substance in the animal body is,
(a) Bone (b) Muscle
(c) Nails (d) Enamel

117. Which of the following cell organelle are known as 'suicide bags' ?
(a) Lysosome
(b) Mitochondria
(c) Endoplasmic reticulum
(d) Golgi apparatus

118. Which of the following sequence is correct in meiotic prophase ?
(a) Leptonema - Diplonema - Zygonema - Pachynema - Diakinesis
(b) Leptonema - Zygonema - Pachynema - Diplonema - Diakinesis
(c) Pachynema - Zygonema - Leptonema - Diplonema - Diakinesis
(d) Diplonema - Pachynema - Zygonema - Diakinesis - Leptonema

119. Meiosis makes possible of
(a) The interchange of material between homologous chromosomes
(b) The distribution of one member of each chromosome pair to each gamete
(c) Both of the above
(d) None of the above

120. Which of the following sequence is correct in mitotic cell division ?
(a) Prophase - Interphase - Metaphase - Anaphase - Telophase
(b) Interphase - Prophase - Anaphase - Metaphase - Telophase
(c) Metaphase - Anaphase – Prophase - Telophase - Interphase
(d) Interphase - Prophase - Metaphase - Anaphase - Telophase

121. The major group of organisms which are Psychotropic in raw milk are
(a) *Bacillus spp*
(b) *Streptococcus species*
(c) *Pseudomonas spp*
(d) *Staphylococcus spp*

122. In human milk the major factor concerned for germicidal action is
(a) Compliment (b) Leucocytes
(c) Lysozyme (d) Bifidus factor

123. In milk, Bromothymol test is used to detect
(a) Mastitis
(b) Developed acidity
(c) Salt imbalance
(d) Microbial load

124. The inhibitor generally used in cleaning solution of aluminium dairy equipment
(a) Sodium hydroxide
(b) Sodium sulphite
(c) Sodium metasilicate
(d) Phosphoric acid

Answers

114. (b)	117. (a)	120. (d)	123. (a)
115. (b)	118. (b)	121. (c)	124. (c)
116. (d)	119. (c)	122. (d)	

125. The quality of this milk product is affected by the presence of bacteriophage in milk
(a) Khoa (b) Ice cream
(c) Cheese (d) Paneer

126. The carcass with imperfect bleeding can be identified by
(a) Discernible veins
(b) Dark colored flesh
(c) Blood in left ventricle
(d) All are correct

127. Stale fish can be identified by
(a) Dark brown and slimy gills
(b) Dull and shrunken eyes
(c) Loose scales
(d) All are correct

128. Chemical method (CO_2) of stunning is generally practiced in the species of
(a) Cattle (b) Horse
(c) Pigs (d) Sheep

129. The condition in which knife is passed too far towards chest, while sticking causing aspiration of blood in to thoracic cavity
(a) Blood splashing
(b) Imperfect bleeding
(c) Back bleeding
(d) All are correct

130. Myoglobin content is more in the flesh of
(a) Pork (b) Beef
(c) Chicken (d) Rabbit

131. The post bite anti-rabies vaccination is given on the following days
(a) 0, 3, 6, 14, 28, 60th day
(b) 0, 3, 7, 14, 28, 60th day
(c) 0, 3, 7, 14, 28, 90th day
(d) 0, 7, 28, 60th day

132. Occurrence of a disease in a community clearly in excess of acceptance is called
(a) Sporadic (b) Epidemic
(c) Pandemic (d) Endemic

133. Echinococcus is an example of
(a) Sapro zoonosis
(b) Cyclo zoonosis
(c) Meta zoonosis
(d) Nematode zoonosis

134. Amplifier hosts for the Japanese (B) encephalitis virus are
(a) Birds (b) Pigs
(c) Cattle (d) Sheep

135. The organism localized in the kidney and are shed in urine often over a long period is
(a) Salmonellosis (b) Tuberculosis
(c) Brucellosis (d) Leptospirosis

136. Self purification of river water occurs due to
(a) Setting of suspended impurities
(b) Organic matter eaten by fish
(c) UV rays from sun
(d) All of the above

137. The air pollution surrounding electric power plant is due to
(a) CO_2 (b) SO_2
(c) H_2S (d) None

138. Following is the essential amino-acid for poultry
(a) Tyrosine (b) Proline
(c) Cystine (d) Glycine

139. The regeneration of Zeolite is done with
(a) H_2SO_4 (b) HCl
(c) NaCl (d) $CaCl_2$

Answers					
	125. (c)	128. (c)	131. (c)	134. (b)	137. (b)
	126. (d)	129. (c)	132. (b)	135. (d)	138. (d)
	127. (d)	130. (b)	133. (c)	136. (d)	139. (c)

140. The hardness of water intended for drinking purpose ranges from
(a) < 100 ppm
(b) < 50 ppm
(c) 150 - 300 ppm
(d) 100 - 150 ppm

141. Average gestation length in cattle is
(a) 280 days (b) 380 days
(c) 480 days (d) 580 days

142. Hallikar is a breed of
(a) Cattle (b) Sheep
(c) Goat (d) Pig

143. Total numbers of teats present in goat are
(a) Four (b) Three
(c) Two (d) One

144. White leg horn is a poultry breed kept for
(a) Egg (b) Meat
(c) Both (d) None

145. Male cat is called
(a) Queen (b) Tom
(c) Billy (d) Mew Mew

146. Colostrum is generally fed to
(a) Adult cow (b) Adult buffalo
(c) Young calves (d) Heifer

147. Ear notching is more common method of identifying
(a) Pig (b) Cattle
(c) Sheep (d) Poultry

148. Corrugated asbestos sheets are the materials of choice for constructing.
(a) Roof (b) Floor
(c) Partitions (d) All of these

149. One of the following straw is generally not offered to animal for feeding
(a) Paddy (b) Oat
(c) Maize (d) Napier

150. Which country accommodates the highest number of buffaloes in the world ?
(a) China (b) India
(c) Indonesia (d) Thailand

151. The structural and functional unit of body is
(a) Cell (b) Tissue
(c) System (d) Organ

152. Which of the following is the organ of detoxification ?
(a) Liver (b) Gall bladder
(c) Spleen (d) Pancreas

153. Birds reared for meat productions are known as
(a) Layer (b) Broiler
(c) Culled
(d) None of the above

154. Highest semen volume is evaculated by
(a) Poultry (b) Pig
(c) Ram (d) Cattle

155. Identify the sugar present in milk :
(a) Fructose (b) Sucrose
(c) Lactose (d) Mannose

156. Identify the world smallest breed of dog
(a) Chow chow (b) Chihuahua
(c) Pug (d) Pomeranian

157. Pashmina is the name given for
(a) Hair of Angora goat
(b) Hair of Buffalo
(c) Hair of Kashmiri goat
(d) Meat of goat

158. Indian camel has
(a) Single hump (b) Double hump
(c) Three humps (d) No humps

Answers						
	140. (d)	143. (c)	146. (c)	149. (a)	152. (a)	**155. (c)**
	141. (a)	144. (a)	147. (a)	150. (b)	153. (b)	**156. (b)**
	142. (a)	145. (b)	148. (a)	151. (a)	154. (b)	**157. (c)**
						158. (a)

159. One of the animal possess undivided hoof
(a) Horse (b) Cattle
(c) Buffalo (d) Sheep

160. Colour of buffalo milk is
(a) White (b) Yellowish white
(c) Yellow (d) Red

161. The classical unit of inheritance is
(a) Tetrad (b) Gene
(c) Polar body (d) Antibody

162. Father of genetics is
(a) Johannsen (b) Charles Darwin
(c) G. Mendel (d) Lamarck

163. _____ coined the term chromosome,
(a) W. Waldeyer (b) G. Mendel
(c) De Vries (d) Lamarck

164. _____ discovered the blood groups of man
(a) Waldeyer (b) W. Flemming
(c) H. J. Muller (d) Landsteiner

165. The chromosome number in pig is,
(a) 64 (b) 78
(c) 28 (d) 38

166. Scientist(s) who proposed double helix structure of DNA is/are
(a) Watson (b) Hershey & Chase
(c) Wilkins (d) Watson and Crick

167. The diploid chromosome number in chicken is
(a) 76 (b) 78
(c) 74 (d) 68

168. The increase in vigor or growth of a hybrid over the parents is known as,
(a) Hybrid (b) Hereditary
(c) Heterosis
(d) All the three together

169. The central dogma of molecular genetics was proposed by,
(a) Kornberg (b) Minonad
(c) Khorana (d) Crick

170. Adenine of RNA will pair with,
(a) Thymine (b) Uracil
(c) Cytosine (d) Guanine

171. The discovery of cell was made by
(a) Robert Hook (b) Priestly
(c) Van Mohl (d) Leven Hock

172. Common in both DNA and RNA
(a) Adenine (b) Guanine
(c) Adenine and Guanine
(d) Cytosine

173. The basic unit of life is
(a) Cell (b) Protoplasm
(c) DNA (d) Gene

174. The basic mechanism of hereditary transmission is
(a) Sexual reproduction
(b) Polyploidy
(c) Mitotic division
(d) Splitting of chromosome

175. First organized plan to improve rural cattle in India
(a) Grading
(b) Operation flood
(c) Key village scheme
(d) Integrated cattle development project

176. The ultimate source of organic variation is
(a) Sexual reproduction
(b) Natural selection
(c) Mutation
(d) Cross breeding

Answers

159. (a)	**163. (a)**	**167. (b)**	**171. (a)**	**175. (c)**
160. (a)	**164. (d)**	**168. (c)**	**172. (c)**	**176. (b)**
161. (b)	**165. (d)**	**169. (d)**	**173. (a)**	
162. (c)	**166. (d)**	**170. (b)**	**174. (d)**	

177. Avikalin is cross between _____ and Malpura,
(a) Merino (b) Rambouillet
(c) Chokla (d) Suffollk

178. Milk fever is caused by
(a) Hypoglycemea (b) Hypo-calcimia
(c) Hypo-Mangesemia
(d) Bacterial infection

179. Karan Swiss breed of cattle is developed by
(a) Hariana × Brown swiss
(b) Sahiwal × Brown swiss
(c) Tharparkar × Brown swiss
(d) Gir × Brown swiss

180. How many sex chromosomes are there in the nucleus of a fertilized animal ovum ?
(a) 1 (b) 2
(c) 3 (d) 4

181. The number of chromosomes in cattle and buffalo are
(a) 60 and 50 (b) 50 and 60
(c) 50 and 40 (d) 60 and 60

182. Most of the table eggs produced in the world today are by _____
(a) Australorp
(b) White leg horn
(c) New hampshire
(d) Aseel

183. Avivastra, a fine wool breed developed by crossing Rambouillet rams with
(a) Chokla (b) Malpura
(c) Bikaner (d) Gaddi

184. Karan Fries is result of
(a) Tharparkar × HF
(b) Deoni × HF
(c) Rathi × HF (d) Ongole × HF

185. The chromosome number of swamp buffalo and riverine buffalo are
(a) 48 and 50 (b) 50 and 48
(c) 50 and 50 (d) 49 and 51

186. Hepatitis is an indication for the disorder of
(a) Kidney (b) Liver
(c) Brain (d) Stomach

187. Normal life span of red blood cell is
(a) 180 days (b) 120 days
(c) 80 days (d) 200 days

188. Rh factor is associated with
(a) Sputum (b) Bile
(c) Cerebrospinal fluid (d) Blood

189. A person associated with high temperature is likely to have
(a) Low pulse rate
(b) High pulse rate
(c) Normal
(d) Very low pulse rate

190. Leukemia means
(a) Skin disorder (b) Blood cancer
(c) Type of jaundice
(d) Eye infection

191. Epilepsy is associated with
(a) Nervous system
(b) Gastro intestinal tract
(c) Urinary system
(d) Mascule skeletal system

192. Expand AIDS,
(a) Acquired infectious disease
(b) Auto immuno disorder
(c) Acquired immunodeficiency syndrome
(d) Acquired intermittent disease syndrome

Answers

177. (b)	180. (b)	183. (a)	186. (b)	189. (b)	192. (c)
178. (b)	181. (b)	184. (a)	187. (b)	190. (b)	
179. (b)	182. (b)	185. (a)	188. (d)	191. (a)	

193. Tuberculosis typically a chronic infectious disease of cattle is caused by
(a) Mycobacterium bovis
(b) M. tuberculosis
(c) M. avium
(d) M. leprae

194. Oncology is a study of
(a) Tumours (b) Insects
(c) Cells (d) Plants

195. Anaemia is defined as
(a) Decrease in protein in blood
(b) Decrease in protein in urine
(c) Decrease in haemoglobin content in blood
(d) Decrease in antibody level in blood

196. Pneumonia is
(a) Disorder of kidney
(b) Disorder of lungs
(c) Disorder of liver
(d) Disorder of brain

197. Biopsy is
(a) Collection and examination of tissue from living animal
(b) Collection and examination of blood from living animal
(c) Collection and examination of cerebrospinal fluid from living animal
(d) Collection and examination of feces from living animal

198. Following is the essential amino-acid for poultry
(a) Tyrosine
(b) Proline
(c) Cystine
(d) Glycine

199. Urea cannot be utilized as Protein source by
(a) Sheep (b) Horse
(c) Camel (d) Cow

200. Approximate weight of rumen contents as % body weight in adult buffalo is
(a) 30-35 % (b) 40-45 %
(c) 20-25 % (d) 15-20 %

201. Browsing is the feeding habit exhibited by
(a) Sheep (b) Camel
(c) Goat (d) Rabbit

202. Energy metabolism needs
(a) Vitamin A
(b) Vitamin B-complex
(c) Vitamin D
(d) Vitamin K

203. Coprophagy is the normal habit of
(a) Elephant (b) Rabbit
(c) Cat (d) Horse

204. Rickets is caused by deficiency of
(a) Calcium
(b) Vitamin D
(c) Both
(d) Any of A and B

205. Piglet anaemia is caused by deficiency of
(a) Copper
(b) Iron
(c) Cobalt
(d) Any of the (a), (b) or (c)

○○○○○

Answers

193. (a)	196. (b)	199. (b)	202. (b)	205. (b)
194. (a)	197. (a)	200. (c)	203. (b)	
195. (c)	198. (d)	201. (c)	204. (d)	

15 Fisheries Science

1. To get 40 tonnes of nitrogen/ha how much *Azolla* can be used
(a) 20 tonnes (b) 30 tonnes
(c) 40 tonnes (d) 50 tonnes

2. Dorsal fin erosion in fish is due to deficiency of which amino acid
(a) Lysine (b) Histidine
(c) Tryptophan (d) Leucine

3. Shrimp production / ha is maximum in which state
(a) Andhra Pradesh (b) Tamil Nadu
(c) West Bengal (d) Goa

4. Biodrum refers to
(a) Ozoniser (b) Biofilter
(c) Machine (d) Weeder

5. Chromosome number in *Penaeus monodon* is
(a) 50 (b) 88
(c) 46 (d) 36

6. Chromosome number in Indian Major Carps (IMC) Rohu is
(a) 50 (b) 46
(c) 88 (d) 22

7. First transgenic fish production, associated group –
(a) *Zhu et al.* (b) *Palmitter et al.*
(c) *Chu et al.* (d) *Dabla et al.*

8. One million carps spawn weighs
(a) 150 g (b) 600 g
(c) 1500 g (d) 250 g

9. Black pearl is obtained from –
(a) *P. margaratifera* (b) *P. maxima*
(c) *P. fucuta* (d) *P. sutchi*

10. Main composition of fish inducing agent (Ova prim) is
(a) LHRA (b) LHRA-analogue
(C) G n RH (d) FSH

11. CIFAX is developed by which ICAR institution
(a) CIBA (b) NBFGR
(c) CICFRI (d) CIFA

12. Scoliosis and Lordosis is due to deficiency of
(a) Vitamin - A
(b) Vitamin - C
(c) Vitamin - B complex
(d) Vitamin - D

13. Beche-de-mere obtained from
(a) Sea cucumben (b) Seafen
(c) Sea lily (d) Sea turtle

14. Pearl spot is known as
(a) *E. suratensis* (b) *T. nilotica*
(c) *Magil cephalus*
(d) *Scylla serrata*

15. Fresh water snake is
(a) *Wallaga attu* (b) *M. armatus*
(c) *C. batrachus* (d) *M. seenghala*

16. Fish cell lines are used for
(a) Bacteria (b) Virus
(c) Protozoan (d) Ectoparasites

Answers

1. (c)	4. (b)	7. (a)	10. (b)	13. (a)	16. (b)
2. (a)	5. (b)	8. (c)	11. (d)	14. (a)	
3. (b)	6. (a)	9. (a)	12. (b)	15. (a)	

17. Seaweed *Nymphea* produces
(a) Alginic acid (b) Agar
(c) Caragenen (d) Biotoxin

18. Squid jigging employs the principle of
(a) Color (b) Smell
(c) Light (d) Electric current

19. To minimize the cannibalism of *Wallaga attu* which color is given to tanks-
(a) Green (b) Red
(c) Blue (d) Violet

20. Area of Indian EEZ (Exclusive Economic Zone) is
(a) 2·02 million km^2
(b) 12 million km^2
(c) 5 million km^2
(d) 1 million km^2

21. Cage culture started first from
(a) Indonesia (b) Egypt
(c) Japan (d) USA

22. The % of weight gain achieved by selective breeding in Rohu is
(a) 45 (b) 30
(c) 14 (d) 34

23. Fresh water prawns yields eggs @
(a) 100 nos./g (b) 500 nos./g
(c) 1000 nos./g (d) 5000 nos./g

24. The pelagic fish production in India is how much of the total marine production ?
(a) 25 % (b) 50 %
(c) 30 % (d) 10 %

25. The inland fish production is almost how much % of total fish production in India
(a) Over 50 % (b) 30 %
(c) 20 % (d) 40 %

26. Preparations of fish feed by maximizing profit and minimizing cost is possible by
(a) Pearson square
(b) Linear programming
(c) Heat and trail
(d) Complex square

27. In a productive soil, what should be the phosphorus level
(a) 6 - 12 mg/g (b) 3 - 6 mg/g
(c) > 12 mg/g (d) < 2 mg/g

28. A fish seed hatchery can well run by obtaining iron free water from
(a) Tube well (b) Bore well
(c) River (d) Pond

29. Mina Mata Bay disease in Japan happened due to
(a) Methyl mercury
(b) Cadmium poisoning
(c) Hydrochloric acid
(d) Methyl isocyanides

30. Grass carp is used for control of
(a) Phytoplankton (b) Macrophytes
(c) Zooplankton (d) Insects

31. Indian hill trout is
(a) Schizothorax (b) Rohu
(c) *Marieus bola* (d) *Catla*

32. Which one is true fish in the following ?
(a) Dog fish (b) Cattle fish
(c) Star fish (d) Jelly fish

33. In feed, shark gel is used
(a) To increase water stability of feed
(b) Texture
(c) Color
(d) Smell

Answers												
17.	(a)	20.	(a)	23.	(c)	26.	(b)	29.	(a)	32.	(a)
18.	(a)	21.	(a)	24.	(b)	27.	(b)	30.	(b)	33.	(a)
19.	(b)	22.	(d)	25.	(a)	28.	(c)	31.	(c)		

34. Highest capture species in world is
(a) *Peruvian anchori* (b) Salmon
(c) Mackerel (d) Tuna

35. Single most cultured shellfish in world is
(a) *C. gigas* (b) Lobster
(c) Cuttle fish (d) *Scylla serrata*

36. Fish dies after spawning (Catadromous fish)
(a) Trout (b) Atlantic salmon
(c) C. hilsa (d) Eel

37. *Tenulosa ilisha* propagation by
(a) Induced breeding
(b) Wet striping
(c) Both (a) and (b)
(d) None

38. Community Development Programme was started in
(a) 1958 (b) 1953
(c) 1952 (d) 1976

39. For spawning of 1 kg of carp, how much water is required in hatchery
(a) 1 m^3 (b) 10 m^3
(c) 50 m^3 (d) 80 m^3

40. Act of identification of disease is known as
(a) Diagnosis (b) Synthesis
(c) Scoliosis (d) Genesis

41. Widely distributed bivalve along the coast of India is
(a) Calm (b) Oyster
(c) Green mussle (d) Blue mussle

42. One knot in ship is
(a) 1·8 nautical miles/hr
(b) 6 nautical miles/hr
(c) 8 nautical miles/hr
(d) 10 nautical miles/hr

43. Which of the following hormone in fish is used for feminisation ?
(a) 17-β-estradiol (b) Testosterone
(c) HCG (d) PMS

44. Blue color of sea water is due to
(a) Scattering effect of light
(b) Reflection
(c) Diffraction (d) Integration

45. Larvae of fresh water mussle (*L. marginalis*) is
(a) Tocophor (b) Pedivelligen
(c) Glochidium (d) Spat

46. If temperature, salinity increases, what will happen to dissolved oxygen of water ?
(a) Decrease (b) Increase
(c) Remain constant (d) None of these

47. To estimate population variance which test is used ?
(a) t-test (b) Z-test
(c) F-test (d) Correlation

48. Bombay duck is mostly fished by
(a) Gill net (b) Cast net
(c) Dol net (d) Cover pot

49. Widely distributed and cultured fish species in world is
(a) Silver carp (b) Grass carp
(c) Common carp (d) *L. rohita*

50. The best algae for *Penaeus monodon* is
(a) *Chaetocerous* (b) *Skeletonema*
(c) *Chlorella* (d) *Paramyesium*

51. Induced breeding was practiced by people of which country in 1930 ?
(a) Brazil (b) India
(c) China (d) Japan

Answers												
34.	(a)	37.	(b)	40.	(a)	43.	(a)	46.	(a)	49.	(b)
35.	(a)	38.	(c)	41.	(a)	44.	(a)	47.	(c)	50.	(a)
36.	(d)	39.	(a)	42.	(a)	45.	(c)	48.	(c)	51.	(a)

52. Which induced breeding agent developed indigenously ?
(a) Ova prim (b) Ovatide
(c) FSH (d) GnRH

53. IMC (Indian Major Crops) spawns in
(a) Afternoon (b) Morning
(c) Night (d) Evening

54. Diseases found in fish mainly due to
(a) Gram - ve organisms
(b) Gram + ve organisms
(c) Protozoan
(d) Fungus

55. Common name of *Tinca tinca* is
(a) Doctor carp (b) Tench
(c) Loach (d) Major carp

56. Which among the following fish is common carp ?
(a) *L. rohita*
(b) *B. bola*
(c) *Cyprinous carpio*
(d) *M. cephalus*

57. Which day is remembered as first day when induced breeding was carried out in India ?
(a) 10 July, 1957
(b) 10 August, 1957
(c) 15 May, 1960
(d) 10 June, 1960

58. First triploid in fish was produced by
(a) Swarup et al
(b) Palmitter et al
(c) Minimoto et al
(d) Zhu et al

59. Annually, total fisheries potential of India is
(a) 8.4 mt (b) 6.4 mt
(c) 6.2 mt (d) 10 mt

60. Which of the following is not a bony fish ?
(a) Rohu (b) Catla
(c) Prawn (d) Grass carp

61. Cell lines are used in
(a) Viral cell isolation
(b) Immune response studies
(c) Prophylaxis
(d) Bacterial cell isolation

62. Equipment used for measuring the gross energy is
(a) HPLC
(b) GLC
(c) Bomb Calorimeter
(d) Spectrophotometer

63. Scientific name of golden snapper is
(a) *Lutjanus sp.* (b) *S. guttatus*
(c) *S. commersoni* (d) *Lates calcarifer*

64. Optimum protein requirement for *P. monodon* is
(a) 20 % (b) 25 %
(c) 40 % (d) 50 %

65. Dominant species of mussel available in East Coast of India is
(a) *Perna indica*
(b) *Perna viridis*
(c) *Lamellidens marginalis*
(d) *Parassia corrugata*

66. Larvae of eel is known as
(a) Leptocephalus (b) Cyphonata
(c) Phyllosoma (d) Spat

67. The marine shrimp that does not come to brackish water for breeding is
(a) *P. monodon* (b) *P. indica*
(c) *M. rosenbergii* (d) *P. stylifera*

Answers

52. (b)	55. (a)	58. (a)	61. (a)	64. (c)	67. (d)
53. (b)	56. (c)	59. (a)	62. (c)	65. (b)	
54. (a)	57. (a)	60. (c)	63. (a)	66. (a)	

68. Marine products export earning of India during 2004 - 2005 (Rs. in crores)
(a) 6841 (b) 4000
(c) 3000 (d) 2000

69. Trichodesmium causes ………, which kills the fishes and other organisms
(a) White tide (b) Blue tide
(c) Red tide (d) Yellow tide

70. Two fauling organisms of crabt are
(a) Isopods and myriopods
(b) Blue and green mussle
(c) Barnacles and oysters
(d) Cardium and mya

71. Graphic representation of trophic level in an ecosystem is known as
(a) Food chain (b) Food web
(c) Cold chain (d) Sulphur chain

72. Migration from fresh water to marine water for reproduction is known as
(a) Anadromous (b) Catadromous
(c) Amphidromous (d) Potamodromous

73. Indian reservoirs produce fishes annually
(a) 10 kg/ha (b) 15 kg/ha
(c) 20 kg/ha (d) 40 kg/ha

74. Gear used in deepwater to capture fish in reservoir is
(a) Tramel net (b) Trawl net
(c) Gill net (d) Scine net

75. Larvicidal fish is
(a) *Gambusia affinis* (b) *Catla catla*
(c) *Tilapia* (d) *Labeo rohita*

76. Chlorotetracycline is obtained from
(a) Virus (b) Protozoa
(c) Metazoans (d) Bacteria

77. Fishes possessing only maternal inheritance is known as
(a) Androgenesis (b) Gynogenesis
(c) Oognesis (d) Parthenogenesi

78. ……… chemicals is used to induc triploids
(a) Nitrous oxide
(b) Sulphuric acid
(c) Hydrochloric acid
(d) Calcium oxide

79. Fishes with foreign gene is known a
(a) Foreign fish (b) Exotic fish
(c) Indigenous fish (d) Transgenic fisl

80. Process that nutrient rich subsurfac water come to surface is known as
(a) Upwelling (b) Downwelling
(c) Upswelling (d) Downswelling

81. Gas bubble disease is associated wit super saturation of
(a) O_2 / N_2 (b) CO_2
(c) SO_2 (d) NH_3 / H_2S

82. Active ingredient of Nuvan is
(a) DAP
(b) DDT
(c) DDVP
(d) Bleaching powder

83. Device used to draw eggs for microscopi study is known as
(a) Spatula (b) Scalpel
(c) Canula (d) Dracula

84. Freezing at - 196 °C is known as
(a) Rapid freezing (b) Slow freezing
(c) Chilling (d) Cryogenic

85. Exclusive Economic Zone of Indi extends from shore to ……… nautica miles
(a) 320 (b) 350
(c) 200 (d) 180

Answers

68. (a)	71. (a)	74. (c)	77. (b)	80. (a)	83. (c
69. (c)	72. (b)	75. (a)	78. (a)	81. (a)	84. (d
70. (c)	73. (c)	76. (d)	79. (d)	82. (c)	85. (c

6. Material for settlement of Oyster larvae is known as
(a) Spat (b) Cultch
(c) Claries (d) Butch

7. Fat digesting enzyme is .....
(a) Amylase (b) Diastase
(c) Lipase (d) Cellulase

8. Active components of Mahua Oil Cake is
(a) Rotenone (b) Acid
(c) Saponin (d) Menthonine

9. Crustacean known as sea lice
(a) Argulus (b) Caligus
(c) Cymothoa (d) Ergasilus.

0. Optimum salinity requirements for the breeding of *Macrobrachium malcolmsonii*
(a) 12 - 14 ppt (b) 10 - 15 ppt
(c) 18 - 20 ppt (d) 25 - 28 ppt

1. Loktak lake is located in which state
(a) Meghalaya
(b) Arunachal Pradesh
(c) Manipur
(d) Andhra Pradesh

2. Central Institute of Fresh water Aquaculture is located at
(a) W.B. (b) Bihar
(c) M.P. (d) Orrisa

3. Scientific name of sea cock-up / sea bass is known as
(a) *S. lineolatus* (b) *L. rohita*
(c) *L. calcarifer* (d) *M. cephalus*

4. Which of the following species is hermaphrodite ?
(a) *O. mossambicus*
(b) *M. cephallus*
(c) *Epinephilus taurina*
(d) *Chanos chanos*

95. The main causative agent of Epizootic Ulcerative Syndrome (EVS) is
(a) *Aphanomyces invadens*
(b) *A. hydrophilla*
(c) *Pseudomonas maxima*
(d) *Myxobolus cyprini*

96. Whirling disease of trout / salmon is associated with
(a) *Myxosoma cerebralis*
(b) *M. atri*
(c) *I. multitilis*
(d) *S. domergue*

97. Fish Fisheries Extension unit in India was started at
(a) CMFRI (b) CIFRI
(c) CIFE (d) CIFA

98. Head quarter of World Fish Centre (earlier ICLARM) is located at
(a) Malaysia (b) Indonesia
(c) Germany (d) USA

99. Per capita fish availability in India is (annually)
(a) 15 kg (b) 6 kg
(c) 8 kg (d) 11 kg

100. Evaluation of profitability is calculated by
(a) NPV (b) B : C ratio
(c) IRR (d) All of these

101. Blood pigment of crustaceans is known as
(a) Haemoglobin (b) Haemocyanin
(c) Phycocyanin (d) Phycobilin

102. Oxidation is related to
(a) Protein (b) Carbohydrate
(c) Vitamin (d) Fat

Answers						
86. (b)	89. (b)	92. (d)	95. (a)	98. (b)	101. (b)
87. (c)	90. (c)	93. (c)	96. (a)	99. (c)	102. (d)
88. (c)	91. (c)	94. (c)	97. (b)	100. (d)	

103. Phosphorus and nitrogen content is highest in
(a) Poultry manure (b) Cow dung
(c) Pig manure (d) Rabbit manure

104. Species contributing largest to fish catch in India
(a) Indian mackerel
(b) Sardin
(c) Bombay duck
(d) Tuna

105. Most preferred food item of carp spawn
(a) Rotifer (b) Phytoplankton
(c) *Chlorella* (d) Chaetocerous

106. Indian river prawn is associated with
(a) *M. rosenbergii* (b) *M. lameraii*
(c) *M. malcolmsonii* (d) *M. idea*

107. The largest reservoir of India is located in
(a) A.P. (b) H.P.
(c) M.P. (d) Orrisa

108. During viral infections ..... cells in the blood increases its number
(a) R.B.C. (b) Neutrophil
(c) Basophil (d) W.B.C.

109. The largest quantity of prawns and Shrimps are produced by
(a) Malaysia (b) India
(c) USA (d) Thailand

110. Global marine fish production is the highest in
(a) North America (b) Africa
(c) Asia (d) Australia

111. When EL Nino occurs, it affects the countries or the region by way of
(a) Floods (b) Cyclones
(c) Drought (d) Tornedo

112. About 80 % of the worlds fish meal supply comes from
(a) South America (b) Australia
(c) Europe (d) Africa

113. The contribution of aquaculture to total fish production in India is about
(a) 32 % (b) 22 %
(c) 50 % (d) 40 %

114. Tapti estuary is in the state of
(a) Goa (b) Kerala
(c) Maharastra (d) Gujarat

115. Carp fry production in India how stand at about
(a) 10, 000 million
(b) 17, 000 million
(c) 21, 000 million
(d) 32, 000 million

116. Shark liver oil is a good source of
(a) Vitamin - E (b) Vitamin - A
(c) Lipids (d) Minerals

117. A commercially important airbreathing fish in the Indian sub continent is
(a) *Anguilla bengalensis*
(b) *Clupea garua*
(c) *Notopterus chitala*
(d) *Heteropneustes chitala*

118. The scientific name of the Indian shad is
(a) *Polydactylus indicus*
(b) *Tenualosa ilisha*
(c) *Rastrelliger kanagurta*
(d) *Harpodon nehereus*

119. The national fish of India is
(a) *Rastrelliger kanagurta*
(a) *Labeo rohita*
(c) *Catla catla*
(d) *Clarias batrachus*

Answers						
103. (a)	106. (c)	109. (d)	112. (a)	115. (c)	118. (b)
104. (b)	107. (d)	110. (c)	113. (c)	116. (b)	119. (a)
105. (a)	108. (d)	111. (b)	114. (d)	117. (d)	

120. The largest ocean in the world is
(a) Indian (b) Pacific
(c) Atlantic (d) Antartic

121. The most dominant species of krill is
(a) *Sardinops sagax*
(b) *Engraulis ringens*
(c) *Euphasia superba*
(d) *Nemipterus japonica*

122. The continental slope extends from
(a) 200 - 500 m (b) 100 - 200 m
(c) 500 - 700 m (d) 150 - 450 m

123. Yellowfin tuna is
(a) *Katswonus pelamis*
(b) *Auxis thazard*
(c) *Gymnosarda unicolor*
(d) *Thunnus albacores*

124. Phyllosoma is the larvae of
(a) Bivalves (b) Oysters
(c) Lobster (d) Cuttle Fish

125. Coral reefs are found in India along the coasts of
(a) Sagar Islands
(b) Kerala
(c) Andaman & Nicobar Islands
(d) Andhra Pradesh

126. Rihand reservoir is known for the fishery of large sized
(a) *C. mrigala* (b) *W. attu*
(c) *P. pangasius* (d) *C. catla*

127. Nagarjunasagar is located in the state of
(a) T.N. (b) A.P.
(c) Kerala (d) Maharashtra

128. The well known reservoir on Tapti river is
(a) Hirakud (b) Ukai
(c) Aliyar (d) Sardar sarovar

129. The common indigenous larval fish is
(a) *Chanda nama*
(b) *Labeo rohita*
(c) *Channa punctatus*
(d) *Clarias batrachus*

130. Argulus is commonly found in ponds with
(a) Low saline water
(b) Low alkainity
(c) High turbidity
(d) High organic matter

131. *Ichthyophthiris multifilis* belongs to the group of
(a) Fungi (b) Nematode
(c) Crustacea (d) Protozoa

132. Organisms that do not tolerate wide ranges of salinity are
(a) Euryhaline
(b) Eurythermal
(c) Stenohaline
(d) Stenothermal

133. Freshwater pearls can be developed in
(a) *Pila globosa*
(b) *Crassostrea madrasensis*
(c) *Pinctada fucuta*
(d) *Lamellidens marginalis*

134. One of the largest breeding grounds for marine turtles is located in
(a) Orissa (b) Tamil Nadu
(c) Gujarat (d) Karnataka

135. Seaweeds are rich source of
(a) Carbohydrates (b) Protein
(c) Iodine (d) Fat

136. Megalopa is associated with
(a) Octopus (b) Starfish
(c) Prawns (d) Crabs

Answers						
	120. (b)	123. (d)	126. (d)	129. (a)	132. (c)	135. (c)
	121. (b)	124. (c)	127. (b)	130. (d)	133. (d)	136. (d)
	122. (a)	125. (c)	128. (b)	131. (d)	134. (a)	

137. Mowrin kills fish through
(a) Asphyxiation
(b) Increasing the ammonia level
(c) Production of Hydrogen Sulphide
(d) Haemolysing the blood cells

138. The Indian edible oyster is
(a) *Perna viridis*
(b) *Crassostrea madrasensis*
(c) *Varuna litterata*
(d) *Sepia aculeata*

139. Chinese dip-nets are most common in
(a) W.B. (b) Gujarat
(c) Kerala (d) A.P.

140. The most preferred food of carp fry in nurseries are
(a) Ceriodaphnia (b) Asplanchna
(c) Keratella (d) Moina

141. Pony fishes are
(a) Polynemids (b) Silver bellies
(c) Carangids (d) Croakers

142. CM technique used to estimate primary productivity was developed by
(a) Niel Armstrong
(b) Nielson Mandella
(c) Steeman & Nielson
(d) Hillman & Soderhall

143. The fertilized eggs of Catla take about _ to _ hrs for hatching at 30°C
(a) 10 to 12 (b) 12 to 14
(c) 14 to 18 (d) 18 to 24

144. The dominant Mahseer in Himachal Pradesh is
(a) *Tor khudree* (b) *Tor tor*
(c) *Tor putitora* (d) *Tor mosal*

145. Clarias batrachus belongs to family
(a) Pangasidae
(b) Claridae
(c) Heteropneustidae
(d) Pomacentridae

146. The most widely cultured fish in the brackish waterponds of S.E. Asia is
(a) Mugil (b) Sea bass
(c) Milk fish (d) Pearl spot

147. Integrated farming of rice and fish results in an increase of rice production by
(a) 5-8 % (b) 8-12 %
(c) 15-20 % (d) 25-30 %

148. _____ leads all the Indian states in aquaculture production
(a) W.B. (b) Orrisa
(c) Gujarat (d) Kerala

149. The European eel breeds in the _____ sea
(a) China Sea (b) Red Sea
(c) Sargasso Sea (d) Arabian Sea

150. The blue green algae _____ contain 71 % protein
(a) Spirulina (b) Microcystis
(c) Anabaena (d) Verticella

151. _____ is the only reservoir in the country where golden mahseer _____ forms good catches
(a) Gandhisagar, *Tor putitora*
(b) Hirakund, *Tor putitora*
(c) Govindasagar, *Tor putitora*
(d) Nagarjunasagar, *Tor putitora*

152. *Eichhornia crassipes* was introduced in India from
(a) Germany (b) Indonesia
(c) USA (d) China

Answers						
	137. (d)	140. (d)	143. (d)	146. (c)	149. (c)	152. (c)
	138. (b)	141. (b)	144. (c)	147. (c)	150. (a)	
	139. (c)	142. (c)	145. (b)	148. (a)	151. (c)	

3. *Aspergillus spp.* produces toxin known as
(a) Neurotoxin (b) Aflatoxin
(c) Figuatoxin (d) Sarcotoxin

4. Large quantity of tuna is captured in laccadives by employing _____ Methods of fishing.
(a) Trawling (b) Long line
(c) Hook & line (d) Pole and line

5. The most efficient gear used for exploiting the pelagic fishery resources along Karnataka coast is .....
(a) Rampani (b) Beachsiene
(c) Dol net (d) Scoop net

6. Lines joining points of equal depths in oceans are called
(a) Isobar (b) Isopleth
(c) Isobath (d) Isotherm

7. On an average, the body of fish contains..... protein
(a) 10 % (b) 14 %
(c) 15-22 % (d) 25-30 %

8. ..... is the Asias largest brackish water lagoon
(a) Vembnand lake (b) Pulicat lake
(c) Chilka lake (d) Hukitola lake

9. Portion of the lake basin situated below the sea level is known as
(a) Apex point
(b) End point
(c) Cryptodepression
(d) Mean sea level

0. ..... serves as highways for diadromous fishes
(a) Backwater (b) River
(c) Estuary (d) Canals

161. Belly scutes are present in
(a) Sardinella (b) Leiognathus
(c) Mugil (d) Chanos

162. The following Oceans exploited nearer to its maximum fisheries potential
(a) Pacific (b) Atlantic
(c) Indian (d) Antarctic

163. A breed of fish produced in the same year is known as
(a) Year class
(b) Age group
(c) Recruitments
(d) None of the above

164. In fish population studies, e^{-z} indicates
(a) Survival rate
(b) Mortality rate
(c) Growth rate
(d) Recruitment

165. Lentic habitat includes
(a) Lakes (b) Rivers
(c) Oceans (d) Estuaries

166. Alima is the larvae of
(a) Crab (b) Lobster
(c) Squilla (d) Prawn

167. The fecundity of an individual fish is called
(a) Absolute fecundity
(b) Relative fecundity
(c) Ovarian fecundity
(d) None

168. In VBGF, the value of to indicates
(a) Age of fish at capture
(b) Length of fish at zero age
(c) Age of fish at zero length
(d) Age of fish at first maturity

nswers 153. (b) 156. (c) 159. (c) 162. (b) 165. (a) 168. (c)
154. (d) 157. (c) 160. (c) 163. (a) 166. (c)
155. (a) 158. (c) 161. (a) 164. (b) 167. (a)

169. In the length weight relationship of the form, $Y = ax^b$, allometry is indicated if the value of b is greater than
(a) 0·05 (b) 1·0
(c) 3·0 (d) 10·0

170. Occurrence of senile fish in a population indicates
(a) Over exploitation
(b) Migration
(c) Under exploitation
(d) None

171. The magnitude of natural mortality of a fish stock in the sea depends mainly on
(a) Diseases
(b) Predation
(c) Death due to old age
(d) Fishing efforts

172. The number of barbels in catfish family Tachysuridae are
(a) Two pair (b) Three pair
(c) Four pair (d) One pair

173. The scientific name of Indian halibut is
(a) *Harpodon nehereus*
(b) *Gambusia affinis*
(c) *Chanos chanos*
(d) *Psettodes erumei*

174. Which among the following organisms is considered as an indicator species for the abundance of oil sardine ?
(a) *Skeletonema costatum*
(b) *Fragilaria oceanica*
(c) *Brachionus plicatilis*
(d) *Artemia salina*

175. The second stage in the food chain of an aquatic ecosystem is mainly contributed by
(a) Macrophytes
(b) Benthos
(c) Zooplankton
(d) Fin fish

176. The major pollution compounds released in the aquatic ecosystem from oil spillage is
(a) Nitrogen
(b) Hydrocarbon
(c) Phosphates
(d) Ammonia

177. At every trophic level, the amount of energy lost is about
(a) 50 % (b) 65 %
(c) 80 % (d) 90 %

178. Epilimnetic zone is the layer of lake water which lies
(a) Below thermocline
(b) Near the bottom
(c) Above thermocline
(d) At the thermocline region

179. The Elasmobranchs contribute the maximum annual landing in India from
(a) North east (b) South east
(c) South west (d) North east

180. The productivity of a reservoir depends on its
(a) Area
(b) Plankton resources
(c) Stocking rate, exploitation methods and conservation methods
(d) All

181. Adults of which of the following fishes are illiophagous in their feeding habit
(a) *Etroplus suratensis*
(b) *Mugil cephalus*
(c) *Mugil persia*
(d) *Polynemus tetradactylus*

Answers 169. (c) 172. (d) 175. (c) 178. (c) 181. (b)
170. (c) 173. (d) 176. (b) 179. (b)
171. (b) 174. (b) 177. (d) 180. (d)

182. Which of the following fishes uses the sticky mucus secreted its skin for preparing nests for egg laying ?
(a) Gasterosteus (b) Trichogaster
(c) Protopterus (d) Lepidopterus

183. Which one of the following is not an exotic species ?
(a) *Tinca tinca*
(b) *Osphronemus gorami*
(c) *Chanos chanos*
(d) *Cyprinus carpio*

184. In temperate lake, the surface temperature
(a) Never goes above 4°C
(b) Varies above and below 4°C
(c) Always remains above 4°C
(d) Remains above 4°C

185. In which of the following group of phytoplankton silica forms the basis of the skeletal systems ?
(a) Chlorophyceae
(b) Cyanophyceae
(c) Bacillariophyceae
(d) None

186. Amount of organic matter stored after expenditure in terms of respiration is termed as
(a) Gross primary production
(b) Net primary production
(c) Respiration
(d) none

187. The scientific name of goat fish is
(a) *Saurida tumbil*
(b) *Sillago sihama*
(c) *Upeneus vittatus*
(d) *Cybium gutatus*

188. Which one of the following is an essential fatty acid ?
(a) Oleic acid
(b) Palmitic acid
(c) Arachidonic acid
(d) All of these

189. Which among the following is a typical anaerobic bacteria ?
(a) *E. coli*
(b) *Faecal streptococci*
(c) *Bacillus subtilis*
(d) *Clostridium botulinum*

190. Cathepsins are
(a) Proteolytic enzymes
(b) Lipases
(c) Nucleotidase
(d) Kinase

191. Gel filtration separates protein based on their
(a) Molecular weight
(b) Molecular charge
(c) Atomic number
(d) Both charge and size

192. Vitamin B_{12} is
(a) Alfa-tocopherol
(b) Ascorbic acid
(c) Cyano cobalamine
(d) Citric acid

193. Arginine is a _____ amino acids
(a) An acidic
(b) Basic
(c) Sulphur containing
(d) Methionine containing

194. Isinglass is made from
(a) Shark fins
(b) Fish maws
(c) Prawn shell
(d) Chitin

Answers

182. (a)	185. (c)	188. (c)	191. (d)	194. (b)
183. (c)	186. (b)	189. (d)	192. (c)	
184. (b)	187. (c)	190. (a)	193. (b)	

195. Major fatty acid seen in coconut oil is
(a) Oleic acid
(b) Lauric acid
(c) Arachidonic acid
(d) Citric acid

196. Recommended level of chlorination of process water in fish processing plant is
(a) 10 ppm (b) 50 ppm
(c) 100 ppm (d) 150 ppm

197. Chitosan is
(a) Polysaccharide
(b) Polypeptide
(c) Polycyclic aromatic hydrocarbon
(d) Polyester

198. Ambergris is found in
(a) Some sharks (b) Some whale
(c) Dolphins (d) Turtles

199. Melanosis causes
(a) Yellow discolouration in frozen pomfrets
(b) Blacking of prawns
(c) Blue discolouration of crabs
(d) White colouration of fish

200. Match the following

1	LH - RH-A	A.	Minnow
2	Lates calcarifer	B.	Salmon
3	*Pangasius pangasius*	C.	Toxicant
4	Azolla	D.	Insect
5	Calcium carbide	E.	Fertilizer
6	Smolt	F.	Predator
7	*Esomus dandricus*	G.	Nitrogen fixation
8	Potamogeton	H.	Reproduction
9	Anisops	I.	Grass carp
10	Biogas slurry	J.	Molluscs

Answers of matching
(a) 1 H, 2 F, 3 J, 4 G, 5 C, 6 B, 7 A 8 I, 9 D, 10 E
(d) 1 A, 2 J, 3 F, 4 E, 5 C, 6 I, 7 H, 8 D, 9 B, 10 G
(c) 1 F, 2 J, 3 H, 4 G, 5 C, 6 B, 7 A 8 I, 9 D, 10 E
(b) 1 H, 2 F, 3 H, 4 C, 5 B, 6 G, 7 I 8 A, 9 E, 10 D

○○○○○

Answers

195. (b)	198. (b)	
196. (a)	199. (b)	
197. (a)	200. (a)	

16) Plant Biotechnology & Molecular Biology

The microbes play an important role in the catalytic complicated chemical reactions of
(a) Wine productions
(b) Fermentation
(c) Dairy product
(d) All of the above

Bacteria are present everywhere except in
(a) Ice (b) Soil
(c) Sea water (d) Distilled water

Microbiology is a discipline of science dealing with the study of...
(a) Forms and structure of organism
(b) Malignant tissues
(c) Microbes (d) Parasites

The unique properties of each amino acid are determined by its particular -
(a) R-groups (b) H-bonds
(c) Peptide (d) Amino groups

Who introduced the term Biochemistry ?
(a) Marshall Nirenberg
(b) Carl Neuberg
(c) John H. Northrop & Kunitz
(d) Van Helmont

Optical isomerism arises from the presence of
(a) An asymmetric carbon atom
(b) A center of symmetry
(c) A line of symmetry
(d) None

7. Alanine is found in-
(a) Skin (b) Muscles
(c) Brain (d) All of the above

8. Pyruvate is used to produce
(a) Glucose (b) Fructose
(c) Sucrose (d) Maltose

9. In the conversion of pyruvic acid to acetyl co-enzyme A, NAD+ is
(a) Reduced (b) Oxidized
(c) Hydroxylated (d) None

10. In the breakdown of glucose to pyruvic acid, how many enzymes catalyze these successive steps ?
(a) 3 (b) 6 (c) 9 (d) 11

11. During catabolism, glucose is converted to G.6.F. using A.T.P., while in anabolism
(a) Glucose is formed from phosphate ester by hydrolysis.
(b) Glucose is formed from pyruvate
(c) Pyruvate is produced from its enol phosphate by transphosphorylation to ADP
(d) None of these

12. Which among the following contains only one type of nucleic acid ?
(a) Bacteria (b) Virus
(c) Dead virus (d) All

13. The plant virus was first isolated in crystalline form
(a) TMV (b) Bacteriophages
(c) Cyanophages (d) None of these.

nswers									
1. (d)	4. (a)	7. (b)	10. (d)	13. (a)
2. (d)	5. (b)	8. (a)	11. (a)	
3. (c)	6. (a)	9. (a)	12. (b)	

14. Manipulation of the genetic material towards a desired end in a directed & predetermined way is called
(a) Genetic engineering
(b) Gene cloning
(c) recombinant DNA technology
(d) All of the above

15. The molecular scissors used to cut DNA into specific genes of interest are called
(a) Exonucleases
(b) Restriction endonucleases
(c) Ligases
(d) Polymerases

16. A set of disease resistance mechanisms that are not specific to a particular pathogen comes under
(a) Adaptive immunity
(b) Innate immunity
(c) Passive immunity
(d) Active immunity

17 Which of these is/are the characteristic /s of the specific immunity ?
(a) Antigenic specificity
(b) Diversity & self \ nonself recognition
(c) Immunologic memory
(d) All of the above

18. Microbes have a relatively _____that allows the chemical conversions possible.
(a) High metabolic rate
(b) Large surface area
(c) High multiplication rate
(d) All of the above

19. The medium is added continously to the fermentor tank to replace that, which has been fermented. This is true in case of
(a) Batch technique
(b) Continuous flow technique
(c) Both are true
(d) None is true

20. Removal of the topological strain by inducing the negative supercoiling is carried out by
(a) Topoisomerases
(b) DNA gyrases
(c) Primases
(d) DNA polymerases

21. Chromosomal aberration in which two breaks occur in a chromosome & the intercalary segment reunites in a reverse order is categorized as
(a) Duplication (b) Deletion
(c) Inversion (d) Translocation

22. ABO blood groups is a good example for both _____ & multiple allelism
(a) Co dominance
(b) Dominance
(c) Recessive ness
(d) Over dominance

23. Why is the gene that was used by Sheller *et al.* to produce spider silk in transgenic plants called a "synthetic" gene ?
(a) It produces silk fibre, which is a synthetic product in plants
(b) It is assembled from synthesized DNA oligomers
(c) It is a synthesis of proteins from different types of spiders
(d) Some of the amino acids encoded do not occur in nature
(e) It is encodes synthetic components such as an epitope tag

Answers									
14. (d)	17. (d)	20. (b)	23. (b)
15. (b)	18. (d)	21. (c)	
16. (b)	19. (b)	22. (a)	

24. Which of the following statements about astaxanthin is false ?
   (a) It is a carotenoid
   (b) It is normally produced by salmon
   (c) It is a red-orange pigment
   (d) It is produced from terpenoids
   (e) It has anti-oxidant properties

25. You want to know whether the enzyme you have introduced as a transgene in poplar is being expressed in the intended cells at the intended developmental stage. Which technique would be most informative ?
   (a) Microarray
   (b) Immunolocalization
   (c) RNA *in situ* hybridizatiom
   (d) Promoter fusion
   (e) QRT-PCR

26. When producing human serum albumin (HSA) in transgenic plants, what would be an advantage of incorporating the transgene into the chloroplast genome ?
   (a) HSA forms inclusion bodies if expressed in cytoplasm
   (b) HSA becomes allergenic if expressed in cytoplasm
   (c) HSA is toxic to plants if expressed in cytoplasm
   (d) HSA is degraded by plant enzymes if expressed in cytoplasm
   (e) HSA diverts too many amino acids if expressed in cytoplasm

27. Which of the following transgenic methods were used (in separate experiments) in an attempt to increase the prevalence of certain amino acids in seeds ?
   (a) Altered tRNA gene; overexpression of sunflower seed albumin (SSA)
   (b) Altered tRNA gene; overexpression of human serum albumin (HSA)
   (c) Altered rRNA gene; overexpression of sunflower seed albumin (SSA)
   (d) Altered rRNA gene; overexpression of human serum albumin (HSA)
   (e) Altered tRNA gene; repression of sunflower seed albumin (SSA) expression

28. How was luciferase (LUC) with an artificial stop codon used as a control in the experiments involving altered tRNA?
   (a) Diminished LUC expression demonstrated that the altered tRNA could properly recognize stop codons.
   (b) LUC expression demonstrated that the gene was being induced by Lys.
   (c) LUC expression demonstrated that Lys was being substituted for the stop codon by the altered tRNA
   (d) Loss of LUC expression demonstrated that a transversion had occurred, in order to create a stop codon.
   (e) The artificial LUC is an example of a synthetic gene.

29. Which of the following are NOT possible uses for fructans as presented in class?
   (a) Natural insecticides
   (b) Fat substitute
   (c) Paper production
   (d) Sweeteners

Answers 24. (b) 27. (a) 25. (b) 28. (c) 26. (d) 29. (a)

30. Which of the following statements is true regarding the production of transgenic cassava ?
   (a) The release of cyanide was inhibited by immunomodulation
   (b) The release of cyanide was inhibited by antisense gene regulation
   (c) The release of cyanide was inhibited by immunolocalization
   (d) The production of cyanide was enhanced by overexpression of an enzyme
   (e) A non-toxic cyanide derivative was produced by metabolic engineering

31. Which of the following statements regarding manipulation of the flavonol bio-synthetic pathway in tomato is true ?
   (a) Increased flavanol production led to decreased carotenoid production
   (b) Increased flavanol production led to increased carotenoid production
   (c) Increased flavanol production did not affect carotenoid production
   (d) Decreased flavanol production did not increase carotenoid production
   (e) Decreased flavanol production increased carotenoid production

32. Which method enhances vitamin C production ?
   (a) Polymerization of a series of simple sugars
   (b) Partitioning of ascorbate into seed storage proteins
   (c) Derivatization of tocopherols from the shikimate pathway
   (d) Increased enzymatic activity in the beta-carotenoid pathway
   (e) Enzymatic reduction of a component of pectin

33. Which of the following statements concerning the RNA/DNA hybrid oligonucleotides is incorrect ?
   (a) They form a specific hairpin structure that is recognized by the host cell
   (b) They may be synthesized to contain a mutation that will be incorporated into the host genome
   (c) They provide a mechanism for targeted alteration of the plant genome
   (d) They are incorporated using a mechanism that involves host DNA repair machinery
   (e) They hybrid molecule must be introduced into the cell using a binary vector

34. What is a disadvantage of the current use of transgenic antibody fragments to induce resistance to the herbicide picloram ?
   (a) Each antibody molecule can neutralize only one herbicide molecule
   (b) Picloram is an auxinic herbicide, thus the antibodies will neutralize endogenous auxin
   (c) The antibodies induce morphological defects (e.g. epinasty)
   (d) The antibodies are encoded by two seperate polypeptide chains
   (e) The antibodies are quickly degraded by host enzymes, so they have little effect on picloram

Answers 30. (d) 33 (e) 31. (c) 34. (a) 32 (e)

5. Which of the following attempts to increase the utility of fungal herbicides succeeded ?
   (a) Expression of a phytoxic protein at abnormally high levels in Fusarium
   (b) Expression of a phytotoxic protein from Fusarium in another fungal species
   (c) Expression of a phytotoxin resistance protein from Fusarium in a crop plant
   (d) Expression of a phytotoxic protein from Fusarium in a weed
   (e) Expression of a phytotoxic protein from Fusarium in a crop plant

6. Which of the following was an unexpected result connected to the transgenic production of the terpenoid linalool ?
   (a) Increased production of linalool resulted in lower levels of GA hormones
   (b) Increased transgene expression was not strongly correlated with increased levels of linalool
   (c) Transgene expression resulted in production of unexpected enantiomers of linalool
   (d) Linalool accumulation was localized to the nectary
   (e) Increased transgene expression resulted in higher levels of herbivory

7. Introduction of a tobacco mosaic virus transgene into plants in 1986 was used to demonstrate
   (a) Cross-expression
   (b) Co-innoculation
   (c) Co-transformation
   (d) Cross-protection
   (e) Cross-innoculation

38. Which of the following plants produce endosperm following fertilization ?
   (a) Wheat (b) Canola
   (c) Pine (d) Both a & b
   (e) None

39. Which of the following pairs of species best demonstrates the c-value paradox ?
   (a) Arabidopsis and rice
   (b) Rice and maize
   (c) Rice & poplar (d) Rice & wheat

40. Which of the following is most likely to be present in a BAC ?
   (a) cDNA (b) EST
   (c) LB, RB (d) UTR
   (e) opine genes

41. Which of the following statements about basal promoters is true ?
   (a) Basal promoters can be located in the 3' UTR
   (b) Basal promoters direct assembly of the core translation machinery
   (c) Basal promoters are sufficient for expression in the shoot apical meristem
   (d) Basal promoters are necessary for enhancer trapping
   (e) Basal promoters are necessary for heterologous expression

42. Which of the following methods would give you the most precise and accurate information about where and when a given gene is expressed ?
   (a) *in situ* hybridization
   (b) DNA microarray
   (c) Protein microarray
   (d) Reporter gene fusion including introns

Answers 35. (b) 36. (b) 37. (d) 38. (c) 39. (d) 40. (d) 41. (d) 42. (d)

43. Which of the following is involved in seedless watermelon production ?
   (a) Apomixes
   (b) Interspecific crosses
   (c) Tetraploidy
   (d) Both (a) and (b)

44. Which of the following is present on a Ti plasmid, but not on any component of a binary vector system ?
   (a) Vir genes (b) GUS genes
   (c) LB, RB (d) MCS
   (e) Opine genes

45. Why might you find two kanamycin resistance genes on different parts of a T-DNA plasmid ?
   (a) One of the genes could be used for positive selection, and one could be used for negative selection
   (b) One of the genes could be used for selection in plants, and one could be used for selection in bacteria
   (c) This arrangement facilitates site-specific recombination for marker-free selection
   (d) Each gene might have been introduced by a independent co-transformation event

46. Why have transgenic proteins present in crops often been tested in the presence of stomach acid before the plants were released ?
   (a) To see whether the protein will be mutated into a more harmful protein (e.g. prions)
   (b) To see whether the protein can be digested to provide substantially equivalent nutrients
   (c) To see whether the protein will be digestible by an average consumer
   (d) To see whether the protein will persist long enough to cause an allergic reaction

47. Which of the following is true of glyphosate ?
   (a) It has an animal LD 50 of 0.4g/kg
   (b) It is more selective than 2,4-D
   (c) It can be manufactured without a license from the patent holder
   (d) It inhibits the synthesis of branch chain amino acids

48. StarLink is most closely associated with which of the following terms ?
   (a) Glufosinate (b) Event 176
   (c) Cry9 (d) Cry1
   (e) Glyphosate

49. According to the assigned reading, in terms of total area of transgenic crops cultivated in 2001, the four major producers of transgenic crops (ranked highest to lowest) are :
   (a) USA, Argentina, Canada, China
   (b) USA, China, Canada, India
   (c) USA, Canada, China, Argentina
   (d) USA, China, India, Canada

50. The quickest way to produce homozygous breeding lines from heterozygous parents is through :
   (a) Half-seed technique
   (b) Doubled haploids
   (c) Introgression
   (d) Aneuploidy

51. Which of the following organelle lack membrane ?
   (a) Mitochondria (b) Ribosomes
   (c) Microtubules (d) Peroxisomes

Answers 43. (a) 44 (e) 45. (b) 46. (d) 47. (c) 48. (c) 49. (a) 50. (b) 51. (b)

52. Which organelles is/are semi autonomous in nature ?
(a) Mitochondria (b) Chloroplast
(c) Nucleus (d) Both a and b

53. Virions are _____
(a) DNA viruses
(b) RNA viruses
(c) Naked DNA viruses
(d) Naked RNA viruses

54. AIDS lead to destruction of immune system due to depletion of
(a) B - cells (b) T helper cells
(c) Macrophages (d) Plasma cells

55. For cloning of the gene, which among following is not important ?
(a) Vector (b) Host
(c) Restriction enzymes (d) DNase

56. Haploid production cannot be done through
(a) Pollen culture (b) Callus culture
(c) Anther culture (d) Hybridization

57. Chromosome number of *Arabidopsis* is
(a) 4 (b) 5
(c) 6 (d) 7

58. DNA is present in
(a) Nucleus (b) Mitochondria
(c) Chloroplast (d) All the above

59. Ribosomes are synthesized in
(a) Nucleus (b) Nucleolus
(c) Cytoplasm (d) All the above

60. Eukaryotic DNA replication is carried out by
(a) DNA pol α (b) DNA Pol β
(c) DNA Pol μ (d) DNA Pol δ

61. Prokaryotic DNA Polymerase comprises five subunits, which are
(a) $\alpha\beta\mu\delta\varepsilon$ (b) $\alpha_2\beta\beta'\sigma$
(c) $\alpha\varepsilon\delta\omega\omega$ (d) $\alpha\varepsilon\delta\beta\theta$

62. DNA replication occur in which stage of cell division ?
(a) G1 phase (b) G2 phase
(c) S phase (d) M phase

63. During meiosis actual reduction of chromosomes occur in which sub stage?
(a) Anaphase (b) Metaphase
(c) Telophase (d) Prophase

64. RAPD molecular markers are _____ in nature
(a) Dominant (b) Co-dominant
(c) Recessive (d) Neutral

65. AFLP molecular markers are _____ in nature
(a) Dominant (b) Co-dominant
(c) Recessive (d) Neutral

66. Which of the following technique is used for amplification of DNA ?
(a) HPLC (b) PCR
(c) TLC (d) ELISA

67. Which of the following technique is used for DNA fingerprinting ?
(a) HPLC (b) RFLP
(c) TLC (d) ELISA

68. Prions are microorganisms, which consist of _____
(a) DNA and protein
(b) DNA and RNA
(c) DNA, RNA and proteins
(d) Proteins only

69. Taq polymerase used in PCR is
(a) Thermotolerant
(b) Highly processive enzyme
(c) Osmotolerant
(d) All the above

Answers						
	52. (d)	55. (d)	58. (d)	61. (b)	64. (a)	67. (b)
	53. (d)	56. (b)	59. (b)	62. (c)	65. (b)	68. (d)
	54. (b)	57. (b)	60. (d)	63. (a)	66. (b)	69. (a)

70. Transgenic expression study can be done by
(a) Transcription profiling
(b) RT-PCR
(c) Western hybridisation
(d) All of the above

71. Which of the following are biological mutagens ?
(a) UV radiation (b) Transposons
(c) Ionic radiation
(d) Ethidium bromide

72. When pyrimidine is substituted by purines and vice versa, this type of mutation is known as
(a) Transition (b) Transversion
(c) Non sense mutation
(d) Miss sense mutation

73. Bt cotton is resistant to bollworm, it is due to
(a) Bt is repellent to bollworm
(b) Bt is contact poison for bollworm
(c) Bt is stomach poison; it changes the permeability of stomach due to generation of pores in alkaline environment of stomach
(d) Bt is causing death due to asphagsiation of insect

74. In Bt cotton expression of crystal protein occurs
(a) On surface of leaves
(b) Systemic expression
(c) Only in stem part
(d) Stem and leaves

75. Most commonly used method for transformation of plants is
(a) Agrobacterium mediated transformation
(b) Protoplast method
(c) Electrotransformation
(d) Micro injection

76. Most commonly used method for transformation of animals is
(a) Agrobacterium mediated transformation
(b) Protoplast method
(c) Electrotransformation
(d) Micro injection

77. Bacterial genes lack
(a) Exons (b) Introns
(c) Promoters (d) Operator

78. Which among the following is not used as vector for gene cloning ?
(a) Cosmid (b) Phagemid
(c) PAC (d) MAC

79. Which among the following microorganism is used as bio fertilizer ?
(a) Rhizobium (b) Bacillus
(c) Pseudomonas (d) *E. coli*

80. In phytoremediation plants are used to
(a) Control microbial attack on plants
(b) Control microbial contamination of soil
(c) Accumilate pollutants from soil thus clears soil from pollutants
(d) All of the above

81. For clearing oil spills which micro organism is used ?
(a) *Pseudomonas putida*
(b) *Bacillus*
(c) *Rhizobium* (d) *E. coli*

82. Synthetic seeds are
(a) Protoplasts (b) Somaclones
(c) Cybris (d) Somatic embyos

Answers					
	70. (d)	73. (c)	76. (d)	79. (a)	82. (d)
	71. (b)	74. (b)	77. (b)	80. (c)	
	72. (b)	75. (a)	78. (d)	81. (a)	

83. Cytoplasmic hybrids are known as
(a) Hybrids (b) Cybrids
(c) Both
(d) None of the above

84. Which phyto hormone is used for development of synthetic seeds ?
(a) Auxin (b) GA
(c) ABA (d) Ethylene

85. During stress which of the following amino acid is accumulated ?
(a) Proline (b) Tryptophan
(c) Tyrosine (d) Lysine

86. During stress which of the following phytohormone is accumulated ?
(a) Auxin (b) GA
(c) ABA (d) Ethylene

87. In tissue culture regeneration of shoot and root occurs by manipulating the balance of
(a) Auxin and ABA
(b) Auxin and Cytokinin
(c) Cytikinin and ABA
(d) ABA and Ethylene

88. Plants cells/ tissue has the ability to develop into a complete plant. This property of plants is known as
(a) Pluropotency (b) Totipotency
(c) Multipotency (d) None of these

89. In cell culture medium commonly used carbon source is
(a) Fructose (b) Sucrose
(c) Glucose (d) Mannose

90. Sterlisation of medium through autoclaving is done at
(a) 10 pounds (b) 15 pounds
(c) 20 pounds (d) 25 pounds

91. Sterlization of antibiotics is done by
(a) Autoclaving (b) Dry heat
(c) Use of filter
(d) Any of the above methods

92. After transformation of plant cells through *Agrobacterium*, which antibiotic is used to carry out *Agrobacterium* free selection of cells/tissues ?
(a) Ampicillin
(b) Rifamycin
(c) Tetracyclin
(d) Carbencillin / Kenamycin

93. Which factor is necessary for maintaining lysogeny in lemda phage ?
(a) Cro (b) C1 repressor
(c) Both (d) None

94. Which among the following is not unicellular ?
(a) Bacteria (b) Yeast
(c) Fungi (d) None of these

95. Three terminal codons are
(a) AUC, GUG, GUC
(b) UAG, UAA, AGA
(c) UAA, UAC, AUC
(d) UAA, UAG, UUA

96. Shine Dalgarno sequence present on mRNA in case of prokaryotes plays as important role in protein synthesis. This sequence binds with _____ during translation initiarion
(a) 16s RNA (b) tRNA
(c) 23S RNA (d) 5s RNA

97. Which sequence in case of eukaryotes is important for mRNA tailing ?
(a) GAGAGA (b) GAATTC
(c) UACGAC (d) UACUAAC

Answers					
	83. (b)	86. (c)	89. (b)	92. (d)	95. (b)
	84. (c)	87. (b)	90. (b)	93. (b)	96. (a)
	85. (a)	88. (b)	91. (c)	94. (c)	97. (d)

98. tRNA synthesis is done by
(a) RNA Plymerase I
(b) RNA Polymerase II
(c) RNA Polymerase III
(d) All of the above

99. Sieve tubes of phloem tissue lack
(a) Nucleus (b) Membrane
(c) Mitochondria (d) Ribosomes

100. For molecular characterization of plant species which of the following molecular markers are used ?
(a) RAPD (b) AFLP
(c) SSR/STMS (d) All of the above

101. Transfer of genes (gene flow) in between different species is known as
(a) Vertical gene flow
(b) Horizontal gene flow
(c) Lateral gene flow
(d) None of these

102. Horizontal gene flow can be reduced by expressing genes in
(a) Nucleus (b) Chloroplast
(c) Both a & b (d) None

103. Most commonly used organism in SCP is
(a) *Bacillus* (b) *E. coli*
(c) *Spirulina* (d) *Pseudomonas*

104. Which sigma factor of RNA polymerase comes into play during stress?
(a) σ^{32} (b) σ^{70}
(c) σ^{14} (d) σ^{60}

105. During DNA isolation which chemical is used for breaking of plasma membrane ?
(a) Phencl (b) Isopropancl
(c) CTAB / SDS (d) Ethanol

106. Protein purification can be done by
(a) Affinity chromatography
(b) Ion exchange chromatography
(c) Sephadex column
(d) All of the above

107. Development of high-density molecular linkage map of a particular mapping population can be used for
(a) MAS
(b) Map based cloning
(c) Species characterization
(d) All of the above

108. During RNA isolation, which chemical is used to prevent RNAase contamination ?
(a) DMSO
(b) DEPC
(c) Glycerol
(d) All of the above

109. Star activity of restriction enzyme means
(a) It cuts the restriction site more efficiently
(b) It cuts at only one site
(c) It does not cut at any site
(d) Due to change in ionic conc. or other components it cuts at more sites generating more no. of fragments

110. Yeast two hybrid system is used to
(a) Determine interaction between DNA and RNA
(b) Determine interaction between two domains of proteins (i.e., DNA binding and protein binding domains)
(c) Determine interaction between RNA and proteins
(d) Determine interaction between DNA and proteins

Answers					
	98. (c)	101. (b)	104. (a)	107. (d)	110. (b)
	99. (a)	102. (b)	105. (c)	108. (b)	
	100. (d)	103. (c)	106. (d)	109. (d)	

111. Which category of microbes are used in retting process of jute ?
(a) Microbes tolerant to high temperature
(b) Which possess high amount of hydrolytic enzyme activity
(c) Anaerobic microbes
(d) Aerobic microbes only

112. What is the role of SDS in case of SDS PAGE ?
(a) It increases speed of proteins in gel
(b) It protects proteins from denaturation
(c) It provides negative charge to all the proteins so that separation can be done only on the basis of molecular weight
(d) SDS is detergent so is used to emulsify contaminating fats if any in samples

113. Operon comprise of
(a) Operator (b) Structural gene
(c) Promoter (d) Repressor
(e) All of the above

114. In lac operon, allolactose act as
(a) Inducer
(b) Gratituous inducer
(c) Repressor
(d) Substrate

115. Which factor is responsible for detoxification of drugs in case of humans ?
(a) p53 (b) P450
(c) p21 (d) All of the above

116. In most of the cancer cases which gene is mutated ?
(a) p53 (b) p21
(c) p16 (d) p15

117. RNA interference is used to control different viral diseases in case of plants and animals. The active fragment involving in interference is known as
(a) Si RNA (b) Micro RNA
(c) Both a & b (d) None of these

118. Plant viral diseases can be controlled by
(a) Antisense RNA technology
(b) By using ribozymes
(c) RNAi technology
(d) Settellite RNA
(e) All of the above

119. Photorespiration occurs in
(a) Mitochondria (b) Peroxisomes
(c) Chloroplast (d) All of the above

120. DNA replication is
(a) Conservative
(b) Semi - conservative
(c) None of these
(d) Both of the above

121. The bond between sugar and nitrogenous base in case of DNA is known as
(a) Glycosidic bond
(b) Phosphodiester bond
(c) H - bond
(d) Peptide bond

122. Which bond in the DNA provides it the backbone ?
(a) Glycosidic bond
(b) Phosphodiester bond
(c) H - bond (d) Peptide bond

123. DNA is fit for making tools in case of nanotechnology. This is due to
(a) Branching nature of DNA
(b) Flexibility in DNA conformation
(c) Small size of DNA
(d) All of the above

Answers					
	111. (b)	114. (b)	117. (c)	120. (b)	123. (d)
	112. (c)	115. (b)	118 (e)	121. (a)	
	113 (e)	116. (a)	119. (d)	122. (b)	

124. Which of the following DNA structure forms left hand helix ?
(a) DNA A (b) DNA B
(c) DNA C (d) DNA Z

125. Which of the following amino acid participate in urea cycle ?
(a) Arginine (b) Lysine
(c) Tryptophan (d) Histidine

126. Transplastomics :
(a) Targets genes in the chloroplast
(b) Provides exceptionally low yields of protein products
(c) Produces genes that are released in pollen
(d) Offers little opportunity for practical use

127. In a ____ protocol, bacteria with engineered abilities to detoxify pollutants are intentionally released in an area.
(a) Microcosm establishment
(b) Hybridization
(c) Bioremediation
(d) Rhizosecretion

128. The first field tests were of what genetically altered organism ?
(a) Bt. Corn
(b) Vaccinia virus containing a gene from the rabies virus
(c) The "flavrsavr" tomato
(d) Strawberry seedlings sprayed with "ice-minus" bacteria

129. The roots of a plant are converted into drug-producing structures in a process called
(a) Microcosm establishment
(b) Mibridization
(c) Bioremediation
(d) Rhizosecretion

130. Colchicine arrests cells in Mitos because
(a) It binds to monomeric tubulin a thus depolymerizes microtubules
(b) It prevents chromosome condensati by inhibiting histone-histo interactions
(c) It dephosphorylates tubu monomers and thus depolymeriz microtubules
(d) It binds to the + end of F-actin a prevents further addition of G-ac to actin filaments

131. What does the CT-value (cutoff thresho in real-time PCR experiments mean
(a) The lower the value, the higher transcript amount
(b) The higher the value, the higher transcript amount
(c) No transcript, if the value is lar than 30
(d) No transcript, if the value is lo than 30

132. Somatic embryogenesis is :
(a) Germ line cells developing i embryos
(b) Non-germ line cells developing i embryos
(c) Embryos developing from zygote
(d) Embryonic tissue becoming soma

133. mRNA usually is being extracted us
(a) polyT resin (b) RNase I
(c) a polyA resin (d) an rRNA tra

134. A CsCl gradient will separate D molecules by
(a) Absorption (b) Resorption
(c) Density (d) Adhesion

Answers				
	124. (d)	127. (c)	130. (a)	133. (a)
	125. (a)	128. (c)	131. (a)	134. (c)
	126. (a)	129. (d)	132. (b)	

135. A C-terminal KDEL motif will most often ensure
(a) The protein to be folded by HSC70
(b) The protein to be degraded by the polyubiquitine pathway
(c) ER-retention of the protein
(d) Secretion of the protein

136. People become tolerant to malaria if they are carriers for
(a) Sickle cell anemia
(b) Thalisemia
(c) Leishmenia
(d) Kala azar

137. Disorder, which occur due to single nucleotide change
(a) Sickle cell anemia
(b) Thalisemia
(c) Leishmenia
(d) Anemia

138. Type 2 diabetes mellitus occur due to
(a) Deficiency of insulin
(b) Inactivation of insulin receptors
(c) Both of the above
(d) None of the above

139. For patenting a plant variety it should be
(a) DUS
(b) DUD
(c) DDS
(d) Any of the above

140. Products will be applicable for patenting only if they are
(a) Novel (b) Inventive
(c) Useful (d) All of the above

141. IPR stands for
(a) Intellectual Property Rights
(b) Indigenous Product Right
(c) Indian Property Rights
(d) International Product Rights

142. The techniques to clone the first gene were developed in
(a) 1972 (b) 1987
(c) 1976 (d) 1977

143. The ability to create transgenic organisms allows genetic characteristics to be transferred beyond
(a) Genus
(b) Species lines
(c) Across kingdom boundaries
(d) All of the above

144. Complete set of cloned DNA fragments of an organism is known as
(a) Genomic library
(b) cDNA library
(c) mRNA lirary
(d) Any of the above

145. Virus free plants can be obtained by
(a) Meristem culture
(b) Pollen culture
(c) Ovary culture
(d) Shoot tip culture

146. Selection of protoplast fusion hybrids can be done by
(a) Visual selection
(b) Fluorescent labels
(c) FACS
(d) Any of the above methods

147. Micro propagation can be done by
(a) Through shoot bud proliferation
(b) Through adventitious buds
(c) Meristem tip culture
(d) All of the above

Answers

135. (c)	138. (b)	141. (a)	144. (a)	147. (d)
136. (a)	139. (a)	142. (a)	145. (a)	
137. (a)	140. (d)	143. (d)	146. (d)	

148. Which of the following enzyme is used in brewing ?
(a) β amylase (b) Cellukase
(c) Dextranase (d) Pectinase

149. Urokinase enzyme is produced by
(a) *Baccillus fastidious*
(b) *Baccillus subtilis*
(c) *Baccillus thuriengenesis*
(d) *Peudomonas putida*

150. Immobilization of enzymes is done by
(a) Physical adsorption
(b) Cross linking
(c) Entrapment
(d) All of the above

151. Important constituent of Biogas is
(a) Methane (b) Ethane
(c) Carbon monoxide (d) SO_2

152. Which plant is used for bio-diesel production ?
(a) Jatropha (b) Soybean
(c) Hevea (d) Wolfia

153. Which organism is used to accumulate copper from factory waste ?
(a) *Baccillus subtillis*
(b) *Pseudomonas putida*
(c) *Zoogloea ramigera*
(d) *E. coli*

154. Biosensers are used as
(a) Purified enzymes
(b) Antibodies
(c) Whole microbial cells
(d) Any of the above

155. DNA chip is a wafer of
(a) Silicon (b) Al
(c) Carbon (d) Phosphorus

156. DNA chip carries a large number of
(a) Oligonucleotides
(b) cDNAs
(c) DNA probes
(d) Any of the above

157. The combination of biology and IT is
(a) Nanotechnology
(b) Biotechnology
(c) Bio-informatics
(d) Information technology

158. Technique for sequencing DNA and protein is
(a) NMR spectroscopy
(b) X-ray crystallography
(c) Electron microscopy
(d) All of the above

159. Structural DNA nanotechnology is for
(a) Nanoelectronics
(b) Nanorobotics
(c) Smart material
(d) All of the above

160. Microsatellites are also known as
(a) VNTRs (b) RFLPs
(c) STRs (d) RAPDs

161. Minisatellites are also known as
(a) VNTRs (b) RFLPs
(c) STRs (d) RAPDs

162. Example of tandem gene cluster is
(a) rRNA genes
(b) Histone gene cluster
(c) Both a & b
(d) None of these

163. RNA molecules involved in splicing are
(a) Sn rRNA (b) 5s rRNA
(c) 16s RNA (d) tRNA

Answers

148. (a)	151. (a)	154. (d)	157. (c)	160. (c)	163. (a)
149. (a)	152. (a)	155. (a)	158. (d)	161. (a)	
150. (d)	153. (c)	156. (d)	159. (d)	162. (c)	

164. During splicing of proteins which part is removed ?
(a) Exons (b) Introns
(c) Exteins (d) Inteins

165. Which amino acid plays an important role in splicing of proteins ?
(a) Serine (b) Glycine
(c) Proline (d) Tryptophan

166. Which amino acid provide twists in tertiary structure of proteins ?
(a) Serine (b) Glycine
(c) Proline (d) Tryptophan

167. Which among the following is released in photorespiration ?
(a) Serine (b) Cysteine
(c) Proline (d) Tryptophan

168. During the process of reverse transcription
(a) mRNA is synthesized from DNA
(b) DNA is synthesized from DNA
(c) Proteins are formed from mRNA
(d) DNA is synthesized from mRNA

169. Which enzyme plays important role in reverse transcription ?
(a) DNA polymerase
(b) RNA polymerase
(c) Reverse transcriptase
(d) Ribonuclease

170. For cloning eukaryotic gene in prokaryotes, genes should be isolated from
(a) cDNA library
(b) Genomic library
(c) Eukaryotic host
(d) Any of the above

171. Essential constituents of a cloning vector are
(a) Replicon, promoter and selectable marker
(b) Replicon, Unique restriction site and selectable marker
(c) Promoter, operatop and restriction site
(d) Replicon, unique restriction site and promoter

172. Essential constituents of an expression vector are
(a) Replicon, promoter and selectable marker
(b) Replicon, Unique restriction site, selectable marker and promoter
(c) Promoter, operatop and restriction site
(d) Replicon, unique restriction site and promoter

173. Restriction site for cloning should be
(a) Tandemly repeated
(b) Palindromic in nature
(c) Repeated sequence
(d) Hexanucleotide

174. GAATTC is restriction sequence of CTTAAG
(a) Eco RI (b) Bam HI
(c) Sau 3 (d) Nco I

175. Antibiotic resistance is used as a selectable marker for
(a) Selection of vector
(b) Selection of recombinant vectors
(c) Selection of transformed cells
(d) Selection of resistant bacteria

Answers

164. (d)	167. (a)	170. (a)	173. (b)
165. (a)	168. (d)	171. (b)	174. (a)
166. (c)	169. (c)	172. (b)	175. (c)

176. Commonly used host in gene cloning is
(a) *E. coli* (b) Pseudomonas
(c) Fungi (d) Bacillus

177. Bacteria possessing restriction enzymes get not affected because
(a) These restriction enzymes are in inactive form
(b) Their genome is methylated
(c) These enzymes are present in less concentration
(d) Their genome lack unique restriction sites for enzymes

178. Which of the following vector can be used for cloning bigger DNA fragments ?
(a) YACs (b) Cosmids
(c) Plamids (d) Phagemids

179. Marker free selection can be done by
(a) Co-transformation
(b) Deletion
(c) Inversion
(d) Insertion

180. Which vector was used for development of hepatitis vaccine ?
(a) pBluescript
(b) PUC 18
(c) Cosmid
(d) Yeast expression vector

181. In tissue culture disease resistance can be obtained by
(a) Somaclonal variation
(b) Meristem culture
(c) Somatic hybridization
(d) Anther culture

182. Bioreactors are used for
(a) Production of ethanol
(b) Production of enzymes on large scale
(c) Production of cell culture on la scale
(d) All of the above

183. Methanogenic bacteria are
(a) Anaerobic in nature
(b) Aerobic in nature
(c) Micro aerophillic in natur
(d) Saprophtic in nature

184. Which yeast strain is naturally used ethanol production ?
(a) *Saccharomyces cereviciae*
(b) *S. diastaticus*
(c) Both of these
(d) None of these

185. What are the components of P reaction ?
(a) Buffer, Taq polymerase, dNT primer and template
(b) Buffer, dNTPs, primer and templ
(c) Buffer, Taq polymerase, primer a template
(d) Buffer, Taq polymerase, dNTPs, a template

186. Which of the following is a domin marker ?
(a) RAPD (b) RFLP
(c) SSR (d) AFLP

187. High density molecular map can developed by
(a) RFLP (b) RAPD
(c) AFLP (d) SNPs

188. Double stranded DNA can be isola from ssDNA or RNA by using
(a) Ion exchange column
(b) Sephadex column
(c) Hydroxyapatite column
(d) Affinity chromatography

Answers

176. (a)	179. (a)	182. (d)	185. (a)	188. (c)
177. (b)	180. (d)	183. (a)	186. (a)	
178. (a)	181. (a)	184. (b)	187. (d)	

9 Which of the histone protein is known as linker protein ?
(a) H1 (b) H2A
(c) H2B (d) H3

0. Translation of histone proteins occur during
(a) S phase of cell division only
(b) G1 and S phase
(c) G2 Phase
(d) M phase only

1. Histone octomer comprise of
(a) H1, H2A, H2B, and H3
(b) H1, H2A, H2B, H3 and, H4
(c) H1, H2B, H3 and, H4
(d) H2A, H2B, H3 and H4

2. Histone proteins are _____ in nature
(a) Acidic
(b) Basic
(c) Neutral
(d) Any of the above

3. Chaperone present in ER is
(a) Hsp 60 (b) Hsp 43
(c) Hsp 80 (d) Bip protein

4. Chaperones play an important role in
(a) Protein folding
(b) Protein denaturation
(c) Protein trafficking
(d) Protein synthesis

5. Which gene is used for development of salt tolerant crops ?
(a) LEA genes
(b) Genes involved in proline biosynthesis
(c) Heat shock proteins
(d) All of the above

196. What strategy can be adopted to overcome the chances of resistance development in case of insects against transgenic crops ?
(a) Growing of refuge crops
(b) Tissue specific expression of genes
(c) Temporal gene expression
(d) Any of the above

197. Stable transformation of genes in case of plants can be done by
(a) Biolistic gun method
(b) Agrobacterium mediated transformation
(c) Protoplast fusion
(d) Microinjection

198. Cryopreservation is done to store cells/ cultures etc for a longer period at
(a) High humidity
(b) Very low temperature
(c) Low humidity
(d) High temperature

199. Which of the following enzyme is used to overcome oxidative stress?
(a) SOD (b) PDH
(c) LDH (d) G6PDH

200. Vaccine against bird flu have been developed by using complete sequence of _____ gene from an H5N1
(a) Haemagglutinin (HA)
(b) Protease gene
(c) Protease inhibitor gene
(d) RNAase

❑❑❑❑❑❑

Answers				
	189. (a)	192. (b)	195. (d)	198. (b)
	190. (a)	193. (d)	196. (d)	199. (a)
	191. (d)	194. (a)	197. (b)	200. (a)

17) Seed Technology

1. Seed lot certificate colour is
(a) Orange (b) Green
(c) Purple (d) Orange or Green

2. Seed sample certificate colour is -
(a) Blue (b) Orange
(c) Purple (d) White

3. Hot water treatment is used to break dormancy in
(a) Lentil (b) Cherry
(c) Cotton (d) None

4. Smaller plant virus is
(a) SBYV (b) TMV
(c) Satellite virus (d) PVX

5. Fungi and Bacteria usually enters through
(a) Stomata (b) Wounds
(c) Hydathodes (d) Insect puntyre

6. How many primary samples will be taken from 3 containers of 100 kg ?
(a) 3 (b) 5
(c) 15 (d) 9

7. Difference between seed and grain is
(a) Seed processing
(b) Genetic purity
(c) Seed quality
(d) Cost

8. Embryo exised test _____ used for surface disinfestation.
(a) NaOCl (b) Lactophenal
(c) $AlK(SO_4)_2$ (d) All

9. Fanning mill is
(a) Air screen cleaner
(b) Hammer mill
(c) Blower
(d) Rice mill

10. Haryali yojna is related to
(a) Soil management
(b) Water management
(c) Crop management
(d) Air management

11. Mak - 12 is a variety of
(a) Maize (b) Medicago
(c) Bt Cotton (d) Tomato

12. National Nematode collection of India is located at
(a) New Delhi (b) Dharwad
(c) Anand (d) Bangalore

13. Adsali sugarcane planted in
(a) June/July (b) Dec./Jan.
(c) Feb./March (d) None

14. Leverage ratio is :
(a) $\frac{\text{Owner's equity}}{\text{Total assets}}$
(b) $\frac{\text{Owner's equity}}{\text{Current liabilities}}$
(c) $\frac{\text{Current liabilities}}{\text{Owner's equity}}$
(d) $\frac{\text{Total debt}}{\text{Owner's equity}}$

Answers					
1. (d)	4. (c)	7. (b)	10. (b)	13. (a)	
2. (a)	5. (a)	8. (a)	11. (c)	14. (d)	
3. (a)	6. (d)	9. (a)	12. (a)		

15. Stripe rust is due to :
(a) *P. graminis striformis*
(b) *P. graminis tritici*
(c) *P. graminis recondita*
(d) None

16. Size of Saltation is
(a) 0·1 - 0·5 mm (b) < 0·1 mm
(c) 0·55 - 1 mm (d) > 0·1 mm

17. Monocarpic flower is :
(a) Mango (b) Agave
(c) Amaranthus (d) Mulburry

18. Seed coat peroxidase test is used for :
(a) Sorghum (b) Wheat
(c) Soybean (d) Groundnut

19. Alakoid test is used for :
(a) Lucern (b) Lupins
(c) Crysanthimum (d) Cereals

20. Average diameter of bulbet of onion (seed standard) shall not be less than
(a) 2·5 cm (b) 1 cm
(c) 3 cm (d) 2 cm

21. Pure seed fraction in *Abelmoschus esculentus*
(a) 98 (b) 95
(c) 99 (d) 96

22. Sequence of cell division phases on duration bases. Which one is correct ?
(a) Prophase → Metaphase → Anaphase → Telophase
(b) Metaphase → Prophase → Telophase → Anaphase
(c) Prophase → Metaphase → Telophase → Anaphase
(d) Anaphase → Prophase → Metaphase → Telophase

23. Harvesting index is maximum in
(a) Carrot (b) Pigen Pea
(c) Rice (d) Wheat

24. % of absorbed water used in protosynthesis is
(a) 10% (b) 0·2%
(c) 9·7% (d) 33%

25. Flaring of square in cotton is due to
(a) Pink boll worm
(b) Spotted boll worm
(c) American boll worm
(d) All

26. _____ Sugar found in germinating seed in large amount.
(a) Maltose (b) Sucrose
(c) Cellobiase (d) Lactose

27. Citrate soluble phosphotic fertilizers is/ are
1. Dicalcium phosphate
2. Basic slag
3. DAP 4. SSP
(a) 4 and 3 (b) 2 only
(c) 1 and 2 (d) 3 only

28. Expand the following :
1. CSC 2. OCS
3. PVA 4. PLS
5. SSC 6. TIBA

29. Match the following :

List I	List II
A. *B. juncea* var *rugosa*	a. Kalisarson
B. *B. nigra*	b. Pilisarson
C. *B. tournefortii*	c. Punjabi Rai
D. *B. compestris* var *sarson*	d. Banarasi rai
E. *B. comferis* var *dichotoma*	e. Phadi Rai

	A	B	C	D	E
(a)	e	d	c	b	a
(b)	c	d	e	b	a
(c)	e	c	d	b	a
(d)	e	d	b	c	a

Answers 15. (a) 16. (a) 17. (b) 18. (c) 19. (b) 20. (d) 21. (c) 22. (c) 23. (a) 24. (b) 25. (b) 26. (a) 27. (c) 28. Central Seed Certification, Other Crop Seed, Plant Variety Act, Pure Live Seed, State Seed Corporation, Tissue Blot Imbut Assay 29. (a)

30. Match the following :

List I	List II
A. Flavr Savr	a. 1970
B. ICPH - 8	b. 2000
C. DT - 46	c. 1996
D. PRH - 10	d. 1991
E. Cotton hybrid	e. 1994

	A	B	C	D	E
(a)	c	d	e	b	a
(b)	a	c	d	b	e
(c)	e	d	c	b	a
(d)	b	d	c	e	a

31. Match the following :

List I	List II
A. Na is essential	a. Oil seed crop
B. S is essential	b. Rice, maize
C. Si is essential	c. Sugarbeet
D. Ni and Co is essential	d. Soybean and Sugarbeet
E. High Lime require crop	e. Legumes

	A	B	C	D	E
(a)	a	c	b	e	d
(b)	c	a	b	e	d
(c)	c	b	a	e	d
(d)	c	a	e	b	d

32. Match the following :

List I	List II
A. Accelerating Ageing Test	a. Maize
B. Cold Test	b. Soybean
C. A_6 Test	c. Virus Y
D. M_1 Test	d. Leaching Test
E. Cool Germination Test	e. Groundnut
F. Mitochondrial Activity	f. Cotton

	A	B	C	D	E	F
(a)	a	b	c	d	e	f
(b)	a	b	c	d	f	e
(c)	b	a	c	d	e	f
(d)	b	a	c	d	f	e

33. In maize, a foundation single cro production field must be isolated by r less than _____ mts from maize wi icernal colour or texture different fro that of seed part.
(a) 400 mts (b) 600 mts
(c) 200 mts (d) 250 mts

34. A group of similar plants in structu features and performance is known
(a) Variety (b) Clone
(c) Pure line (d) Inbred line

35. The blotter method of seed health testi detects primarily
(a) Virus (b) Fungi
(c) Bacteria (d) Nematodes

36. Which part of rice plant is active transpiration ?
(a) Root (b) Leaf
(c) Culms (d) Panicle

37. Possible reasons for seed dormancy
(a) Presence of pathogens
(b) Cracking of hulls
(c) Immature embryo
(d) Green distoration

38. A sound seed certification programm requires
(a) Direct participation of breeder
(b) Use of sophesticated equipment
(c) Classification of seed
(d) Support of law

Answers 30. (c) 31. (b) 32. (d) 33. (b) 34. (a) 35. (b) 36. (b) 37. (c) 38. (a)

. The seed which farms generally used are called
(a) Breeder seed
(b) Foundation seed
(c) Certified seed
(d) Nucleus seed

. Middle layer of fruit wall is called
(a) Mesocarp (b) Mericarp
(c) Meristem (d) Microbyle

. The Rudimentary root of the seed or seedling that forms the primary root of the young plant is known as :
(a) Rachis (b) Radicle
(c) Rachilla (d) Racerne

. New genes are created by
(a) Mutation (b) Recombination
(c) Inversion (d) None

. Mode of pollination in maize is
(a) Self-pollination
(b) Vegetative propagation
(c) Cross-pollination
(d) None

. The genome contained by bread wheat are
(a) ABC (b) XYZ
(c) AED (d) None

. Seed drying is very important to maintain its
(a) Viability and vigour
(b) Protein content
(c) Oil content
(d) Chemical composition

. The two most important factors influencing the life span of seeds under storage are :
(a) Relative humidity and temperature
(b) Rainfall and RH
(c) Climate and temperature
(d) Seed size and moisture content

47. The chemical seed treatment is given to control
(a) Fungi & bacteria
(b) Soil insects
(c) Storage insects
(d) All

48. Maximum moisture content for safe storage in wheat seed is
(a) 12 (b) 15
(c) 7 (d) None

49. The factors affecting the final marketing price of crops seed are
(a) Input costs
(b) Supply and demand
(c) Prices of other farm produce & time trend
(d) All

50. The equipment used to apply chemicals that involves suspension and wettable powder treatment material in water is
(a) Slury treaters
(b) Direct treaters
(c) Panogen treaters
(d) Mist-o-matic treaters

51. The structure and function of nitrogenase can be studied by
(a) NMR
(b) EPR
(c) Massbauer spectroscopy
(d) All

52. Mutalism are shown by
(a) Pollination by animals
(b) Dispersal of fruits and seed
(c) Lichen
(d) All

Answers

39. (c)	42. (a)	45. (a)	48. (a)	51. (d)
40. (a)	43. (c)	46. (a)	49. (d)	52. (d)
41. (b)	44. (c)	47. (d)	50. (a)	

53. In India, normally how many generation system seed are produced ?
(a) 1 (b) 2
(c) 3 (d) 4

54. Off types are removed by
(a) +ve selection
(b) -ve selection
(c) Pure line selection
(d) Mass selection

55. Dicot endospermic seed is
(a) Castor (b) Fenugreek
(c) Both (a) and (b)
(d) Bean

56. Basic input of Agriculture is
(a) Seed (b) Fertiliser
(c) Soil (d) Irrigation

57. When the pathogen is loosely mixed with seed in the form of sclerotia, galls etc are called
(a) Infection (b) Infestation
(c) Contamination
(d) Concomitant contamination

58. Seed certification involves :
(a) 1 phase (b) 3 phase
(c) 5 phase (d) 7 phase

59. Slow drying seed is
(a) Cereals
(b) Rapeseed and mustard
(c) Grass
(d) Pulses

60. Mite don't survive below
(a) 5°C (b) 7°C
(c) 10°C (d) 15°C

61. Ist photosynthetic cell on earth was
(a) Gunerra (b) Gunflintio
(c) Chlorella (d) BGA

62. Which is total root parasite ?
(a) Orobanchae (b) Conophalis
(c) Epitagus (d) All

63. Seed dormancy are shown by
1. Nigella 2. Xanthium
3. Tomato 4. Lettuce
(a) Only 1 and 2
(b) Only 1, 2 and 3
(c) Only 1, 2 and 4
(d) Only 2

64. Reproduction by leaf occur in
(a) Begonia (b) Hydrilla
(c) Cerotophyllum (d) None

65. +ve photoblastic seeds are
(a) Nigella (b) Silene
(c) Nemophills (d) Arraranutum

66. Epigeal germination is found in
(a) Pea (b) Gram
(c) Cucumber (d) Mango

67. Germination is inhibited by
(a) Red light (b) Blue light
(c) IR light (d) UV light

68. Pyrenoids are
(a) Protein surrounded by starch grain
(b) Starch surrounded by protein
(c) Fat surrounded by starch grain
(d) Starch surrounded by fat

69. Tetrazolium test determine the level of activities of enzyme
(a) ATPase (b) Dehydrogenase
(c) Carboxylase (d) Isomerase

70. Indian cotton is
(a) *G. herbaceium*
(b) *G. arbore um*
(c) *G. hirsutum*
(d) *G. barbadense*

Answers

53. (c)	56. (a)	59. (d)	62. (d)	65. (d)	68. (a)
54. (b)	57. (d)	60. (a)	63. (a)	66. (c)	69. (b)
55. (c)	58. (c)	61. (b)	64. (a)	67. (c)	70. (b)

71. Nutrient helpful for the transfer of sugar is
(a) K (b) Ca
(c) P (d) Mg

72. Murate of potash is
(a) K_2SO_4 (b) KCl
(c) KNO_3 (d) K_2HPO_4

73. The dwarf variety of rice released in India is
(a) IR - 8 (b) TN - 4
(c) Jaya (d) PR - 10

74. Production of seedless grapes require :
(a) Gibberelins (b) NAA
(c) Ethylene (d) IAA

75. Sugar turn out from cane in India is
(a) 8 - 10 % (b) 19 - 20 %
(c) 14 - 15 % (d) 23 - 25 %

76. The curve of Normal distribution is called
(a) Bell shaped (b) Parabolic
(c) Sigmoid (d) Irregular

77. Inflorescence of cauliflower is called
(a) Catkin (b) Head
(c) Curd (d) None

78. First super fine aromatic Basmati hybrid released in India is
(a) GEB 24
(b) PUSA RH-23
(c) PUSA RH - 10
(d) PUSA Basmati - 1

79. Pusa snow ball is variety of
(a) Sapota (b) Cauliflower
(c) Ber (d) Cabbage

80. Which of the following vigour test method estimates decarboxylation activities ?
(a) Leachate test (b) GADA test
(c) ATPase test (d) Exhaustion test

81. ISTA was established in the year
(a) 1871 (b) 1876
(c) 1921 (d) 1924

82. While sampling from a seed lot of 50 bags, the minimum number of primary sample should be
(a) 5 (b) 10
(c) 15 (d) 20

83. Certified seed of cottom should have minimum germination of
(a) 50% (b) 60%
(c) 70% (d) 80%

84. Half gram is working sample for Parity analysis of
(a) Tomato (b) Onion
(c) Berseem (d) Tobacco

85. For seed samples kept in an incubator for germination test, light is
(a) Alwasy essential
(b) Never essential
(c) Not harmful
(d) Harmful

86. Development of embryo without fertilization is
(a) Apomixis (b) Amghimixis
(c) Partheno carpy (d) None

87. Male sterility is used to develop
(a) Inbreds (b) Hybrids
(c) Synthetics (d) None

88. Occurrence of more than one embryo in seed is known as
(a) Polysomy (b) Polyembryony
(c) Apogamy (d) None

Answers						
	71. (a)	74. (a)	77. (c)	80. (c)	83. (b)	86. (a)
	72. (b)	75. (a)	78. (c)	81. (d)	84. (d)	87. (b)
	73. (c)	76. (a)	79. (b)	82. (b)	85. (c)	88. (b)

89. Interaction between alleles of two different loci is called as
(a) Epistasis (b) Dominance
(c) Overdominance (d) None

90. Seedlessness in fruits is called as
(a) Parthenogensis (b) Parthenocarpy
(c) Apomixis (d) None

91. First hybrid of pegionpea in the world is
(a) ICPH - 8 (b) ICPH - 10
(c) PUSA - Arhar (d) PUSA HR - I

92. Solar treatment is used for
(a) Loose smut
(b) Stem rust
(c) Powery mildew
(d) Blast

93. The moisture content for safe storage of cereals is
(a) 12-14% (b) 14 - 16%
(c) 16-18% (d) 18-20%

94. Percent oil content is highest in
(a) Sesamum (b) Groundnut
(c) Castor (d) Soybean

95. Centre of origin of rice is
(a) SW Asia (b) SE Asia
(c) South America (d) North America

96. Neurotoxin present in lathyrus is
(a) BOAB (b) BOAA
(c) AOBA (d) AOAB

97. Gauch - 1 is a variety of
(a) Castor (b) Groundnut
(c) Sesamum (d) Soybean

98. The constituent of wheat affecting baking quality is
(a) Glutin (b) Pectin
(c) Vitamin B_1 (d) Moisture

99. Loose smut is
(a) Internally seed borne
(b) Externally seed borne
(c) Air borne
(d) None

100. The GoT is done for verification c
(a) Physical purity (b) Genetic pur
(c) Germination % (d) None

101. T_2 test colour of living tissues of s changed to
(a) Red (b) Blue
(c) Yellow (d) Green

102. The minimum number of counts t taken for an area upto two hec. wheat desing any field inspection
(a) 7 (b) 5
(c) 3 (d) 10

103. The standard for germination % (n for certified seed of gram is
(a) 85 (b) 90
(c) 80 (d) 75

Answers						
	89. (a)	92. (a)	95. (b)	98. (a)	101. (a)	
	90. (b)	93. (a)	96. (b)	99. (a)	102. (b)	
	91. (a)	94. (c)	97. (a)	100. (b)	103. (a)	

E/FALSE

Sunflower is an example of protandry.
Detasseling is done in sorghum hybrid seed production.
More than half of the size of a broken seed is considered as a pure seed.
Tip sterlity is common in Bajra.
Hard seeds are FUS.
In light sensitive seeds dormancy is controlled by phytochromes.
All varieties can be certified.
In storage the loss of seed vigour presseds loss of viability.
For long storage seed with recommended moisture, should be packed in moisture vapour proof containers.
Foundation stage II seed shall be the progeny of breeder seed.
Field inspection is made to verify seed source.
Seed analysis is done to verify prescribed seed standards.
Basic or general seed certification standards are same for all classes of seed.
Isolation distance is maintained to protect the crop from insect pest.
Loose smut is a designated disease in rice.
Inspection made at flowering stage gives more realistic picture.
Cultivar purity of a seed lot is evaluated through a standard laboratory test.
The inspection at flowering stage in case of cross-pollinated crop should be in the presence of grower.
Pollen shadder are found in maize.
Only those variety are eligible for seed production and certification which are already notified.

Match the following :

1.	Used for clonal propagation and recovery of virus free plant	a.	Fertilisation
2.	Structural unit in the nucleus that carries genes in a linear order	b.	Totipotency
3.	Lack of pairing between homologous chromosomes during meiosis	c.	Allopolyploid
4.	Union of male and female gamete in sexual reproduction	d.	Autopolyploid
5.	Individual that has more than two complete chromo-some sets of a single genome.	e.	Chromosome
6.	Used for finding new markers that are slightly linked with a specific locus	f.	Asynapsis
7.	Incompatibility reaction of pollen grain is controlled by genotype of plants on which they produced mutation	g.	Frame shift
8.	Ability of plant cell to develop into a complete plant	h.	Meristem culture
9.	Mutational addition or deletion of a base pair in a gene that disrupts the normal reading frame of a m-RNA Incompatibility	i.	Saprophytic cell
10.	Individual has two or more genomes from different species	j.	RAPD

nswers

1. (T) 2. (F) 3. (T) 4. (T) 5. (F) 6. (T) 7. (T) 8. (T)
9. (T) 10. (F) 11. (F) 12. (T) 13. (F) 14. (F) 15. (F) 16. (T)
17. (F) 18. (T) 19. (T) 20. (T)
Match : 1 - h, 2 - e, 3 - f, 4 - a, 5 - d, 6 - j, 7 - i, 8 - b

Fill in the blanks :

1. Under seed act _____ is voluntary and _____ is compulsory.
2. _____ day and _____ continuous induce stimulative flowers in cucurbits.
3. Isolation distance for soybean _____.
4. _____ is used for delinity of cotton seed.
5. _____ is used for separation of discoloured seed.
6. Ist Agri university _____ .
7. Most explosive type of N_2 fertiliser is _____.
8. N_2 fixing non-leguminous tree is _____.
9. Ratooning is practised as a matter of routine in _____.
10. Harvest index _____.
11. Indian farming is published by _____.
12. Actinomycetes are also known as _____.
13. Moko disease is found in _____.
14. Maintainer line hybrid seed production is also known as _____.
15. T_2 test is used for evaluating the _____ of seed.
16. Pre-chilling treatment to seed is given for overcoming _____ of seed.
17. The first generation hybrid between two single crosses is known as _____.
18. The immature seed is also classified as _____ seed.
19. Sexual function of the sperm and egg cell are called _____.
20. The outermost wall of the ovary is called the _____.
21. The species which has male and female flowers on the different plants, are known as _____.
22. A flower containing both male and female reproductive organs is called _____ flower.
23. A flower having pistils, stamens, petals and sepals is called _____ flower.
24. The pistil, sometimes called the _____ in the female part of the flower.
25. The tissue of seeds that develops from sexual fusion of the polar nuclei of the ovule and the second male sperm cell, the term used as _____.
26. The portion of the embryo or seedling above the cotyledons is known as _____.
27. Truness to type or variety, usually referring to seed is known as _____.
28. The hereditary make up of a plant or variety, which determine its inheritance is called _____.

Answers :
Blanks : 1. Certification, labelling, 2. Long, dry, 3. 3 M, 4. H_2SO_4, 5. Electric colour sorter, 6. G. B. Pant, 7. Ammonium Nitrate, 8. Casurania, 9. Sugarcane, 10. (Economic yield × 100)/(Biological yield) 11. ICAR, 12. Ray fungi, 13. Banana, 14. B-line, 15. viability, 16. Dormancy, 17. Double hybrid, 18. Pure, 19. Syngamy, 20. Pericarp, 21. Dioecious, 22. Perfect, 23. Complete, 24. Gynaecium, 25. Endosperm, 26. Epicotyl, 27. Genetic purity, 28. Genotype

Answers Match : 9 - g, 10 - c

Match

(A)

1.	Stratification	a.	Thermo-dormancy
2.	Bleached seed	b.	Wheat
3.	Lucerne	c.	Delinting
4.	Nobbe	d.	Hybrid maize
5.	Brinjal	e.	Steckling
6.	Ganga-5	f.	Heterostyly
7.	Radish	g.	Father of seed technology
8.	Hybrex	h.	Tripping
9.	Cotton	i.	Bolting
10.	Tobacco	j.	Peas

(B)

1.	Genetic Purity	a.	Seed dormancy
2.	Scarification	b.	Low germination
3.	Seed research	c.	ISST
4.	Poor storer	d.	Certification
5.	Dormancy	e.	Cross pollination
6.	Notified variety	f.	Off types
7.	Rogueing	g.	Somatic mutation

(C)

1.	Mitosis	a.	Mayer
2.	Meiosis	b.	Ramass
3.	Amitosis	c.	Flaming
4.	Disomitosis	d.	Farmer and Moore
5.	Brachymeiosis	e.	Guynne-Vaughan

(D)

1.	Pusa Jaikisan	a.	Mutation
2.	Bahar	b.	Polyploidy
3.	Kranti	c.	selection
4.	Pusa gaint	d.	Trafloid
5.	Hua Bezar	e.	Biotechnology

(E)

1.	Duplicate epistasis	a.	2 : 1 : 1
2.	Recessive epistasis	b.	1 : 2 : 1
3.	Simple epistasis	c.	1 : 3
4.	Duplicate dominant epistasis	d.	3 : 1
5.	Polymeric	e.	1 : 1 : 2

(F)

1.	Rhizopus	a.	Marticin
2.	Alternaria	b.	Victoria
3.	Fusarium	c.	Tubtonic
4.	Helianthosporium	d.	Fumaric acid
5.	Pseudomonas	e.	Tentoxin

(G)

1.	Castor	a.	Somatic Mutation
2.	Quick viability	b.	Staggered Planting
3.	Tripping	c.	Recalcitrant Seed
4.	Chemera	d.	Endospermic Seed
5.	Coffee beans	e.	Lucerne
6.	Multigerm	f.	Sugarbeet
7.	Coumarin	g.	Jack bean
8.	Vivipary	h.	Growth inhibitor
9.	Nicking	i.	PGS
10.	Fluid drilling	j.	T_2 test

(H)

1.	Centromere	a.	Deviation to Mendels law
2.	VNTR	b.	Stabilising unit
3.	Unique DNA	c.	Repetative DNA
4.	Telomere	d.	*E. Coli*
5.	Genome	e.	Kinetochore imprint

(A) – 1 - a, 2 - j, 3 - h, 4 - g, 5 - f, 6 - d, 7 - e, 8 - b, 9 - c, 10 - i
(B) – 1 - g, 2 - e, 3 - c, 4 - b, 5 - a, 6 - d, 7 - f
(C) – 1 - c, 2 - d, 3 - b, 4 - a, 5 - e
(D) – 1 - e, 2 - c, 3 - a, 4 - b, 5 - d
(E) – 1 - c, 2 - e, 3 - a, 4 - d, 5 - b
(F) – 1 - d, 2 - e, 3 - a, 4 - d, 5 - c
(G) – 1 - d, 2 - j, 3 - e, 4 - a, 5 - c, 6 - f, 7 - h, 8 - i, 9 - b, 10 - g
(H) – 1 - e, 2 - a, 3 - d, 4 - b, 5 - c

(I)

1.	Gram Positive cell	a.	Gram +ve cell
2.	Gram -ve cell	b.	Archaebacteria
3.	Techoic acid	c.	Sphaeroplast
4.	Methanogens	d.	Protoplast
5.	Dipicolinic acid	e.	Endospore

(J)

1.	Heterosis	a.	Unisexual flowers
2.	Cross Pollination	b.	Pairing and homologous chromosomes
3.	Self fertilisation	c.	Increased vigour
4.	Double trisomic	d.	Inbreeding
5.	Synapsis	e.	2n + 1 + 1

(K)

1.	Orthodox seed	a.	Cocca
2.	Recalcitrant seed	b.	Legumes
3.	Citrus	c.	Sulphuric acid
4.	Hard seed	d.	Polyembryony
5.	Scarification	e.	Wheat

(L)

1.	Chickpea blight	a.	Pyrin
2.	Sugarcane	b.	Ascochyle
3.	Karnal bunt	c.	Virus
4.	Cotton leaf curl	d.	Neovarsia
5.	Blast	e.	Coll

(M)

1.	Carbohydrate	a.	Hiltners test
2.	Germination test	b.	Trier
3.	Moisture test	c.	Phenol test
4.	Purity test	d.	Fat
5.	Vigour test	e.	Pre drying
6.	Varietal identification	f.	Starch
7.	T_2 test	g.	FUG
8.	Protein	h.	Amino Acid
9.	Glycerol	i.	Other crop se
10.	Nobbe	j.	Formazan

(N)

1.	NBPGR	a.	Homozygonit
2.	IRRI	b.	Gowden
3.	Allogamy	c.	Shull and Ea
4.	Self-Pollination	d.	Hull
5.	Bulk Breeding method	e.	Philippines
6.	Single seed descent	f.	Karpenchank
7.	Recurrence selection	g.	Nilsson Ehle
8.	Over dominance hypothesis	h.	New Delhi
9.	Raphonobrassica	i.	Varder Plank
10.	Vertical & horizontal resistance	j.	Outbreeding

(I) – 1 - d, 2 - c, 3 - a, 4 - b, 5 - e
(J) – 1 - c, 2 - a, 3 - d, 4 - e, 5 - b
(K) – 1 - e, 2 - a, 3 - d, 4 - b, 5 - c
(L) – 1 - b, 2 - c, 3 - d, 4 - e, 5 - a
(M) – 1 - f, 2 - g, 3 - e, 4 - i, 5 - a, 6 - c, 7 - j, 8 - h, 9 - d, 10 - b
(N) – 1 - h, 2 - e, 3 - j, 4 - a, 5 - g, 6 - b, 7 - d, 8 - c, 9 - f, 10 - i

nswer the following questions :

Competitions between individual pollen tubes belonging to different genotypes and growing at different rates is called _____.

Method of emasculation in maize _____.

Change in genetic make up of varieties if grown over a long period in areas outside their adaptation due to natural selection, specially in composites, synthetic and open pollinted varieties.

Those weed species whose seed is difficult to separate from the crop seed or, which have poisonous or injurious effect on main crop and is difficult to eradicate due to high multiplication ratio _____.

A weed plant, which is considered to be undesirable extremely harmful and usually difficult to control is called _____.

Write two example for the above mentioned category of weeds : (i) _____, (ii) _____

A machine used to separate seeds on the basis of seed shape used for seed cleaning _____.

In hybrid seed production based on male sterility, a plant belonging to A line that produces pollen is termed as _____.

Write two examples for pseudocereals : (i) _____, (ii) _____.

_____ refers to the percentage of seed sample that would produce seedlings of the variety under certification.

Restover line restores fertility to _____.

_____ refers to a specified quantity of seed which is physically identifiable from other such quantities.

____ technique is used for the commercial production of virus free seed potatoes.

A machine which divides seeds on the basis of their weight and size which is used for seed cleaning grading _____.

15. Small sugar beet roots, stored over winter and planted for the productions of seed _____.

16. Seed produced by a breeder of an entry that has been identified for pre-release multiplications but has not been released and notified _____.

17. _____ refers to the weight in grams of 1000 seeds or grains.

18. A machine used to separate seeds on the basis of their surface smoothness, used for seed cleaning _____.

19. Write the minimum germination percentage

(i) Hybrid maize certified seed
(ii) Cauliflower and Bhindi certified seed
(iii) Carrot and Chilli certified seed
(iv) Jowar and Rice certified seed

20. The maximum permissible level of moisture in soybean certified seed is _____.

21. Maximum amount of weed seed permitted in certified seeds of cauliflower, carrot and onion _____.

22. Minimum pure seed in carrot certified seed _____.

23. Weight of working sample is usually ____.

24. The Tarai Development Corporation was established at Pant Nagar on _____.

25. Fine grinding is usually done for mositure determination for _____, _____ and coarse grinding for _____.

26. For moisture determinations what is the temperature required (oven method) ?

(i) Low temperture oven method
(ii) High temperature oven method

27. Phosphorus pentroride method is a method used for _____ determination.

28. Seed testing rules are revised every _____ years.

29. Enzyme responsible for pollen release -

30. Basic unit in seed sampling -

31. Seed values (1968) has _____ number of rules.

32. For moisture determination how much is the sample size required for submitted sample ?

33. In which stage seed dry weight and fressh weight is maximum ?

34. Write the minimum germination %.

(i) Hybrid jowar - (ii) Wheat -
(iii) Rice -
(iv) Water melon -
(v) Hybrid bajra -
(vi) Hybrid maize -

35. Outermost layer of endosperms -

36. _____ refers to the process used to test vegetatively reproduced plants (eg. potato) for freedom from virus diseases before multiplying them.

37. Top of the paper method for germination is usually done for _____ sized seeds.

38. Tobacco and Lettua are examples of _____ seeds.

39. Cold test is a type of vigour test used for _____.

40. Recocitrant seeds follow Harrigton's thump rule ? True or false

41. Write two cryo protectors :

(i) _____, (ii) _____

42. Write the minimum genetic purity required

(i) Foundation seed -
(ii) Breeder seed -
(iii) Certified seed --
Varieties - Composites -
Synthetics - Hybrids -

43. Match :

(i) Seed Act	(a) 1961
(ii) NSC	(b) 1968
(iii) NSP	(c) 1983
(iv) UPOV	(d) 1963
(v) Seed rules	(e) 1976
(vi) Seed control order	(f) 1966
(vii) World seed day	(g) 1961

44. Match :

(i) Breeder seed	(a) Buff
(ii) Foundation seed	(b) White
(iii) Certified seed	(c) Golden yellow
(iv) Truthfully labelled seed	(d) Opel Green
(v) Nucleous seed	(e) Blue

45. Naked seeds are generally found in _____.

46. Black point of wheat is caused by _____.

47. A legislation passed in western countries that entitles the breeder of a variety, a prescribed loyality for using the variety _____.

Answers :

1. Certation, 2. Detassling, 3. Genetic Shift, 4. Objectional weed, 5. Noxious weed, 6. Cyperous rotundus, Cynodon dactylon, 7. Spiral, 8. Sheddy tassel, 9.Amaranthus, Buck wheat, 10. RLV, 11 A-line, 12. Seed lot, 13. Seed plot technique, 14. Specific gravity, 15. Stacking, 16. Stock seed, 17. Test weight, 18. Velvet roll separator, 19. (90°C, 65°C, 60°C, 80°C), 20. 12, 21. 10/kg, 22. 95 23. 25 gm, 24. 27 Feb 1969, 25. Cereals + cotton legue, 26. 103 ± 2°C, 130 - 135°C, 27. Moisture content, 28. 3 years, 29. Callase, 30. – , 31. 39 rules, 32. 100 gm and 50 gm, 33. Physiological maturity, 34. (80, 85, 80, 60, 75, 90), 35. Aleurone layer, 36. Indexis, 37. Small, 38. Photoblastic, 39. Maize, 40. False, 41. DMSO, Glycerne, 42. (99%, 100 or 99.9%, 98%, 98%, 98%, 95%), 43. (1-f, 2-d, 3-e, 4-a/g, 5-b, 6-c, 7-a/g), 44. (1-c, 2-b, 3-e, 4-d, 5-a), 45. Gymnosperm, 46. A. alternoria, 47. PBR

18 Agricultural Microbiology

1. Who is credited with discovery of Bacteria ?
   (a) Louis Pasteur (b) Leewenhoek
   (c) Needham (d) Tyndall
2. Founder of modern bacteriology is
   (a) Leewenhoek (b) Pasteur
   (c) Robert Koch (d) None
3. Father of Bacteriological techniques is
   (a) Pasteur (b) Koch
   (c) Gram (d) Buchner
4. Gram staining was discovered by Gram in year -
   (a) 1762 (b) 1932
   (c) 1884 (d) 1890
5. Gram stain is an example of
   (a) Simple stain (b) Differential stain
   (c) Acid fast stain (d) None
6. Counter stain used in gram staining -
   (a) Ethyl Alcohol (b) Iodine solution
   (c) Crystal violet (d) Safranin
7. Acid fast staining used for which bacteria -
   (a) Mycobacterium (b) Rhizobium
   (c) Bacillus sp. (d) Clostridium
8. Agar-Agar was developed by -
   (a) Joseph Lister (b) Koch
   (c) Hesse (d) Pasteur
9. Faultative free living 'N' fixing bacterium
   (a) Rhizobium (b) Azotobacter
   (c) Klebsiella (d) None
10. In bacteria, cubical packets of 8 cells is called
    (a) Staphylococcus (b) Diplococcus
    (c) Bacillus (d) Sarcina
11. Resolving power of electron microscope is _____ times that of light microscope.
    (a) 10^1 (b) 10^2
    (c) 10^3 (d) 10^4
12. Braun's lipoprotein is present in
    (a) Gram +ve bacteria
    (b) Gram -ve bacteria
    (c) Bacteriophage (d) Yeast
13. In Endospore staining, which one is used ?
    (a) Malachite green
    (b) Basic fuschin
    (c) Indian Ink (d) Methylene blue
14. Pseudomorein is present in which organism ?
    (a) Archaebacteria (b) Eubacteria
    (c) Eukaryote (d) Fungi
15. Mesosomes are well developed in :
    (a) Gram +ve bacteria
    (b) *E. Coli*
    (c) Yeast (d) Mycoplasma
16. Energy parasite
    (a) Spirilla (b) Mycoplasma
    (c) Chlaymidia (d) Archaebacteria

Answers							
	1. (b)	5. (b)	9. (c)	13. (a)
	2. (b)	6. (d)	10. (d)	14. (a)
	3. (b)	7. (a)	11. (d)	15. (a)
	4. (c)	8. (c)	12. (b)	16. (c)

17. Example of pleomorphic bacteria is :
    (a) Acetobacter (b) Azotobacter
    (c) Achromobacter (d) Arthrobacter
18. Cyst formation is characteristic feature of :
    (a) Acetobacter (b) Arthrobacter
    (c) Azotobacter (d) None
19. N-reserve materials in Cyanobacteria :
    (a) Volutin granular
    (b) PHB
    (c) Polysaccharides
    (d) Cyanophycin granules
20. Lysozyme treated Cells of gram +ve bacteria are called :
    (a) Protoplast (b) Sphaeroplast
    (c) Cytoplasm (d) None
21. Lysozyme treated Cells of gram -ve bacteria are called :
    (a) Protoplast (b) Sphaeroplast
    (c) Cytoplasm (d) Mesosomes
22. Bacteria having especially high rate of respiration :
    (a) Rhizobium (b) Azotobacter
    (c) *E. Coli* (d) Acetobacter
23. Species of Mycoplasma are inhibited by
    (a) Penicillin (b) Tetramycin
    (c) Both (d) None
24. Xanthomonas is an example of :
    (a) Monotrichous (b) Peritrichous
    (c) Lophotrichous (d) Cephalotrichous
25. Test organism for pasteurization is
    (a) *Coxicella burnetti*
    (b) *Clostridium pasteurizanum*
    (c) *Bacillus subtilis*
    (d) *Bacillus steareothermophillus*
26. "Ray Fungi" is the name given to
    (a) Rhizopus (b) Yeast
    (c) Actinomycetes (d) Mycoplasma
27. Actinomycetes are
    (a) Gram +ve, aerobic
    (b) Gram +ve, anaerobic
    (c) Gram -ve, aerobic
    (d) Gram -ve, anaerobic
28. Example for microaerophilic N_2 fix
    (a) Rhizobium (b) Azotobacter
    (c) *E. Coli* (d) Frankia
29. Citric acid is produced by
    (a) Aspergillus niger
    (b) Acetobacter
    (c) Acetobutylicum
    (d) None
30. Vitamin B_2 is produced by
    (a) Ashbya gossypii
    (b) Pseudomonas
    (c) Brevibacterium sp.
    (d) None
31. Bacitracin is produced by
    (a) Bacillus subtilis
    (b) Aspergillus niger
    (c) *E. Coli*
    (d) Yeast
32. Production of Vinegar is by
    (a) Bacillus subtilis
    (b) Glucanobacter
    (c) Azotobacter
    (d) None
33. First Antifugal antibiotic
    (a) Cycloheximide (b) Aureofungin
    (c) Neomycin (d) Nystatin
34. Neomycin is produced by
    (a) *S. Nouesii* (b) *S. fradiae*
    (c) *S. erthyreus* (d) *S. Venezuelea*

Answers							
	17. (d)	20. (a)	23. (b)	26. (c)	29. (a)	32. (b)
	18. (c)	21. (b)	24. (a)	27. (a)	30. (a)	33. (d)
	19. (d)	22. (b)	25. (a)	28. (d)	31. (a)	34. (b)

Which one of the following is used for commercial production of Vitamin B_{12} ?
(a) Brevibacterium
(b) Mycobacterium
(c) Propionibacterium
(d) None

Inhibitory action of penicillin is
(a) Cell wall synthesis
(b) Protein synthesis
(c) Both (d) None

Organism involved in swiss cheese ripening is
(a) *Penicillium sp.*
(b) Propionibacterium
(c) *Streptococcus sp.*
(d) None

Phosphorus solubilizing microorganism
(a) VAM (b) Mucor
(c) Rhizopus (d) *E. Coli*

The term Mycorrhiza is coined by
(a) Frank (b) Hartig
(c) De bary (d) Winogradasky

Name the scientists involved in commercial production of Penicillin
(a) Alexander Flemming
(b) Florey & Chain
(c) Tulsane Brothers
(d) Louis Pasteur

Development of plants due to increase in number of cells is called
(a) hypertrophy (b) hypotrophy
(c) hyperplasia (d) hypoplasia

Name of the bacterium producing endospore is
(a) Bacillus (b) Agrobacterium
(c) Xanthomonas (d) *E. Coli*

If 10 % of the population of cells is killed by antimicrobial agent in the Ist minute of exposure, during II nd minute the percentage of killing will be
(a) 9 % (b) 10 %
(c) 1 % (d) 10.1 %

44. The most resistant form of microbial life in the bacteria is
(a) Cyst (b) Endospore
(c) Vegetative stage (d) None

45. If broth culture of following are heated in boiling water for 10 min. which culture is most likely to be sterilized
(a) *Bacillus sp.*
(b) *Pseudomonas sp.*
(c) *Clostridium sp.* (d) None

46. Liquid N_2 has a temperature
(a) - 196 °C (b) - 186 °C
(c) - 176 °C (d) - 172 °C

47. Ultraviolet light is most germicidal at the wavelength of
(a) 245 nm (b) 255 nm
(c) 265 nm (d) None

48. UV light are microcidal due to the formation of
(a) Pyrine dimers
(b) Pyrimidine dimer
(c) DNA damage
(d) RNA damage

49. In general, an ideal antimicrobial chemical agent have a _____ spectrum activity
(a) Limited (b) Broad
(c) Narrow (d) None

50. Ethylene oxide exhibits its antimicrobial activity by _____ reaction.
(a) Oxidation (b) Hydrogenation
(c) Reduction (d) Alkylation

Answers						
	35. (c)	38. (a)	41. (c)	44. (b)	47. (c)	50. (d)
	36. (a)	39. (a)	42. (a)	45. (b)	48. (b)	
	37. (a)	40. (b)	43. (b)	46. (a)	49. (b)	

51. The low pH of media inhibits the growth of
(a) Bacteria (b) Molds
(c) Both (d) None

52. Canning is a Food Preservation technique first derived by
(a) Appert (b) Pasteur
(c) Buchner (d) Menton

53. Which of the following genera is most likely to contain organisms capable of surviving high temperature ?
(a) Clostridium (b) Penicillium
(c) Torula (d) Pseudomonas

54. In the microbial production of an amino acid, which form of the amino acid is synthesized ?
(a) D - Stereoisomers
(b) L - Stereoisomers
(c) L & D forms
(d) None

55. Which of the following is/are Bio-insecticides ?
(a) Bacillus thuringiensis
(b) Bacillus popilliae
(c) Both (a) and (b)
(d) None

56. Funaric acid is produced by
(a) *Aspergillus terrus*
(b) *Rhizopus nigricans*
(c) *Aspergillus niger*
(d) *Aspergillus fumigatus*

57. Ionizing radiation to sterilize materials is called
(a) Ionisation
(b) Pasteurization
(c) Cold sterilization
(d) Tyndallisation

58. Rhizosphere was coined by
(a) Hiltner (b) Beijernick
(c) Winogradsky (d) None

59. ATP needed for N_2 fixation
(a) 12 (b) 16
(c) 28 (d) 32

60. Factor which does not affect legume root nodulation ?
(a) Temperature (b) Light
(c) Combined N_2 (d) H^+ ion conc.

61. Microaerophillic N_2 fixing bacteria
(a) Azotobacter (b) Azospirillium
(c) Clostridium (d) Enterobacter

62. Bacteria which can ferment sugar faster than yeast is
(a) Clostridium (b) Zygomonas
(c) Thiobacillus (d) Bacillus

63. Father of Soil Microbiology is
(a) Winogradsky (b) Beirjenick
(c) Spermi (d) Hiltner

64. Glycolysis inhibition in the presence of oxygen is called
(a) Warburg effect
(b) Hypoglycolytic effect
(c) Pasteur effect
(d) None of these

65. Wood sugar is
(a) Glucose (b) Mannose
(c) Xylose (d) Arabinose

66. A mat of organism formed at the surface of a liquid culture is called
(a) Biofilm (b) Pellicle
(c) Scum (d) Foam

67. Alginates are isolated from
(a) Rhodophyta (b) Bryophyta
(c) Chlorophyta (d) Phaeophyta

Answers						
	51. (a)	54. (b)	57. (c)	60. (b)	63. (a)	66. (c)
	52. (a)	55. (c)	58. (a)	61. (b)	64. (c)	67. (d)
	53. (a)	56. (b)	59. (b)	62. (b)	65. (c)	

68. The first antiseptic agent used was
(a) Mercuric chloride
(b) Carbolic acid
(c) Alcohol
(d) Hyposolution

69. A fluorescent dye used in fluorescent microscopy is
(a) Acridine orange
(b) Phosphotungstic acid
(c) Ethidium bromide
(d) Luciferin

70. What is the transformation of floral parts into leaf like structures ?
(a) Witche's broom
(b) Faciation
(c) Phyllody
(d) All of these

71. All bacteria having a conjugative plasmid will have
(a) Drug resistance (b) Sex pili
(c) Flagella (d) All of these

72. A mutation with multiple effect on the phenotype is called
(a) Multiple mutation
(b) Frame shift mutation
(c) Pleotrophic mutation
(d) None

73. A DNA specific to plants & algae is
(a) Cytoplasmic DNA
(b) Plastid DNA
(c) Heterocystic DNA
(d) Mitochondrial DNA

74. The TCA cycle pathway is
(a) Anabolic (b) Catabolic
(c) Amphibolic (d) None of these

75. Which among the following is used for insertion of foreign DNA into cells ?
(a) Agrobacterium
(b) Vaccinia virus
(c) Hela cells
(d) All of these

76. Starting material for wine making is
(a) Molasses (b) Barley malt
(c) Grape juice (d) Beet root mash

77. Virus quantification in a given sample is done by
(a) End point efflux
(b) End point dilution
(c) End point titration
(d) All of these

78. The distance between the specimen and the nearest face of the objective lens when the specimen is in sharp focus in a microscope is
(a) Resolution distance
(b) Numerical aperture
(c) Working distance
(d) Nose length

79. Plasmids with a similar or identical replicon which cannot coexist in a cell are
(a) Compatible plasmids
(b) Iso replicon plasmids
(c) Incompatible plasmids
(d) Stringent plasmids

80. Which among the following is a flagellated cycanobacteria ?
(a) Chroococcum (b) Nostoc
(c) Both a and b (d) None

81. Which among the following is a restriction modification in DNA ?
(a) Capping (b) Tailing
(c) Methylation (d) Phosphorylation

Answers					
	68. (b)	71. (b)	74. (c)	77. (b)	80. (d)
	69. (c)	72. (d)	75. (a)	78. (c)	81. (c)
	70. (d)	73. (b)	76. (c)	79. (c)	

82. First antifugal antibiotic is
(a) Nystatin (b) Cycloheximide
(c) Aureofungin (d) None of these

83. S^{35} incorporation helps in accumulation of radioactivity in the amino acid
(a) Proline (b) Arginine
(c) Valine (d) Methionine

84. A micrometer is
(a) 10^{-3} mm (b) 10^{-9} mm
(c) 10^{-3} m (d) 10^{-9} m

85. A medium in which different types of microorganisms exhibit different growth forms so that they could be distinguished is called
(a) Selective medium
(b) Synthetic medium
(c) Differential medium
(d) Preferential medium

86. Cell - Cell interaction and differentiation is mostly studied on
(a) Arabidopsis thaliana
(b) Cenorabditis elegens
(c) Escherichia coli
(d) Dictyostlium discodeum

87. Milky disease is caused by
(a) Bacillus thurimgiensis
(b) Lactobacillus lactis
(c) Bacillus popiliae
(d) None

88. mRNA which contains a transcript of more than one gene is said to be
(a) Multigenic (b) Polygenic
(c) Polycistronic (d) Heterogenic

89. A bacterial cell which lacks a chromosome but contains all the components for transcription and translation
(a) Maxi cell (b) Empty cell
(c) Mini cell (d) Ghost cell

90. Warburg's effect is due to
(a) Increased photorespiration
(b) Reduced photorespiration
(c) Increased glycolysis
(d) Decreased glycolysis

91. Fractional sterilization is
(a) Appertization
(b) Pasteurization
(c) Tyndalization
(d) Cold sterilization

92. In gram staining the alcohol acts o
(a) Teichoic acids
(b) Peptidoglycan
(c) Periplasm
(d) Membrane lipids

93. Partial diploid in bacteria is called
(a) Merozygote (b) Heterokaryo
(c) False zygote (d) None of the

94. Specialised N-fixing cells in Filament Cyanobacteria are
(a) Akinites (b) Endospores
(c) Cysts (d) Heterocysts

95. Cell to cell communication in legu Rhizobium symbiosis is carried out
(a) Lectins (b) Flavanoids
(c) Isoflavons (d) Haemoglobi

96. Bacterial endospores are characteri by the presence of
(a) Diaminopimelic acid
(b) Polybetahydroxy butyrate
(c) Dipicolinic acid
(d) All of these

Answers					
	82. (a)	85. (c)	88. (c)	91. (c)	94. (d)
	83. (d)	86. (d)	89. (c)	92. (d)	95. (a)
	84. (b)	87. (c)	90. (a)	93. (a)	96. (c)

In true photosynthesis the electron donor is
(a) Oxygen (b) Water
(c) Photosystem I (d) ATP

The most predominant immunoglobulin in tears is
(a) IgG (b) IgA
(c) IgE (d) IgD

In leghaemoglobin the heme portion is specified by
(a) Plantgenes (b) Bacterial genes
(c) Both (d) None

Leghaemoglobin is structurally and functionally similar to
(a) Haemoglobin (b) Actin
(c) Myosin (d) Myoglobin

The anticodon for ACG is
(a) UGC (b) TGC
(c) CGU (d) CGT

Negative supercoiling in DNA is brought about by
(a) DNA gyrase (b) DNA helicase
(c) DNA ligase (d) All these

A substance that can elicit an immune response only when combined with another carrier
(a) O antigen (b) Haptan
(c) Adjent (d) Immunogen

The non-celluiolytic polysaccharide fraction of plants are represented mainly by
(a) Lignin (b) Pectin
(c) Hemicellulose (d) Suberin

Yeast are
(a) Gram positive (b) Gram Negative
(c) Gram variable (d) None of these

106. Giemsa stain are used as particularly applicable for staining
(a) Rickettsias (b) Spores
(c) Protzoa (d) Both a and c

107. Name the organism which are predatory on bacteria
(a) Virus (b) Viroid
(c) Bdellovibrios (d) Prion

108. In cocoa fermentation, the microbial inoclumn used is of
(a) Aspergillus niger
(b) Candida Krusei
(c) Rhizopus oryzae
(d) None of the above

109. Riboflavin can be obtained by microbial fermentation using fungi
(a) Ashbya gossypii
(b) Rhizopus oryzae
(c) Sacchromycetes
(d) None

110. Tetracycline is effective against
(a) Gram +ve bacteria
(b) Gram -ve bacteria
(c) Fungi
(d) Broad spectrum

111. Bacitracin is effective against
(a) Gram +ve bacteria
(b) Gram -ve bacteria
(c) Fungi
(d) Broad spectrum

112. Pili are filamentous hair like structures on the surface of only
(a) Gram +ve bacteria
(b) Gram -ve bacteria
(c) Both
(d) None

nswers						
	97. (b)	100. (a)	103. (b)	106. (d)	109. (a)	112. (b)
	98. (a)	101. (a)	104. (c)	107. (c)	110. (d)	
	99. (b)	102. (a)	105. (a)	108. (b)	111. (a)	

113. The phenomenon of inhibiting the growth of bacteria without killing them
(a) Bactericidal (b) Bacteriostatic
(c) Both (d) None

114. The morphological form of rhizobium cells within the root nodules of legumes is
(a) Ovoid (b) Bacteroid
(c) Viroid (d) None

115. A cell wall component which anchors the outer membrane of enteric Gram negative bacteria to the peptidoglycan layer
(a) Techioic acid (b) Lignic acid
(c) Braun lipoprotein
(d) None

116. Protein coat of a virus
(a) Capsule (b) Capsid
(c) Envelope (d) Coat

117. An organism that uses inorganic compounds as electron donors and releles on chemical compounds for energy
(a) Chemoautotroph
(b) Photoautrotroph
(c) Chemolithotroph
(d) Photolithotroph

118. A relationship between members of different species living in proximity in which one organism benefits from the association but the other is not affected
(a) Ammensalism (b) Commensalism
(c) Predation (d) Parasite

119. An agent which frees from infection by killing the vegetative cells of microorganism
(a) Surfactant (b) Disinfectant
(c) Antiseptic (d) None

120. The preservation of biological specimens by rapid freezing and rapid dehydration in a high vacuum is known as
(a) Immobilisation
(b) Cryopreservation
(c) Lyophilization
(d) None

121. Periplasmic Flagella is also called
(a) Axial fibrils (b) Endoflagella
(c) Both of these (d) None of these

122. An antiviral substance produced by animal tissue
(a) Virion (b) Interferon
(c) Antibody (d) Antigen

123. Temperature necessary for destroyed of all the microbes within 10 minutes is called
(a) Decimel reduction time
(b) Thermal death point
(c) Thermal death time
(d) None of these

124. Nitrogenous enzyme first isolated from
(a) Clostridium pasteurianum
(b) Bacillus sp.
(c) Azotobacter
(d) Penicillium

125. Fungi used for bioassay of biotin
(a) Neurospora (b) Yeast
(c) Aspergillus (d) Penicillium

126. Region arcund the plant root where materials released from the root increase microbial population activities is called
(a) Rhizosphere (b) Rhizoplane
(c) Phyllosphere (d) None

Answers					
	113. (b)	116. (b)	119. (b)	122. (b)	125. (a)
	114. (b)	117. (a)	120. (c)	123. (b)	126. (a)
	115. (c)	118. (b)	121. (c)	124. (a)	

127. _____ is a plant pathogen bacteria
(a) Shigella (b) *E. Coli*
(c) Salmonella (d) Erwinia

128. Anaerobic free living 'N' fixing bacterium
(a) Azotobacter (b) Acetobacter
(c) Kelbsiella (d) Clostridium

129. Virus - "Contangium viuum fluidum" was given by
(a) A. Mayer (b) Beijerinck
(c) Iwanoski (d) None

130. Itaconic acid is produced by
(a) Aspergillus terrus
(b) Aspergillus itaconicus
(c) Both
(d) None

131. Phagocytosis is discovered by
(a) Robert Koch (b) Elie Metchnikoff
(c) Joseph Lister (d) Fanny Hesse

132. Lipopolysaccharide is found in cell wall of
(a) Gram -ve bacteria
(b) Gram +ve bacteria
(c) Both
(d) Fungi

133. In autoclave which form of heat is used ?
(a) dry heat (b) moist heat
(c) vacuum heat (d) both a and b

134. Who developed cell free fermentation of Modern Science ?
(a) Pasteur (b) Koch
(c) Buchner (d) None of these

135. Nitrogenase enzyme have how many component ?
(a) 1 (b) 2
(c) 3 (d) 4

136. Antiseptic surgery is given by
(a) Joseph Lister (b) Schrcedes
(c) Koch (d) Jenner

137. Five kingdom classification was developed by
(a) Haeckel (b) Chatn
(c) Stainer (d) Whittaker

138. Number of chromosome in bacteria is
(a) 0 (b) 1
(c) 2 (d) Many

139. Murein is present in
(a) Cyanobacteria (b) Halobacterium
(c) Methanobacterium
(d) None

140. Sterols are present in
(a) Eubacteria (b) Fungi
(c) Mycoplasma (d) None

141. In _____, there is V-shaped structure due to snapping fission
(a) Fusobacterium
(b) Mycobacterium
(c) Spirochaetes
(d) Cornyebacterium

142. Who proposed new grouping of living organisms into 3 kingdom i.e. Archaebacteria, Eubacteria and Eukaryotes ?
(a) Eichels (b) Woose
(c) Haeckel (d) Chester

143. Father of bacteriology is
(a) Leewenhoek (b) Pasteur
(c) Koch (d) None of these

144. Microorganism which are associated with non legumes
(a) Anabaena (b) Klebsiella
(c) Both (d) None

Answers						
	127. (d)	130. (c)	133. (a)	136. (a)	139. (a)	142. (b)
	128. (d)	131. (b)	134. (c)	137. (d)	140. (c)	143. (a)
	129. (b)	132. (a)	135. (c)	138. (b)	141. (b)	144. (c)

145. Lipopolysaccharide do not contain
(a) Lipid (b) D-Antigens
(c) Porins (d) Polysaccharides

146. In Archaebacteria which one is present in cell wall ?
(a) Murein (b) Pseudomurein
(c) Both (d) None

147. The invaginations seen at localised areas specially near the site of cell division and participate in transverse septum formation is called
(a) Lysosomes (b) Mesosomes
(c) Murein (d) Capsules

148. Mesosomes are well developed in
(a) *E. Coli* (b) *Proteus Vulgaris*
(c) Bacillus (d) None

149. Snallest self-replicating prokaryotes capable of generating their own energy
(a) Mycoplasma (b) Virus
(c) Chlamydia (d) Rickettsias

150. Species of Mycoplasma are inhibited by
(a) Penicilin (b) Tetracycline
(c) Both (d) None

151. Principal sites for CO_2 fixation in autotrophic prokaryotes
(a) Chromosomes (b) Carboxysomes
(c) Both (d) None

152. Causal organism of Q. fever
(a) *Coexiella burnetti*
(b) *Salmonella sp.*
(c) *E. Coli* (d) None

153. Which one is not correct about mesosomes ?
(a) Prominent in gram +ve bacteria
(b) Prominent in gram -ve bacteria
(c) Helps in cell division
(d) Helps in DNA replication

154. In gram +ve bacteria Flagella
(a) Only M ring is present
(b) Only S ring is present
(c) Only S and M rings are present
(d) All rings L, P, S and M are prese

155. Bacteria are commonly seen in soils suc as
(a) acidic (b) neutral
(c) alkaline (d) saline

156. Diazotrophs are
(a) Fix N_2 (b) Fix Phosphoru
(c) Fix O_2 (d) None of these

157. In archaebacteria, first amino acid initiate a new polypeptide chain is
(a) Methionine (b) Cysteine
(c) Lysine (d) None

158. Amylases produced by
(a) *Aspergillus sp.* (b) *Bacillus sp.*
(c) Both (d) None

159. Lipase produced by
(a) *Bacillus subtillis*
(b) *Rhizopus sp.*
(c) *Aspergillus sp.* (d) None

160. Red pigment produced by
(a) Serratia (b) Micrococcus
(c) Both (d) None

161. Bacillus is a
(a) Psychrophillic (b) Thermophilic
(c) Osmophilic (d) Gas former

162. Commercial (now a days) production penicillin is by
(a) *Penicillium notatum*
(b) *Pencillium chrysogenium*
(c) *Aspergillus sp.*
(d) None of these

Answers						
	145. (c)	148. (c)	151. (b)	154. (c)	157. (a)	160. (a)
	146. (b)	149. (a)	152. (a)	155. (b)	158. (c)	161. (b)
	147. (b)	150. (b)	153. (b)	156. (a)	159. (b)	162. (b)

163. Mesophilic bacteria involved in composting
1. Cellulomonas 2. Myxococcus
3. Bacillus 4. Clostridium
(a) 1, 2 (b) 1, 2, 3
(c) 2, 3 (d) All

164. Mesophilic fungi involved in composting
1. Rhizopus
2. Fusasium
3. Aspergillus niger
4. Mucor
(a) 1, 2 (b) 2, 3
(c) 3, 4 (d) 1, 2, 3

165. Antibiotic streptomycin was isolated by
(a) Buiknokles (b) Fleming
(c) Waksman (d) Duggar

166. An aminoglycoside antibiotic
(a) Penicillin (b) Streptomycin
(c) Tetracycline (d) None

167. Which of the following have highest magnification ?
(a) Simple microscope
(b) Compound microscope
(c) Phase contrast
(d) Oil immersion microscope

168. Mesophiles have temperature range of
(a) 25 - 45 °C (b) 15 - 30 °C
(c) 20 - 45 °C (d) 15 - 45 °C

169. Root surface that can be colonized by the microbes
(a) Rhizosphere (b) Rhizoplane
(c) Both (d) None

170. Number of layers surrounding the heterocyst
(a) One (b) Two
(c) Three (d) Four

171. Heterocyst lack
(a) PSI (b) PSII
(c) Both (d) None

172. Match the following :

(i)	Acetic Acid	(A)	*A. Oryzae*
(ii)	Lactic Acid	(B)	*L. Delbruckie*
(iii)	Citric Acid	(C)	*A. Niger*
(iv)	Gluconic Acid	(D)	*Acetobacter sp.*

Codes :

	(i)	(ii)	(iii)	(iv)
(a)	A	B	C	D
(b)	C	B	D	A
(c)	D	B	C	A

(d) None of these

173. Fungi used for bioassay of pantothenic acid
(a) Yeast (b) Neurospora
(c) Mucor (d) Aspergillus

174. Fermenting organism involved in Yoghurt
(a) Streptococcus (b) Aspergillus
(c) Pediococcus (d) None

175. Microbe used for Sarurkraut preparation
(a) *A. Niger* (b) *Streptococcus sp.*
(c) *Leuconostoc sp.* (d) None

176. Ropiness of unpacked bread is due to growth of
(a) *Bacillus subtilis* (b) *Clostridium sp.*
(c) *A. Niger* (d) *Streptococcus sp.*

177. Example of Chemolithotroph
(a) *E. Coli* (b) Bacillus
(c) Azotobacter (d) Nitrosomonas

178. Iron bacteria which oxidizes ferrous into ferric compound is
(a) Leptothrix (b) Beggiotoa
(c) Both (d) None

Answers						
	163. (a)	166. (b)	169. (b)	172. (c)	175. (c)	178. (a)
	164. (d)	167. (d)	170. (c)	173. (a)	176. (a)	
	165. (c)	168. (d)	171. (a)	174. (a)	177. (d)	

179. Match the following :

(i)	Tetracycline	(A)	*Bacillus subtillis*
(ii)	Bacitracin	(B)	*Streptomyces aureofaciens*
(iii)	Chloram-phenicol	(C)	*S. Grisens*
(iv)	Cyclbheximide	(D)	*S. Venezuelae*

	(i)	(ii)	(iii)	(iv)
(a)	A	B	C	D
(b)	B	A	D	C
(c)	A	B	D	C

(d) None of these

180. Nitrat reductase enzyme present in
(a) Cytoplasm (b) Chloroplast
(c) Mitochondria (d) Nucleus

181. Test organism for phenol coefficient
(a) *Salmonella typhi*
(b) *Staphylococcus aureus*
(c) Both
(d) None

182. Microbe involved in Fibre retting
(a) *Micrococcus sp.*
(b) *Bacillus subtilis*
(c) *Clostridium butrycium*
(d) *Lactobacillus sp.*

183. Microbe involved in tobacco curing
(a) *Micrococcus sp.*
(b) *Bacillus subtilis*
(c) *Lactobacillus sp.*
(d) *Aspergillus niger*

184. Urea degrading bacteria
(a) *Bacillus pasturi*
(b) *Clostridium pasteurianum*
(c) *A. Niger*
(d) *Micrococcus sp.*

185. 'P' solubilizing bacteria
(a) *Bacillus megatherium*
(b) *Clostridium pasteurianum*
(c) *A. Niger*
(d) *Micrococcus sp.*

186. Example of Eukaryotic inhibitor antibiotic
(a) Cycloheximide (b) Penicillium
(c) Tetracycline (d) Streptomycin

187. Lactose sugar of milk is converted into Lactic acid by
(a) *Streptococcus lactis*
(b) *Lactobacillus sp.*
(c) *Clostridium sp.*
(d) None

188. The size of microbe as
(a) Viriod < Virus < Bacteria < Fungi
(b) Virus < Viriod < Bacteria < Fungi
(c) Viriod < Virus < Fungi < Bacteria
(d) Virus < Viriod < Fungi < Bacteria

189. Match the following :

(i)	Amylase	(A)	*Bacillus sp.*
(ii)	Invertase	(B)	*Saccharomyces cersevisine*
(iii)	Proteases	(C)	*Aspergillus niger*
(iv)	Lipases	(D)	*Rhizopus sp.*

	(i)	(ii)	(iii)	(iv)
(a)	A	B	C	D
(b)	B	C	D	A
(c)	C	A	B	D

(d) None of these

190. Which of the following is used to detect the presence of HIV ?
(a) ELISA test (b) Benedict's test
(c) Widal test (d) Biuret's test

191. Which of the following does not produce any enzyme ?
(a) Amoeba (b) Virus
(c) Bacteria (d) Fungi

Answers					
	179. (b)	182. (c)	185. (a)	188. (a)	191. (b)
	180. (a)	183. (a)	186. (a)	189. (a)	
	181. (c)	184. (a)	187. (b)	190. (a)	

192. A virus that may not destroy the host
(a) Virulent phage
(b) Temperature phage
(c) Cyanophage
(d) Lytic cycle

193. Prions are
(a) Organism containing only nucleic acid
(b) Proteins which are capable of replications in certain mammalian cells
(c) Small cells which are infectious
(d) Fungal toxins

194. A virion is a
(a) Infectious nucleic acid
(b) Infectious virus particle
(c) A virus parasite on bacteria
(d) None of these

195. Which bacterium solublizes tricalcium phosphate in soluble rock phosphates in soils ?
(a) *Bacillus polymyxa*
(b) *Pseudomonas striata*
(c) *Spirillum lipoferum*
(d) Both (a) and (b)

196. Number of flagella in Cyanobacteria are
(a) Zero (b) One
(c) Two (d) Three

197. Type of relationship between *Acetobacter diazotrophicus* and sugarcane is
(a) Symbiotic (b) Associative
(c) Endophytic (d) Free living

198. Example of VAM fungi
(a) Pisoletecis (b) Sclerotenia
(c) Glomus (d) Trichoderma

199. Match the following :

(i) Whisky	(A) Grape wine
(ii) Rum	(B) Potato
(iii) Brandy	(C) Grain mash
(iv) Vodka	(D) Molasses

Codes :

	(i)	(ii)	(iii)	(iv)
(a)	A	B	C	D
(b)	C	D	A	B
(c)	B	A	C	D

(d) None of these

200. Match the following :

(i) Tryptophan	(A) *Brevibacterium sp.*
(ii) Valine	(B) Entero-bactericeae
(iii) Glutamic acid	(C) *Claviceps purpurea*
(iv) Lysine	(D) *E. Coli*

Codes :

	(i)	(ii)	(iii)	(iv)
(a)	A	B	C	D
(b)	C	A	D	B
(c)	B	C	A	D

(d) None of these

❑❑❑❑❑

Answers			
	192. (b)	195. (b)	198. (c)
	193. (b)	196. (a)	199. (b)
	194. (b)	197. (c)	200. (c)

ICAR INSTITUTES & UNIVERSITIES

A. Deemed Universities - 4

1. Indian Agricultural Research Institute, New Delhi
2. National Dairy Research Institute, Karnal
3. Indian Veterinary Research Institute, Izatnagar (UP)
4. Central Institute on Fisheries Education, Mumbai

B. Institutions - 45

1. Central Rice Research Institute, Cuttack
2. Vivekananda Parvatiya Krishi Anusandhan Sansthan, Almora
3. Indian Institute of Pulses Research, Kanpur
4. Central Tobacco Research Institute, Rajahmundry (A.P.)
5. Indian Institute of Sugarcane Research, Lucknow
6. Sugarcane Breeding Institute, Coimbatore
7. Central Institute of Cotton Research, Nagpur
8. Central Research Institute for Jute and Allied Fibres, Barrackpore
9. Indian Grassland and Fodder Research Institute, Jhansi
10. Indian Institute of Horticultural Research, Bangalore
11. Central Institute of Sub Tropical Horticulture, Lucknow
12. Central Institute of Temperate Horticulture, Srinagar
13. Central Institute of Arid Horticulture, Bikaner
14. Indian Institute of Vegetable Research, Varanasi
15. Central Potato Research Institute, Shimla
16. Central Tuber Crops Research Institute, Trivandrum
17. Central Plantation Crops Research Institute, Kasargod
18. Central Agricultural Research Institute, Port Blair
19. Indian Institute of Spices Research, Calicut
20. Central Soil and Water Conservation Research & Training Institute, Dehrad
21. Indian Institute of Soil Sciences, Bhopal
22. Central Soil Salinity Research Institute, Karnal
23. ICAR Research Complex for Eastern Region including Centre of Makhana, Pa

24. Central Research Institute of Dryland Agriculture, Hyderabad
25. Central Arid Zone Research Institute, Jodhpur
26. ICAR Research Complex Goa
27. ICAR Research Complex for NEH Region, Barapani
28. National Institute of Abiotic Stress Management, Malegaon, Maharashtra
29. Central Institute of Agricultural Engineering, Bhopal
30. Central Institute on Post harvest Engineering and Technology, Ludhiana
31. Indian Institute of Natural Resins and Gums, Ranchi (Jharkhand)
32. Central Institute of Research on Cotton Technology, Mumbai
33. National Institute of Research on Jute & Allied Fibre Technology, Kolkata
34. Indian Agricultural Statistical Research Institute, New Delhi
35. Central Sheep and Wool Research Institute, Avikanagar, Rajasthan
36. Central Institute for Research on Goats, Makhdoom (Mathura)
37. Central Institute for Research on Buffaloes, Hissar
38. National Institute of Animal Nutrition and Physiology, Bangalore
39. Central Avian Research Institute, Izatnagar (UP)
40. Central Marine Fisheries Research Institute, Kochi
41. Central Institute Brackishwater Aquaculture, Chennai
42. Central Inland Fisheries Research Institute, Barrackpore
43. Central Institute of Fisheries Technology, Cochin
44. Central Institute of Freshwater Aquaculture, Bhubneshwar
45. National Academy of Agricultural Research & Management (NAARM), Hyderabad

. National Research Centres - 17

1. National Research Centre on Plant Biotechnology, New Delhi
2. National Centre for Integrated Pest Management, New Delhi
3. National Research Centre for Litchi, Muzaffarpur (Bihar)
4. National Research Centre for Citrus, Nagpur
5. National Research Centre for Grapes, Pune
6. National Research Centre for Banana, Trichi (TN)
7. National Research Centre Seed Spices, Ajmer
8. National Research Centre for Pomegranate, Solapur
9. National Research Centre on Orchids, Pakyong, Sikkim

10. National Research Centre Agroforestry, Jhansi
11. National Research Centre on Camel, Bikaner
12. National Research Centre on Equines, Hisar
13. National Research Centre on Meat, Hyderabad
14. National Research Centre on Pig, Guwahati
15. National Research Centre on Yak, West Kemang
16. National Research Centre on Mithun, Medziphema, Nagaland
17. National Centre for Agril. Economics & Policy Research, New Delhi

D. National Bureaus - 6

1. National Bureau of Plant Genetics Resources(NBPGR), New Delhi
2. National Bureau of Agriculturally Important Micro-organisms, Mau, (UP)
3. National Bureau of Agriculturally Important Insects(NBAII), Bangalore
4. National Bureau of Soil Survey and Land Use Planning, Nagpur
5. National Bureau of Animal Genetic Resources, Karnal
6. National Bureau of Fish Genetic Resources, Lucknow

E. Directorates / Project Directorates - 25

1. Directorate of Maize Research (DMR), New Delhi.
2. Directorate of Rice Research (DRR), Hyderabad
3. Directorate of Wheat Research (DWR) Karnal
4. Directorate of Oilseed Research (DOR), Hyderabad
5. Directorate of Seed Research (DSR), Mau (UP)
6. Directorate of Sorghum Research, Hyderabad
7. Directorate of Groundnut Research (DGR), Junagarh
8. Directorate of Soybean Research(DoSR), Indore
9. Directorate of Rapeseed & Mustard Research, Bharatpur
10. Directorate of Mushroom Research, Solan (Himachal Pradesh)
11. Directorate on Onion and Garlic Research, Pune
12. Directorate of Cashew Research, Puttur (Karnataka)
13. Directorate of Oil Palm Research, Pedavegi, West Godawari (A.P.)
14. Directorate of Medicinal and Aromatic Plants Research, Anand
15. Directorate of Floriculture Research, Pusa, New Delhi
16. Project Directorate for Farming Systems Research, Modipuram, Merrut (UP)
17. Directorate of Water Management Research, Bhubaneshwar

18. Directorate of Weed Science Research, Jabalpur
19. Project Directorate on Cattle, Meerut
20. Project Directorate on Foot & Mouth Disease, Mukteshwar(Uttrakhand)
21. Project Directorate on Poultry (PDP), Hyderabad
22. Project Directorate on Animal Disease Monitoring and Surveillance, Hebbal, Bangalore
23. Directorate of Information & Publication in Agriculture (DIPA), New Delhi
24. Directorate of Cold Water Fisheries Research, Bhimtal, Nainital (Uttrakhand)
25. Directorate of Research on Women in Agriculture (DRWA), Bhubaneshwar

F. RESEARCH SCHEMES / PROJECTS

In addition to its institute based research, ICAR promotes research schemes/projects in agriculture and allied areas to resolve location - specific problems.

(a) All India Coordinated Research Projects (AICRP)

There are 91 such projects with majority of them currently operating in Agricultural Universities and ICAR Institutes. First AICRP was sanctioned for Maize in 1957 in country. The expenditure on these projects has increased steadily and nearly 1/4 of the ICAR's budget is now spent on these projects. The expenditure is shared by the ICAR and the collaborating institution on 75 : 25 basis.

(b) National Agricultural Research Project (NARP)

Agricultural Universities which have a state wide mandate for agriculture, did not have a strong base for research at the regional level. Most of the funds provided were utilized for developing the University main campuses, thus neglecting the regional research needs. To overcome this, the ICAR launched in 1979, with World Bank assistance, a novel scheme known as National Agricultural Research Project (NARP) to strengthen the regional research capabilities of these Universities for conducting need based, location specific and production oriented research in identified agro-climatic zones. Under this project, each state is divided into a contiguous set of agro-climatic zones on the basis of climate, soils, crops and ecology.

The project had the IDA supply of $27 million in the first phase, which was about 50 percent of the project cost. This first phase was closed in September, 1985 after having used $19 5 million of the $27 million credit. The second phase under implementation since February 1986 had an estimated cost of $110 9 million of which the IDA credit is $72 1 million. On the recommendation of the mid-term review committee, the second phase of the project was extended upto 1994.

(c) National Agricultural Technology Project (NATP) :

With a view to raise the efficiency of resource use for technology generation assessment as well as transfer i.e., involving both agricultural research and extens ICAR has initiated the major National Agricultural Technology Project (NATP) in with the financial support provided by the World Bank to the tune of US $243 mill After successful completion of five year, the project came to an end in Decem 2005. The project essentially focused on the following components :

1. Organization and Management (O & M) Reforms.
2. Agro-ecosystem Research.
3. Innovations in Technology Dissemination.
4. Competitive Grants Scheme.

(d) National Agricultural Innovations Project (NAIP) :

After the completion of NATP, the remaining one-third financial credit remai unutilized. So ICAR has decided to use the credit in innovation of technology diffus under the new project named as National Agricultural Innovations Project (NA came in existence in July, 2006. Project was funded from World Bank.

(e) Technology mission in Agriculture :

The Technology Mission on Oilseeds Research was set up in April 1986, to prov research and technology support to make the country self-reliant in edible and n edible oils.

(f) Professors of Eminence and National Fellows :

ICAR launched in 1978 a special scheme known as "Professors of Eminence National Fellows" to identify individuals of outstanding merit, who could prov leadership in the development of "Schools of Thought" in specific areas by undertak fundamental research in agriculture and allied areas.

INTERNATIONAL AGENCIES

A. CGIAR Institutions :

The Consultative Group on International Agriculture (CGIAR) is an association of countries including India, international and regional organizations, and priv foundations devoted to improve global food production. It was established in 1 and is now located in Washington, D.C. The CGIAR supports a network of 16 IAR distributed throughout the World. The World Bank, the UNDP and the FAO are sponsors of this network. The 16 IARCs are indicated below.

1. International Rice Research Institute (1960) - IRRI : Manila (Philippines)
2. Centro Internatinoal de Majoromiento de Maiz Y Trigo - CIMMYT (Internatio Centre for the Improvement of Maize and Wheat) : Mexico

3. Centro Internacional de law Papa - CIP (International Potato Centre) : Lima (Peru)
4. West Africa Rice Development Association, WARDA : Bouake (Cote d'Ivoire)
5. International Plant Genetic Resources Institute, IPGRI : Rome (Italy)
6. International Crops Research Institute for the Semi-Arid Tropics - ICRISAT : Patancheru, Andhra Pradesh (India)
7. International Centre for Agricultural Research in the Dry Areas - ICARDA : Aleppo (Syria)
8. Centro International de Agricultura Tropical - CIAT (International Centre for Tropical Agriculture) : Cali (Columbia)
9. International Institute for Tropical Agriculture - IITA : Ibadan (Nigeria)
10. World Agroforestry Centre - (WAC) : Nairobi (Kenya)
11. Centre for International Forestry Research - CIFOR : Bogor (Indonesia)
12. International Irrigation Management Institute - IIMI : Colombo (Sri Lanka)
13. International Livestock Research Institute - ILRI : Nairobi (Kenya)
14. International Centre for Living Aquatic Resource Management - ICLARM : Manila (Philippines)
15. International Food Policy Research Institute - IFPRI : Washington, D.C. (U.S.A.)
16. International Service for National Agricultural Research - ISNAR : The Hague (Netherland)

Non-CGIAR Institutions :

1. Asian Vegetable Research and Development Centre - AVRDC : Shashua (Taiwan)
2. International Board for Soil Research and Management : IBSRAM : Bangkok (Thailand)
3. International Centre of Insect Physiology and Ecology - ICIPE : Nairobi (Kenya)
4. International Centre for Integrated Mountain Development - ICIMD : Kathmandu (Nepal)
5. South East Asian Regional Centre for Graduate Study and Research in Agriculture - SEARCGA : Los Banos (Philippines)

Country Based Institutions

CIDA	:	Canadian International Development Agency, Canada
DANIDA	:	Danish Development Agency, Denmark
FINNIDA	:	Finish Development Agency, Finland
IDRC	:	International Development Research Centre, Canada
IDS	:	Institute of Development Studies, UK

ISAAA	:	International Service for the Acquisition of Agri-Biotechnology Application, USA
JIRCAS	:	Japanese International Research Centre for Agricultural Sciences, Japan
ODA	:	Overseas Development Administration, UK
SIDA	:	Swedish International Development Agency, Sweden
USAID	:	United States Agency for International Development, USA
USDA	:	United States Department of Agriculture, USA

D. Institutions for South-South Co-operation (Third World Countries)
1. Third World Academy of Science - TWAS : Trieste (Italy)

E. World Grain Council (WGC) - London (UK)

Universities :

The SAUs are major partners in growth & development of Agricultural Research and Education under National Agricultural Research System. For any relevant information, you may contact any of the State Agricultural Universities at their respective addresses.

1. Acharya NG Ranga Agricultural University, Rajendra Nagar, Hyderabad, Andhra Pradesh
2. Anand Agricultural University, Anand, Gujarat
3. Assam Agricultural University, Jorhat, Assam
4. Bidhan Chandra Krishi Viswavidyalaya, Nadia, West Bengal
5. Birsa Agricultural University, Ranchi, Jharkhand
6. Central Agricultural University, Imphal, Manipur
7. Chandra Shekar Azad University of Agriculture & Technology, Kanpur, Uttar Pradesh
8. Chaudhary Charan Singh Haryana Agricultural University, Hisar, Haryana
9. CSK Himachal Pradesh Krishi Vishvavidyalaya, Palampur, Himachal Pradesh
10. Dr Balasaheb Sawant Konkan Krishi Vidyapeeth, Ratnagiri, Maharashtra
11. Dr Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra
12. Dr Yashwant Singh Parmar Univ of Horticulture & Forestry, Nauni, Himachal Pradesh
13. Govind Ballabh Pant University of Agriculture & Technology, Pantnagar, Uttarakhand
14. Guru Angad Dev Veterinary and Animal Science University, Ludhiana, Punjab
15. Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh
16. Jawaharlal Nehru Krishi Viswavidyalaya, Jabalpur, Madhya Pradesh

17 Junagadh Agricultural University, Junagadg, Gujarat
18 Kerala Agricultural University, Trichur, Kerala
19 Maharana Pratap Univ. of Agriculture & Technology, Udaipur, Rajasthan
20 Maharashtra Animal Science & Fishery University, Nagpur, Maharashtra
21 Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra
22 Marathwada Agricultural University, Parbhani, Maharashtra
23 Narendra Deva University of Agriculture & Technology, Faizabad, Uttar Pradesh
24 Navsari Agricultural University, Navsari, Gujarat
25 Orissa Univ. of Agriculture & Technology, Bhubaneshwar, Orissa
26 Punjab Agricultural University, Ludhiana, Punjab
27 Rajasthan Agricultural University, Bikaner, Rajasthan
28 Rajendra Agricultural University, Pusa, Samastipur, Bihar
29 Sardarkrushinagar - Dantiwada Agricultural University, Sardar Krushinagar, Distt Banaskantha, Gujarat
30 Sardar Vallabhbhai Patel University of Agriculture and Technology, Modipuram, Meerut, Uttar Pradesh
31 Sher-E-Kashmir Univ of Agricultural Sciences & Technology, Jammu, J & K
32 Sher-E-Kashmir Univ of Agricultural Sciences & Technology of Kashmir, Shrinagar, Jammu & Kashmir
33 Sri Venkateswara Veterinary University, Tirupati
34 Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu
35 Tamil Nadu Veterinary & Animal Science University, Chennai, Tamilnadu
36 University of Agricultural Sciences, Bangalore
37 University of Agricultural Sciences, Dharwad, Karnataka
38 UP Pandit Deen Dayal Upadhaya Pashu Chikitsa Vigyan Vishwa Vidhyalaya evam Go Anusandhan Sansthan, Mathura, Uttar Pradesh
39 Uttar Banga Krishi Viswavidyalaya, Coach Bihar,West Bengal
40 West Bengal University of Animal & Fishery Sciences, Kolkata, West Bengal
41 Karnataka Veterinary, Animal and Fisheries Sciences University, Bidar, Karnataka
42 University of Agricultural Sciences, Raichur, Karnataka
43 University of Horticultural Sciences, Bagalkot, Karnataka
44 Andhra Pradesh Horticultural University, West Godavari District, Andhra Pradesh
45 Rajmata Vijayraje Sciendia Krishi Vishwa Vidyalaya, Race Cource Road, Gwalior, Madhya Pradesh
46 Rajasthan University of Veterinary and Animal Sciences, Bikaner, Rajasthan
47 Bihar Agricultural College, Bhagalpur, Bihar
48 Kerala Veterinary and Animal Sciences University, Thiruvananthapuram

OOOOO

SPICES

SPICES

Total spices in world according to International standard organisation = 107

In India total spices grown = 52

Economic parts of spices :

Seed spices
- Cumin
- Coriander
- Fennel
- Fenugreek, ajwan
- Suwa
- Kala zeera

Floral parts - Cloves and saffron (dried stigma)

Fruits/pods/capsules
- Chillies
- Cardamom

Berries
- Black pepper
- Tamarind

Rhizomes
- Turmeric
- Ginger

S. No.	Spices	Family	Origin	Habit
1.	*Cuminum cyminum* Cumin (Jeera)	Umbelliferae	Egypt, Syria	Annual
2.	*Corriandrum sativum* (Coriander)	Umbelliferae	Mediterranean region	Annual herb
3.	*Foeniculum vulgare* (Fennel, Saunf)	Umbelliferae	Romania/India	Biennial o perennial
4.	*Elettaria cardamomum* (Chhoti elaichi)	Zingiberaceae	India	Perennial herb
5.	*Zingiber officinale* (Ginger, Adrak)	Zingiberaceae	India	Perennial
6.	*Curcuma longa* (Haldi/turmeric)	Zingiberaceae	India	Perennial
7.	*Crocus sativus* (Kesar, Saffron)	Iridaceae	Europe/Mediterranean region	Bulbous perennial

8.	*Trigonella foenum graecum* (Methi, fenugreek)	Leguminosae	Europe/West Asia	Annual herb
9.	*Piper nigrum* (Black pepper)	Piperaceae	India	Climbing perennial
10.	*Allium sativum* (Garlic)	Lilliaceae	India	Bulbous perennial
11.	*Allium cepa* (Onion)	Lilliaceae	India	Biennial herb
12.	*Capsicum annuum* (Chilli or Mirch)	Solanaceae	America	Annual
13.	*Syzygium aromaticum* (Long)	Myrtaceae	-	Perennial

- Spices crops are largely grown in the tropics between 20°N and 20°S.
- Ginger require warm and humid climate.
- Propagation of ginger is from bits obtained from rhizomes.
- Seed rate of ginger to get desired plant rhizomes stand is 2000-2500 kg ha^{-1}.
- Turmeric requires humid climate.
- Volatile oil in turmeric is 3-5%
- Clove requires warm and humid climate with a annual rainfall of 1500-2000mm
- Clove is propagated through *seeds.*
- *Dried stigma* is the economic part of saffron.
- Propagating material of saffron is *corms.*
- In cardamom mosaic, marble or katte disease is caused by virus.
- Optimum seed rate of coriander is 12-15 kg ha^{-1}
- Cumin contains about 3 - 4 % volatile oils
- Seed rate to get desired plant stand in cumin is 10-15 kg ha^{-1}.
- Total crop duration of cumin and coriander is 100 days
- Oil content in fennel is 9-13%
- Seed rate of fennel is 10-12 kg ha^{-1}.
- Garlic contains about 0.1% *volatile oil*
- Seed rate of methi (*Trigonella foenum graecun*) is 25 kg/ha.
- National Research Center for Seed Spices, Tabiji (Rajasthan).
- National Research Center for Spices, Calicut (Kerala).

IMPORTANT FACTS

- Meteorological subdivision in India 36
- Contribution of South West monsoon in rainfall ..... 80 - 90 %
- Which ICAR institute celebrated its centenary year in 2005 ..... IARI
- ICAR was established on the recommendation of Royal Commission on Agriculture (1928) on ..... 16 July, 1929
- Number of agro - climatic zones in India (Planning commission) is 15
- Number of agro - ecological zones in India (NBSS & LUP) is 20
- Number of Agricultural Universities in India ..... 48 (SAUs 47 and one CAU at Imphal)
- Number of Deemed Universities in ICAR ..... 4 (IARI, NDRI, IVRI, CIFE)
- Number of National Bureaus 6
- Recently a new National Institute was established in Feb 2009 as National Institute of Abiotic Stress Management (NIASM) at Baramati (Maharashtra).
- National Institute of Biotic Stress Management, Raipur (Chattishgarh) is going to be established under 12th Five Year Plan.
- Placed different agricultural research institutes under the purview of ICAR in 1966
- President of ICAR ..... Union Minister of Agriculture
- First Agricultural Minister of Independent India ..... Rafi Ahmed Kidwai
- First KVK in India was established in Pondichery in 1974
- Number of KVKs in India (till Jan 2012) 605
- ICAR is a registered society came in existence in 1929
- Wheat variety contributed much to green revolution is ..... HD 2329
- Number of country members of UNO ..... 193 (recently joined South Sudan on 14th July 2011)
- Number of country members of WTO 153
- Forest area in the country ..... 20.5 % (state having highest forest area is M.P.)
- ICAR reorganized in ..... 1965 and 1972

- India is the 3rd largest producer of fish in the world (first- Japan).
- India is the 2nd largest producer of inland fish in the world
- Distribution of quality seeds in the year 2009 - 10 was ..... 257 lakh tonnes
- Contribution of Agriculture in National GDP in 2010 - 11 (estimated) was ..... 14.2 %
- Percent work force of India engaged in agriculture is (2009-10) 52
- Share of agricultural products in total exports (2009-10) was ..... 9.9 %
- Largest contributor commodity in agricultural exports (2009-10) was ..... Rice
- Largest contributor commodity in agricultural imports (2009-10) : Edible oils (1.7 % of total imports)
- External debt on India in 2010 was ..... 262.34 billion $
- Value of export of Agricultural and allied products in 2008 - 09 was US $ 169 billion
- Largest contributor in total power generation is ..... Thermal power
- Consumption of fertilizers in India (2009 - 10) was ..... 135.3 kg / ha
- State having highest fertilizer consumption in Kg / ha is ..... Punjab
- UT having highest fertilizer consumption in Kg / ha is ..... Pondicherry
- State having lowest fertilizer consumption in Kg / ha is ..... Nagaland
- The average size of agriculture holding in India during 2009-10 was ..... 1.06 ha
- Largest coffee producing state ..... Karnataka
- Largest tea producing state ..... Assam
- Largest rubber producing state ..... Kerala
- UN declared year 2010 as ..... "International Year of Biodiversity"
- UN declared year 2011 as ..... "International Year of Forests"
- UN declared year 2012 as ..... " International Year of Cooperatives"
- National Water Grid was proposed by ..... K. L. Rao
- National water policy was announced in 1987
- Per hectare consumption of pesticides in India during 2008 was 381g against the world average of 500g.
- Rice is the highest pesticide consuming crop (25.9 % of total pesticides) in the country.
- Andhra Pradesh is the highest pesticide consuming state (23 % of total) followed by Punjab and Maharashtra.

- Frizwal hybrid of Deshi Sahiwal cow has been developed recently, whose o lactation period milk yield is about 3600 litres.
- National Agricultural Science Museum (2004) located at ..... New Del
- India is the first nation in world to develop hybrid cotton variety H 4 in 1970, pe millet hybrid HB 1 in 1965, CSH -1 sorghum hybrid in 1964, castor (GCH-3) and pige pea hybrid (ICPH 8 in 1991) & second to develop hybrid rice after China in 1994.
- India's first safflower hybrid was DSH-129, first mustard hybrid was NRCHB -506
- The world's first high yielding aromatic basmati rice Pusa Basmati; first amber colo commercial Triticale variety DT 46; the first composite maize varieties Vijay, Kis Jawahar and Vikram; the first hybrids of mango Amrapali and Malika, have all be developed at the IARI, New Delhi.
- More than 180000 germplasm of agri - horticultural crops and their wild relati collected and preserved in the National Gene Bank (NBPGR), New Delhi.
- Great success has been achieved in introduction of new crops, such as soybean a sugar beet (both in 1960), and sunflower (in 1969) in India.
- "Every thing else may wait but not agriculture" statement was given by J. L.Nehr
- "Our salvation can only come through the farmer, Neither the lawyer, nor the doct nor the rich landlord are going to secure it" statement was given by .. M. K. Gand
- Food grain production of India rose from 50 million tonne during 1950-51 to 241 million tonnes in 2010 - 11 (Fourth advanced estimate)
- The 11th Five year plan targets of an annual growth rate of 9
- Contribution of services in national GDP during 2009-10 was 57.2
- India is largest consumer of sugar and second largest producer of sugar with a producti of 188 lakh tonnes during 2009 - 10.
- India is largest producer and consumer of black tea in world (Tea is grown in 16 sta of India).
- India is the largest producer, consumer and exporter of spices in the world.
- India was one of the first in Asia to set up Export Processing Zone model in 1965 Kandla
- In India, electricity generation by power utilities during 2009 - 10 was ..... 796.3 Billion KW
- The per capita net availability of cereals and pulses in India during 2009 was 407 a 37 g / day, respectively.
- A.P. (90.61 lakh tones) followed by Punjab (85.53 lakh tonnes) and UP (25.38) was leading states in procurement of rice in central pool during 2008 - 09.

- Punjab (99.4 lakh tonnes) followed by Haryana (52.31) and UP (31.37) was the leading states in procurement of wheat in central pool during 2008 -09.
- During 2010 - 11 the procurement of wheat in central pool was 22.52 million tonnes.
- During 2009 - 10 (kharif) the procurement of Rice was ..... 31.46 million tonnes.
- Area under soil conservation in the country during 2004 - 05 was 39.8 million ha
- Irrigation potential created and utilized during 2002 - 07 (tenth plan) was 102.8 and 87.2 million ha, respectively.
- National Food Security Mission (NFSM) was started during 2007 - 08 to increase the production of rice, wheat and pulses by 10, 8, and 2 million tonnes, respectively by the end of 11th Five year plan with an allocation of Rs 4882.5 crores.
- Rashtriya Krishi Vikas Yojana (RKVY) was started in August 2007 as 100 per cent grant by central government to the states with an outlay of Rs 25,000 crores.
- National Policy for Farmers, 2007 has approved as a holistic approach for the development of the farm sector
- India is the 4th largest producer of natural rubber with a share of 8.5 % in world production in 2009
- National Horticulture Mission (NHM) was launched for holistic development of horticulture sector during..... 2005 - 06
- The 18th Livestock Census (2007) has placed the total livestock population at 529.7 millions, and that of poultry birds at 648.8 millions.
- Livestock Insurance Scheme was started during 2005 - 06 on pilot basis in 100 selected districts.
- Commercial cultivation of Bt-cotton was started in India during 2002
- The world's first cotton hybrid H 4 was developed by C. T. Patel at Surat (Gujarat) in 1970
- The world's first inter-specific cotton hybrid Varalaxmi (*G. hirsutum* x *G. barbadense*) was developed by S.A.Patil at UAS, Dharwad in 1976
- The world's first diploid cotton hybrid DH 7 was released from Surat in 1985
- Ramie (*Boehmeria nivea*) belongs to family Utricaceae yields strongest vegetable fibre from ..... Stem
- Central Institute of Horticulture (CIH) was established at Medziphema (Nagaland) under supervision of Horticultural Commissioner, DAC, Ministry of Agriculture, GOI, India during 2006.
- In 2009 - 10, livestock sector produced 112.5 million tonnes of milk; 59.8 billion eggs; 43.2 million kg of wool, 4.0 million tonnes of meat and 7.85 million tonnes of fish.
- The livestock and fisheries sector contributes 26.84 % to the GDP from agriculture and allied activities.

- India's share in world exports (2006) was ..... 1 %
- The livestock & fisheries sector contributed over 4.07 % to Total Indian GDP in 2008 - 09
- India is the second largest producer of fruits and vegetables in the world.
- India possesses the largest livestock population in the world after ..... Brazil
- India rank first in respect of Buffalo and second in respect of cattle and goat population, third in respect of sheep, 4th in ducks, 5th in chickens and 7th in Camels in the world.
- The annual per capita availability of eggs in India in 2009 was 51
- Which GM crop occupies largest area in world ..... Soybean
- Which amino acid accumulates under water stress condition in plant.....Proline
- In sorghum, HCN synthesizes in roots and under stress condition it accumulates in Leaves
- In tobacco, nicotine synthesis take place in roots and stored in ..... Leaves
- The precursor of auxin (Zn help in IAA synthesis) hormone is .....Tryptohan
- The precursor of ethylene hormone is ..... Methionine
- The first alkaloid to be isolated and crystallized was the drug morphine, isolated in 1805 from opium poppy (*Papaver somniferum*)
- The first herbicide in world was 2, 4 - D developed in 1945 by Zimmerman and Hitchkock (USA)
- Father of field plot technique is ..... J. B. Boussingault
- Pusa Nanha is a mutant variety of ..... Papaya
- Budha garden situated in New Delhi is a type of style of gardening.. Japanese style
- Biggest cultivated fruit in world ..... Jack fruit
- Oleoresin is extracted from ..... Chillies
- *Bacillus thuringiensis* was discovered by ..... S. Ishiwata
- Transgenic crop having largest area in world is ..... Soybean
- Which element is deficient in milk ..... Iron
- Pashmina wool is obtained from Kashmiri ..... Goat
- Dolly clone (sheep) is created by ..... Wilmont
- Hormone responsible for milk let down ..... Oxytocin
- The important green house gas releases from paddy field & wasteland ..... Methane
- National Biodiversity Authority is located at ..... Chennai
- Milk city of India is ..... Anand

- Year 2008 - 09 declared as "Food security and quality year" by ..... GOI
- Asia's largest Tulip Garden (2008) is situated in..... Srinagar
- Most dominant enzyme on the earth (quantity wise) is..... Rubisco
- Golden rice is a rich source of vitamin 'A' have beta - carotene about..... 37 ppm
- Durum wheat contain about 6 ppm yellow pigment as compared to aestivum (2.5 ppm)
- Bael is a good source of..... Marmelosin and riboflavin
- System of Rice Intensification (SRI) requires only 5 Kg seed / ha (method developed at Madagaskar in 1983).
- Indian Lac Research Institute (ILRI), Ranchi (Jharkhand) now renamed as Indian Institute of Natural Resins and Gums (NINRG).
- The first time avian influenza (bird flu) in poultry started in Hong Kong in 1997
- The swine flue (Human disease) is caused by ..... AH1N1 virus.
- The first out break of avian influenza (H5N1 virus) was reported in February, 2006 in Maharashtra
- Genome of Rice, *Arabidopsis*, maize, sorghum and pigeonpea (by Indian Scientists in 2011) plants have completely sequenced.
- Recently, a pain killer for cattle has been banned by Drug Controller General of India Diclofenac
- GEAC stands for Genetic Engineering Appraisal Committee is the authority in India which recommends to grow Bt-crops belongs to Ministry of Environment and Forest
- In India first public sector transgenic Bt cotton variety is .... Bikaneri Nerma (BN Bt).
- India developed World's first cloned buffalo in Feb 2009 and also birth of Mithun calf through AI
- Scientists developed World's first cloned camel using DNA harvested from an adult camel at ..... Emirate of Dubai.
- Maharashtra is having first position in area and production of fruits in the country (2008 - 09).
- Tamil Nadu is having highest productivity (25.78 t / ha) of fruits in the country followed by MP (25.68 t / ha).
- State having largest area (29, 000 ha) and production (2,34,000 MT) of flowers is Tamil Nadu followed by Karnataka (Area = 26,000 ha and production = 2,04,000)
- WB is producing largest number of cut flowers in the country.
- WB is number one in area and production of vegetables in the country followed by Uttra Pradesh.
- Area of GM crops in the world was about 148 mha (in 2010).

- Animal phylum Loricifera (*Spinoloricus* nov. sp., *Rugiloricus* nov. sp. and *Pliciloric* nov. sp.) new to science and discovered as first multicellular organisms lacki mitochondria. These organisms are metabolically active and show specific adaptatio to the extreme conditions of the deep basin, such as the lack of mitochondria, an large number of hydrogenosome-like organelles, associated with endosymbio prokaryotes.
- In addition to CAU, Imphal one more Central Agricultural University is going to established at Jhansi (UP).

Indian National Symbols :

S.No.	Symbol	Common / scientific name	Remark
1	National tree	Banyan (*Ficus benghalensis*)	-
2.	National bird	Indian peacock (*Pavo cristatus*)	-
3.	National flower	Lotus (*Nelumbo nucifera*)	-
4.	National fruit	Mango (*Mangifera indica*)	Also regarded "food of god"
5.	National animal	Tiger (*Panthera tigris*)	Royal Beng tiger
6.	National heritage animal	Elephant (*Elephas maximus*)	-
7.	National river	The Ganga	It originate Gaumakh in t souihern Himalayas
8.	National calander	Saka calander (Saka samvat)	Begun from vernal equinox AD 79
9	National Anthem	Jana - gana - mana	Written by Tagore and adopted on 2 Jan, 1950
10	National Song	Vande Mataram	By BC Chatte
11	National flag	Horizontal tricolor (deep saffron at the top, darkgreen at the bottom and white in the middle (with navy blue wheel consists of 24 spokes)	Adopted on 2 July, 1947

	Revolution	Field
1.	Green revolution	Food grains
2.	White revolution	Milk
3.	Blue revolution	Fisheries
4.	Brown revolution	Food processing / Fertilizers
5.	Yellow revolution	Oil Seeds
6.	Golden revolution	Horticulture
7.	Round revolution	Potato
8.	Rainbow revolution	Overall development of agriculture sector
9.	Black revolution	Petroleum products
10.	Silver revolution	Eggs Production

	ICAR		Persons
1.	First DG of ICAR	:	Dr B. P. Pal
2.	First President of ICAR	:	Habibullah
3.	First Director of IARI	:	Dr. Vishwanathan
4.	Present DG of ICAR	:	Dr. S. Ayyappan
5.	Present President of ICAR	:	Sh. Sharad Pawar
6.	Present Director of IARI	:	Dr. H. S. Gupta

Crop		Seed rate (Kg / ha)
Bt - cotton	:	1.5
Hybrid cotton	:	2
Hybrid rice	:	10 - 15
Hybrid wheat	:	65
Hybrid maize	:	20 - 25

Revolution	Father
Green Revolution	N. E. Borlaug (Got Nobel Prize for Peace in 1970)
Green Revolution in India	M. S. Swaminathan
White Revolution in India	V. Kurien

Organization		Chairman
NAAS (New Delhi)	:	R. B. Singh
PPV & FR Authority (New Delhi)	:	P.L. Gautam
Rainfed Authority (India) (New Delhi)	:	J. S. Samra
TAAS	:	R.S. Paroda

Project	Associate Person
Gurgaon	F. L. Bryne
Sewagram	Mahatma Gandhi
Shantiniketan	R. N. Tagore
Marthandom	Hatch
Etawah Pilot	Albert Mayer
T & V System	Daniel Benor

	Science	Father
1.	Agricultural Chemistry	Liebig
2.	Modern Agronomy	Pietro de Crenscenzi
3.	Pedology	Dokuchaev
4.	Agroclimatology	Koppen
5.	Genetics	G. J. Mendel
6.	Modern Genetics	T. H. Morgan
7.	Plant Pathology	Anton de Bary
8.	Plant Pathology in India	E. J. Butler
9.	Safeners	O. L. Hoffman
10.	Cytology	Robert Hooke
11.	Mycology	A. M. Micheli
12.	Biology	Aristotle
13.	Botany	Theophrastus
14.	Modern botany	C. Linnaeus
15.	Zoology	Aristotle
16.	Endocrinology	Thomas Addison
17.	Bacteriology	Leeuwenhoek
18.	Microbiology	Louis Pasteur

	Science	Father
19.	Immunology	Edward Jenner
20.	Medicine	Hippocrates
21.	Paleontology	Leonard da Vinci
22.	Evolutionary ideas	Empedocles
23.	Indian Paleontology	Birbal Sahani
24.	Plant Physiology	Stephan Hales
25.	Indian Ecology	R. Mishra
26.	Taxonomy	Carolus Linnaeus
27.	Radiation Genetics	H. J. Muller
28.	Microscopy	Marcello Malpighi
29.	Mutation	Hugo De Vries
30.	Blood circulation	William Harvey
31.	Blood groups	Karl Landsteiner
32.	Eugenics	Francis Galton
33.	Organic farming	Albert Howard
34.	Biodynamic farming	Rudolf Steiner
35.	Natural farming	Masanobu Fukuoka
36.	Indian Ornithology	Salim Ali

	Plants	:	Condition
01.	Halophytes	:	Plants prefer saline conditions
02.	Sciophytes	:	Plants prefer shady condition
03.	Lithophytes	:	Plants grows on rock surface
04.	Psammophytes	:	Plant prefer sandy soils
05.	Calciphytes	:	Plant require large quantity of Ca
06.	Xerophytes	:	Plant grow under desert condition
07.	Acidophiles	:	Plant grow well under acidic condition
08.	Bryophytes	:	Non-vascular thallus plants
09.	Chamaephytes	:	Plants growing under extremely cold climate
10.	Cryophytes	:	Plant grows on ice or snow
11.	Hemicryptophytes	:	Plants suitable for grassland condition
12.	Amphipytes	:	Plants grows on two contrasting condition eg. Land & water

13.	Calcifuges	:	Calcium sensitive plants
14.	Chasmophytes	:	Plants roots capable of penetrating into rock fissures
15.	Epiphytes	:	Plant grows on another plant for physical support
16.	Gypsophytes	:	Gypsum loving plants
17.	Heliophytes	:	Light loving plants
18.	Basophiles	:	Plants prefer alkali soils
19.	Hydrophytes	:	Water loving plants
20.	Oxylophytes	:	Plants tolerant to high acidic soil condition.
21.	Petrophytes	:	Plants able to grow on rocks
22.	Phreatophytes	:	Plant shows the presence of sub-surface water
23.	Phanerophytes	:	Plants grow on warm and moist climate.
24.	Pteridophytes	:	Seedless vascular plants
25.	Spermatophytes	:	Seeded vascular plants
26.	Therophytes	:	Plants growing in hot and dry conditions (remains in dormancy under adverse condition)

Vegetation (Grasslands) :

Region	Type of grassland	Remarks
USA	Prairies (steppe)	Temperate treeless grasslands
Eurasia	Steppe	Temperate treeless grasslands
Hungry	Pustza	Temperate treeless grasslands
South America (Argentina)	Pampas	- do -
South Africa	Veldts	Temperate grasslands
Africa, South America, Australia, India, Madagascar and Myanmar - Thialand	Savanna	Tropical grasslands with scattered trees under hot - dry conditions
Australia Murray - Darling basin	Downs (Rangeland)	Temperate grasslands under
Brazil, Paraguay, Uruguay species	Campos	Humid-sub tropic rich in plant
New Zealand	Rangeland	Temperate grasslands

National Board/ Authority	Place	Chairman	Year of establishment
Tea Board	Kolkata	Basudeb Banaerjee	1953
Coffee Board	Bangalore	G.V. Krishna Rav	1942
Biodiversity Authority	Chennai	Shri M. F. Farooqui	2008
Rubber Board	Kottayam, Kerala	-	1947
Spices Board	Kochi	-	1986
Fish and Fish product Board	Hyderabad	-	2006
Tobacco Board	Guntur, A.P.	J Suresh Babu	1976
Central Silk Board	Bangalore	H. Hanumanthappa	1949
Coconut Development	Kochi	Minnie Mathew	12 Jan 1981
Agricultural Scientist Recruitment Board (ASRB)	New Delhi	Gurbachan Singh	1975

Concept	Person / Father
Golden rice	Ingo potrichus
Super rice	G. S. Khush
Hybrid rice	Yuvan Long Ping
Super wheat	S. Nagrajan
Bt - cotton in India	C. D. Mayee
Proteto (protein rich potato)	Ashish Dutta

Concept / Term	Person
Rainbow revolution	Nitish Kumar
Evergreen revolution	Swaminathan
Green house effect	J.B.Fourler
Drip irrigation	Symcha Blass
Tillage	Jethro Tull

Crop	Bale (Kg)
Cotton	170
Jute	180
Mesta	181

Strange studies :

Name of studies	Subject
Tsiology	Tea
Pomology	Fruits
Cereology	Crops cycles
Cryology	Snow, ice & froz
Xylology	Wood
Cryptology	Codes and ciphe
Eremology	Deserts
Nephology	Clouds
Siphonapterology	Fleas

ICAR Awards

	ICAR Awards	Field
1.	Jawahar Lal Nehru award	Best Ph.D thesis in the field of Agril and allied subject
2.	Fakruddin Ali Ahmed award	Agriculture research in tribal areas
3.	ICAR young scientist award	In agriculture and allied subject
4.	Vasantrao Naik award	Water conservation and dry land farming
5.	Rafi Ahmed Kidwai award	Agril, animal husbandry and allied science
6.	Outstanding women agril scientist	To encourage ICAR women scientist
7.	Hari Om Ashram Trust award	Published research in agriculture
8.	ICAR team award	For multi-disciplinary research in Agril and allied sciences
9.	Jagjivan Ram Kisan Puruskar	Two innovative farmers in agril and allied sciences
10.	Chaudhary Devi Lal award	For out standing performance of ACRIP
11.	Best KVK award	For out standing performance made by KVK
12.	Chaudhary Charan Singh award	For excellence in journalism related to agril research and development
13.	ICAR Norman Borlaug Award	For out standing research work by a scientist in any discipline
14.	ICAR Challenge Award	To find out the solution of any immediate or long standing problem or limitation in agriculture.
15.	Sardar Patel Outstanding Institution	To recognize the out standing performance of Institute / SAU etc.
16.	Panjabrao Deshmukh Outstanding Women Scientist Award	To promote woman Scientist for research/ extension in agriculture individually.
17.	N.G. Ranga Farmer Award for Diversified Agriculture	To recognise the farmer for innovation in diversified agriculture.
18.	Bharat Ratna Dr C. Subramaniam Award for Outstanding Teachers	To provide recognition to outstanding teachers for quality education.
19.	Dr. Rajendra Prasad Puruskar	For technical books in Hindi in Agricultural and Allied Sciences.
20.	Lal Bahadur Shastri Outstanding Young Scientist Award	
21.	Swami Sahajanand Saraswati Outstanding Extension Scientist Award	Meant exclusively for extension scientist or teacher for excellence in agriculture extension methodology and education.

Publication of ICAR

	Periodicals (English)	Periodicals (Hindi)
1.	Indian Journal of Agricultural Sciences (Monthly)	Kheti
2.	Indian Journal of Animal Sciences (Monthly)	Phal Phool
3.	Indian Farming (Monthly)	Krishi Chayanika
4.	Indian Horticulture (Quarterly)	
5.	ICAR News (Quarterly)	
6.	ICAR Reporter (Quarterly)	
7.	ARIS (Quarterly)	

	Awards	Person
1.	First Indian to get World food prize (1987)	M.S.Swaminathan
2.	Ist Swaminathan award by GOI in 2005 given to	N. E. Borlaug
3.	Commander of Agriculture Merit award (By government of France)	M. S. Swaminathan
4.	Nobel prize for peace in 2007 given to (Study on climate change and global warming)	Al Gore and Rajendra K Pachuri
5.	FAO conferred FAOs Highest Award 'Agricola Medal' on Dr. Manmohan Singh for his support to agricultural and social development programmes for the year 2008	
6.	C. Subramanian (Agril minister during green revolution era) awarded Bharat Ratan	
7.	Hiroshima Peace Award 2006 awarded to	M. S. Swaminathan
8.	World Food Prize 2011 awarded to	John Kufuor and Luiz Inacio Lula da Silva (President of Ghana and Brazil, respectively)
9.	IFA Norman E Borlaug award 2011 awarded to	Roland Buresh (IRRI)

Record breaking plants :

1. Tallest tree : World's tallest tree is called stratosphere giant grows in Rock feller forest (California) measures a height of 112.3 m
2. Biggest living thing : The General Sherman giant Sequoia in California (Weigh 2000 tonnes)
3. Largest and smelliest flower : The flower of Rafflesia (Stinking Corpse Lily) measures about 1 m across and weigh 11 kg.
4. Smallest flowering plant : Wolffia, a kind of duckweed is just 0.6mm long.
5. Largest seed : The seeds of the coco-de-mer palm are upto 30 cm long and weigh 20 kilogram.

Programme	Year of start	Source of funding
Grow More Food Campaign	1942 - 43	Imperial Govt.
Community Development Programme	1952	Ford Foundation
National Extension Service	2nd Oct., 1953	GOI
Panchayati Raj	1958	Govt.
High Yielding Variety Programme	1965 - 66	GOI
Drought Prone Area Programme	1970 - 71	Govt.
Training and Visit System (by Daniel Benor)	1974	World Bank
Training of Rural Youth for Self Employment (TRYSEM)	15th Aug., 1979	Govt.
Integrated Rural Development Programme (IRDP)	2nd Oct., 1980	Govt.
Jawahar Rozgar Yojana (JRY)	1989	Govt.
Institute Village Linkage Programme (IVLP)	1995	GOI
Kisan Call Centre (No. 1551 now as 1800 - 180 - 1551)	21st Jan 2004	GOI
Agriculture Technology Management Agency (ATMA)	May 2005	GOI
National Rural Employment Guarantee Programme (NREGA)	2 Feb. 2006	GOI
National Demonstration started in	1965	
Kisan Credit Cards (KCC) Scheme	1998	
Agri Clinic and Agri-business Centres	2002	
Projects / Mission		
AICRPs first on Maize	1957	ICAR/SAUs
Technology Mission on Oil Seeds	1986	GOI
National Agricultural Research Project (NARP)	1979	World Bank
National Agricultural Technology Project (NATP)	1998	World Bank
National Agricultural Innovation Project (NAIP)	July, 2006	World Bank
National Horticultural Mission (NHM)	2005 - 06	GOI
National Food Security Mission (NFSM)	2007 - 08	GOI
National Initiative on Climate Resilient Agriculture (NICRA)	Feb. 2011	ICAR

Dam/Reservoir	River	State	Purpose / Remarks
Bhakra Nangal	Sutlej	Haryana, Punjab and Rajasthan	India's biggest multi-purpose river valley proje
Beas	Beas - Sutlej link	Haryana, Punjab Rajasthan	Irrigation
Bhadra	Bhadra	Karnataka	Irrigation and electricity
Bargi	Bargi	Madhya Pradesh	Irrigation
Farakka	Ganga, Bhagirathi	West Bengal	Taken up for the preservati & maintenance of Kolkatt port
Chambal	Chambal	M.P. and Rajasthan	It have Gandhi Sagar, Ra Pratap & Jawahar Sagar dams
Damodar Valley	Damodar	West Bengal & Bihar	Multipurpose
Gandak	Gandak	Bihar, U. P. & Nepal	Irrigation and Power
Hirakund	Mahanadi	Orissa	World's Iongest dam, multipurpose
Karanj	Karanj	Gujarat	Irrigation
Nagarjuna Sagar	Krishna	A.P.	Multipurpose
Tawa	Tawa	M.P.	Irrigation
Tehri dam	Bhagirathi	Uttarakhand	Multipurpose
Ukai	Tapti	Gujarat	Irrigation & drinking wat
Sardar Sarovar	Narmada	Gujarat	Multipurpose
Indira Sagar	Narmada	M.P.	Irrigation & Electricity
Mettur	Kaveri	T.N., K.T., Pondicherry	Irrigation

Tropisms :

Gravitropism	-	Growth toward gravity
Phototropism	-	Growth toward light
Thigmotropism	-	Growth toward solid objects
Heliotropism	-	Response to Sunlight
Thigmotropism	-	Plant movement toward solid object

Medicinal Plants (1)

Plant	Scientific name	Family	Climate	Habit	Method of propaga-tion	Economic part
Asand	Withania somnifera	Solanaceae	Subtropical with low rainfall	Perennial, evergreen	Seeds @ 10-12 kg/ha	Roots
Opium Poppy (afim)	Papaver somnifera	Papaeaceae	Cool weather with foggy nights	Annual herb	Seeds @ 4-6 kg /ha	Latax from fruit and seed
Sarpagandha	Rauvolfia serpentina	Apocynaceae	Humid tropics	Perennial, evergreen herb	6 kg seed/ha	Roots
Guggal	Commiphora wightii	Burseraceae	Extreme temp. with low rainfall	Woody perennial	Semi-woody Stem cuttings	Gum resin (stem)
Isabgol	Plantago ovata	Plantaginaceae	Cool climate & dry sunny weather	Stem less annual herb	4 kg seed /ha	Seed and seed husk
Pipali / long pepper	Piper longum	Piperaceae	Humid tro-pics with high rainfall	Trailing perennial dioecious herb	Stem cutting	Unripe fruit (female spikes)
Physic nut/ Jamalgota/ Safed arand	Jatropa curcas	Euphorbiaceae	Tropical & sub tropical	Shrub	Seed / cutting	Fresh latex / seed

Medicinal Plants (1)

Plant	Sowing Time	Alkaloid/ Chemical	Medicinal Property	Growing States	Native place
Asand	August	Withanine A and pseudo-withanine	Adaptogenic, aphrodisiac, anti-stress and mild sedative in hypertension	M.P. and Raj	India
Opium Poppy (afim)	Octo- Nov.	Morphine, codeine, papaverine and thebaine	Sedative, analgesic, antitussive and antispasmodic	M.P., Raj. and U.P.	West Asia
Sarpagandha	April-May (Nursery) July- August (transplanting)	Resperine, ajmalicine and serpentine	Used in hypertension; sedative property used for insomnia, epilepsy and asthma; antidote against snake bite	M.P., U.P., W.B., Assam and Orrisa	India
Guggal	June	Z and E gugglusterones	Anti-inflamnuatory, hypoglycemic	Raj. and Gujarat	India
Isabgol	Nov- Mid Dec.	Saussurine (roots)	Seed husk safe laxative helps in constipation, diarrhoea and dysentry	Guj., Raj. and U.P.	Persia (Iran)
Pipali / long pepper	April-May (Nursery) July- August (transplanting)	Piperine (about 6 %)	Stimulant, appetizer and general tonic given in bronchial asthmas, insomnia, jaundice and hepatitis	M.H., Assam, Kerela and Karnataka	India
Physic nut/ Jamalgota/ Safed arand	Feb-March And June-July	Oil used as bio-diesel	Mouth wash (leaves), seeds make an acro-narcotic poison; active purgative, oil used for skin diseases like eczema, herpes, itch, sores and bleeding wounds, fresh latex applied to piles, scabies, ringworms and decayed teeth	All India	Tropical America

Medicinal Plants (2)

Plant	Scientific name	Family	Climate	Habit	Method of propaga-tion	Economic part
Senna	*Cassia angustifolia*	Leguminoseae	Subtropical	Perennial shrub	6 kg Seed /ha 70000- 80000 plants/ha	Leaves and pods
Periwinkle / sadabahar	*Carthamus roseus*	Compositeae	Tropical	Perennial herb	500 g seed /ha; 75000 plants/ha	All parts
Indrayan (Tumba)	*Citrullus colocynthis*	Cucurbitaceae	Tropical and subtropical	Trailing perennial herb	Seed	Fruit pulp
Asafetida (Hing)	*Ferula asafoetida*	Umbelliferae	Temperate	Perennial herb	Seed	Root
Henbane	*Hyocyamus niger*	Solanaceae	Dry cool	Annual herb climate	3 kg Seed /ha	Leaves
Quinine	*Cinchona officinalis*	Rubiaceae	Tropical	Perennial tree	Seed	Bark of stem
Indian aloe	*Aloe barbadensis*	Liliaceae	Tropical and subtropical	Perennial	Root suckers	Fleshy leaves
Holy basil (Tulsi)	*Ocimum sanctum*	Labiatae	Tropical and sub tropical	Aromatic herb	Seed	Leaves
Belladona (Sag-angur)	*Atropa belladonna*	Solanaceae	Cool climate	Erect herb	Multiple shoot bud	Dried roots and leaves
Safed Musli	*Chlorophytum borivillianum*	Liliaceae	Normal climate	Annual herb	Fleshy roots (tubers)	Tuberous roots

Medicinal Plants (2)

Plant	Sowing Time	Alkaloid/ Chemical	Medicinal Property	Growing States	Native place
Senna	July (NW India) Sept-Oct (S India)	Sennosides	Laxative used for constipation	T.N., Guj. and Raj.	Central Africa
Periwinkle / sadabahar	April-May (Nursery), July (direct sowing)	VLB, ajmalice, raubacine and reserpine	Anti-neoplastic used in blood cancer, high blood pressure	T.N., K.T., Guj. and Raj.	Eastern Mediterra-nean region
Indrayan (Tumba)	July- August	Citrullin	Antipyretic, carminative and anthelmintic given in dropsy, tumours, leucoderma, asthmas, jaundice, spleen and liver enlargement	N India, M.P., Guj. and S India	Israel
Asafetida (Hing)	Sept -October	Oleo-resin gum	Carminative,antispasmodic, nervine, stimulant, digestive, sedative, diuretic, anthelmintic; used in flatulent colic, cholera , dyspepsia, asthma, hysteria, whooping cough, bronchitis etc.	Punjab, and Kashmir	Iran
Henbane	Octo -Nov.	Hyocyamine, hyocine, atropine	Sedative, cholingeric & antispasmodic ; used in asthma and whooping cough etc.	Malwa region of M.P.	Mexico
Quinine	November	Quinine, cinchonine	Cure for malaria	NE and S. India & M.P.	Andes of S. America
Indian aloe	July	Amine	Used in skin diseases, gonorrhea, constipation, piles, rheumatic, cough and cold, abdominal tumors, dropsy, sciatica and cosmetics	All India	Tropical America
Holy basil (Tulsi)	Feb- March	Eugenol and linalool	Leaves are expectorant, stomachic, anticatarrhal; aromatic and diaphoretic given in malaria, gastric diseases, leaf juice is given in chronic fever, dysentery and dyspepsia	All India	India
Belladona (Sag-angur)	March- August	Atropine and hyoscyamine	Dried roots and leaves are used as sedative, antispasmodic & anodyne; used externally to relieve pain & internally to check excessive sweat, cough	Kashmir	Europe
Safed musali	June-July	25 alkaloids	Arthritis, diabetes mellitus, aphrodisiac, impotency; due to its multiple uses	Mainly in central India	Central India

Aromatic Plants (1)

Plant	Scientific name	Family	Climate	Habit	Method of propaga-tion	Economic part
Vanilla	*Vanilla planifolia*	Orchidaceae	Warm & moist	Climber vine	Stem cutting	Fruits
Ambrette/ Muskdana	*Abelmoschus moschatus*	Malvaceae	Tropical and sub tropical	Annual herb	Seed @ 1.5 kg/ha	Seed
Davana	*Artemisia pallens*	Asteraceae	Cool	Aromatic herb	Seed	Leaves & floral top
Celery	*Apium graveolens*	Apiaceae	Cool	Annual herb	Seed	Seed
Chamomile	*Matricaria chamomilla*	Asteraceae	Temperate	Annual herb	Seed @ 1 kg/ha	Flower oil
Indian Basil	*Ocimum basilicum*	Labiatae	Warm tropical	Perennial herb	Seed @ 250 g/ha	Seed oil
French jasmine	*Jasminum grandiflorum*	Oleaceae	Mild climate	Climbing herb	Stem cutting	Flower / flower oil
Kewada (Screwpine)	*Pandanus fasicularis*	Pandana-ceae	Tropical	Perennial shrub	Suckers	Flower / oil
Lemon grass	*Cymbopogon flexuosus*	Poaceae	Tropical	Perennial sedge	Seeds @ 4-6 kg/ha	Leaves oil
Patchouli	*Pogostemon patchouli*	Labiatae	Humid	Bushy shrub	Shoot cutting	Flower
Scented rose (damask rose)	*Rosa × damascena ; Rosa × centifolia* (cheti gulab) ; *Rosa × borbonia* (Edward rose)	Rosaceae	Tropical and sub tropical	Perennial shrub	Stem cutting	July

Aromatic Plants (1)

Plant	Sowing Time	Alkaloid/ Chemical	Medicinal Property	Growing States	Native place
Vanilla	Feb-March	Vanillin	Scent and flavor used in ice- creams, beverages and food industry	Karnataka and Kerela	Mexico
Ambrette/ Muskdana	July	Farnesol and ambrettolide	Oil used in perfumery, cosmetics and scents imparts musky odour to sachets, pan masala and incense sticks	Sub-tropical parts of India	India
Davana	Nov.-Dec.	Essential oil	Bouquets, cosmetics and oil used in flavouring of cakes, pastries and beverages	KTK, T.N. and M.H.	India
Celery	Oct.- Nov	Selinene, limonene, sado-nolide	Seeds are used as spice and seed oil used for flavoring of sauces and purees	Punjab and U.P.	Europe
Chamomile	Sept.- Oct.	Oil	Flower oil used in pain relieving balms, scenting of shampoos, face cream, and liquors	U.P. and H.P.	Europe
Indian basil	June - July	Methyl chavicol	Oil is used for flavoring of foods, bakery products and beverages	U.P.	India
French jasmine	June - July	-	Its flowers used for perfumes	South India	India (South Asia)
Kewada (Screwpine)	June - July	-	Perfume oil, kewada water is used for syrups, soft drinks, scenting of soaps, hair oil, cosmetics incense sticks	Orissa	South Asia
Lemon grass	April - May (Nursery)	Citral	Oil is used in scenting of soaps, cosmetics, ionones and vitamin A	Kerela, Assam, Orrisa, A.P., KT	India
Patchouli	June - July (Nursery)	-	Oil is used in scenting of soaps, cosmetics, after shave lotion, detergents, beverages, candy and baked products	KT, Kerela, and T.N.	Philippine Islands
Scented rose (Damask rose)	July	-	Flower used for making rose water, attar and gulkand	U.P., and Rajasthan	Syria

Food Grain statistic (Economic Survey (GOI), 2010-11)

Table 1. Food grain production (Million Tonnes)

Crop / Year	1960 – 61	2008 - 09	2009 - 10	2010 - 11*
Rice	34.6	99.18	89.13	94.01
Wheat	11.0	80.68	80.80	81.47
Coarse cereals	N.A.	40.03	33.55	40.08
Pulses	12.7	14.57	14.66	16.51
Food grains				
Kharif	-	118.14	103.8	-
Rabi	-	116.33	114.4	-
Total	82.0	234.47	218.11	232.07

* Second Advanced estimate

Table 2. Commercial crop production (Million tonnes)

Crop / Year	1960–61	1970–71	1980–81	2000–01	2009–10	2010 – 11
Groundnut	4.8	6.1	5.0	6.4	5.50	-
Rapeseed / mustard	1.4	2.0	2.3	4.2	6.40	-
Soybean	-	-	-	-	10.05	-
Total nine oilseeds	7.0	9.6	9.4	18.4	24.90	27.85
Cotton*	5.6	4.8	7.0	9.5	23.90	33.93
Jute**	4.1	4.9	6.5	9.3	10.70	-
Mesta**	1.1	1.3	1.7	1.2	0.60	-
Sugarcane	110.0	126.4	154.2	296.0	277.70	336.7

*Million bales of 170 kg each; ** million bales of 180 kg each

Table 3. Annual average growth rate (per cent)

Five year Plan	Agriculture and allied sector	Overall GDP growth rate
Tenth Plan (2002–2007)	2.3	7.6
2002–03	–7.2	3.8
2003–04	10.0	8.5
2004–05	0.0	7.5
Ninth and Tenth Plan		
(1997–98 to 2006–07)	2.5	6.6
(2005–06 to 2006–07)	4.8	9.5
(2006–07)	4.4	9.7
(2007–08)	4.7	9.0

Table 4. Production and export of tea and coffee

Year	Tea (million kg)		Coffee (lakh tonnes)	
	Production	Export	Production	Export
2004 – 05	830.7	205.8	2.75	2.11
2005 – 06	930.9	181.1	2.74	2.02
2006 – 07	947.1	218.2	2.88	2.49
2007 – 08	900.0	-	2.62	2.19
2008 – 09	900.0	-	2.62	2.04
2009 – 10	1000.0	-	3.00	-

Table 5. Area and production of major horticultural crops
(Area : million hectares; production : million tonnes)

Crops	2007 – 08		2008 – 09	
	Area	Production	Area	Production
Fruits	5.86	65.59	6.10	68.47
Vegetables	7.85	128.45	7.98	129.1
Flower Loose	0.17	0.87	0.17	0.99
Plantation Crops	3.19	11.3	3.21	11.3
Spices	2.61	4.36	2.62	4.15
Total	20.2	211.12	20.66	214.47

Table 6. Production of milk and marine products

Year	Milk		Fish production (million tonnes		
	Production (mt)	Per capita availability (gms / day)	Marine	Inland	Total
1950–51	17.0	-	-	-	-
2003–04	88.1	-	3.0	3.4	6.4
2004–05	90.7	-	2.8	3.5	6.3
2005–06	97.1	241	2.8	3.8	6.6
2006–07	100.9	246	3.0	3.8	6.8
2007–08	104.8	252	2.9	4.2	7.3
2008–09	108.5	258	2.9	4.7	7.6
2009–10	112.5	263	2.98	4.87	7.85

Table 7. Area, production, productivity and leading producing states of major crops

Crops	2008 – 09 Area	2008 – 09 Production	2008 – 09 Productivity	2009 – 10 Area	2009 – 10 Production	2009 – 10 Productivity	Leading States 2008 – 09 (Production)
Food grains	122.8	234.4	1909	121.3	218.2	1798	UP > Punjab > A.P.
Cereals	100.7	219.9	2183	98.0	203.6	2077	UP
Pulses	22.1	14.6	659	23.4	14.6	625	M.P. > U.P. > Raj.
Rice	45.5	99.2	2178	41.8	89.1	2130	W.B. > A.P. > U.P.
Wheat	27.8	80.7	2907	28.5	80.7	2830	U.P. > Punjab > Haryana
Jowar	7.5	7.2	962	7.6	7.0	911	Maharashtra
Maize	8.2	19.7	2414	8.3	16.7	2002	A.P. > Karnataka > Raj.
Bajra	8.8	8.9	1015	8.9	6.5	728	Rajasthan
Gram	7.9	7.1	895	8.2	7.3	895	M.P. > U.P.
Tur (Arhar)	3.4	2.3	671	3.5	2.6	723	Maharashtra
Oilseeds	27.5	27.7	1007	26.1	24.9	955	M.P. > Raj. > Gujarat
Groundnut	6.2	7.2	1163	5.4	5.5	1157	Gujarat > A.P. > TamilNadu
Rapeseed and Mustard	6.3	7.2	1143	5.5	6.4	1159	Rajasthan > U.P. > Haryana
Sugarcane	4.4	285.0	69 (t/ha)	4.2	277.7	66 (t/ha)	U.P. > Mah. > T.N.
Cotton bales (170 kg)	9.4	22.3	403	10.3	23.9	395	Guj. > Mah. > A.P.
Jute and Mesta	0.9	10.3	2071	0.9	11.3	2216	W.B. > Bihar > Assam
Soybean bales (180 kg)	-	-		-	-		
Tea	-	1.0	-	-	-	-	M.P. > Mah. > Raj.
Coffee (plucked area)	-	0.3	-	-	1.0	-	Assam
Potato	1.8	34.4	191/ha	-	0.3	-	Karnataka
				-	-	-	West Bengal

[*Source*: Economic Survey (GOI), 2010–11]

Area in mha; Production in mt; Productivity in kg / ha

Table 8. Irrigated area under different crops (mha)

Crops	1970 – 71	2007 – 08	2008 – 09	Remark
Rice	14.3 (38.4)	25.1 (56.9)	26.5 (58.7)	
Wheat	9.9 (54.3)	25.8 (90.2)	25.5 (91.3)	Wheat crop have highest irrigated area (25.5 mha)
Maize	0.9 (15.9)	1.9 (21.5)	2.0 (25.2)	
Jowar	0.6 (3.6)	0.7 (8.5)	0.7 (8.9)	
Bajra	0.5 (4.0)	0.9 (9.5)	0.8 (9.4)	
Barley	1.3 (52.0)	0.52 (72.2)	0.5 (75.1)	
Total cereals	28.1 (27.6)	55.0 (54.3)	56.2 (55.9)	
Total pulses	2.0 (8.8)	4.0 (16.2)	3.8 (16.0)	
Total food grains	30.1 (24.1)	59.0 (46.8)	60.0 (48.3)	
Oilseeds	1.1 (7.4)	7.9 (27.1)	8.2 (27.1)	
Cotton	1.4 (17.3)	3.3 (35.1)	3.3 (35.3)	
Sugarcane	1.9 (72.4)	4.8 (93.4)	4.5 (93.7)	Sugarcane have highest percent irrigated area (93.7)

Note: Figures in parentheses represent percentage of irrigated area to total area under the crop.

Table 9. Per capita availability of agriculture items in the country.

Year / Item	Per day (grams) Cereals	Per day (grams) Pulses	Total
1951	334.2	60.7	394.9
2007	407.4	35.5	442.8
2008	374.6	41.8	436.0
2009	407.0	37.0	444.0

Table 10. International comparisons of yield of selected commodities — 2004–05

(metric tonnes/ha)

Rice		Wheat		Maize	
Egypt	9.8	U.K.	7.77	U.S.A.	9.15
India	**2.9**	France	7.58	France	7.58
U.S.A.	7.83	China	4.25	Germany	6.69
Japan	6.42	**India**	**2.71**	China	4.90
Korea	6.73	Pakistan	2.37	**India**	**1.8**
		Iran	2.06		
		Australia	1.64		
World	3.96		2.87		3.38

Major oilseeds (2004 - 05)		Cotton (2004 - 05)	
Germany	4.07	China	11.10
U.S.A.	2.61	Brazil	10.96
Argentina	2.51	U.S.A.	9.58
Brazil	2.48	Uzbekistan	7.98
China	2.05	Pakistan	7.60
India	0.86	**India**	4.64
World	1.86	World	7.33

Table 11. Consumption of major fertilizers (in lakh tonnes) at national levels

Fertilizer	2007-08	2008-09	2009-10
N	144.19	150.9	155.8
P	55.15	65.06	72.74
K	26.36	33.13	23.35
N + P + K	225.7	249.09	264.86
Per ha consumption (kg/ha)	117.07	128.6	135.3

Table12. Per capita availability of edible items in the country.

Year/Item	Edible oils (kg/annum)	Milk (gm/day)	Eggs (No./annum)	Tea (gms/annum)	Coffee (gms/annum)	Sugar kg/an.
1950-51	2.5	-	-	362	67	-
2002-03	7.2	-	-	623	67	-
2005-06	10.6	241	-	287	80	-
2006-07	11.1	246	42	687	85	-
2007-08	11.4	252	-	-	80	-
2008-09	12.7	258	47	-	82	-
2009-10	13.1	263	51	-	85	18.6

Table 13. Minimum support price/procurement price for crops (Rs/quintal)

Crop	1990-91	2009-10	2010-11	2011-12
Kharif				
Paddy (Procurement price)				
Common	205	950	1000	1080
Grade A	-	980	1030	1110
Coarse cereals	180	Jowar - 860	900	980
(Jowar, Bajra and Ragi)		Ragi - 915	965	1050
Maize	180	840	880	980
Arhar (Tur)	480	2300	3000*	3200
Moong	480	2720	3170*	3500
Urd	480	2520	2900*	3300
Sugarcane (statutory minimum price)	23	129.84	139.12	145
Cotton				
F-414/H-777 (Medium Staple)	620	2500	2500	2800
H-4 (Long Staple)	750	3000	3000	-
Groundnut	580	2100	2300	2700
Jute (TD-5)	320	1250	1575	-
Sunflower	600	2215	2350	2800
Soybean				
Black	350	1350	1400	1690
Yellow	400	1390	1440	-
Sesamum	-	2850	2900	3400
Niger seed	-	2405	2450	-
Rabi				
Wheat	225	1100	1120	
Barley	200	750	780	
Gram	450	1760	2100	
Rapeseed/mustard	810	1830	1850	
Safflower	760	1680	1800	
Toria	780	-	1780	
Lentil	-	1870	2250	

Note: *An additional incentive at the rate of Rs 500/quintal is also available for moong and urad sold to procurement agencies during the harvest/arrival period of t months.

Crops/Year	2007 - 08		2008-09	
	Area (in 000 ha)	Production (in 000 MT)	Area (in 000 ha)	Production (in 000 MT)
Fruits				
Mango	2201	13997	2309	12750
Apple	264	2001	274	1985
Banana	658	23823	709	26217
Citrus	867	8015	923	8608
Guava	179	1981	204	2270
Grapes	68	1735	80	1878
Litchi	69	418	72	423
Papaya	83	2909	98	3629
Pineapple	80	1245	84	1341
Pomegranate	124	884	109	807
Sapota	152	1258	156	1308
Others	1112	7321	1083	7249
Total Fruits	**5857**	**65587**	**6101**	**68466**
Vegetables				
Potato	1795	34658	1828	34391
Onion	821	13900	834	13565
Tomato	566	10303	599	11149
Brinjal	561	9678	600	10378
Cabbage	266	5910	310	6870
Cauliflower	312	5777	349	6532
Okra	407	4179	432	4528
Peas	313	2491	348	2916
Tapioca	270	9056	280	9623
Sweet potato	123	1094	124	1120
Others	2414	31402	2275	28006
Total	**7848**	**128449**	**7981**	**129077**
Aromatic	397	396	430	430
Almond/walnut	132	177	136	173
Flowers loose	166	868	167	987
Flower cut*	-	43654	-	47942
Plantation crops	3190	11300	3217	11336
Mushroom	-	37	-	37
Honey	-	65	-	65
Spices	**2617**	**4357**	**2629**	**4145**
Grand total	**20207**	**211234**	**20662**	**214716**

Table

Animal/ Bird name	Scientific name	Family	Life span (year)	Gestation period (Days)	Group	Male	Female	Young	Act of parturition	Chromosome number (2n)
Cow	Desi: *Bos indicus* Exotic: *Bos taurus*	Bovidae	20-25	285	Herd	Bull	Heifer	Calf	Calving	60
Buffalo	*Bubalus bubalis*	Bovidae	20-25	310	Herd	Bull	She buffalo	Calf	Calving	50, 48
Goat	*Capra hircus*	Bovidae	8-10	146	Trip	Buck	Nanny/ Dove	Kid	Kidding	60
Sheep	*Ovis aries*	Bovidae	10-13	151	Flock/ hurtle	Buck/ ram	Ewe / dam	Lamb	Lambing	54
Camel	Arabian Single humped: *Camelus dromedarious* Asian double humped: *C. bactrianus*	Cammelidae	30-40	380	Herd	He camel	She camel	Calf		74
Swine	*Sus domesticus Sus scrofa Sus vittatus*	Suidae	14-18	114	Herd/drove	Boar	Sow	Piglet	Farrowing	38
Horse	*Equus caballus*	Equidae	20-30	330-345	Stable/herd	Stalion	Mare	Foal	Foaling	64
Ass	*Equus asinus*	Equidae	20-25	365	Herd	Jack ass	Jennet	Colt	Foaling	62
Fowl	*Gallus gallus Gallus domesticus*	Phasianidae	4	21 (Hatching)	Flock	Cock	Hen/ pullet	Chick	Hatching	78
Elephant	Indian: *Elephas maximus;* African: *Loxodonta africans*		60-70	630-660	Herd	Bull	Cow	Calf	Calving	

Table : Land utilization of Country and some states

Classification	India (mha)	Madhya Pradesh (mha)	Chhattisgarh (mha)	Rajasthan (mha)
Total geographical area	329	30.8	13.7	34.22
Net cropped area	143	15.07	4.83	17.39
Net irrigated area	57	6.42	1.33	5.24
Gross irrigated area	76	6.57	1.52	6.39
Cropping intensity	135 %	130 %	134 %	125 %
Forest area	69.5	9.5	5.9	3.22
Wasteland	63.85	5.84	-	10.56
Size of operation holding	1.41(ha)	2.5 (ha)	-	3.96 (ha)
Per capita agriculture land	0.15 (ha)	-	-	0.38 (ha)
Average rainfall (mm)	1190	1089.3	1400	575
Total farm holdings	107 (millions)	6.64 (millions)	-	-
Rain fed area	60 %	70 %	75 %	70 %
Agro-climatic/ sub ACZ	15 (ICAR)	11 (SACZ)	3 (SACZ)	10 (SACZ)
Forest area (%)	21 %	30.73 %	44.0 %	9.43 %

Horticulture (JRF : 2003-04) (Memory based)

1. The highest production in terms of million tones per year in India is that of
(a) Groundnuts (b) Potatoes (c) Sugarcane (d) Pulses

2. The two major races of rice are.
(a) European and African (b) India and japonica
(c) Temperate and tropical (d) Asiatic and American

3. The total cultivated area in India is close to.
(a) 100 mha. (b) 500 mha (c) 60 mha (d) 400 mha

4. Which of the following states has the largest geographical area?
(a) Bihar (b) U.P. (c) M.P. (d) Rajasthan

5. The nitrogen deficiency in plants leads to.
(a) Excessive growth (b) Chlorosis
(c) Dark green colour (d) Profuse flowering

6. Which one of the following is not a legume crop
(a) Wheat (b) Peas (c) Groundnuts (d) Beans

7. N : P : K requirements in legumes is generally.
(a) 3 : 1 : 1 (b) 3 : 1 : 0 (c) 1 : 2 : 2 (d) 4 : 2 : 1

8. Soil productivity takes into account the following
(a) Soil structure (b) Soil moisture
(c) Soil fetility (d) Both soil fertility and soil structure

9. The idea of particulate nature of inheritance was given by.
(a) Darwin (b) Bate son (c) Mendel (d) Jones

10. Alternate forms of gene at the same locus are refered to as.
(a) Allis (b) Chromosome (c) Plastid (d) Dominant

11. Cultivated rice (*Oryza sativa*) has following number of chromosomes.
(a) 24 = 18 (b) 2n = 20 (c) 2n = 24 (d) 2n = 32

12. Sequence of growing crops on a given piece of land is referred as
(a) Crop insurance (b) Crop management
(c) Crop production (d) Crop rotation

13. Suphur fungicides can be freely used on all vegetables except the following.
(a) Cucurbits (b) Beans and peas (c) Root vegetables (d) Okra

14. India has to provide food for its population that is now exceeding.
(a) One million (b) 600 million (c) One billion (d) Two billion

15. NARS refers to.
(a) National Aurvedic Research System (b) National Agricultural Review System
(c) National Agricultural Rsearch Streams (d) National Agricultural Research System

16. In a diploid species generally following number of the chromosomes are involed in pollen mitosis
(a) n (b) 2n (c) 3n (d) 4n

17. NPK are regarded in plant nutrition as.
(a) Macro nutrients (b) Micro nutrients (c) Trace elements (d) Basic elements

18. DNA contains following number of nitrogenous bases repeated in various sequences
(a) One (b) Two (c) Four (d) Ten

19. Respiration in plants is essentially a process related to the following.
(a) Transpiration (b) Evaporation (c) Oxidation (d) None

20. Linkage between genes affects.
(a) Vernalization (b) Fertilization (c) Anaphase (d) Independent assortment

21. Animal and plant cells can be differentiated by.
(a) Size (b) Shape
(c) Conductivity (d) Presence or absence of cell wall

22. In temperate countries, generally, sugar is obtained from which of the following
(a) Wheat (b) Maple (c) Sugarbeet (d) Sugarcane

23. If chromosme compliment of two diploid species is combined in one, the resultant species would be called.
(a) Haploid (b) Monogenic (c) Ploygenic (d) Amphidiploid

24. In the presence of sunlight, CO_2 and H_20 (with help of chlorophyll) are converted into carbohydrates, this is called as
(a) Respiration (b) Solar radiation (c) Metabolism (d) Photosynthesis

25. Modified leader system of training fruit trees is.
(a) Unscientific (b) discarded
(c) Good for plains only (d) Most acceptable

26. Zinc is required for synthesis of.
(a) Tryptophan (b) Fats (c) Sugars (d) Proteins

27. Contour system of orchard planting is generally followed in.
(a) Punjab (b) Hills (c) Saline soils (d) U.P.

28. "T" budding is also referred to as.
(a) Shield budding (b) Patch budding
(c) Annular budding (d) Ring budding

29. To check the variability in rootstocks one should opt for.
(a) Clonal rootstock (b) Seedling rootstock
(c) Seasoned rootstock (d) Any of the above

30. Most of the fruit tree varieties are highly heterozygous, therefore, for commercial plantation, their propagation is recommended by.
(a) True seeds (b) Asexual propagation
(c) Mutations (d) All

31. In apple dwarfing, rootstock is good for.
(a) Low chilling (b) Scab resistance
(c) Fruit colour (d) High density planting

32. Cryo preservation is done in liquid nitrogen at a temperature of.
(a) 0°C (b) 4°C (c) 200°C (d) -196°C

33. Semi hard woodcutting is mostly used to propagate the following.
(a) Evergreen fruit plants (b) Apple
(c) Vegetable crops (c) Peach

34. "June drop" in apple is mainly due to
(a) Lack of pollination (b) Alternate bearing
(c) Moisture stress (d) Calcium deficiency

35. Commercial propagation of papaya is done through .....
(a) Budding (b) Layering (c) Seeds (d) Cutting

36. Karnal bunt is a serious disease of .....
(a) Mango (b) Wheat (c) Tomato (d) Apple

37. Spongy tissue of mango is a.
(a) Bacterial disease (b) Fungal disease (c) Viral Disease (d) Physiological disorder

38. Most of the varieties of mango grown in South India are.
(a) Disease free (b) Seedless (c) Monoembryonic (d) Polyembryonic

39. Dwarf Cavendish is a variety of.
(a) Tomato (b) Mango (c) Banana (d) Grape

40. Mcintosh is a variety of.
(a) Apple (b) Plum (c) Peach (d) Pear

41. In India, banana contributes following percentage of total fruit production.
(a) 80% (b) 60% (c) 31% (d) 10%

42. India contributes following percentage of mango production in the world.
(a) 20% (b) 10% (c) 56% (d) 80%

43. Piheapple originated in.
(a) Brazil (b) India (c) New Zealand (d) China

44. Growth regulator CCC is used in grapes for.
(a) Increase vegetable growth (b) Increases TSS
(c) Increase fruifullness (d) None

45. The following crop does not belong to Cole group.
(a) Kale (b) Turnip (c) Cabbage (d) Cauliflower

46. In Nilgries the main crop of mandorin Orange is horvestedin.
(a) July (b) August -October
(c) December-September (d) March

47. Stooling method of propagation is generally used in cause of.
(a) Grapes (b) Walnut (c) Guava (d) Apple

48. More than 50 percent of the area under grapes in India is under the variety.
(a) Thompson seedless (b) Dikhush
(c) Palette (d) Anab-e-shahi

49. Rains during ripening of grapes cause.
(a) Low TSS (b) Fruit drop
(c) Berry cracking (d) Higher marketable yield.

50. Kniffin system of training is used in.
(a) Litchi (b) Papaya (c) Mango (c) Grapes

51. Seedss varieties of guava bear following types of fruits
(a) All seeded (b) All seedless
(c) Both seedless & seeded (d) None

52. Farmers can have a staggered harvesting of following as it does not set harvesting time.
(a) Cabbage (b) Onion (c) Cassava (d) Cauliflower

53. There are no commercial by hybrids in
(a) Cucumbers (b) Tomatoes (c) Cabbage (d) Peas

54. Contender is a variety of
(a) Bush bean (b) Mungbean (c) Pole bean (d) Pea

55. Broccoli is a
(a) Cole crop (b) Root crop (c) Fruit crop (d) Legume

56. Which kind of variety in tomato needs staking?
(a) Dwarf (b) Determinate (c) Indeterminate (d) None

57 Lagenaria siceraria is the botankical name of
(a) Bittergourd (b) Bottlegourd (c) Pumpkin (d) Cucumber

58. Which of the following variety of radish is round in shape
(a) Pusa Himani (b) Japanese white (c) RRWT (d) Chinese pink

59. For dissect seeding of bitter gourd, following quantity of seed is enough to plant one hectare
(a) 10 kg (b) 5 kg (c) 20 kg (d) 40 kg

60. Amongst vegetable crops, leaving aside potatoes the maximum production in the world is that of.
(a) Cucumber (b) Brinjal (c) Onion (d) Tomato

61. Pear is adapted to
(a) Asiatic climate (b) Tropical climate
(c) Temperate climatic (d) European climate

62. Stratification is essentially a
(a) Storing (b) hilling treatment (c) Aging (d) Heating

63. On an average, a good variety of Papaya may yield :
(a) 10 t/ha (b) 60 t/ha (c) 30 t/ha (d) 150 t/ha

64. Most peach varieties bear flowers of following colour :
(a) Blue (b) Pink (c) Yellow (d) White

65. Sweet orange is generally trained to :
(a) Single branches (b) Two branches
(c) Multiple branches (d) None

66. Best time of pruning peach is :
(a) Spring (b) Mid winter (c) Autumn (d) Mid summer

67. Frontier is midseason variety of :
(a) Apricot (b) Grape (c) Plum (d) Peach

68. Nectarine is fuzzyness mutant of :
(a) Plum (b) Almond (c) Peach (d) Apricot

69. Seeds of Mandarin Orange should be sown as under:
(a) After vernalization (b) After stratification
(c) After dormancy (d) Immediately after extraction

70. Bell peper and Chilli peper belongs to:
(a) Different genera (b) Same species (c) Different species (d) None of above

71. Pusa ruby is a variety of :
(a) Pea (b) Tomato (c) Brinjal (d) Ber

72. Which one of the following is most important temperate vegetable ?
(a) Onion (b) Cabbage
(c) Radish (d) Indian cauliflower

73. Pride of India is a variety of :
(a) Radish (b) Turnip (c) Cabbage . (d) Cauliflower

74. Cole crops are predominantly :
(a) Dioecious (b) Self pollinated
(c) Cross pollinated (d) Often cross pollinated

75. "Whip tail" is a physiological disorder of:
(a) Potato (b) Tomato (c) Cabbage (d) Cauliflower

76. Which of the following is sufficient to plant one hectare in cabbage (seed rate) ?
(a) 50 - 80 g (b) 1 kg (c) 350 - 450 g (d) 10 kg

77. Pusa Mukta variety of Cabbage is resistant to:
(a) Virus (b) Bolting
(c) Cabbage caterpillar (d) Black rot

78. Seed production of early cauliflower can be done:
(a) In Europe only (b) In plains (c) In hills only (d) None

79. In general, fruits and vegetables are not a rich source of :
(a) Vitamin C (b) Vitamin B_1 (c) Vitamin A (d) Minerals

80. Which of the following is important for antioxidant properties in human body?
(a) Carbohydrates (b) Proteins (c) Vitamin C (d) Fats

81. Gladiolus is very sensitive to :
(a) Florida pollution (b) Nitrogen (c) CO_2 pollution (d) Dust pollution

82. Cyclamen is a :
(a) Annual (b) Temperate plant (c) Tropical plant (d) Polar plant

83. Which of the following is indigeneous to South Africa?
(a) Gladiolus (b) Rose (c) Carnation (d) None

84. First Red kind is generally referred to in :
(a) Marigold (b) Rose (c) Vinta (d) Lark Spur

85. Sweet pea falls in the category of :
(a) Creepers (b) Hedges (c) Perennial (d) Winter annuals

86. Pinching is generally done in quality production of :
(a) Gladiolus (b) Carnation (c) Dahlia (d) Aster

87. Pusa Narangi is a variety of :
(a) Marigold (b) Jasmine (c) Carnation (d) Rose

88. At the following temperature, there is a sharp decline in tuberization in potato.
(a) Above 21°C (b) Above 30°C (c) Above 40°C (d) None

89. Watermelon is propagated through :
(a) Buddings (b) Grafting (c) Seeds (c) Cutting

90. Sweet potato is primarily a crop of :
(a) Arid region (b) Temperate region (c) Tropical region (d) None

91. Beet Spinach and European Spinach belongs to :
(a) Same species (b) Same genus (c) Same family (d) None

92. Most varieties of onion grown in India are :
(a) Chilling types (b) Day neutral (c) Short day types (d) Long day types

93. Pusa Yamdagni is a variety of :
(a) Luffa (b) Spinach (c) Cabbage (d) Carrot

94. Pusa Purple Cluster of Brinjal is resistant to :
(a) Drought (b) Mites (c) Purple blotch (d) Bacterial wilt

95. In high sugar varieties of musk melon, T.S.S. may be as high as :
(a) 2% (b) 4% (c) 17% (d) 80%

96. Which of the following vegetables has the highest sodium content ?
(a) Cabbage (b) Brinjal (c) Lettuce (d) Beet Spinach

97. Root knot of vegetables is caused by :
(a) Bacteria (b) Nematodes (c) Fungus (d) None

98. Which of the following vegetable is directly sown through seed commercially?
(a) Fenugreek (b) Cabbage (c) Tomato (d) Cauliflower

99. Quincunx system of planting is used in :
(a) Fruit trees (b) Flowers (c) Potato (d) Vegetable crops

100. Panama disease of banana is a :
(a) Bacterial (b) Fungal (c) Mycoplasma (d) None

101. "Pusa Chikni" is a variety of :
(a) Cucumber (b) Bottle gourd (c) Sponge gourd (d) Bitter gourd

102. The following quantity of seed rhizomes is enough to plant one hectare of ginger :
(a) 10 kg (b) 100 kg (c) 500 kg (d) 1200 to 1400 kg

103. Mulching is an important practice in the orchards related to :
(a) Pruning (b) Training
(c) Canopy management (d) Floor management

104. Fenugreek and spinach are regarded as :
(a) Cool season vegetable (b) Temperate vegetables
(c) Warm season vegetable (d) None

105. Vegetables are regarded as protective food because generally they are rich in :
(a) Fats (b) Vitamins and minerals
(c) Proteins (d) Sugars

106. Gladiolus is propagated through :
(a) Suckers (b) Budding (c) Corms (d) Cuttings

107. Red rust is a disease of :
(a) Litchi (b) Apple (c) Mango (d) Guava

108. Seed borne diseases of cauliflower are generally managed by :
(a) Methyl Bromide application (b) Soil sterilization
(c) Formaldehyde (d) Hot water treatment of seeds

109. Cymbidium is a kind of :
(a) Orchid (b) Rose (c) Vegetable (d) Fig

110. Citrus die-back is mainly caused by :
(a) Virus (b) Water stress
(c) Fungi and other factors (d) Bacteria

111. Black tip of mango is caused by :
(a) Virus (b) Fungus (c) Bacteria (d) None of these

112. Which one of the following is a copper fungicide ?
(a) Dithane M-45 (b) Captan (c) Streptocycline (d) Blitox

113. Chrysanthemum is a :
(a) Day neutral (b) Long day plant (c) Short day plant (d) None of above

114. Powdery mildew of pea is caused by :
(a) Virus (b) Fungus (c) Bacteria (d) None

115. Ornamental value of baugainvilia lies in :
(a) Green foliage (b) Seeds (c) Colourful bracts (d) Fruits

116. Magnolia is best propagated through :
(a) Air layering (b) Cutting (c) Seeding (d) None of these

117. *Curcuma longa* is botanical name of :
(a) Turmeric (b) Ginger (c) Tuberose (d) Nutmeg

118. Gynomoecious means
(a) Having female and bisexual flowers (b) Having all female flowers
(c) Having male flowers only (d) None

119. India is third largest producer of coconut next only to :
(a) China and Brazil (b) Sri Lanka and Maldives
(c) Philippines and Indonesia (d) Japan and Korea

120. Betelvine is a :
(a) Hermaphrodite (b) Dioecious plant
(c) Andromonoecious (d) Monoecious plant

121. Mango and banana are :
(a) Non-climacteric fruits
(b) Climacteric fruits
(c) Nature of ripening depends upon varieties
(d) None

122. Aurocaria is a tree suited to following regions :
(a) Cold desert (b) Marshy lands (c) Sub-tropical (d) None

123. Cactus is generally suited to :
(a) Marshy lands (b) Sunny sites (c) Shade loving (d) None

124. Increase in ethylene production with ripening is characteristics of :
(a) Citrus fruits (b) Grapes
(c) Climacteric fruits (d) Non-climacteria fruits

125. Modified Atmospheric Packaging (MAP) of fruits and vegetables prevents the built up of following ?
(a) CO_2 and O_2 (b) CO_2 and C_4H_4 (c) Sugars (d) Proteins

126. Sulphites and SO_2 are added to preserve fruits and vegetables products to check :
(a) Reduce acidity (b) Microbial activity
(c) Ethylene production (d) Methane production

127. Fruits and vegetables are generally rich in dietary fibre which protects from :
(a) Fat deficiency (b) Protein deficiency
(c) Colon cancer (d) Carbohydrate deficiency

128. Crossing over during meiosis results in :
(a) Help mutation (b) Promoting
(c) Breaking linkage (d) None

129. Genic male sterility in chillies is maintained through :
(a) Mutation (b) Polyploidy
(c) Homozygous pollinator (d) Heterozygous pollinator

130. Pedigree selection is a :
(a) Root stock (b) Scion
(c) Method of breeding (d) Principle of plant breeding

131. Self incompatibility in cole crops is of:
(a) Pin and thrum type flowers (b) Gametophytic
(c) Saprophytic type (d) None

132. Randomization is done to remove:
(a) LSD (b) Probability
(c) Degree of freedom (d) Bias

133. The simplest measure of variability in a data set is :
(a) Range (b) Median
(c) Mode (d) Mean

134. In heterosis breeding, one should capitalize on :
(a) In breeding depression (b) Over dominance
(c) Higher seed vigour (d) Homozygosity

135. Mass selection is essentially a :
(a) Hybridization technique (b) Population improvement
(c) Mutation method (d) Clonal selection

136. A pure line variety is generally developed in :
(a) Cabbage (b) Beets
(c) Sweet corn (d) Predominantly self pollinated cro

137. Backcross method of breeding means :
(a) Mutation breeding (b) Tissue culture
(c) Polyploidy breeding (d) Crossing back the F_1 to desirable pa

138. Which one of the following is a narcotic crop?
(a) Isabgol (b) Ephedra (c) Periwinkle (d) Poppy

139. Which vegetable crop is known as vegetable of Twentieth century?
(a) Winged bean (b) Cluster bean (c) Chekkurmanis (d) Amaranthu

140. Browing is a boron deficiency symptom noticed commonly in :
(a) Tomato (b) Potato (c) Cauliflower (d) Brinjal

141. Large cardamom is commercially propagated through :
(a) Suckers (b) Seeds (c) Layers (d) Cuttings

142. The state accounting for maximum area and production of cardamom is :
(a) Tamil Nadu (b) Kerala (c) Meghalaya (d) Karnataka

143. The part used as vegetable in gerusalem artichoke is :
(a) Flower bud (b) Root tuber (c) Stem (d) Leaf stalk

144. Bitter principle in bittergourd is :
(a) Capsorubin (b) Allyl propyl disulphide
(c) Cucurbitacin (d) Phenol

145. Pick out the method which is not available for extraction of floral perfumes.
(a) Maceration (b) Solvent extraction (c) Enfleurage (d) Distillation

146. Which one of the following is a well-known cardiotonic ?
(a) Cinchona (b) Periwinkle (c) Eucalyptus (d) Digitalis

147. Match the List I with List II and select the correct answer using the codes given below :

List I (Varieties/place)	List II (Crop/place)
A. Tulipa stelata	1. Himalaya
B. Langra	2. Potato
C. Hara Madhu	3. Mango
D. Kufri Jyoti	4. Tomato
E. Kallo	5. Melon

	A	B	C	D	E
(a)	4	3	5	2	1
(c)	5	4	3	2	1

	A	B	C	D	E
(b)	1	2	3	4	5
(d)	4	3	2	5	1

148. Match the List I with List II and select the correct answer using the codes given below :

List I	List II
A. *Allium cepa*	1. Mountain range
B. New world	2. Onion
C. Andes	3. Cole crops
D. Cliff cabbages	4. Capsicum
E. Hindustan	5. Brinjal

	A	B	C	D	E
(a)	1	2	3	4	5
(c)	2	4	1	3	5

	A	B	C	D	E
(b)	4	2	1	3	5
(d)	4	5	3	1	2

149. Match the List I with List II and select the correct answer using the codes given below :

List I	List II
A. Begonia	1. Spice
B. Brussels sprout	2. Fruit
C. Cumin	3. Wheat
D. Kiwi	4. Vegetable
E. Mexican	5. Ornamental

	A	B	C	D	E
(a)	5	4	1	2	3
(c)	4	5	2	3	1

	A	B	C	D	E
(b)	5	4	3	2	1
(d)	2	1	3	4	5

150. Match the List I with List II and select the correct answer using the codes given below :

List I	List II
A. DNA	1. Growth hormone
B. Glucose	2. Nucleic Acid
C. Cellulose	3. Sugar
D. Metasystox	4. Insecticide
E. GA_3	5. Cell wall

	A	B	C	D	E
(a)	2	3	1	4	5
(c)	1	2	3	4	5

	A	B	C	D	E
(b)	2	3	5	4	1
(d)	5	4	3	1	2

151. Match the List I with List II and select the correct answer using the codes given below :

List I	List II
A. Sugar beet	1. Legume
B. Wheat	2. Sugar crop
C. Chickpea	3. Leafy vegetable
D. Peach	4. Cereal
E. Swiss chard	5. Stone fruit

	A	B	C	D	E
(a)	4	2	1	5	3
(c)	2	4	1	5	3

	A	B	C	D	E
(b)	5	4	3	2	1
(d)	1	2	3	4	5

152. Match the List I with List II and select the correct answer using the codes given below :

List I	List II
A. 4 n	1. Pure line
B. F_1	2. Cell organelle
C. Fixed	3. Hybrid
D. Mitochondria	4. Sex chromosome
E. Allosomes	5. Tetraploid

	A	B	C	D	E
(a)	5	1	2	3	4
(c)	3	5	2	1	4

	A	B	C	D	E
(b)	2	3	4	1	5
(d)	5	3	1	2	4

153. Match the List I with List II and select the correct answer using the codes given below :

List I	List II
A. Pickle	1. Repetition
B. Phalsa	2. Fruit
C. Pansy	3. Preservation
D. Replication	4. Annual
E. Duranta	5. Hedge

	A	B	C	D	E
(a)	3	2	4	1	5
(c)	1	2	3	4	5

	A	B	C	D	E
(b)	4	1	2	3	5
(d)	5	4	1	2	3

154. Match the List I with List II and select the correct answer using the codes given below:

List I	List II
A. Pusa Purple Long	1. Bio-pesticide
B. Roma	2. Brinjal
C. Arka Jay	3. *Dolichos*
D. Neem	4. Tomato
E. HD 2009	5. Wheat

	A	B	C	D	E
(a)	4	2	1	5	3
(b)	4	2	3	1	5
(c)	1	2	3	4	5
(d)	2	4	3	1	5

155. Match the List I with List II and select the correct answer using the codes given below:

List I	List II
A. Larkspur	1. Rose
B. *Ipomea batatas*	2. Carrot
C. Hybrid Teas	3. Annual Flower
D. Vitamin A	4. Sweet potato
E. Cascade	5. Chrysanthemum

	A	B	C	D	E
(a)	1	2	3	4	5
(b)	4	3	2	1	5
(c)	3	4	1	2	5
(d)	1	3	2	4	5

156. Match the List I with List II and select the correct answer using the codes given below:

List I	List II
A. Nagpur Mandarin	1. Fruit
B. Dr. B. P. Pal	2. Rose
C. Yellow-vein-Mosaic	3. Okra
D. Staphylococcus	4. Food poisoning
D. Pusa Basmati-1	5. Rice

	A	B	C	D	E
(a)	1	2	3	4	5
(b)	5	4	3	2	1
(c)	1	2	4	3	5
(d)	2	1	3	4	5

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Answers
JRF (Horticulture, 2003-04)

1.	(c)	36.	(b)	71.	(b)	106.	(c)	141.	(a)
2.	(b)	37.	(d)	72.	(b)	107.	(a)	142.	(b)
3.	(a)	38.	(d)	73.	(c)	108.	(d)	143.	(b)
4.	(d)	39.	(c)	74.	(c)	109.	(a)	144.	(c)
5.	(b)	40.	(a)	75.	(d)	110.	(c)	145.	(c)
6.	(a)	41.	(c)	76.	(c)	111.	(d)	146.	(b)
7.	(c)	42.	(c)	77.	(d)	112.	(d)	147.	(a)
8.	(d)	43.	(a)	78.	(b)	113.	(c)	148.	(c)
9.	(c)	44.	(c)	79.	(a)	114.	(b)	149.	(a)
10.	(a)	45.	(b)	80.	(c)	115.	(c)	150.	(b)
11.	(c)	46.	(b)	81.	(b)	116.	(a)	151.	(c)
12.	(d)	47.	(c)	82.	(b)	117.	(a)	152.	(d)
13.	(a)	48.	(a)	83.	(a)	118.	(a)	153.	(a)
14.	(c)	49.	(c)	84.	(b)	119.	(b)	154.	(d)
15.	(d)	50.	(d)	85.	(d)	120.	(b)	155.	(c)
16.	(b)	51.	(c)	86.	(c)	121.	(b)	156.	(a)
17.	(a)	52.	(c)	87.	(a)	122.	(c)		
18.	(c)	53.	(d)	88.	(b)	123.	(b)		
19.	(c)	54.	(a)	89.	(c)	124.	(a)		
20.	(d)	55.	(a)	90.	(c)	125.	(b)		
21.	(d)	56.	(c)	91.	(c)	126.	(b)		
22.	(c)	57.	(a)	92.	(c)	127.	(c)		
23.	(d)	58.	(c)	93.	(d)	128.	(c)		
24.	(d)	59.	(b)	94.	(d)	129.	(d)		
25.	(d)	60.	(d)	95.	(c)	130.	(d)		
26.	(a)	61.	(c)	96.	(d)	131.	(c)		
27.	(b)	62.	(b)	97.	(b)	132.	(d)		
28.	(a)	63.	(b)	98.	(a)	133.	(a)		
29.	(a)	64.	(b)	99.	(a)	134.	(b)		
30.	(b)	65.	(a)	100.	(b)	135.	(b)		
31.	(d)	66.	(b)	101.	(c)	136.	(d)		
32.	(d)	67.	(c)	102.	(*)	137.	(d)		
33.	(a)	68.	(c)	103.	(d)	138.	(d)		
34.	(c)	69.	(d)	104.	(a)	139.	(a)		
35.	(c)	70.	(b)	105.	(b)	140.	(c)		

Horticulture (JRF : 2004-05) (Memory based)

1. Which one is the most drought tolerant crop ?
(a) Bajra (b) Maize (c) Sugarcane (d) Mungbean

2. Lasso is the trade name of which herbicide ?
(a) Butachlor (b) Isoproturon (c) Atrazine (d) Alachlor

3. Excess of chlorides in tobacco leads to
(a) Two faced leaf (b) Inhibition of burning
(c) Poor storage life (d) All of these

4. Which one of the followings is the best green manure crop ?
(a) Mungbean (b) Cowpea (c) Urdbean (d) Dhaincha

5. Which one of the following crop does not follow C_3 pathway ?
(a) Barley (b) Sugarbeet (c) Maize (d) Soybean

6. When a seed is stored at freezing temperature, it is known as
(a) Ex-situ conservation (b) Orthodox seed
(c) In-situ conservation (d) Reclacitrant seed

7. In double helical structure of DNA, distance of one turn is
(a) 36A° (b) 38A° (c) 34A° (d) 3.4A°

8. A gene located on Y chromosome and therefore, transmitted from father to son is known as
(a) Autosomal gene (b) Supplementary gene
(c) Sex linked gene (d) Holandric gene

9. The proportion of additive genetic variance to phenotypic variance is called
(a) Heritability (b) Heterobeltosis
(c) Linkage relationship (d) Dominance relationship

10. The average daily requirement of vegetables for human adult is
(a) 510 g (b) 285 g (c) 180 g (d) 130 g

11. Strawberry is propagated through
(a) Suckers (b) Crown (c) Rhizome (d) Runners

12. Which of the following is monocot fruit ?
(a) Banana (b) Date palm (c) Pineapple (d) All of these

13. The variety of mango seriously affected by spongy tissue is
(a) Neelam (b) Dashahari (c) Amrapali (d) Alphanso

14. The plant bioregulator that acts as antigibberellin is
(a) Paclobutrazole (b) Indole acetonitrite (c) Zeatin (d) Morphactin

15. The pear fruit tree is trained in
(a) Open center system (b) Head system
(c) Modified central leader system (d) None

16. Winter Banana is a variety of the fruit crop
(a) Aonla (b) Apple (c) Banana (d) Pineapple

17. Following is the dwarfing rootstock of apple
(a) M 25 (b) M 15 (c) M 9 (d) M 1

18. Which of the following is not a cytokinin ?
(a) Diphenylurea (b) Ethrel (c) Zeatin (d) IBA

19. The class of plant bioregulator used commercially in grape production is
(a) Cytokinin (b) Gibberellin (c) Ethylene (d) Auxin

20. The plant bioregulator used as substitute for chilling is
(a) GA (b) IAA (c) BA (d) MH

21. Which of the following fruits is rich source of fat ?
(a) Aonla (b) Avocado (c) Bael (d) Pomegranate

22. "Cricket Ball" is the variety of
(a) Loquat (b) Guava (c) Litchi (d) Sapota

23. "Little leaf" of mango is caused by the deficiency of
(a) K (b) P (c) Cu (d) Zn

24. Which of the following fruits is most suitable for high PH soils ?
(a) Litchi (b) Aonla (c) Mango (d) Apple

25. Which of the following fruits does not belong to the family Anacardiaceae ?
(a) Cashew nut (b) Pistachio nut (c) Pecaanut (d) Mango

26. The origin place of the fruit guava is
(a) China (b) Australia
(c) India (d) Tropical America

27. "Heroine" one of the major chemicals responsible for "drug abuse" is obtained from
(a) *Podophylum sp.* (b) *Datura sp.* (c) Poppy (d) Periwinkle

28. Kinnow cultivator of citrus is a hybrid between
(a) King x willow leaf (b) King x Owari
(c) King x Cleopatra (d) King x Dancy

29. The term Ikebana is related to
(a) Flower arrangement (b) Topiary
(c) Carpet bedding (d) Bonsai culture

30. Which one of the following is a climber ?
(a) *Hibiscus collinus* (b) *Cassia gluaca* (c) *Quisqualis indica* (d) *Ixora cocinea*

31. Which of the following is a summer annual flower ?
(a) Linum (b) Clarkia (c) Zinnia (d) Dianthus

32. Deficiency of the following is responsible for whiptail in cauliflower
(a) Mn (b) B (c) Zn (d) Mo

33. The pungency in onion is due to the presence of
(a) Isothiocynate (b) Solanin
(c) Allyl Propyl Disuphide (d) None

34. Little leaf of brinjal is caused by
(a) Viruses (b) Bacteria
(c) Mycoplasma (d) Physiological disorder

35. Triploidy has been put to commercial use in following vegetable
(a) Watermelon (b) Brinjal (c) Tomato (d) Cauliflower

36. For complete preservation the percentage of sugar in fruit jam should be nearly
(a) 90 % (b) 70 % (c) 50 % (d) 30 %

37. Which one of the following is not the variety of brinjal ?
(a) Pant Bahar (b) Pant Samrat (c) Pant Rituraj (d) Pusa Ankur

38. Onion variety for *Kharif* cultivation in north India is
(a) N-53 (b) Pusa White (c) Pusa Red (d) Arka Nihar

39. Which of the following is not the variety of watermelon ?
(a) Arka Rajhans (b) Durgapura Meetha
(c) Sugar Baby (d) Arka manik

40. Pre-harvest spray of which of the following is done to reduce storage loss of onion
(a) IBA (b) GA (c) Ethephon (d) MH

41. Which of the following is used for curing high blood pressure ?
(a) *Rauvolfia serpentina* (b) *Catheranthus alba*
(c) *Aloe vera* (d) *Coitus speciosus*

42. Phomopsis blight is a major disease of
(a) Pea (b) Tomato (c) Brinjal (d) None of these

43. Which one of the following is not a food preservative ?
(a) Glacial acetic acid (b) Benlate
(c) KMS (d) Sodium benzoate

44. Thrips are major insects of the vegetable
(a) Tomato (b) Cabbage (c) Onion (d) Brinjal

45. Which of the following medicinal plants is called Indian Gooseberry ?
(a) Arjuna (b) Aonla (c) Bohera (d) Harar

46. Which of the following enhances seed germination ?
(a) Paclobutrazol (b) GA (c) NAA (d) BA

47. Following is recommended for maintaining freshness in cut leafy vegetables
(a) Cytokinin (b) ABA (c) Auxin (d) Gibblerellin

48. Which of the following can be used in crop regulation of guava ?
(a) NAA (b) Ethephon (c) IBA (d) GA

49. Which of the following medicinal plants is called as Indian Ginseng ?
(a) *Azadirachta indica* (b) *Withania somnifera*
(c) *Hemidesmus indicus* (d) *Cephaelis ipecacuanha*

50. The botanical name of the aromatic geranium is
(a) *Gloriora superba* (b) *Pelorgonium greveolens*
(c) *Abelmoschus moschatus* (d) *Andrographis paniculato*

51. The tuber of which of the following plants is effective as aphrodisiac tonic ?
(a) *Asparagus racemosus* (b) *Rauvolfia serpentina*
(c) *Ammi majous* (d) *Curcuma amada*

52. Which of the following alkaloids from Datura is used in the relief of withdrawal sympto of morphine and alcohol addition ?
(a) Hyoscine (b) Atropine (c) Meteloidine (d) Hyoscyamine

53. Which of the following plants is used for curing cough and cold ?
(a) Adusa (b) Arondi (c) Ambrette (d) Kachnar

54. Which of the following insects are not pests of apple ?
(a) Tent caterpillar (b) San Jose scale (c) Wooly aphid (d) Shoot gall ma

55. Which of the following is a day neutral vegetable ?
(a) Radish (b) Spinach (c) Tomato (d) Sweet potato

56. In potato tuberization does not occur at a temperature above
(a) 25 °C (b) 30°C (c) 20 °C (d) 15°C

57. Which of the following vegetables is not transplanted ?
(a) Cauliflower (b) Tomato (c) Radish (d) Brinjal

58. Which of the following vegetable is not pungent when cooked ?
(a) Radish (b) Onion (c) Lettuce (d) Chilli

59. Which of the following plants is used for curing blood cancer ?
(a) *Catharanthus roseus* (b) *Agave americana*
(c) *Veliveria zizanioides* (d) *Viola serpens*

60. "Umran" is high yielding variety of
(a) Ber (b) Acidlime (c) Guava (d) Date palm

61. Jamun belongs to the same family as
(a) Guava (b) Peach (c) Apricot (d) Jack fruit

62. Which one of the following is the variety of apricot ?
(a) Chaubattia Princes (b) Sunehri
(c) Chaubattia Anupam (d) Chaubattia Madhu

63. Central Institue for Temperate Horticulture is located at
(a) Solan (b) Srinagar (c) Kullu (d) Chaubattia

64. Mango tree bears fruits on.
(a) Last year growth (b) Current season growth
(c) Both a & b (d) None

65. The center of origin of papaya is
(a) China (b) India (c) Central America (d) South America

66. The commercially used growth retardant is.
(a) GA (b) BA (c) Paclobutrazol (d) Kinetin

67. Botanically loquat is a type of fruit.
(a) Nut (b) Pome (c) Berry (d) Drupe

68. The ultra dwarf rootstock of apple is.
(a) M 27 (b) MM 106 (c) M 9 (d) MM 104

69. Which fruit crop can be grown successfully under high drought conditions?
(a) Strawberry (b) Banana (c) Guava (d) Date palm

70. The tristeza tolerant rootstock in citrus is
(a) Sweet orange (b) Rangpur lime (c) Karna khatta (d) None of these

71. Which one is a male sterile cultivar of peach ?
(a) Sharball (b) Flordasum (c) J.H. Hale (d) Red heaven

72. Fruit cracking in pear is due to
(a) Boron deficiency (b) Zinc deficiency (c) Zinc toxicity (d) Boron toxicity

73. Among the following fruits, the richest source of vitamin "A" is
(a) Papaya (ripe) (b) Beal (ripe) (c) Jack fruit (ripe) (d) Mango (ripe)

74. Deficiency of vitamin "C" (ascorbic acid) in human diet leads to the development of.
(a) Scurvy (b) Beri-beri (c) Pellagra (d) Goitrel 18

75. Whiptail disorder of cauliflower is due to the deficiency of
(a) Mo (b) B (c) Fe (d) Zn

76. Seedless ness in most grape varieties is due to
(a) Stenospermocarpy (b) Parthenocarpy (c) Polyembryony (d) Apomixis

77. One gallon of water is equal to.
(a) 4.55 Lit. (b) 5.5 Lit. (c) 3.5 Lit. (d) 2.55 Lit.

78. Which of the following fruit has maximum protein (21%) ?
(a) Date (b) Walnut (c) Almond (d) Cashew nut

79. Essential ingredients for making jelly are
(a) Lemon fruit, sugar, water, sodium benzoate
(b) Fully ripe guava, sugar, acid, water
(c) Pectin, sugar, acid water
(d) Immature plum fruit, sugar, water, KMS

80. The dwarfing rootstock of guava is
(a) Brazilian guava (b) Cattleya guava (c) Pineapple guava (d) Chinese guava

81. Horticulture has been derived from "hortus" which is
(a) German (b) Latin (c) English (d) French

82. "Protective food" includes
(a) Fruits & vegetable (b) Cereals (c) Fruits (d) Vegetables

83. The edible part of pomegranate is called
(a) Peduncle (b) Endosperm (c) Thalamus (d) Aril

84. The finest variety of *Citrus reticulata* grown in the world is
(a) Coorg mandarin (b) Kaula orange (c) Kashi mandarin (d) Nagpur mondarin

85. In peaches the traditional system of training is
(a) Open center (b) Multiple stem
(c) Central leader (d) Modified central leader

86. Which of the following fruits is richest source of Vit. C ?
(a) Aonla (b) Ber (c) Bael (d) Apple

87. Kinnow mandarin is a hybrid of
(a) *C. nobillis* X *C. deliciosa* (b) *Citrus sinensis* X *Citrus nobillis*
(c) *C.nobillis* X *C. sinensis* (d) *C. deliciosa* X *C. nobilis*

88. The process of natural pollination in Cocoa is by
(a) Birds (b) Water (c) Insect (d) Air

89. Citrus canker is caused by
(a) Virus (b) Fungus (c) Bacteria (d) Insects

90. Bunchy top disease of banana is mainly transmitted by
(a) Aphid (b) Fungus (c) Virus (d) Bacteria

91. "Washington Naval" is a famous cultivar of
(a) *C.granids* (b) *Citrus reticulata* (c) *C. paradisi* (d) *C. sinensis*

92. Indian Institute of Vegetable Research is located at
(a) Ajmer (b) Varanasi (c) Lucknow (d) Kanpur

93. Marmalade is prepared from the fruits of.
(a) Citrus (b) Apple (c) Mango (d) Guava

94. The TSS at the end of jam preparation should be.
(a) 48.5°B (b) 60.5°B (c) 58. 5°B (d) 78. 5°B

95. Which one is a ripening hormone ?
(a) GA4 (b) B4 (c) GA3 (d) Ethylene

96. All bulbous vegetable crops belong to the family.
(a) Amaryllidaceae (b) Cruciferae (c) Solanaceae (d) None

97. The best storage temperature for onion is
(a) 0° (b) -5°C (c) 5°C (d) 10°C

98. Nontes is an important variety of
(a) Carrot (b) Turnip (c) Beet root (d) Radish

99. Cytokines cause.
(a) Cell division (b) Growth retardation (c) Rooting (d) Cell abortion

100. Avenue term is mostly related to.
(a) Shrubs only (b) Annuals only (c) Trees only (d) None

101. Most of the banana species are
(a) Triploid (b) Diploid (c) Haploid (d) Hexaploid

102. Which is a non-climacteric fruit ?
(a) Jackfruit (b) Banana (c) Papaya (d) Orange

103. Which is a climacteric fruit ?
(a) Grapes (b) Pomegranate (c) Bael (d) Litchi

104. The book "Horticultural Science" has been written by
(a) T.K.Bose (b) K.L.Chadha (c) Jules Janick (d) J.O.Simmonds

105. T.S.S. is measured by.
(a) Refractometer (b) Thermometer (c) Colorimeter (d) Spectrophotometer

106. Sweetest sugar in fruit is.
(a) Glucose (b) Fructose (c) Sucrose (d) Galactose

107. Waxing of fruit is done mainly to reduce
(a) Respiration (b) Transpiration
(c) Ripening (d) Transpiration & respiration

108. Which of the following is a rich source of fat ?
(a) Aonla (b) Citrus (c) Arecanut (d) Walnut

109. Which of the following is an aggregate fruit ?
(a) Guava (b) Strawberry (c) Citrus (d) Pineapple

110. The only University of Horticulture and Forestry is situated at .
(a) New Delhi (b) Solon (c) Shimla (d) Banglore

111. The heat treatment given to inactivate enzymes is called
(a) Blanching (b) Cooling (c) Dehydration (d) Oxidation

112. Lye peeling is done by.
(a) 10% hot acid solution (b) 10% cool solution
(c) 1% cool alkali solution (d) 1% hot alkali solution

113. Which of the following has maximum oil contents.
(a) Oil palm (b) Mustard (c) Groundnut (d) Linseed

114. Root wilt is a serious disease of.
(a) Oil palm (b) Cashew nut (c) Areca nut (d) Coconut

115. National Medicinal Plants Board is located at.
(a) Banglore (b) New Delhi (c) Chennai (d) Mumbai

116. Coconut Development Board is located at.
(a) Patna (b) Kota (c) Cochin (d) Hyderabad

117. Yellow leaf is a serious disease of .
(a) Cocoa (b) Areca nut (c) Cashewnut (d) Coconut

118. Haploid plants can be produced by culturing
(a) Anthers (b) Endosperm (c) Single cell (d) Nucellus

119. Which of the following is high value crop expensive perfume.
(a) Kalmegh (b) Jasmine (c) Altis (d) Chirata

120. Transgenic in cross-pollinated species should ideally be raised.
(a) In an open field (b) Under controlled conditions
(c) Any where at will (d) None

121. Match the following.

(1) Marketing	(A) Natural
(2) Enterprise	(B) Complementary
(3) Demand	(C) Function
(4) Resources	(D) Ebasticity
(5) Bank cheques	(E) Optimal money

Select the correct one :
(a) 1-B, 2-B, 3-D, 4-A, 5-E (b) 1-A, 2-C, 3-D, 4-A, 5-E
(c) 1-D, 2-A, 3-C, 4-E, 5-B (d) 1-A, 2-B, 3-C, 4-D, 5-E

122. Match the following :

(1) Sugarcane topborer	(A) Earwing
(2) E.D.B.	(B) Carbofuran
(3) Trichogramma	(C) Bioagent
(4) Carina	(D) Fumigant
(5) Insects	(E) Red spidermite

Select the correct one :
(a) 1-A, 2-D, 3-C, 4-B, 5-E (b) 1-D, 2-C, 3-B, 4-A, 5-E
(b) 1-E, 2-C, 3-B, 4-A, 5-D (d) 1-B, 2-C, 3-D, 4-E, 5-A

123. Match the following groups :

Group A		Group B
(1)	Millardet	(A) *Melampsora Lini*
(2)	Autoecious rust	(B) Ergot
(3)	Honeydew	(C) Bordeaux mixture
(4)	Ear cockle	(D) *Anguina tritici*
(5)	Symbiotant	(E) *Rhizobium*

Select the correct one :

(a) 1-A, 2-B, 3-C, 4-D, 5-E (b) 1-C, 3-A, 3-B, 4-D, 5-E
(c) 1-D, 2-C, 3-A, 4-D, 5-E (d) 1-A, 2-B, 3-C, 4-E, 5-D

124. Match the following :

Group A		Group B
(1)	Aldicarb	(A) Granule
(2)	Antherea	(B) Silk
(3)	Honey dew	(C) Mealybug
(4)	Dead heart	(D) Stemborer
(5)	Hopper burns	(E) BHP

Select the correct one :

(a) 1-B, 2-C, 3-D, 4-E, 5-A (b) 1-B, 2-D, 3-C, 4-A, 5-E
(c) 1-A, B-2, 3-C, 4-D, 5-E (d) 1-E, 2-A, 3-B, 4-C, 5-D

125. Match the following :

Group A		Group B
(1)	Grafting by approach	(A) Incrching
(2)	Bridge grafting	(B) Micropropagation
(3)	"T" Budding	(C) Rpse
(4)	Tissue culture	(D) Changing scion
(5)	Top working	(E) Repairing of damaged trunk

Select the correct one

(a) 1-A, 2-E, 3-C, 4-B, 5-D (b) 1-A, 2-B, 3-C, 4-D, 5-E
(b) 1-B, 2-C, 3-D, 4-E, 5-A (d) 1-A, 2-B, 3-D, 4-C, 5-E

126. Match the following :

Group A		Group B
(1)	Tab toxin	(A) *Pseudomonas tabaci*
(2)	Virus indexing root stock	(B) *Poncirus trifoliate*
(3)	Fire blight of apple & pear	(C) *Erwinia amylovora*
(4)	Dentromycotina	(D) *Colletotrichum*
(5)	Gram positive bacteria	(E) *Clavibacter*

Select the correct one :

(a) 1-A, 2-B, 3-D, 4-C, 5-E (b) 1-A, 2-B, 3-C, 4-D, 5-E
(b) 1-E, 2-D, 3-C, 4-B, 5-A (d) 1-E, 2-C, 3-D, 4-B, 5-A

127. Match the following :

Group A		Group B
(1)	NAFED	(A) Linoleic acid
(2)	Sunflower	(B) Agricultural Marketing
(3)	Albert Mayer	(C) Piezometer
(4)	Device to measure fee water	(D) Etawah pilot project
(5)	Seed plot technique	(E) Potato

Select the correct one :

(a) 1-B, 2-A, 3-D, 4-C, 5-E (b) 1-A, 2-B, 3-C, 4-D, 5-E
(c) 1-A, 2-B, 3-D, 4-C, 5-E (d) 1-B, 2-A, 3-C, 4-D, 5-E

128. Match the following :

Group A		Group B
(1)	Mass Media	(A) Radio
(2)	Vikash Adhikari	(B) Democratic decentralization
(3)	Vilage Panchayat	(C) Process
(4)	Rogers	(D) Change agent
(5)	Disemination of Information	(E) Diffusion

Select the following :

(a) 1-A, 2-E, 3-C, 4-D, 5-E (b) 1-A, 2-D, 3-B, 4-C, 5-E
(d) 1-B, 2-A, 3-C, 4-D, 5-E (d) 1-B, 2-A, 3-C, 4-D, 5-E

129. Match the following :

Group A		Group B
(1)	Pasteurization	(A) Milk
(2)	Blanching	(B) Vegetables
(3)	Banking	(C) Bread
(4)	Brewing	(D) Barely
(5)	Suitable for avoiding scurvy	(E) Aonla

Select the correct one :

(a) 1-A, 2-B, 3-C, 4-D, 5-E (b) 1-A, 2-C, 3-B, 4-D, 5-E
(c) 1-A, 2-D, 3-C, 4-E, 5-E (d) 1-D, 2-E, 3-C, 4-A, 5-E

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Answers
JRF (Horticulture, 2004 – 05)

1. (a)	36. (b)	71. (c)	106. (b)
2. (d)	37. (d)	72. (a)	107. (d)
3. (d)	38. (a)	73. (d)	108. (d)
4. (d)	39. (a)	74. (a)	109. (b)
5. (c)	40. (d)	75. (a)	110. (b)
6. (d)	41. (a)	76. (a)	111. (a)
7. (c)	42. (c)	77. (a)	112. (d)
8. (c)	43. (b)	78. (d)	113. (a)
9. (d)	44. (c)	79. (c)	114. (d)
10. (b)	45. (b)	80. (b)	115. (b)
11. (a)	46. (b)	81. (b)	116. (c)
12. (d)	47. (a)	82. (a)	117. (b)
13. (d)	48. (d)	83. (d)	118. (a)
14. (a)	49. (b)	84. (d)	119. (b)
15. (c)	50. (b)	85. (c)	120. (b)
16. (b)	51. (b)	86. (a)	121. (a)
17. (c)	52. (d)	87. (a)	122. (a)
18. (b)	53. (a)	88. (c)	123. (b)
19. (b)	54. (a)	89. (c)	124. (c)
20. (a)	55. (c)	90. (a)	125. (a)
21. (b)	56. (a)	91. (b)	126. (b)
22. (d)	57. (c)	92. (b)	127. (a)
23. (d)	58. (c)	93. (a)	128. (b)
24. (b)	59. (a)	94. (b)	129. (a)
25. (c)	60. (a)	95. (d)	
26. (d)	61. (a)	96. (a)	
27. (c)	62. (d)	97. (c)	
28. (a)	63. (b)	98. (a)	
29. (a)	64. (b)	99. (a)	
30. (c)	65. (c)	100. (c)	
31. (c)	66. (c)	101. (a)	
32. (d)	67. (b)	102. (d)	
33. (c)	68. (a)	103. (c)	
34. (c)	69. (d)	104. (c)	
35. (a)	70. (b)	105. (a)	

General Agriculture (JRF – 2003 - 04)
(Memory based)

1. Which one of the following is not a legume crop ?
   (a) Wheat (b) Peas (c) Beans (d) Groundnut
2. Total cultivated area in India is close to
   (a) 500 mha (b) 400 mha (c) 180 mha (d) 60 mha
3. Nitrogen deficiency in plants leads to
   (a) Chlorosis (b) Excessive growth
   (c) Profuse flowering (d) Dark green colour
4. The two major races of rice are
   (a) European and Tropical (b) Indica and Japonica
   (c) Asiatic and American (d) Temperate and Tropical
5. N : P : K requirement in legumes is generally
   (a) 3 : 1 : 1 (b) 3 : 1 : 0 (c) 1 : 2 : 2 (d) 4 : 2 : 1
6. Which of the following states has largest geographical area ?
   (a) U.P. (b) Bihar (c) Rajasthan (d) M.P.
7. The highest production in terms of million tonnes per year in India is that of
   (a) Pulses (b) Groundnut (c) Sugarcane (d) Potatoes
8. Respiration in plants is essentially a process related to the following
   (a) Evaporation (b) Transpiration (c) Oxidation (d) None of the
9. Linkage between genes affects
   (a) Vernalization (b) Fertilization
   (c) Anaphase (d) Independent assortment
10. NPK are regarded in plant nutrition as
    (a) Trace elements (b) Macro nutrient (c) Micro nutrient (d) Non-essenti
11. DNA contains following number of nitrogenous bases repeated in various sequenc
    (a) One (b) Two (c) Four (d) Ten
12. Animal and plant cells can be differentiated by
    (a) Conductivity (b) Size
    (c) Presence or absence of cell wall (d) Shape
13. In temperate countries, generally, sugar is obtained from which of the following cr
    (a) Maple (b) Sugar beet (c) Wheat (d) Sugarcane
14. The idea of particulate nature of inheritance was given by
    (a) Darwin (b) Mendel (c) Jones (d) Bateson

15. Cultivated rice *Oryza sativa* has the following number of chromosomes
(a) 2n = 32 (b) 2n = 20 (c) 2n = 24 (d) 2n = 18

16. In the presence of sunlight, CO_2 and H_2O (with the help of chlorophyll) and converted into carbohydrates, this is known as
(a) Photosynthesis (b) Respiration (c) Metabolism (d) Solar radiation

17. Soil productivity takes into account the following
(a) Soil structure (b) Soil moisture
(c) Soil fertility (d) Soil fertility and productivity

18. If chromosome compliment of two diploid species is combined in one, the result species would be
(a) Amphidiploid (b) Haploid (c) Monogenic (d) Polygenic

19. Alternate form of gene at the same locus are referred to as
(a) Allel (b) Plastid (c) Dominant (d) Chromosome

20. Sequence of growing crops on a given piece of land is known as
(a) Crop insurance (b) Crop rotation (c) Crop production (d) Crop management

21. India has to provide food for its population that is now exceeding
(a) Two billion (b) One billion (c) 600 million (d) One million

22. In a diploid species generally following number of the chromosome are involved in pollen mitosis
(a) 4n (b) 3n (c) 2n (d) n

23. Sulphur fungicides can be freely used on all vegetables except the following
(a) Cucurbits (b) Beans and peas (c) Okra (d) Root vegetables

24. Karnal bunt is a serious disease of
(a) Wheat (b) Apple (c) Tomato (d) Mango

25. Zinc is required for synthesis of
(a) Fats (b) Proteins (c) Tryptophan (d) Sugars

26. Contour system of orchard planting is generally followed in
(a) Punjab (b) Hills (c) Saline soils (d) U.P.

27. NARS refers to which one of the following
(a) National Agricultural Research Streams (b) National Agricultural Research System
(c) National Agricultural Review System (d) National Aurvedic Research System

28. Cryo-preservation is done in liquid nitrogen at a temperature of
(a) 0°C (b) 4°C (c) 200°C (d) - 196°C

29. Crossing over during meiosis results in
(a) Help mutation (b) Breaking linkage
(c) Promoting linkage (d) None of these

30. The simplest measure of variability in a data set is
(a) Range (b) Mean (c) Mode (d) Median

Answers (General Agriculture JRF - 2003-04)

1. (a)	4. (b)	7. (c)	10. (b)	13. (b)	16. (a)	19. (a)	22. (c)	25. (c)	28. (d)
2. (c)	5. (c)	8. (c)	11. (c)	14. (b)	17. (d)	20. (b)	23. (a)	26. (b)	29. (b)
3. (a)	6. (c)	9. (d)	12. (c)	15. (c)	18. (a)	21. (b)	24. (a)	27. (b)	30. (a)

General Agriculture (JRF-2005)

(Memory based)

1. Growth of plants towards light is called
(a) Phototropism (b) Photoperiodism (c) Photocromatism (d) Photorespiration

2. Geographical area of India is
(a) 148 mha (b) 328 mha (c) 392 mha (d) 420 mha

3. The net gain of ATP during glycolysis is
(a) 2 (b) 4 (c) 6 (d) 8

4. Plants capable of growing in rock crevices are called
(a) Lithophytes (b) Calciphytes (c) Chosmophytes (d) None of these

5. Law of tolerance was introduced by
(a) Hilaire (b) Milvert (c) Shelford (d) Ear-net Haeckel

6. *Triticum aestivum* is a
(a) Diploid (b) Tetraploid (c) Hexaploid (d) All of these

7. Maize leaves develop red and purple colour due to the deficiency of
(a) S (b) P (c) Ca (d) Fe

8. The plant cells are connected with the help of
(a) Cell wall (b) Plasmoderma (c) Plasma membrane (d) Plasmodesmata

9. Cropping intensity in India is about
(a) 135 % (b) 100 % (c) 155 % (d) 185 %

10. Phosphorus in plants is absorbed as
(a) PO_4 (b) SSP (c) H_2PO_4 (d) None of these

11. Which one of the following is a C_4 plant
(a) Pea (b) Papaya (c) Potato (d) Maize

12. Oleoresin is an important product of
(a) Potato (b) Cotton (c) Tomato (d) Chilli

13. The principles of experimental design were given by
(a) Cox and Cochran (b) Wilcox (c) RA Fisher (d) WG Cochran

14. "t" test is applicable when the number of treatments are
(a) 2 (b) 4 (c) 8 (d) 12

15. The error degree of freedom for a RBD design with 10 treatments and 4 replications is
(a) 27 (b) 30 (c) 36 (d) 40

16. Mendal worked on
(a) Sweat peas (b) Garden peas (c) Field peas (d) Beans

17. Total number of State Agricultural Universities in India in the year 2004 was
(a) 24 (b) 33 (c) 46 (d) 40

18. Absorption of solute ions is regulated by
(a) Nucleus wall (b) Cell organelles (c) Vacuoles (d) Plant cell membrane

19. One gram of glucose produces how much fat or oil
(a) 0.25 g (b) 0.45 g (c) 0.66 g (d) 0.32 g

20. Criteria for the essentiality of nutrient for plants was given by
(a) Arnon (b) Wilcox (c) Liebig (d) None

21. The Central Agricultural University is located at
(a) Manipur (b) Delhi (c) Patna (d) Hyderabad

22. An acid derived from green leaves of chickpea prescribed for intestinal disorders is
(a) Oxalic acid (b) Citric acid (d) Prussic acid (d) Sulphuric acid

23. End product of glycolysis is
(a) ATP (b) PEP (c) Pyruvate (d) None of these

24. The C : N ratio of humus is
(a) 20 : 1 (b) 100 : 1 (c) 10 : 1 (d) 400 : 1

25. Plants, which keep their stomata, open during night for taking CO_4 are known as
(a) C_3 (b) C_4 (c) CAM (d) All of above

26. The CO_2 content of soil air is
(a) 0.03 % (b) 0.3 % (c) 21 % (d) None of these

27. In India, most common method of irrigating crops is
(a) Drip (b) Sprinkler (c) Check basin (d) Border strip

28. Atmosphere extends above mean sea level to a height of about
(a) 160 km (b) 1600 km (c) 1600 miles (d) 1600 metres

29. Densest part of atmospheric strata is
(a) Stratosphere (b) Troposphere (c) Mesosphere (d) Thermosphere

30. Global warming is attributed to increase in concentration of green house gases like
(a) CO_2 (b) CFCs (c) CH_4 (d) All of these

Answers (General Agriculture JRF - 2005)

1. (a)	4. (a)	7. (b)	10. (c)	13. (c)	16. (b)	19. (b)	22. (a)	25. (c)	28. (b)
2. (b)	5. (c)	8. (d)	11. (d)	14. (a)	17. (b)	20. (a)	23. (c)	26. (b)	29. (b)
3. (a)	6. (c)	9. (a)	12. (d)	15. (a)	18. (d)	21. (a)	24. (c)	27. (c)	30. (d)

General Agriculture (JRF-2006)

(Memory based)

1. The contribution of Agricultural sector to the gross domestic product (GDP) in India in year 2004-05 has been nearly
(a) 25 % (b) 35 % (c) 45 % (d) 55 %

2. Most suitable design for experiment involving varying number of tillage and nitro levels is
(a) Split plot (b) Strip plot (c) RBD (d) Latin square

3. In a RBD experiment having 9 treatments and 4 replications, the error degree of freed will be
(a) 24 (b) 36 (c) 32 (d) 27

4. Which one of the following is used to work out critical difference (C.D.) ?
(a) CD = EMS × 100/Overall mean (b) CD = t × SE (d)
(c) CD = $\sqrt{2MSE / r}$ (d) CD = $\sqrt{2SE(d) / r}$

5. Which part of the plant cell is known as power house ?
(a) Lysosomes (b) Ribosomes (c) Golgi bodies (d) Mitochondri

6. Which one of the following is a C_3 plant ?
(a) Sorghum (b) Maize (c) Wheat (d) Pearlmillet

7. The plants with male and female flowers on different plants are called
(a) Dioecious (b) Dicot (c) Dichogamy (d) Dicliny

8. Which one of the following process results in release of energy ?
(a) Physiology (b) Metabolism (c) Anabolism (d) Catabolism

9. The centre of origin of *Triticum aestivum* is
(a) Near eastern region (b) Mediterranean centre
(c) South Mexican centre (d) Chilean centre

10. Which one of the following element is a constituent of protoplasm ?
(a) Potassium (b) Calcium (c) Sulphur (d) Iron

11. Which one of the following element is mobile in plants but immobile in soil ?
(a) Phosphorus (b) Boron (c) Zinc (d) Sulphur

12. The 5- carbon compounds produced during dark reaction of photosynthesis is
(a) Seda heptulose phosphate (b) Xylulose phosphate
(c) Ribose phosphate (d) Ribulose bis phosphate

13. The light generated reducing power is
(a) $NADPH_2$ (b) $NADH_2$ (c) $FADH_2$ (d) ATP

14. Which of the following process is not takes place in evolution of plants ?
(a) Mutation (b) Linkage (c) Coupling (d) Crossing ov

15. Which one of the following is sulphur-containing amino acid ?
(a) Lysine (b) Proline (c) Tryptophan (d) Cystine

16 The splitting up of water molecules in plant cells in the presence of sunlight is called
(a) Phosphorylation (b) Photolysis (c) Photosynthesis (d) Phytophosphorylation

17. What does the stomata open ?
(I) When the guard cells are in flaccid condition
(II) When there is an accumulation of K ions in the guard cells
(III) When water enters into the guard cells
(IV) When the water potential of guard cells is lower than that of adjacent cells
(a) I and IV (b) I and III (c) II, III and IV (d) None

18. Which state of India leads in area under wheat crop ?
(a) Rajasthan (b) U.P. (c) Punjab (d) M.P.

19. Khaira disease in rice is due to the deficiency of
(a) Zn (b) S (c) Mn (d) Boron

20. The process of use of microorganism to remove salts from soil is referred as
(a) Chelation (b) Phyto-remediation (c) Bioremediation (d) Oxidation

21. Economic part of Isabgol is
(a) Husk (b) Seed (c) Seed and husk (d) Leaf

22. Which of the following is non-climacteric fruit ?
(a) Apple (b) Banana (c) Mango (d) Litchi

23. Norin - dwarf gene was introduced in which cereal ?
(a) Oat (b) Maize (c) Rice (d) Wheat

24. Saffron (kesar) belong to the family
(a) Lauraceae (b) Orchidaceae (c) Apiaceae (d) Iridaceae

25. Which one of the following clay mineral has the highest CEC ?
(a) Illite (b) Kaolinite (c) Montmorillonite (d) Vermiculite

26. Under seventh approximation soil classification, the number of soil orders is
(a) 8 (b) 11 (c) 14 (d) 15

27. The number of Agro-climatic zones of India is
(a) 7 (b) 10 (c) 15 (d) 17

28. Solar constant is equal to (in cal/cm^2/min)
(a) 0.194 (b) 1.94 (c) 19.4 (d) 194

29. The grand period of rainfall in India is
(a) South - west monsoon (b) North - east monsoon
(c) Cold weather period (d) Post monsoon

30. Horse latitude lies in between north and south latitudinal belt of equator
(a) 10 to 15° (b) 0 to 5° (c) 20 to 25° (d) 30 to 35°

Answers (General Agriculture JRF - 2006)

1. (a)	4. (b)	7. (a)	10. (b)	13. (a)	16. (b)	19. (a)	22. (a)	25. (d)	28. (b)
2. (a)	5. (d)	8. (d)	11. (a)	14. (b)	17. (c)	20. (c)	23. (d)	26. (b)	29. (a)
3. (a)	6. (c)	9. (b)	12. (d)	15. (d)	18. (b)	21. (c)	24. (d)	27. (c)	30. (d)

GENERAL AGRICULTURE, JRF (Memory Based) 2007

1. Disease caused by Zn deficiency is
(a) Whiptail (b) Mosaic (c) Khaira (d) Die-back

2. The specific heat of water is
(a) 0.5 Cal/g (b) 1 Cal/g (c) 2 Cal/g (d) 10 Cal/g

3. Karnal bunt is caused by
(a) *Nevosia indica* (b) *Albugo candida*
(c) *Phytophthora infestans* (d) None of these

4. Sugarcane inflorescence is
(a) Compound (b) Racemose (c) Capitulum (d) Spikejet

5. Soil air contains CO_2 (%)
(a) 0.25 (b) 0.03 (c) 2.50 (d) 3.0

6. Sulphur containing amino acid
(a) Lysine (b) Glutamine (c) Methionine (d) Glycine

7. Non-edible plant suitable for biodiesel
(a) Castor (b) Rapeseed (c) Coconut (d) Jatropa

8. Biurate content in urea is
(a) 1.5% (b) 2% (c) 4% (d) 5%

9. Greenhouse gas having largest contribution to global warming
(a) Methane (15%) (b) Nitrous oxide (5%)
(c) Carbon dioxide (60%) (d) CFC

10. Total geographical area of India is
(a) 328.9 ha (b) 328.9 mha (c) 328.9 sq.km. (d) 328.9 m.sq.km.

11. Country having the maximum area of hybrid rice is
(a) India (b) U.S.A. (c) Indonesia (d) China

12. Maximum productivity of sugarcane in India is
(a) Uttar Pradesh (b) Punjab (c) Tamil Nadu (d) Haryana

13. Net cultivated area in India is
(a) 328 mha (b) 180 mha (c) 150 mha (d) 143 mha

14. Transgenic crop having maximum cultivated area in the world is
(a) Rice (b) Maize (c) Soybean (d) Cotton

15. Contribution of agriculture in GDP is
(a) 60% (b) 40% (c) 30% (d) 23%

16. 'Vertisol' is related to
(a) Red soil (b) Laterite soil (c) Black soil (d) Alluvial soil

17. The simplest measure of variability in a data set is
(a) Median (b) Mean (c) Mode (d) Range

18. Agroclimatic zones in India are
(a) 15 (b) 16 (c) 17 (d) 18

19. Law of Minimum was given by
(a) Shelford (b) Liebig (c) Clement (d) Blackman

20. When the fertility gradient of the field is in two directions, the most appropriate experimental design is
(a) CRD (b) RBD (c) LSD (d) SPD

21. 'ANOVA' was defined by
(a) A.L. Bowley (b) Horace Secrist
(c) Karl Pearson (d) R.A. Fisher

22. The square of standard deviation is
(a) Variance (b) Standard deviation
(c) Coefficient of variance (d) Mean deviation

23. The principle of making use of greater homogeneity in groups of experimental units to reduce the experimental error is
(a) Local control (b) Replication (c) Randomisation (d) Sampling

24. Most of the wheat varieties are
(a) Quantitative long day plants (b) Qualitative long day plants
(c) Day neutral (d) Short day plants

25. Rice grain is deficient in
(a) Glycine (b) Lysine (c) Alanine (d) Isoleucine

26. An ideal type of rice with small, thick and erect leaf was proposed by
(a) Yoshida (b) Tsunoda (c) Murata (d) Tanaka

27. Bonneville, Early Badger, Arkel are the improved varieties of
(a) Soybean (b) Sunflower (c) Pea (d) Frenchbean

28. Double cross hybrid maize production technique was introduced by
(a) Mendel (b) D.F. Jones (c) G.H. Shull (d) E.M. East

29. Mat nursury is related to
(a) Onion (b) Tobacco (c) Chillies (d) Rice

30. The crop having the highest pesticide use is
(a) Oilseeds (b) Rice (c) Vegetables (d) Cotton

Answer Key :

1. (c)	2. (b)	3. (a)	4. (d)	5. (a)	6. (c)	7. (d)
8. (b)	9. (c)	10. (b)	11. (d)	12. (c)	13. (d)	14. (c)
15. (d)	16. (c)	17. (d)	18. (a)	19. (b)	20. (c)	21. (d)
22. (a)	23. (a)	24. (b)	25. (b)	26. (a)	27. (c)	28. (b)
29. (d)	30. (d)					

ICAR - JRF (General Agriculture) 2008

1. Photo-respiration rate is highest in which group of plants ?
(a) C_3 plants
(b) C_4 plants
(c) CAM plants
(d) None of these

2. Required seed rate for raising tomato nursery is
(a) 400 gm (b) 1000 gm
(c) 1.5 Kg (d) 2.0 Kg

3. The net gain of ATP in glycolysis is
(a) 1 ATP (b) 2 ATPs
(c) 8 ATPs (d) 36 ATPs

4. The precursor of ethylene is
(a) Methionine
(b) Tryptophane
(c) Glycine
(d) Histidine

5. Which element is involved in biosynthesis of IAA ?
(a) Boron (b) Zinc
(c) Nitrogen (d) Copper

6. PAR (Photo-synthetically active radiation) is measured in
(a) Einstein (b) Photon
(c) Quantum (d) Watts

7. Maximum number of treatment accommodates in RBD without loss of efficiency is
(a) 8 (b) 15
(c) 20 (d) 25

8. CO_2 accepter in C_4 plants is :
(a) OAA (b) RuBP
(c) PGA (d) None

9. Aflatoxin contamination generally foun in
(a) Chickpea (b) Groundnut
(c) Pea (d) Soybean

10. Which crop is also known as white gold
(a) Cotton (b) Opium
(c) Soybean (d) Maize

11. In Indo-gangatic plains, rice-whe cropping system covers about
(a) 8 m ha (b) 10 m ha
(c) 15 m ha (d) 5 m ha

12. Test between two population variance done by
(a) F - test (b) t - test
(c) A. M. (d) G. M.

13. The chemical responsible for lathyris in mammals is
(a) BOAA (b) HCN
(c) 2, 4 - DB (d) NAA

14. The area under Bt - cotton in India about
(a) 6.4 mha (b) 5.4 mha
(c) 4.4 mha (d) 3.4 mha

15. Which state contributes maximum pu production ?
(a) U. P. (b) M. P.
(c) Punjab (d) Maharastr

16. The first maize hybrid in India was :
(a) Vikram (b) Kisan
(c) Vijay (d) Ganga - 1

ANSWERS

1. a 2. a 3. b 4. a 5. b 6. a 7. c 8. a 9. b 10. a
11. b 12. a 13. a 14. a 15. b 16. d

17. Which of the following gases contributes maximum to global warming ?
(a) CFC (b) CO_2
(c) Methane (d) N_2O

18. Which test is used for comparing two means from independent samples ?
(a) F - test (b) t - test
(c) Chi - square - test
(d) Z - test

19. Which of the following crops has the largest area under transgenic globally ?
(a) Cotton (b) Soybean
(c) Tobacco (d) Maize

20. Which degradation plays a major role in the persistence and behavior of herbicides in soil ?
(a) Thermal (b) Physical
(c) Chemical (d) Microbial

21. Castor belongs to family
(a) Pedaliaceae
(b) Papillionaceae
(c) Compositeae
(d) Euphorbiaceae

22. Plants adapted to saline soils are called as :
(a) Lithophytes
(b) Halophytes
(c) Chasmophytes
(d) None of these

23. Foundation seed is produced from
(a) Certified seed
(b) Breeder seed
(c) Nucleus seed
(d) Registered seed

24. Specific heat of water is
(a) 1 cal/g
(b) 1 cal/ Kg
(c) 2 cal/g
(d) 10 cal/g

25. Sugar-beet is an indicator plant for
(a) Sodium
(b) Molybdenum
(c) Zinc
(d) Phosphorus

26. The study of relationship between soil properties and plant production is known as
(a) Agronomy
(b) Pedology
(c) Edaphology
(d) Soil chemistry

27. The dwarfing gene in rice is :
(a) Opaque - 2
(b) Tift - 23 A
(c) Dee - gee - woo - gen
(d) Norin - 10

28. Sunflower is also known as an indicator plant for the deficiency of
(a) Nitrogen
(b) Zinc
(c) Boron
(d) Potash

29. In India, area under rice is about
(a) 25 mha
(b) 28 mha
(c) 45 mha
(d) 57 mha

30. *Triticale* is a cross between :
(a) Wheat × Rye
(b) Wheat × Barley
(c) Barley × Oat
(d) Wheat × Oat

○○○○○

ANSWERS

17. b 18. b 19. b 20. d 21. d 22. b 23. b 24. a 25. a 26. c
27. c 28. c 29. c 30. a

ICAR - JRF (General Agriculture) 2009

1. India rank first in the production of the following crops in the world:
(a) Wheat (b) Pigeon-pea
(c) Rice (d) Soybean

2. Which of the following crops is thermo-insensitive ?
(a) Jowar (b) Rice
(c) Sunflower (d) Wheat

3. In which of the following crops GM varieties are available for cultivation in India
(a) Mustard
(b) Soybean
(c) Cotton
(d) All of the above

4. Dangerous gas for depletion of ozone layer is :
(a) Methane
(b) CFC
(c) Ethane
(d) Carbon-dioxide

5. The present level of carbon-dioxide in atmosphere is :
(a) 420 - 460 ppm (b) 490 ppm
(c) 295 - 300 ppm (d) 190 ppm

6. Photosynthetic inhibition by O_2 is called :
(a) Reaction
(b) Competitive effect
(c) Warburg's effect
(d) Back inhibition

7. Inflorescence in rice is known as
(a) Panicle (b) Raceme
(c) Ear (d) Spike

8. Blue revolution is related with :
(a) Crops
(b) Energy source
(c) Fish
(d) Oilseeds

9. Weight of one cotton bale is
(a) 190 Kg (b) 180 Kg
(c) 170 Kg (d) 160 Kg

10. Alluvial soils are found in :
(a) River delta (b) Mountains
(c) Forests (d) Deserts

11. Hybrid cotton in India was evolved for the first time in
(a) 1985 (b) 1980
(c) 1975 (d) 1970

12. The relative proportion of sand, silt and clay is called
(a) Soil aggregation
(b) Soil taxonomy
(c) Soil texture
(d) Soil structure

13. Crop logging is done in
(a) Maize (b) Cotton
(c) Sugarcane (d) Tobacco

14. Net cultivated area in India during 2004-05 was
(a) 135 million hectare
(b) 138 million hectare
(c) 141 million hectare
(d) 144 million hectare

ANSWERS

1. b 2. c 3. c 4. b 5. c 6. c 7. a 8. c 9. c 10. a
11. d 12. c 13. c 14. c

15. The IARI was established in :
(a) 1904 (b) 1905
(c) 1907 (d) 1909

16. Which of the following is not a bio-pesticide ?
(a) Dipel (b) Biolap
(c) Carbaryl (d) Bioneem

17. Pheromone trap attracts :
(a) Caterpillars (b) Male moths
(c) Female bugs (d) Female moths

18. Which of the following insecticides may be recommended for the control of termites ?
(a) Dimethonate
(b) Chlorpyriphos
(c) Nimbicidine
(d) Methyl - o - demetone

19. Maize belongs to the category :
(a) Dioecious
(b) Monoecious
(c) Bisexual
(d) None of these

20. IGFRI is located at :
(a) Jhansi (b) Jodhpur
(c) Jallandhar (d) Jorhat

21. The depth of seeding in wheat is depends on
(a) Length of mesocotyl
(b) Length of coleoptiles
(c) Length of radicle
(d) None of these

22. Soil mulch is useful in :
(a) Improving aeration
(b) Improving drainage
(c) Minimize evaporation losses
(d) Removing weeds

23. Origin place of soybean is
(a) China (b) Peru
(c) Brazil (d) Mexico

24. In plants, enzyme responsible for the synthesis of the malic acid is :
(a) PEP carboxylase
(b) Rubisco
(c) Urease
(d) Kinase

25. The photosynthetically active radition (PAR) falls in the range of
(a) 100 - 400 nm
(b) 400 - 700 nm
(c) 700 - 1000 nm
(d) None of the above

26. Photo-periodically rice is a
(a) Long day plant
(b) Short day plant
(c) Day neutral plant
(d) None of these

27. Correct order of rice producing countries is
(a) China > India > Indonesia > Thailand
(b) India > China > Indonesia > Thailand
(c) Indonesia > Thailand > China > India
(d) None on these

28. Missing data are calculated by using
(a) Missing plot technique
(b) ANOVA
(c) Field plot technique
(d) None of these

29. Which soil has highest water use efficiency ?
(a) Sandy soil (b) Loamy soil
(c) Clay soil (d) None of these

30. Major cropping system of trans-gangatic plains is
(a) Rice - wheat
(b) Soybean - wheat
(c) Rice - rice
(d) Maize - wheat

○○○○○

ANSWERS

15. b 16. c 17. b 18. b 19. b 20. a 21. b 22. c 23. a 24. b
25. b 26. b 27. a 28. a 29. c 30. a

ICAR - JRF (General Agriculture) 201

1. Study of soil from the stand point of higher plant is known as :
(a) Edaphology (b) Geo physics
(c) Pedology (d) Physiology

2. The average concentration of carbon dioxide in the atmosphere is :
(a) 300 ppm (b) 30 ppm
(c) 0.3 ppm (d) 0.03 ppm

3. Plant that grow on extremely dry soil are classified under :
(a) Xerophytes (b) Hydroponics
(c) Thalophytes (d) Hydrophytes

4. Which food is designated as "Boneless meat" ?
(a) Potato (b) Banana
(c) Tapioca (d) Soybean

5. Pruning is most essential for :
(a) Rubber (b) Cauliflower
(c) Chinchona (d) Tea

6. Saffron is largely produced in :
(a) J & K
(b) Kerala
(c) Himachal Pradesh
(d) Uttarakhand

7. Agrostology is the study of :
(a) Flower (b) Fruit
(c) Root (d) Grasses

8. Atmospheric layer nearest to earth Surface is :
(a) Thermosphere (b) Biosphere
(c) Troposphere (d) Exosphere

9. Which of the following control th initiation, cell elongation and dominance :
(a) Ethylene (b) ABA
(c) Gibberellins (d) Auxins

10. The progeny of breeder seed is :
(a) Nucleus seed (b) True see
(c) Formation seed (d) Certifie

11. The basis of farm budgeting is :
(a) Farm planning
(b) Cost - benefit analysis
(c) Linear programming
(d) production function analysis

12. The largest tea production state in is :
(a) Kerala (b) Assam
(c) Tamil Nadu (d) Meghal

13. The plant nutrient which he translocation of sugars and starch
(a) Mo (b) Mg
(c) K (d) Na

14. Mycorrhiza is associated with wh of plants ?
(a) Stem (b) Fruits
(c) Roots (d) Leaf

15. The most Suited N fertilizer for t
(a) Urea
(b) Calcium nitrate
(c) Ammonium chloride
(d) Ammonium sulphate

ANSWERS

1. a 2. a 3. a 4. d 5. d 6. a 7. d 8. c 9. d 10. c
11. b 12. b 13. c 14. c 15. d

16. In India maximum area under wheat is occupied by the Species ?
(a) *Triticum durum*
(b) *Triticum aestivum*
(c) *Triticum vulgare*
(d) *Triticum dicoccum*

17. A market guided by rules and regulation is called :
(a) Seasonal market
(b) Terminal market
(c) Perfect market
(d) Regulated market

18. Which among the following colures absorbs more radiation ?
(a) Blue (b) Black
(c) White (d) Red

19. Absolute zero is :
(a) 273 ° K (b) 273 ° F
(c) - 273 ° C (d) 273 ° C

20. Impect of green house effect is :
(a) Sea formation
(b) Ice melting
(c) Global warming
(d) Sea level rise

21. Most widely cultivated mustard type in India is :
(a) Black mustard
(b) Yellow / brown sarson
(c) Toria
(d) Indian mustard

22. The C : N ratio of arable soil commonly ranges from :
(a) 18 : 1 to 19 : 1 (b) 8 : 1 to 15 : 1
(c) 6 : 1 to 7 : 1 (d) 3 : 1 to 4 : 1

23. C_4 plant normaly produce more biological yield than C_3 plant because of :
(a) More photorespiration
(b) Less photorespiration
(c) Less photophosphorylation
(d) More photophosphorylation

24. Which of the following elements is most mobile in soil ?
(a) Ca (b) K
(c) Mg (d) N

25. Magnesium is a constituent of :
(a) Cell wall
(b) Chlorophyll
(c) Nucleic Acid
(d) Enzyme system

26. Which of the following element immobile in soil but mobile in plants ?
(a) Zn (b) P
(c) S (d) B

27. The most deficient micro - nutrient in Indian soil is :
(a) Zn (b) B
(c) Cu (d) Mn

28. Ground water table is measured by :
(a) Pressure plate
(b) Neutron probe
(c) Tensiometer
(d) Piezometer

29. Dwarfing gene in wheat is :
(a) Nif - gene
(b) Dee - gee - woo - gen
(c) Proteina
(d) Norin

30. A crop that can supply oil for petrochemicals is :
(a) Neem
(b) Rubber
(c) Jatropha
(d) Macadamia

○○○○○

ANSWERS

16. b 17. d 18. b 19. a 20. c 21. d 22. b 23. b 24. d 25. b
26. b 27. a 28. d 29. d 30. c

ICAR - JRF (AGRONOMY) 2010

1. The solar radiation is measured by :
(a) Sextant (b) Pyrometer
(c) Pyrheliometer (d) Albedometer

2. Transformation of ammonia salts into nitrate is called as :
(a) Ammonification (b) Nitrification
(c) Nitrogenation (d) Mineralization

3. Plants that grows on extremely dry soils are placed under :
(a) Hydrophytes (b) Xerophytes
(c) Thalophytes (d) Hydroponics

4. Study of soil in relation to higher plants is called as :
(a) Geophysics (b) Pedology
(c) Edaphology (d) Physiology

5. The average concentration of CO_2 in the atmosphere is :
(a) 0.03 ppm (b) 0.3 ppm
(c) 30 ppm (d) 300 ppm

6. Capillary movement of water is complemented by :
(a) Root extension (b) Epinasty
(c) Stem elongation
(d) Leaf orientation

7. pF is a measure of :
(a) Soil aeration (b) Soil moisture
(c) Soil erosion (d) Soil temperature

8. *Chenopodium album* is the scientific name of
(a) Ankri (b) Bathua
(c) Field bind weed (d) Cajri

9. Which food is designated as "boneless meat" ?
(a) Potato (b) Banana
(c) Soybean (d) Tapioca

10. Homogeneity of experimental material is expected in :
(a) RBD (b) CRD
(c) Spilt plot design (d) LSD

11. Which of the following method involves analysis of plant tissue for nutrient management in Sugarcane ?
(a) STCR (b) DRIS
(c) Crop logging (d) Crop Lodging

12. Phosphorus availability to plants is the maximum in pH range of :
(a) 7.0 - 7.5 (b) 6.0 - 6.5
(c) 5.0 - 5.5 (d) 4.0 - 4.5

13. Herbicide related to substituted urea group is :
(a) 2,4 - D (b) Alachlor
(c) Atrazine (d) Isoproturon

14. Herbicide which can be applied before planting / sowing :
(a) Alachlor (b) Atrazine
(c) Fluchloralin (d) Glyphosate

15. Which is the contact, non - selective and zero persistant herbicide in the soil ?
(a) 2,4 - D (b) Bromacil
(c) Triazine (d) Paraquat

16. Grassy weed in barley field can be effectively controlled by :
(a) Isoproturon (b) Pendimethalin
(c) 2,4 - D (d) Both a & b

17. Loranthus is a parasitic weed of:
(a) Rice (b) Tobacco
(c) Mango (d) Wheat

18. The following is an example of a crop bound weed :
(a) Nut sedge (b) *Lantana*
(c) *Cuscuta* (d) *Eichornia*

ANSWERS

1. c 2. b 3. b 4. c 5. d 6. a 7. b 8. b 9. c 10. b
11. c 12. b 13. d 14. c 15. d 16. d 17. c 18. c

19. Distinguishing character for identification of *Phalaris minor* is :
(a) More tillering
(b) Light leaf color
(c) Basal node is pink upto 50 days
(d) Larger ligules than wheat

20. For a given data set, if the standard deviation is 3.56 and mean is 9, then what will be the coefficient of variation ?
(a) 2.53 % (b) 3.95 %
(c) 25.28 % (d) 39.55 %

21. The test of significance of differences between two means in small samples is calculated by :
(a) x^2 test (b) z - test
(c) t - test (d) F - test

22. The organic matter of soil is ordinarily obtained by multiplying the organic carbon content by :
(a) 1.72 (b) 1.82
(c) 1.52 (d) 1.62

23. In a fertilizer experiment, if 40 kg nitrogen/ ha has to be applied to the plot of 10 m^2 areas, how much quantity of urea is needed ?
(a) 178 g (b) 115 g
(c) 95 g (d) 86.5 g

24. When two variables change together in such ways that increase in one variable is accompanied by an increase in the other, the variable is said to be :
(a) Positively correlated
(b) Negatively correlated
(c) Interdependent
(d) Dependent

25. In a agronomical experiment, if the net plot size is 5.0 m × 4.0 m and the crop yield was recorded in kg, what is the conversion factor for t/ha ?
(a) 5.0 (b) 2.5
(c) 1.0 (d) 0.5

26. Sugar recovery from sugarcane is :
(a) 5 % (b) 10 %
(c) 20 % (d) 60 %

27. To design an experiment in latin sq... design (LSD) with 6 treatments, ... required number of replications is :
(a) 4 (b) 5
(c) 6 (d) 36

28. Area under shifting cultivation in India ... around :
(a) 5 mha (b) 7 mha
(c) 20 mha (d) 57 mha

29. The minimum and maximum temperat... for a crop on a given day are 13°C and ... °C, respectively. Calculate the grow... degree days (GDD) for the day if the ... temperature for the crop is 5 °C.
(a) 2.0 (b) 3.4
(c) 16.5 (d) 22

30. Groundnut crop is irrigated at IW/C ... ratio of 0.5 with 6 cm depth of irrigat... What would be the CPE at the time ... irrigation ?
(a) 12 cm (b) 10 cm
(c) 8 cm (d) 6 cm

31. The percent of lint in seed cotton is ...
(a) 10 % (b) 33 %
(c) 60 % (d) 80 %

32. A farmer is practicising soybean + ma... intercropping wherein one row of soy... is grown in between the maize rows ... normal population of maize crop ... maintained, the cropping index will be ...
(a) 150 % (b) 100 %
(c) 250 % (d) 200 %

33. Which of the following elements is ... mobile in soil ?
(a) Ca (b) N
(c) K (d) Mg

34. Dry farming is practiced in areas wi... annual rainfall is :
(a) < 750 mm (b) 750 - 1150 mm
(c) 1150 - 3000 mm (d) > 3000 mm

35. Commercially, pure urea does not contain biuret % more than :
(a) 0.5 % (b) 1.5 %
(c) 2.6 % (d) 4.0 %

ANSWERS

19. c 20. d 21. c 22. a 23. d 24. a 25. d 26. b 27. c 28. a
29. c 30. a 31. b 32. b 33. b 34. a 35. b

36. The percent water lost through transpiration in plants is :
(a) 20 % (b) 40 %
(c) 70 % (d) 90 %

37. Optimum temperature for warm season crop ranges between :
(a) 20 - 25 °C (b) 25 - 28 °C
(c) 30 - 38 °C (d) 38 - 45 °C

38. Temperature absolute zero is :
(a) 273 °K (b) 273 °F
(c) - 273 °C (d) 273 °C

39. The C : N ratio in the organic matter of the furrow slice (upper 15 cm top layer) of arable soils commonly ranges from :
(a) 3 : 1 to 4 : 1 (b) 6 : 1 to 7 : 1
(c) 8 : 1 to 15 : 1 (d) 18 : 1 to 19 : 1

40. Which of the following elements is not involved in the maintenance of charge balance in plants ?
(a) Calcium (b) Carbon
(c) Mg (d) K

41. The form in which potassium is absorbed by plants is :
(a) KOH (b) K_2O
(c) K^+ (d) K

42. The availability of soil nutrients to plants is drastically influenced by :
(a) Soil texture (b) Soil structure
(c) Soil pH (d) Organic matter

43. The essential element required by the N fixing bacterium *Rhizobium* is :
(a) Selenium (b) Zn
(c) Mo (d) Cobalt

44. The plant nutrient which helps in translocation of starch and sugar is :
(a) Na (b) Mo
(c) Mg (d) K

45. Which of the following is not an essential plant nutrient element ?
(a) Mo (b) Mn
(c) Al (d) Zn

46. Mycorrhiza is associated with which parts of plants ?
(a) Fruits (b) Leaf
(c) Roots (d) Stem

47. The element having a role in ionic osmotic balance, enzyme activation catalytic functions is :
(a) Boron (b) Carbon
(c) Oxygen (d) Potassium

48. The form in which sulfer is absorbe... plant is :
(a) HSO_4^{2-} (b) SO_3^{2-}
(c) SO_4^{2-} (d) S

49. Nutrient taken by plants in reduced ... are :
(a) Fe, B (b) Fe, K
(c) Fe, Mn (d) Fe, Mg

50. Concept "Essentiality of elements" ... proposed in 1939 by :
(a) Stout (b) Liebig
(c) Arnon (d) Arnon &

51. The most important growth limiting f... in acid soils, especially those having ... bellow 5.5 is :
(a) Al (b) K
(c) N (d) Ca

52. Under water logged conditions, w... nutrient is/ are found deficient for ... crops
(a) Zn (b) Fe
(c) Cu (d) Both a &

53. Potassium is responsible for transfe... starches and sugars and so its require... is high for :
(a) Maize (b) Banana
(c) Sweet potato (d) Potato

54. Deficiency of which of the follo... nutrient causes typical inter - ve... chlorosis ?
(a) N (b) S
(c) Ca (d) Fe

55. The fertilizer having the highest percen... of total plant nutrients is :
(a) Urea (b) DA...
(c) Sulphate of potash (d) TSI...

ANSWERS

36. d 37. c 38. a 39. c 40. b 41. c 42. c 43. c 44. d 45. c
46. c 47. d 48. c 49. c 50. d 51. a 52. d 53. d 54. d 55. b

56. Microorganism responsible for non-symbiotic nitrogen fixation in the soil is :
(a) Mycorrhiza (b) *Rhizobium*
(c) *Azotobacter* (d) *Nitrobacter*

57. Magnesium is a constituent of :
(a) Nucleic acid (b) Chlorophyll
(c) Cell wall
(d) Enzyme system

58. Which of the following element is immobile in the soil but mobile in the plant ?
(a) B (b) Zn
(c) S (d) Phosphorus

59. The most deficient micronutrient in the Indian soil is :
(a) Mn (b) B
(c) Zn (d) Cu

60. Symptoms of sulphur deficiency initially appear first on :
(a) Lower Leaves
(b) Middle leaves
(c) Upper leaves
(d) All Leaves

61. A - value technique (given by Fried and Dean) is related with :
(a) N (b) K
(c) Ca (d) P

62. Which of the following crop is the most sensitive from nutrient removal aspect ?
(a) Berseem (b) Gram
(c) Maize (d) Linseed

63. Which one is slow release N fertilizer ?
(a) AM (b) DCD
(c) N - Serve (d) IBDU

64. The nutrient needed for energy transformation is :
(a) K (b) Ca
(c) P (d) N

65. The components of biosuper is :
(a) Rock phosphate + P oxidizing bacteria
(b) Rock phosphate + Sulphur
(c) Rock phosphate + Sulphur + S oxidizing bacteria
(d) RP + Sulphur + P oxidizing bacteria

66. Nutrient essential for oil synthesis in plants is :
(a) Mn (b) S
(c) P (d) Mg

67. Which element can be absorbed both in anionic and cationic form ?
(a) P (b) N
(c) Ca (d) K

68. The major form in which phosphorus is absorbed by plant is :
(a) PO_4 (b) HPO_4
(c) H_2PO_4 (d) H_3PO_4

69. Excess use of phosphatic fertilizers may adversely effect the growth of plants by :
(a) Precipitating iron and aluminium
(b) Reducing the availability of calcium
(c) Reducing the availability of zinc
(d) Inhibiting the growth of micro-organism

70. Nitrogenous fertilizer can be top dressed in the cotton crop up to :
(a) Boll bursting
(b) Square formation
(c) Vegetative stage
(d) First flowering

71. An industrial product prepared from tobacco is :
(a) Nicotine chloride
(b) Nicotine sulphate
(c) Nicotine nitrate
(d) Nicotine permangnate

72. The most suited N fertilizer for the tea crop is :
(a) Urea
(b) Ammonium chloride
(c) Ammonium sulphate
(d) Calcium nitrate

73. Most ideal P fertilizer for long duration crops and strongly acidic soils is:
(a) SSP (b) MAP
(c) Rock phosphate
(d) Ammonium phosphate

ANSWERS

56. c	57. b	58. d	59. c	60. c	61. d	62. d	63. d	64. c	65. c	
66. b	67. b	68. c	69. c	70. d	71. b	72. c	73. c			

74. Which fertilizer has nitrogen in amide form ?
(a) Urea
(b) Ammonium nitrate
(c) CAN
(d) Anhydrous ammonium

75. The soil texture denotes :
(a) Flexible nature of the soil
(b) Arrangement of soil particle
(c) Arrangement of soil in a soil profile
(d) Size of the soil mineral particles

76. Saffron (*Crocus sativus*) is largely produced in :
(a) J & K (b) Kerala
(c) Uttarakhand (d) H. P.

77. Atmospheric layer near to the earth surface is :
(a) Biosphere (b) Troposphere
(c) Stratosphere (d) Exosphere

78. If a farmer wants to give one irrigation to wheat crop then at what stage he should give this one irrigation ?
(a) CRI Stage (b) Late tillering
(c) Late jointing (d) Flowering

79. Which of the following controls the apical dominance, root initiation and cell elongation etc. ?
(a) Ethylene (b) ABA
(c) Auxin (d) Gibbrellins

80. Which one has helped in the success of "Zero tillage"?
(a) Herbicides (b) Fungicides
(c) Fertilizers
(d) Soil amendments

81. Frost damage in crop is due to :
(a) Desiccation
(b) Water stagnation
(c) Water freezing in the plants
(d) Cell breakup because of water expansion

82. Agrostology is the study of :
(a) Grasses (b) Animals
(c) Flowers (d) Roots

83. Pruning is most needed for :
(a) Tea (b) Cauliflower
(c) Cinchona (d) Rubber

84. A short duration crop between two main crop is referred as :
(a) Inter crop (b) Catch crop
(c) Cash crop (d) Companion crop

85. Largest *Rabi* maize producing state is :
(a) H. P. (b) U. P.
(c) Bihar (d) Uttarakhand

86. The state having maximum groundnut production :
(a) Tamil nadu (b) Andhra Pradesh
(c) Karnataka (d) Gujarat

87. The *Rhizobium* sp. specific to the nitrogen fixation in *Glycine max.* is :
(a) *R. trifoli* (b) *R. meliloti*
(c) *R. phaseoli* (d) *R. japonicum*

88. A cloud that occurs in low height in the atmosphere is grouped into :
(a) Stratus (b) Cumulus
(c) Cumulo - nimbus (d) Nimbus

89. The progeny of breeder seed is :
(a) True seed (b) Certified seed
(c) Foundation seed (d) Nucleus seed

90. The end product of organic matter decomposition is :
(a) Lignin (b) Fulvic acid
(c) Humus (d) Humic acid

91. The largest tea producing state in India is :
(a) Kerala (b) Assam
(c) Meghalaya (d) Tamil Nadu

92. The basis of farm budgeting is :
(a) Cost benefit analysis
(b) Farm planning
(c) Production function analysis
(d) Linear programming

93. In India maximum area under wheat is occupied by which species ?
(a) *Triticum vulgare*
(b) *Triticum aestivum*
(c) *Triticum durum*
(d) *Triticum dicoccum*

ANSWERS

74. a	75. d	76. a	77. b	78. a	79. c	80. a	81. d	82. a	83. a	
84. b	85. c	86. d	87. d	88. a	89. c	90. c	91. b	92. a	93. b	

94. Which of the following is fibre cum oilseed crop ?
(a) Sunhemp (b) Jute
(c) Linseed (d) Sisal

95. The prime oilseed crop grown in India is:
(a) Groundnut (b) Sesame
(c) Musturd (d) Linseed

96. Which among the following colours absorbs more radiation ?
(a) Red (b) Black
(c) Blue (d) White

97. Green House effect causes :
(a) Ice formation (b) Ice melting
(c) Sea level rise
(d) Global warming

98. The term harvest index was developed by :
(a) Blackman (b) Watson
(c) Gregory (d) Donald

99. Rice yield are higher during dry season mainly due to higher :
(a) Wind (b) RH
(c) Temperature (d) Solar radiation

100. The most widely cultivated mustard type in India is :
(a) Indian mustard (b) Black mustard
(c) Brown sarson (d) Toria

101. Basic requirement of zero tillage is :
(a) Row surface is cleared of mulch
(b) Weed management by herbicides
(c) Seed placed in proper depth with good germination
(d) All of these

102. C_4 plants normally give more biological yield than C_3 plants because of :
(a) Less respiration
(b) More photosynthesis
(c) Less photophosphorylation
(d) More photophosphorylation

103. Commonly followed soil particle classified in India is :
(a) Indian society of soil science
(b) British Standard Institute
(c) International Society of Soil Science
(d) USDA

104. The light intensity at which maximum rate of photosynthesis is obtained is described as :
(a) High light density
(b) Low light intensity
(c) Light saturation point
(d) Light compensation point

105. Which of the following have least albedo ?
(a) Grey soil
(b) Moist black soil
(c) Moist ploughed soil
(d) Dry black soil

106. Which portion of sugarcane stalk should normally be utilized for seed sowing ?
(a) Top $1/4^{th}$ portion
(b) Top $1/3^{rd}$ portion
(c) Bottom $1/4^{th}$ portion
(d) Bottom $1/3^{rd}$ to ½ portion

107. The practice of flushing out germinable weed seeds before crop sowing is called :
(a) Weed eradication
(b) Soil Solarization
(c) Stale seed bed
(d) Weed preservation

108. The brix value in sugarcane juice gives an estimate of :
(a) Sucrose
(b) Reducing sugars
(c) Impurities
(d) Total soluble solids

109. Defuzzing of seed before sowing is done in :
(a) Tomato (b) Gram
(c) Cotton (d) Potato

ANSWERS

94. c 95. a 96. b 97. d 98. d 99. d 100. a 101. d 102. a 103. d
104. c 105. b 106. b 107. c 108. d 109. c

110. Ground water table is measured by :
(a) Peizometer (b) Tensiometer
(c) Pressure plate (d) Odometer

111. The maximum pore spaces are found in :
(a) Sandy loam soil (b) Loamy soil
(c) Clayey soil (d) Sandy soil

112. Which plant have C_4 pathway of photosynthesis ?
(a) Wheat (b) Maize
(c) Oat (d) Rice

113. Most dominant enzyme in photosynthesis in C_3 plants is :
(a) PEPCO (b) Dehydrogenase
(c) RUBISCO (d) Nitrogenase

114. Which one is a petrochemical crop ?
(a) Neem (b) *Jatropha*
(c) Rubber (d) *Albizzia*

115. The individual crop which is a part of a cropping system are called as :
(a) Mixed crop
(b) Component crop
(c) Intercrops (d) Alley crops

116. Which one is non-conventional oilseed crop ?
(a) Sunflower (b) Gingelly
(c) Safflower (d) Groundnut

117. Tuber crop are rich in
(a) Minerals (b) Vitamins
(c) Starch (d) Proteins

118. Repetitive growing of same crop over several years is called
(a) Single cropping (b) Pure cropping
(c) Sole cropping (d) Monoculture

119. Dwarfing gene in wheat is :
(a) Proteina (b) Nif - gene
(c) Dee - gee - woo - gen
(d) Norin

120. The compound that makes linseed oil non - edible is :
(a) HCN (b) Coumarin
(c) Gossipol (d) Linamarin

121. An example of pressurized irrigation method is :
(a) Flood (b) Sprinkler
(c) Border strip (d) Check basi

122. Organic fences are raised by :
(a) Brick walls (b) Iron wires
(c) Electric fencing (d) Castor pla

123. Zn is supplied to the rice crop as ba dose in the form of :
(a) Zinc bromide (b) Zinc sulph
(c) Zinc metal (d) Zinc chlori

124. Collection and storage of water subsequent use in dry period is calle
(a) Water logging
(b) Water harvesting
(c) Water shed (d) Crop logg

125. Continuous variation in atmosphe pressure is recorded by :
(a) Thermograph (b) Barograph
(c) Thermometer (d) Hydrograp

126. The major process by which plants m their phosphorus and k requirement ?
(a) Diffusion (b) Mass flow
(c) Contact exchange
(d) Root interception

127. The product formed after dehydration green plant material so as to decrease moisture content to 15% or less is kno as :
(a) Kutti (b) Bhusa
(c) Hay (d) Silage

128. When the following material is applied availability in the soil is decreased.
(a) Basic slag (b) Lime
(c) FYM (d) Gypsum

129. The studies of plants in relation to soil climate is called :
(a) Agronomy (b) Agriculture
(c) Crop Production (d) Climatolog

130. Available moisture lies in between fi capacity (1/3 bar) and
(a) Evaporation (b) Consumptive
(c) PWP
(d) Field water balance

ANSWERS

110. a 111. c 112. b 113. c 114. b 115. b 116. a 117. c
118. d 119. d 120. d 121. b 122. d 123. b 124. b 125. b 126. a 127. c
128. b 129. d 130. c

131. A market guided by rules and regulations is called :
(a) Seasonal market
(b) Regulated market
(c) Terminal market
(d) Perfect market

132. In legumes, red colour of root nodules is attributed to the presence of :
(a) Urease (b) Nitrogenase
(c) Haemoglobin (d) Leghaemoglobin

133. Sugarcane zone producing highest sugar recovery is :
(a) North zone (b) Coastal zone
(c) East zone (d) Central zone

134. A soil having pH 8.0, EC = 12 dS/m and SAR = 3.0, will be categorized as :
(a) Sodic soil (b) Normal soil
(c) Saline soil
(d) Saline - alkaline soil

135. General practice of cropping under dry land farming areas of arid and semi arid regions of India is reffered as :
(a) Relay cropping
(b) Inter cropping
(c) Alternate cropping
(d) Multiple cropping

136. Crop raised to protect the main crop from adverse impact of nature and also to provide support to the crop is called:
(a) Nurse crop (b) Trap crop
(c) Cover crop (d) Intercrop

137. The most common method of irrigation in India is :
(a) Sprinkler (b) Furrow
(c) Border strip (d) Check basin

138. The ratio between crop ET and Pan ET, where the crop is raised on a large scale under optimum growing condition is called :
(a) CU
(b) Crop coefficient
(c) Critical value
(d) Crop efficiency

139. By making use of non-commercial portion of the crop for the protection or soil improvement activities is called as :
(a) Crop production technology
(b) Crop technology
(c) Crop residue management
(d) Crop lodging

140. A green manure- cum fiber cum minor fodder crop is :
(a) Mesta
(b) Sisal
(c) Linseed
(d) Sunhemp

141. Growing of five different crops with different canopy levels in a coconut based FS is called :
(a) Mixed cropping
(b) Mixed farming
(c) Multiplestoried cropping
(d) Homestead farming

142. Match Set I (Term) with Set II (Plants)

Term		Plants
(i) Heliophytes	(A)	Grown in extreme dry condition
(ii) Hydrophytes	(B)	Plants tolerant to saline condition
(iii) Halophytes	(C)	Sun loving plants
(iv) Sciophytes	(D)	Water loving plants
(v) Xerophytes	(E)	Shade loving plants

143. Match Set I (Nutrient) with Set II (Main function).

Nutrient		Main function
(i) Carbon	(A)	Nitrogen fixation
(ii) Nitrogen	(B)	Basic structural function
(iii) Phosphorus	(C)	Electron carrier
(iv) Copper	(D)	Energy transfer
(v) Molybdenum	(E)	Vegetative growth

ANSWERS
131. b 132. d 133. d 134. c 135. b 136. a 137. d 138. b 139. c 140. d
141. c 142. i - C; ii - D; iii - B; iv - E; v - A 143. i - B; ii - E; iii - D; iv - C; v - A

144. Match Set I (Institutes) with Set II (location)

National Institute		Location
(i) SBI	(A)	Coimbatore
(ii) IASRI	(B)	New Delhi
(iii) CSWRI	(C)	Avikanagar
(iv) CIMAP	(D)	Lucknow
(v) CFTRI	(E)	Mysore

145. Match Set I (Cultural activities) with Set II (Purpose)

Cultural / Tillage activities		Main purpose
(i) Silaging	(A)	Destruction of soil structure
(ii) Interculture	(B)	Covering soil surface
(iii) Mulching	(C)	Weed control
(iv) Puddling	(D)	Preservation for later use
(v) Topping and suckering	(E)	Improve size, body andquality

146. Match the Set I (crop) with Set II (critical stage for irrigation)

Crop		Critical stage for irrigation
(i) Chickpea	(A)	Flower initiation, pod filling
(ii) Maize	(B)	Silking, cob development
(iii) Sugarcane	(C)	Pegging to pod formation
(iv) Groundnut	(D)	Preflowering, flowering
(v) Pigeon pea	(E)	Emergence, tiller formation and stem elongation

147. Match Set I (Growth regulator) with Set II (Uses)

Growth regulator		Uses
(i) Cotton defoliant	(A)	ABA
(ii) Plant cell enlarger	(B)	IAA, IBA
(iii) Dormancy breaker	(C)	Kinetin
(iv) Sucker control in tobacco	(D)	Maleic hydrazide
(v) Dwarfing in wheat, reduced growth in cotton	(E)	Cycocel

148. Match Set I (Weed names) with Set II (Botanical names)

Weeds		Botanical names
(i) Puncture vine	(A)	*Tribulus terrestris*
(ii) Loranthus	(B)	*Dendrophthoe falcate*
(iii) Corn grass cockle	(C)	*Agrostemma githago*
(iv) Bind weed	(D)	*Convolvulus arvensis*
(v) Johnson grass	(E)	*Sorghum halepense*

149. Match Set I (Fertilizer) with Set II (N content)

Fertilizer		N content (%)
(i) CAN	(A)	21
(ii) Anhydrous ammonia	(B)	82
(iii) Urea	(C)	25
(iv) Ammonium sulphate	(D)	46
(v) Ammonium nitrate	(E)	33

150. Match the Set I (Herbicide) with Set II (Chemical group)

Herbicide		Chemical group
(i) Nitrofen	(A)	Dipheryl ether
(ii) Isoproturon	(B)	Urea
(iii) Propham	(C)	Benzoic acid
(iv) Pendimethelin	(D)	Dinitroanalin
(v) Chloramben	(E)	Phenyl carbamates

151. Match the Set I (Crop) with Set II (Uses)

Crop		Uses
(i) Tea	(A)	Beverage crop
(ii) Cardamom	(B)	Spice crop
(iii) Berseem	(C)	Fodder crop
(iv) Vetiver	(D)	Cover crop
(v) Calapagonium	(E)	Essential oil crop

OOOOO

ANSWERS
144. i - A; ii - B; iii - C; iv - D; v - E 145. i - D; ii - C; iii - B; iv - A; v - E
146. i - A; ii - B; iii - E; iv - C; v - D 147. i - A; ii - B; iii - C; iv - D; v - E 148. i - A; ii - B; iii - C; iv - D; v - E
149. i - C; ii - B; iii - D; iv - A; v - E 150. i - A; ii - B; iii - C; iv - D; v - E 151. i - A; ii - B; iii - C; iv - D; v - E

Assistant Director Agriculture
(MPSC, Indore)

Exam Held on 20.12.2009

1. Total number of principles of farm management is :
(a) 4 (b) 7
(c) 5 (d) 8

2. De - greening of banana is done by :
(a) Auxin (b) Cytokinin
(c) Gibberellin (d) Ethylene

3. JNKVV was established in the year :
(a) 1962 (b) 1964
(c) 1968 (c) 1966

4. Thorn - less species of citrus is :
(a) Grape fruit (b) Citron
(c) Pummelo (d) Tahiti lime

5. Bunchy top of banana disease entered in India from which of the following countries ?
(a) America (b) Sri - Lanka
(c) England (d) Holland

6. Physiological basis of life is :
(a) Water (b) Cell
(c) Protoplasm (d) Nucleus

7. Which of the following has maximum productivity of fruits ?
(a) Madhya Pradesh
(b) Maharashtra
(c) Uttar Pradesh
(d) Tamil Nadu

8. Paras is a variety of :
(a) Ber (b) Fig
(c) Jamun (d) Bael

9. Pomology is derived from :
(a) Latin word (b) Greek word
(c) Italic word (d) German word

10. Five inbred lines will lead to how many single crosses ?
(a) 5 (b) 10
(c) 15 (d) 20

11. Common form of DNA present in living organism is :
(a) A form (b) B form
(c) C form (d) D form

12. Vybrids are :
(a) Equivalent to hybrids
(b) Hybrids propagated by clones
(c) Apomictic hybrids
(d) Cybrids

13. Growth regulator isolated from "yam" is
(a) Tricontanol (b) Brassisin
(c) Batasin
(d) Lunularic acid

14. Oil content in soybean is:
(a) 20 % (b) 30 %
(c) 35 % (d) 40 %

15. Leafless variety of Pea is :
(a) Bonnvilla (b) T - 163
(c) L - 116 (d) Aparna

16. Extension teaching method is focused to :
(a) Subject Matter Specialist
(b) Learner
(c) Subject
(d) None of these

ANSWERS

1. b 2. d 3. b 4. d 5. b 6. c 7. d 8. c 9. b 10. b
11. b 12. c 13. c 14. a 15. d 16. b

17. National Agriculture Insurance Scheme started in :
(a) 1998
(b) 1999
(c) 1996
(d) 1997

18. Levy price applies to :
(a) Farmers
(b) Consumers
(c) Middle men
(d) Traders

19. I.P.S. - 147 - 1 variety grown in Madhya Pradesh is of :
(a) Kodo
(b) Sawan
(c) Ragi
(d) Kutki

20. S.R.I. technique of paddy has been evolved at :
(a) Japan
(b) Korea
(c) Madagascar
(d) China

21. First Irrigation Commission in India was formed in the year :
(a) 1899
(b) 1901
(c) 1904
(d) 1905

22. Khaira disease of paddy is caused due to:
(a) Boron deficiency
(b) Nitrogen deficiency
(c) Copper deficiency
(d) Zinc deficiency

23. Which of the following two crops are responsible for 75 % production of pulses in India ?
(a) Gram and Mung
(b) Gram and Pea
(c) Gram and Arhar
(d) Arhar and Pea

24. Seed rate of Niger is :
(a) 2 - 5 kg / ha
(b) 5 - 8 kg/ha
(c) 8 - 12 kg/ha
(d) 12 - 15 kg/ha

25. Which is neem originated toxicant ?
(a) Meliantriol
(b) Karanjin
(c) Acorin
(d) Anonaine

26. How many Agro - Climatic Zones are Madhya Pradesh ?
(a) 15 (b) 11
(c) 12 (d) 5

27. Which of the following is not a flower hormone ?
(a) Florigen
(b) Phosphon D
(c) Anthesin
(d) Vernalin

28. Lasso is other name of which herbicid
(a) Alachlor
(b) Butachlor
(c) Simazine
(d) Atrazine

29. Which of the following bacteria is aero and non - symbiotic ?
(a) *Azospirillum*
(b) *Azotobactor*
(c) *Rhizobium*
(d) *Clostridium*

30. Temperature of cold waves is less fr normal by how many degrees ?
(a) 6 - 8 °C
(b) 8 - 10 °C
(c) 10 - 12 °C
(d) 12 - 14 °C

ANSWERS

17. b 18. d 19. a 20. c 21. b 22. d 23. c 24. b 25. a 26. b
27. c 28. a 29. b 30. a

31. How many elements are found essential for plant growth ?
(a) 15 (b) 16
(c) 17 (d) 21

32. In bacteria, complete oxidation of one mole glucose releases :
(a) 34 ATP (b) 36 ATP
(c) 38 ATP (d) 40 ATP

33. Which of the following is not a "C4" plant ?
(a) Maize
(b) Cyprus
(c) Amaranthus
(d) Barley

34. Length of Gunter chain is :
(a) 66 ft. (b) 77 ft.
(c) 88 ft. (d) 100 ft.

35. "Bipolaris", a mycoherbicide, is used against which weed ?
(a) *Sorghum halepanse*
(b) *Phalaris minor*
(c) *Opuntia*
(d) *Lantana*

36. Self - incompatibility is helpful for the development of :
(a) Synthetic variety
(b) Hybrid variety
(c) Pure Line variety
(d) Composite variety

37. Land Equivalent Ratio (LER) is used to evaluate :
(a) Land value
(b) Intercropping
(c) Soil Fertility
(d) All of these

38. Heat transfer in soil mainly occurs through :
(a) Conduction
(b) Radiation
(c) Convection
(d) None of these

39. Which of the following is not a Zn deficiency ?
(a) Khaira disease of rice
(b) Frenching of citrus
(c) Die back of citrus
(d) White tip of maize

40. NAIP was started on :
(a) May, 2006
(b) July, 2006
(c) Sept., 2006
(d) Dec., 2006

41. For one talk, how many flash cards should be used ?
(a) 10 - 12 (b) 12 - 14
(c) 14 - 18 (d) 20 - 22

42. National Institute of Agricultural Marketing is located at :
(a) Delhi
(b) Mumbai
(c) Bhopal
(d) Jaipur

43. For planting of Napier grass how many root slips are required ?
(a) 27,800 (b) 37,800
(c) 47,800 (d) 57,800

44. Power tiller manufacturing in India was started with the collaboration of which country ?
(a) America
(b) Russia
(c) China
(d) Japan

45. Tuber crop which is rich in protein is :
(a) Potato
(b) Sweet potato
(c) Colocasia
(d) Yam

ANSWERS
31. c 32. c 33. d 34. a 35. a 36. c 37. b 38. a 39. c 40. b
41. a 42. d 43. a 44. d 45. c

46. Bio - super is made of :
(a) Rock phosphate and Zinc powder
(b) Rock phosphate and Sulphur
(c) Organic manure and Superphosphate
(d) Organic manure and Vermicompost

47. Which of the following is the example of companion cropping ?
(a) Sugarcane + Potato
(b) Potato + Mustard
(c) Potato + Radish
(d) Wheat + Mustard

48. In India, mechanization Index is highest for which crop ?
(a) Paddy
(b) Wheat
(c) Maize
(d) Sugarcane

49. "Pusa Bedana" a variety of watermelon is a cross of :
(a) Pusa Rasal × Tetra - 2
(b) Tetra - 2 × Pusa Rasal
(c) M.S.1 × Hara Madhu
(d) Hara Madhu × M.S.1

50. "Pant Uphar" is a variety of :
(a) Okra (b) Soybean
(c) Tomato (d) Pea

51. Which onion variety is suitable for Kharif season ?
(a) Akra Kaiyan
(b) Akra Niketan
(c) Nasik Red
(d) Early Grano

52. Which temperature is found better for colour development in carrot ?
(a) 12 - 15 °C
(b) 20 - 22 °C
(c) 15 - 18 °C
(d) 8 - 12 °C

53. Kinnow is basically a :
(a) Tangerin (b) Tangor
(c) Mandarin (d) Citrange

54. Vegetable rich in Vitamin "C" is :
(a) Tomato
(b) Cabbage
(c) Beet root
(d) Shimla Capsicum

55. Gynomonoeciouc flowers are found in:
(a) Watermelon
(b) Muskmelon
(c) Ridgegourd
(d) Cucumber

56. Per hectare seed rate of knol-khol is :
(a) 1.0 - 1.5 kg
(b) 400 - 500 gm
(c) 2 - 3 kg
(d) 800 - 900 gm

57. Which of the following is used as a recurrent parent in the development of "Sindhu" variety of mango ?
(a) Ratna
(b) Alphanso
(c) Neelam
(d) Dashehari

58. Which of the following agriculture climatic region is found in Madhya Pradesh ?
(a) Western plateau and Hill zone
(b) Sothern plateau and Hills zone
(c) Transgangetic plain zone
(d) Lower gangetic plain zone

59. Which type of paddy is harvested in the month of April - May ?
(a) Aus
(b) Aman
(c) Bora
(d) None of these

ANSWERS
46. b 47. a 48. b 49. b 50. d 51. a 52. c 53. c 54. d 55. d
56. a 57. a 58. a 59. c

60. Welfare definition of Economics was given by :
(a) Adam Smith
(b) Alfred Marshal
(c) Robbins
(d) Keynes

61. Sugarcane growers of a region sell their whole produce to a single sugar factory. Such situation is :
(a) Monopsomy
(b) Monopolistic
(c) Monopoly
(d) Oligopoly

62. Which of the following is not correct about Isoquant curve ?
(a) It is used in factor-factor relationship
(b) They are not intersecting
(c) Concave to origin
(d) Placed above the another represent higher input

63. Which of the following is not a type of farming ?
(a) Specialized farming
(b) Collective farming
(c) Diversified farming
(d) Ranching farming

64. "Profit maximization" is the objective of which farming system ?
(a) Peasant farming
(b) Capitalistic farming
(c) State farming
(d) Cooperative farming

65. Peat soils are :
(a) Acidic
(b) Saline
(c) Alkaline
(d) Saline - Alkaline

66. Gypsum Equivalent in iron sulphate is :
(a) 1.24 (b) 1.78
(c) 1.62 (d) 0.77

67. Which local soil of Madhya Pradesh resembles "Vertisols" ?
(a) Bhata
(b) Matasi
(c) Dorsa
(d) Kanhar

68. "Sekeletal" soil of Madhya Pradesh belongs to order :
(a) Entisols (b) Alfisols
(c) Vertisol (d) Inceptisol

69. Ammonium Sulphate is :
(a) Straight fertilizer
(b) Binary fertilizer
(c) Ternary fertilizer
(d) Mixed fertilizer

70. Which of the following is not a sedimentary rock ?
(a) Limestone (b) Dolomite
(c) Shale (d) Marble

71. pF value (4.18) indicates :
(a) Field capacity
(b) Wilting point
(c) Hygroscopic water
(d) Capillary water

72. Watershed is area of :
(a) Biological system
(b) Physical system
(c) Social system
(d) All of these

73. Round table discussion is called :
(a) Symposium (b) Forum
(c) Panel (d) Workshop

74. Wind speed is measured by :
(a) Anemometer
(b) Hydrometer
(c) Tensiometer
(d) None of these

ANSWERS
60. b 61. a 62. c 63. b 64. b 65. a 66. c 67. d 68. a 69. a
70. d 71. b 72. d 73. c 74. a

75. Dose of N.P.V. is :
(a) 1000 L.E.
(b) 750 L.E.
(c) 500 L.E.
(d) 250 L.E.

76. Bushening operation is performed in :
(a) Wheat
(b) Rice
(c) Maize
(d) Pearl millet

77. Regional laboratory of T. F. R. I. is located at :
(a) Bhopal (b) Jabalpur
(c) Indore (d) Rewa

78. Which state has maximum area under sprinkler system ?
(a) Madhya Pradesh
(b) Uttar Pradesh
(c) Maharashtra
(d) West Bengal

79. First K.V.K. of India was established at :
(a) Nagpur
(b) Nagaur
(c) Madras
(d) Pondicherry

80. Contribution of Central Govt. in the capital share of Regional Rural Bank is :
(a) 50% (b) 35%
(c) 15% (d) 25%

81. Jassid is a vector responsible for which disease of paddy ?
(a) Blast
(b) Tungro
(c) Brown spot
(d) Bacterial blight

82. Optimum temperature for soil microorganism is :
(a) 25 °C (b) 30 °C
(c) 35 °C (d) 40 °C

83. A farmer having 2.0 hectare of land w be grouped under :
(a) Small
(b) Medium
(c) Semi - medium
(d) Large

84. Madhya Pradesh Rajya Bhandar G Nigam was established in the year :
(a) 1958 (b) 1948
(c) 1960 (d) 1970

85. Botanical name of "Harra" is :
(a) *Terminalia bellirica*
(b) *Terminalia indica*
(c) *Terminalia chebula*
(d) *Terminalia arjuna*

86. National Research Centre on Sapota located at :
(a) Madhya Pradesh
(b) Uttar Pradesh
(c) H.P.
(d) Uttarakhand

87. National Demonstration is the exam of :
(a) Demonstration
(b) Method demonstration
(c) Composite Demonstration
(d) Result Demonstration

88. Rate of urea spray to regulate Am Bahar Crop of "Allahbad Safeda" gu is :
(a) 5 - 6 % (b) 7 - 8 %
(c) 10 - 11 % (d) 12 - 14 %

89. Essentiality of which element w established by "Arnon and" Stout" ?
(a) Nitrogen
(b) Magnesium
(c) Chlorine
(d) Molybdenum

ANSWERS
75. d 76. b 77. b 78. a 79. d 80. a 81. b 82. c 83. a 84. a
85. c 86. ** 87. c 88. c 89. d

90. For calculating the value of phosphorus, P_2O_5 is multiplied by :
(a) 3.2
(b) 4.4
(c) 0.44
(d) 0.83

91. Study of fruits is known as :
(a) Pomology
(b) Floriculture
(c) Botany
(d) Horticulture

92. "Silver fish" is studied under :
(a) Pisciculture
(b) Silviculture
(c) Entomology
(d) Pathology

93. Average particle density of soil is :
(a) 1.6 mg/m^3
(b) 2.6 Mg/m^3
(c) 2.6 g/m^3
(d) 1.6 g/m^3

94. Among the following which one is not a Bio-pesticide ?
(a) Bioneem
(b) Bio - lap
(c) Elear
(d) Carbaryl

95. Balram yojana is related to :
(a) Soil Management
(b) Water Management
(c) Afforestation
(d) Crop Management

96. When new variety is recommended, then :
(a) Partial budget should be prepared
(b) Complete budget should be prepared
(c) No need to prepare budget
(d) Only planning is required

97. Ratio of wheat and mustard in intercropping system is :
(a) 9 : 1
(b) 8 : 1
(c) 9 : 2
(d) 8 : 2

98. "Amrapali" is the cultivar of :
(a) Guava
(b) Mango
(c) Apple
(d) Mandarin (Orange)

99. Cottonseed in cotton is :
(a) 65 - 70 %
(b) 75 - 80 %
(c) 50 - 60 %
(d) 80 - 90 %

100. "Ufra disease" mainly occurs in which crop ?
(a) Wheat
(b) Paddy
(c) Maize
(d) Barley

○○○○○

ANSWERS

90. c 91. a 92. c 93. b 94. d 95. b 96. a 97. a 98. b 99. a 100. b

Explanations of some questions (ADA 2009)

1. (d) Ethylene also available as CEPA (Chloroethylene phosphatic acid) and ethephon.
4. (d) Thornless species of citrus is Tahiti lime (*Citrus aurantifolia*).
5. (b) Bunchy top of banana disease entered in India from Sri Lanka in 1950.
6. (d) The maximum productivity of fruits during 2008-09 was in Tamil Nadu (25.78 t/ha) followed by MP (25.68 t/ha), UP (12.82 t/ha) and Maharashtra (7.6 t/ha).
7. (b) Single crosses can be calculated by the formula n(n-1)/2, where n stand for number of inbred lines.
8. (c) Vybrids is apomictic hybrids and cybrids is somatic hybrids.
9. (c) SRI technique was develcped at Madagascar in 1983 and require just 5 kg seed for one ha trans-planting.
10. (b) MP is divided into 11 ACZ and Undivided (Before 2000) MP have 12 ACZ.
11. (c) Self - compatibility and self incompatibility is helpful in development of pure lines and hybrids, respectively.
12. (a) Heat transfer in soil mainly occurs through conduction, whereas in liquids by convection and in gases by radiation.
13. (d) NIAM established in 1988 as an autonomous institute under Ministry of Agriculture, GOI.
14. (d) Power tiller manufacturing in India was Started with collaboration of Japan in 1960.
15. (b) Biosuper is made of Rock phosphate, Sulphur and Sulphur oxidizing bacteria.
16. (b) Welfare definition was given by Alfred Marshal, wealth by Adam Smith and Behavioral by Robbins.
17. (a) Monopsony : Buyer one and sellers are more; Monopoly: Seller one and buyers are more.
18. (c) Isoquant curve is convex to origin not concave to origin.
19. (b) Collective farming is a system of farming like commune farming, contract farming, cooperative and state farming based on management not on climatic and soil conditions.
20. (a) Skeletal soil are formed by physical process like water and wind action eg. Alluvial soils and desert soils.
21. (a) On the basis of ownership, holding grouped into small (< 4.0 ha land), Medium (4.0 to 10.0 ha land) and Large (> 10.0 ha of land), whereas on the basis of operational holding , farmers grouped into Marginal (< 1.0 ha land), Small (1-2 ha land), Semi-medium (2 - 4 ha land), Medium (4 - 10 ha land) and Large (> 10 ha land).
22. (c) Composite demonstration composed of Result and method demonstration.
23. (c) Allahabad Safeda requires 10 - 11 % spray of urea to regulate Ambey Bahar, whereas L - 49 requires 20 % of solution for the same.

○○○○○

ICAR - JRF (Plant Sciences) 2010

1. Breeding method followed to rectify specific defects in a popular cultivar
   (a) Pedigree method
   (b) Bulk method
   (c) Single seed descent method
   (d) Back cross method

2. In a triplet code, three RNA bases code for
   (a) One amino acid
   (b) Two amino acids
   (c) Three amino acids
   (d) Many amino acids

3. In castor bean, the aril which is associated with micropyle is
   (a) Hilum (b) Placenta
   (c) Peduncle (d) Caruncle

4. Seed replacement rate for hybrids is
   (a) 40 % (b) 100 %
   (c) 75 % (d) 50 %

5. Protected areas of great genetic diversity under natural conditions are called
   (a) Gene pool
   (b) Gene sanctuaries
   (c) Gene junction
   (d) None of these

6. The process of transfer of genetic material from one bacterium to another bacterium through a virus is known as
   (a) Lysogeny
   (b) Transformation
   (c) Transduction
   (d) Conjugation

7. Use of wild strain for protection of plant against a mild strain of the same virus is called
   (a) Crop rotation
   (b) Cross protection
   (c) Roughing
   (d) None of these

8. Little leaf of brinjal is caused by
   (a) Mycoplasma (b) Virus
   (c) Viroid (d) Bacteria

9. The Bengal famine was caused by
   (a) *Helminthosporium oryzae*
   (b) *Phytophthora infestans*
   (c) *Albugo candida*
   (d) *Alternaria*

10. In most leguminous plants, atmospheric nitrogen is converted to ammonia by the enzyme
    (a) Nitrite reductase
    (b) Nitrate reductase
    (c) Nitrogenase
    (d) Ammoniase

11. The 'Golden rice" has been engineered for improved content of
    (a) Calcium (b) Chlorophyll
    (c) Iron (d) Vitamin A

12. The dwarf varieties brought from Mexico into India were
    (a) Sonalika
    (b) Sharbati sonara
    (c) Sonora 64 and Lerma Rojo
    (d) Sonora 64 and Sonalika

ANSWERS

1. d 2. a 3. d 4. b 5. b 6. c 7. b 8. a 9. a 10. c
11. d 12. c

13. When a light break is given during a long dark period, it promotes flowering in
    (a) Short day plants
    (b) Long day plants
    (c) Day neutral plants
    (d) None of these

14. The plant growth regulator that retards senescence is
    (a) Cytokinin (b) ABA
    (c) IAA (d) Ethylene

15. Haploids can be produced experimentally from
    (a) Endodermis (b) Pericycle
    (c) Endosperm (d) Anther

16. The edible portion of apple is the
    (a) Juicy testa (b) Thalamus
    (c) Endosperm (d) Pericarp

17. Which is a potent mutagen used for introducing cytoplasmic male sterility ?
    (a) Mustard gas
    (b) EMS
    (c) Ethidium bromide
    (d) UV light

18. Indian Institute for Pulse Research is situated at
    (a) Kanpur (b) Jhansi
    (c) Lucknow (d) Bangalore

19. The male sterility, which is mostly used in vegetative propagated crops
    (a) CGMS (b) GMS
    (c) CMS (d) All of these

20. Which chromosome aberration will produce pseudo - dominance ?
    (a) Deletion (b) Translocation
    (c) Duplication (d) Inversion

21. Which design is mostly used in laboratory experiments ?
    (a) RBD (b) LSD
    (c) CRD (d) Split plot design

22. 'Drosophila of plant kingdom' is norm used for
    (a) Barley (b) Maize
    (c) Wheat (d) Sorghum

23. Ug 99 rust is identified in
    (a) Barley (b) Rice
    (c) Wheat (d) Red gram

24. Sugary disease is found in
    (a) Sorghum (b) Rice
    (c) Barley (d) Red gram

25. The polyploidy level of water melon
    (a) Hexaploid (b) Octoploid
    (c) Tetraploid (d) Triploid

26. When performing electron microscopy, sample should be under
    (a) Vacuum
    (b) Normal atmospheric pressure
    (c) Excess oxygen
    (d) Inert gas

27. A disease affecting food conduction plant
    (a) Sandal spike (b) Root rots
    (c) Vascular wilt (d) Soft rots

28. A button like structure which penetra the host and draws nutrients
    (a) Rhizoid
    (b) Appressorium
    (c) Rhizomorph
    (d) Haustoria

29. Mitochondria and chloroplast contain
    (a) DNA, RNA and protein
    (b) DNA and RNA only
    (c) RNA and protein only
    (d) DNA and protein only

30. Non - endospermous seeds store th food reserves in
    (a) Testa (b) Pericarp
    (c) Cotyledons (d) Scutellum

ANSWERS

13. b 14. a 15. d 16. b 17. c 18. a 19. c 20. a 21. c 22. b
23. c 24. a 25. d 26. a 27. c 28. d 29. a 30. c

31. Triploid plants can be generated by culturing
(a) Embryo (b) Endosperm
(c) Pollen (d) Leaf

32. Which sub - cellular organelle is called power house of the cell ?
(a) Amyloplast (b) Mitochondria
(c) Nucleus (d) Ribosome

33. Dr. B. B. Mundkur is credited for his work on
(a) Rust (b) Late blight
(c) Smut (d) Mildew

34. How many gene combinations are possible in a "Dihybrid cross" ?
(a) 4 (b) 6
(c) 12 (d) 16

35. The act of identifying and removing undesired plants from agricultural fields is called
(a) Rouging (b) Isolation
(c) Sod culture (d) Harrowing

36. Crop which is grown on the boundary of the field or as an intercrop for protection against insects, diseases, nematodes etc., is called
(a) Cover crop (b) Catch crop
(c) Trap crop (d) All of these

37. Seed which can be dried to a low moisture level without a loss in viability is
(a) Orthodox seed
(b) Recalcitrant seed
(c) Hybrid seed
(d) None of these

38. Certified seed is the progeny of
(a) Breeder seed (b) Nucleus seed
(c) Foundation seed
(d) None of these

39. When a disease occurs periodically in a widespread area causing devastating damage to crop plants, it is known as
(a) Epidemic (b) Sporadic
(c) Endemic (d) Pandemic

40. The relationship between two organisms where one organism benefits but the other is neutral (there is no harm or benefit) is known as
(a) Symbiosis (b) Commensalism
(c) Mutualism (d) None of these

41. An important solute in osmo-regulation of plants in stress conditions is
(a) Proline (b) Butanol
(c) Nitrogen (d) Glutamate

42. In photorespiration, CO_2 is released from
(a) Peroxisome (b) Chloroplast
(c) Mitochondria (d) Cytoplasm

43. During photosynthesis, oxygen is generated from
(a) Carbon dioxide only
(b) Water only
(c) Both CO_2 and Water
(d) Phosphoglycerate

44. The progeny of a single homozygous plant of a self - pollinated species is known as
(a) Di - hybrid (b) Pure line
(c) Inbred (d) Monohybrid

45. The cell nucleus got its name by
(a) R. Brown (b) Fleming
(c) Robinson (d) Skoog

46. GM varieties were finally approved by
(a) ACGE (b) EACG
(c) GEAC (d) None of these

47. Ti plasmid used in genetic engineering is obtained from
(a) *Escherichia coli*
(b) *Agrobacterium tumefaciens*
(c) *Agrobacterium rhizogenes*
(d) *Bacillus thuringiensis*

ANSWERS

31. b 32. b 33. c 34. d 35. a 36. c 37. a 38. c 39. a 40. b
41. a 42. c 43. b 44. b 45. a 46. c 47. b

48. Bacteria break down dead and decaying matter into
(a) Humus (b) Fossils
(c) Soils (d) Inert gases

49. Which of the following is known to directly regulate gene expression ?
(a) Trypsin (b) Lac Repressor
(c) Casein (d) Myosin

50. Hydrolysis of sucrose yields
(a) Glucose only (b) Fructose only
(c) Glucose and Fructose
(d) Galactose and glucose

51. A group of plants that was the first to evolve seeds is called
(a) Gymnosperms (b) Angiosperms
(c) Algae (d) Fungi

52. A situation where an algae and a fungus can live intimately, entwined in a mutually beneficial association is known as
(a) Bryophyte (b) Angiosperm
(c) Gymnosperm (d) Lichen

53. Tobacco mosaic virus is a
(a) ds RNA virus (b) ss RNA virus
(c) ds DNA virus (d) ss DNA virus

54. Which of the following substances is commercially extracted from Chrysanthemum ?
(a) Tanin (b) Insecticide
(c) Fibre (d) Drug

55. During fertilization in angiosperms, one out of the two sperm cells coming out of the pollen tube fertilizes which of the following haploid cell types in the megaspore to form the endosperm ?
(a) Synergids (b) Egg
(c) Polar nuclei (d) Antipodals

56. Pollination by birds is called
(a) Autogamy (b) Ornithophily
(c) Entomophily (d) Anemophily

57. A type of plastic that is biodegradable has been in the news lately. The ingredient that makes it biodegradable is
(a) Vegetable oil (b) Petroleum
(c) Corn starch (d) Leather

58. Which one of the following is called single celled protein ?
(a) *Spirulina* (b) *Azotobactor*
(c) Marchentia (d) Volvox

59. Mycorrhizal association is a special kind of symbiosis occurring between
(a) Algae and *Azolla*
(b) Algae and fungi
(c) Higher plant roots and fungi
(d) Cycads' roots and *Rhizobium*

60. Point mutation at molecular level is due to
(a) Destruction of bases
(b) Destruction of double helix
(c) Shifting of a position of helix and bases
(d) Alteration of sequences of bases in DNA

61. Fruit dropping in mango tree can be controlled by spraying of
(a) KCl (b) Urea
(c) NaCl (d) NAA

62. Black heart of potato is caused due to
(a) *Pseudomonas fluorescens*
(b) Deficiency of Oxygen
(c) Deficiency of Boron
(d) None of these

63. The mode of pollination in Pearl millet (Bajra) is
(a) Self - pollinated
(b) Cross - pollinated
(c) Cleistogamous
(d) Auto - crossed

ANSWERS

48. a 49. b 50. c 51. a 52. d 53. b 54. b 55. c 56. b 57. c
58. a 59. c 60. d 61. d 62. b 63. b

64. Chlorosis in plants occurs under deficiency of
(a) Manganese and Sulphur
(b) Boron and Phosphorus
(c) Calcium and Oxygen
(d) Nitrogen and Magnesium

65. Recalcitrant seeds are seeds that
(a) Can be dried
(b) Cannot be dried and stored at low temperature
(c) Can be stored at low temperature
(d) None of these

66. White tag is used for ..... seed
(a) Breeder
(b) Foundation
(c) Nucleus
(d) Registered

67. Enzyme which cut DNA strand at specific site is
(a) Restriction endonuclease
(b) RNA polymerase
(c) DNA polymerase
(d) None of these

68. Which element is required for increasing root nodules in leguminous crop ?
(a) N (b) Mo
(c) P (d) Se

69. Maize crop is cross - pollinated due to
(a) Protogyny
(b) Cleistogamous
(c) Protandry
(d) None of these

70. Milk sourness is due to
(a) Lactic acid
(b) Glycine
(c) Glutamic acid
(d) Protartaric acid

71. Flavr savr is a GE variety of
(a) Cotton
(b) Tomato
(c) Soybean
(d) Brinjal

72. Fermentation of alcohol is due to
(a) Acetic acid
(b) Pyruvic acid
(c) Lactic acid
(d) None of these

73. BOAA neurotoxin produced paralysis, is found in
(a) *Cicer sps.*
(b) *Vigna mungo*
(c) *Lathyrus sativus*
(d) *Vigna radiata*

74. The ratio of purine to pyrimidine in DNA is
(a) 1 : 1 (b) 1 : 3
(c) 1 : 3 (d) 2 : 1

75. 'Father of tissue culture' is
(a) Leeuwanhoek
(b) Skoog
(c) Maheswari
(d) Haberlandt

76. ABO blood group in human beings is an example of
(a) Multiple allelism
(b) Polyploid nature
(c) Dominance
(d) None of these

77. Mushroom belongs to class
(a) Actinomycetes
(b) Allomycetes
(c) Basidiomycetes
(d) None of these

78. Blotter test is used for detection of
(a) Nematodes
(b) Bacteria
(c) Virus
(d) Fungi

ANSWERS

64. d 65. b 66. b 67. a 68. b 69. c 70. a 71. c 72. a 73. c
74. a 75. d 76. a 77. c 78. d

79. Systemic acquired resistance (SAR) in plants can be due to
(a) Salicyclic acid
(b) Both a and c
(c) Isonicotinic acid
(d) None of these

80. Colour blindness controlling genes are situated on
(a) X chromosome
(b) Autosome
(c) Y chromosome
(d) None of these

81. Cells are linked together by
(a) Endoplasmic reticulum
(b) Pellicle
(c) Plasmodesmata
(d) Cytosol

82. The causal organism of Karnal bunt of wheat is
(a) *Neovosia indica*
(b) *Macrophomina phaseolina*
(c) *Tilletia caries*
(d) *Puccinia graminis*

83. "Kyoto protocol" is related to
(a) Pest control
(b) Green house gas minimization
(c) Disease control
(d) Decrease of Methane in atmosphere

84. Father of white revolution is
(a) Norman E Borlaug
(b) Arun Krishnsnan
(c) Verghese Kurien
(d) Swaminathan MS

85. Decomposition of protein under anaerobic conditions is called
(a) Fermentation
(b) Putrefaction
(c) Hydrolisation
(d) None of these

86. Vertisol soils is the other name of
(a) Sandy soils
(b) Saline soils
(c) Alkaline soils
(d) Black cotton soils

87. Nitrogen fixation in cereals is caused
(a) *Azotobacter*
(b) Azospirillum
(c) Both (a) and (b)
(d) None of these

88. Selman Waksman got Nobel Prize for discovery of
(a) Penicillin
(b) Streptomycin
(c) Tetracycline
(d) None of these

89. During replication, super coiling controlled due to an enzyme called
(a) Topoisomerase
(b) Ligase
(c) Helicase
(d) SSB - Proteins

90. Bt - toxin is a
(a) Fungicide
(b) Bactericide
(c) Viroid
(d) Herbicide

91. Bunchy top of banana virus is transmi by
(a) *Bemisia tabaci*
(b) *Thrips tabaci*
(c) *Pentalonia nigronervosa*
(d) *Aphis gossypii*

92. The term Viroid was first introduced
(a) Diener
(b) Skoog
(c) Stanley
(d) Leibig

ANSWERS

79. b 80. a 81. c 82. a 83. b 84. c 85. b 86. d 87. c 88. b
89. a 90. b 91. c 92. a

93. Indicator organism for food microbiology is
(a) *E. coli*
(b) *Coccinella burneti*
(c) *Bacillus subtilis*
(d) None of these

94. Nitrification is a ..... process
(a) Oxidative
(b) Reduction
(c) Redox process
(d) None of these

95. Triton X - 100 is a
(a) Anionic surfactant
(b) Non - ionic surfactant
(c) Cationic surfactant
(d) Mid ionic surfactant

96. Tundu disease of wheat is caused by
(a) Nematode
(b) Virus
(c) Bacteria
(d) Nematode & Bacteria

97. Which of the following vitamins is likely to function as a co - enzyme ?
(a) Panthenate
(b) Riboflavin
(c) Ascorbic acid
(d) Tocopherol

98. A seed lot devoid of physical matter is
(a) Physically pure
(b) Genetically pure
(c) Improved seed
(d) All of these

99. Most of the plant pathogenic bacteria are
(a) G+ve
(b) G-ve
(c) Both (a) and (b)
(d) None of these

100. First patent for life forms was awarded to
(a) A. K. Singh
(b) Cope land
(c) Maheswari
(d) Anand Chakrabarty

○○○○○

ANSWERS

93. c 94. a 95. b 96. d 97. b 98. a 99. b 100. d

RAS (Prelims.) – General Agriculture – 2010
(R.P.S.C., Rajasthan)

Exam Held on 29.09.2010

1. Conversion of ammonia into nitrate by bacteria is known as
(a) Ammonification
(b) Nitrification
(c) Denitrification
(d) Loss of nitrogen

2. What is the size of clay particle ?
(a) < 0.002 mm
(b) > 0.002 mm
(c) < 0.02 mm
(d) > 0.2 mm

3. What is optimum time of application of farm yard manure ?
(a) Six month before sowing of crop
(b) At the time of sowing
(c) One month before sowing of crop
(d) One week after sowing of crop

4. Name the chemical used for reclamation of alkali soils
(a) Lime
(b) Gypsum
(c) Rock phosphate
(d) Sodium nitrate

5. Which one of the following is not a criterion for essentiality of plant nutrient ?
(a) Plant can not complete life cycle
(b) Can not be substituted
(c) Directly involved in metabolism
(d) Is present in the plant

6. Name the chemical used for reclamation of acidic soils.
(a) Gypsum
(b) Lime
(c) Ammonium sulphate
(d) Super phosphate

7. Which one of the following is not essential plant nutrient ?
(a) Ca
(b) Mg
(c) Na
(d) Fe

8. Which one of the following is a micro-nutrient ?
(a) Magnesium
(b) Manganese
(c) Calcium
(d) Potassium

9. Which one of the following is not a micro-nutrient ?
(a) Cl
(b) S
(c) B
(d) Cu

10. What is C : N ratio of a normal soil ?
(a) 10 : 1
(b) 15 : 1
(c) 5 : 1
(d) 20 : 1

11. Fertilizer containing two of more nutrients is called as
(a) Double fertilizer
(b) Complex fertilizer
(c) Mixed fertilizer
(d) Organic fertilizer

ANSWERS

1. b 2. a 3. c 4. b 5. d 6. b 7. c 8. b 9. b 10. a 11. b

12. Which one of the following is an organic fertilizer ?
(a) Anhydrous ammonia
(b) DAP
(c) SSP
(d) Urea

13. Indicate nitrogen content in Calcium Ammonium Nitrate.
(a) 16 % (b) 20 %
(c) 26 % (d) 32 %

14. Indicate P_2O_5 content in DAP.
(a) 16 % (b) 32 %
(c) 46 % (d) 60 %

15. The deficiency of nitrogen in plants first appears on :
(a) Stems
(b) Older leaves
(c) Roots
(d) Younger leaves

16. Which one of the following can check flower drop in crops ?
(a) Gibberelic acid
(b) Kinetin
(c) Ethylene
(d) Auxin

17. Name the cell organelle where photosynthesis takes place ?
(a) Nucleus
(b) Chloroplast
(c) Mitochondria
(d) Endodermis

18. In plants photosynthate moves through
(a) Phloem
(b) Xylem
(c) Endodermis
(d) Vacuole

19. Respiration takes place only in presence of
(a) Oxygen
(b) Carbon dioxide
(c) Nitrogen
(d) Water

20. Energy producing organelle in the cell is :
(a) Nucleus
(b) Nucleolus
(c) Mitochondria
(d) Chloroplast

21. Which of the following nutrient is not found in chloroplast ?
(a) N (b) Mg
(c) Fe (d) O

22. In plants water moves through
(a) Vacuole (b) Phloem
(c) Endodermis (d) Xylem

23. Indicate the formula of leaf area index.
(a) Leaf weight/leaf area
(b) Land area/leaf area
(c) Leaf area/land area
(d) Leaf area/ leaf duration

24. Growing plants at a new place brought from different places, is called as
(a) Collection
(b) Adaptation
(c) Introduction
(d) Multiplication

25. Flax is fibre of
(a) Cotton (b) Sun hemp
(c) Linseed (d) Jute

26. Which one of the following generation shows maximum variability ?
(a) F_1 (b) F_2
(c) F_4 (d) F_6

27. How many generations of selfing are essential for homozygosity after crossing ?
(a) 2 (b) 4
(c) 6 (d) 8

ANSWERS

12. d 13. c 14. c 15. b 16. d 17. b 18. a 19. a 20. c 21. d
22. d 23. c 24. c 25. c 26. b 27. c

28. Why is potato breeding centres located on hills in India ?
(a) Potato grows better on hills
(b) Quality is better on hills
(c) It grows on hills through out year
(d) Potato does not flower in plains

29. Cultivated species of wheat is :
(a) Hexaploid
(b) Tetraploid
(c) Diploid
(d) Monoploid

30. What will be the genotypes of F1 generation of a cross between AABB and aabb ?
(a) AaBb
(b) AAbb
(c) aaBB
(d) AABB

31. If gene 'W' is lethal in 'w' form, which one of the following will not survive ?
(a) ww
(b) WW
(c) Ww
(d) wW

32. Genes are composed of
(a) Proteins
(b) Lipids
(c) RNA
(d) DNA

33. Which one of the following is not a summer season crop ?
(a) Potato
(b) Cucumber
(c) Bottle guard
(d) Pumpkin

34. Which one of the following is a cole crop ?
(a) Okra (b) Arbi
(c) Brinjal (d) Cauliflower

35. Alternate bearing is most common in:
(a) Citrus
(b) Guava
(c) Papaya
(d) Mango

36. Perlette is a variety of
(a) Grapes
(b) Guava
(c) Banana
(d) Ber

37. Calcattia is a variety of
(a) Papaya (b) Litchi
(c) Grape (d) Apple

38. Babugosha is variety of
(a) Ber (b) Mango
(c) Pear (d) Banana

39. Yellow rust is a disease of
(a) Gram (b) Sugarcane
(c) Wheat (d) Potato

40. Name the chemical that can control aphids effectively.
(a) Lime
(b) Metasystox
(c) Vitavax
(d) BHC

41. Pink boll worm is a common insect of
(a) Cotton
(b) Mustard
(c) Cabbage
(d) Mung

42. Late blight is a disease of
(a) Mango
(b) Potato
(c) Groundnut
(d) Cauliflower

43. Most infected crop with stem borer is
(a) Rice (b) Wheat
(c) Gram (d) Maize

ANSWERS

28. d 29. a 30. a 31. a 32. d 33. a 34. d 35. d 36. a 37. b
38. c 39. c 40. b 41. a 42. b 43. d

44. Name the crop associated with Tikka disease.
(a) Mustard
(b) Banana
(c) Cauliflower
(d) Groundnut

45. Maximum edible oil in India is contributed by
(a) Sunflower
(b) Mustard
(c) Castor
(d) Groundnut

46. Central Potato Research Institute (CPRI) is located at
(a) Shimla
(b) Patna
(c) Hyderabad
(d) Lucknow

47. Name the crop that will require maximum seed to sow one hectare are.
(a) Wheat (b) Rice
(c) Maize (d) Gram

48. How much seed will be required to sow 10 square meter area at the rate of 100 kg seed per hectare ?
(a) 10 kg (b) 1 kg
(c) 100 g (d) 10 g

49. What quantity of urea will be required for 10 hectare area at the rate of 120 kg nitrogen per hectare ?
(a) 26 kg
(b) 260 kg
(c) 520 kg
(d) 2600 kg

50. What do you mean by minimum support price ?
(a) Minimum cost of production
(b) Govt. buys produce at this price
(c) Trader can not pay lesser price
(d) Farmer can not sell at higher price

51. If the price of a commodity increases its demand will
(a) Increase
(b) Decrease
(c) Not affected
(d) Fluctuate in either direction

52. Name the centers I.C.A.R is establishing in districts for extension work in collaboration with state agricultural universities.
(a) Krishi Vigyan Kendra
(b) Krishi Gyan Kendra
(c) Krishi Soochna Kendra
(d) Kisan Gosthi Kendra

53. Which one of the following body is responsible for develomment work at village level ?
(a) Gram Panchayat
(b) Block
(c) Tehsil
(d) District

54. Which one is most effective method of communication ?
(a) Radio
(b) Television
(c) Kissan Gosthi
(d) Personal Visit

55. Most effective extension service is
(a) Profiting local leaders
(b) Helping Block Development Officer
(c) Helping Gram Pradhan
(d) Helping the farmers to help themselves

56. Project Directorate of Rapeseed and Mustard Research is located at
(a) Jodhpur
(b) Bharatpur
(c) Udaipur
(d) Jobner

ANSWERS

44. d 45. d 46. a 47. a 48. c 49. d 50. b 51. b 52. a 53. a
54. d 55. d 56. b

57. International Centre for Maize and Wheat Research (CIMMYT) is located at
(a) Syria
(b) Philippines
(c) Mexico
(d) Nigeria

58. Indian Journal of Agricultural Sciences is published from
(a) Indian Society of Agronomy
(b) IARI
(c) Indian Society of Soil Science
(d) ICAR

59. Name the scientist from Rajasthan who has worked as Director General of ICAR.
(a) A. L. Chaudhary
(b) A.S. Faroda
(c) S. M. Gandhi
(d) R.S. Paroda

60. Where is head quarter of Rajasthan Agricultural University located ?
(a) Udaipur
(b) Bikaner
(c) Jobner
(d) Durgapura

61. What is the contribution of agriculture in Gross Domestic Product in India ?
(a) 15 %
(b) 24 %
(c) 50 %
(d) 67 %

62. Name the crop having maximum area in India.
(a) Wheat
(b) Sugarcane
(c) Rice
(d) Sorghum

63. Name the crop having maximum production in India
(a) Maize
(b) Wheat
(c) Groundnut
(d) Rice

64. Name the soil type occupying maximum area in the country.
(a) Alluvial
(b) Black soil
(c) Red soil
(d) Lateritic soil

65. Which one of the following is not edible oil ?
(a) Mustard
(b) Groundnut
(c) Linseed
(d) Sunflower

66. Name the crop rich both in protein and oil.
(a) Groundnut
(b) Soybean
(c) Gram
(d) Pigeon pea

67. Indicate the crop different from others for plant part used as fibre.
(a) Sanai
(b) Jute
(c) Patsan (Mesta)
(d) Cotton

68. Indicate the percentage of Irrigated area in India
(a) 10 % (b) 25 %
(c) 40 % (d) 75 %

69. Find out the intensity of 'Maize - wheat - sugarcane - ratoon' crop rotation.
(a) 133 % (b) 150 %
(c) 167 % (d) 200 %

70. Name the herbicide to control weeds in pulse crops.
(a) Lasso (b) Machete
(c) DDT (d) BHC

ANSWERS

57. c 58. d 59. d 60. b 61. a 62. c 63. d 64. a 65. c 66. b
67. d 68. c 69. a 70. a

71. Phalaris minor is a common weed in the crop of
(a) Rice
(b) Wheat
(c) Sugarcane
(d) Gram

72. Select the most effective herbicide to control Phalaris minor.
(a) 2, 4 - D
(b) Lasso
(c) Isoproturon
(d) Glyphosate

73. Select the most scientific crop rotation.
(a) Rice - wheat
(b) Maize - wheat
(c) Mung - wheat
(d) Maize - potato - sugarcane

74. Which one of the following is a *Rabi* crop ?
(a) Cotton
(b) Sorghum
(c) Sugarcane
(d) Linseed

75. Name the state having maximum productivity of wheat in India.
(a) Uttar Pradesh
(b) Haryana
(c) Rajasthan
(d) Punjab

76. Name the state having maximum area under Bajra.
(a) Madhya Pradesh
(b) Rajasthan
(c) Andhra Pradesh
(d) Chhattisgarh

77. What is the estimated annual food production of India ?
(a) 20 million tonnes
(b) 105 million tonnes
(c) 158 million tonnes
(d) 220 million tonnes

78. Which one of the following is an example of multiple cropping ?
(a) Maize - gram
(b) Soybean - wheat - sugarcane
(c) Maize - potato - peas - mung
(d) Sorghum - lentil

79. If the seed of bajra and sesame (Gingely) is mixed and broadcasted it is an example of
(a) Mixed cropping
(b) Intercropping
(c) Relay cropping
(d) Parallel cropping

80. Which one of the following nutrients is most immobile in soil ?
(a) Nitrogen
(b) Phosphorus
(c) Potassium
(d) Sulphur

81. Indian Council of Agricultural research (ICAR) was established in the year
(a) 1929
(b) 1947
(c) 1955
(d) 1971

82. First Agricultural University in India was established in 1960 at
(a) New Delhi
(b) Udaipur
(c) Pantnagar
(d) Hissar

83. Central Rice Research Institute is located at
(a) Hyderabad
(b) Cuttack
(c) Karnal
(d) Ranchi

ANSWERS

71. b 72. c 73. c 74. d 75. d 76. b 77. d 78. c 79. a 80. b
81. a 82. c 83. b

84. Central Arid Zone Research Institute is located at
(a) Hyderabad
(b) Bhubneshwar
(c) Hissar
(d) Jodhpur

85. Green revolution in India was a result of
(a) Better crop management
(b) Irrigation facilities
(c) Fertilizer application
(d) Development of dwarf varieties of wheat and rice

86. Most critical stage for irrigation in wheat is
(a) Crown root initiation
(b) Jointing stage
(c) Boot stage
(d) Milk stage

87. Arrowing refers to
(a) Panicle initiation in rice
(b) Flowering in banana
(c) Flowering in sugarcane
(d) Flowering in onion

88. Retting is an important process in the crop of
(a) Jute
(b) Onion
(c) Guava
(d) Banana

89. In which of the following crop earthing is not recommended ?
(a) Cotton
(b) Potato
(c) Sugarcane
(d) Sugar beet

90. Khaira disease of rice is caused due to deficiency of
(a) Sulphur
(b) Phosphorus
(c) Zinc
(d) Boron

91. Which one of the following is a variety of sorghum ?
(a) Ganga
(b) Swarna
(c) Lohit
(d) Kanchan

92. Which one of the following is a variety of gram ?
(a) Ratna
(b) Arjun
(c) Avarodhi
(d) Kissan

93. Which one of the following is a variety of mango ?
(a) Amrapali
(b) Allahabad safeda
(c) Kranti
(d) Sangam

94. Which of the following fertilizers can be used for foliar spray ?
(a) Ammonium sulphate
(b) Muriate of potash
(c) Urea
(d) Diammonium phosphate

95. Which one of the following fertilizer can be top dressed ?
(a) Ammonium sulphate
(b) SSP
(c) DAP
(d) Muriate of potash

96. When a cereal crop is sown in rotation after pulse crop the dose of nitrogen to cereal should be
(a) Increased
(b) Decreased
(c) Unchanged
(d) Depends on cereal crop

ANSWERS

84. d 85. d 86. a 87. c 88. a 89. a 90. c 91. b 92. c 93. a
94. c 95. a 96. b

97. Indicate the formula for harvest index.
(a) Land area / leaf area
(b) Leaf area / land area
(c) Grain yield / straw yield
(d) Grain yield / biological yield

98. One row of Urd bean sown between two rows of sugarcane is an example of
(a) Relay cropping
(b) Mixed cropping
(c) Pair cropping
(d) Inter cropping

99. Crop lodging refers to
(a) Record of crop data
(b) Falling of plants horizontally on ground
(c) Cutting of trees to logs
(d) Determination of plant nutrient status

100. Which one of the following is an active factor for soil formation ?
(a) Parent material
(b) Soil erosion
(c) Time
(d) Climate

ANSWERS
97. d 98. d 99. b 100. d

General Agriculture (ICAR - JRF) (Memory Based) 2011

01. National Biodiversity Board is located at :
(a) Hyderabad (b) Kolkata
(c) New Delhi (d) Chennai

02. National Gene Bank is established in 1996 at :
(a) IARI (b) NBPGR
(c) APGR (d) NBSS & LUP

03. Global area under transgenic crops was (in 2010) :
(a) 50 mha (b) 75 mha
(c) 100 mha (d) 143 mha

04. Maximum hybrids are developed in which crop ?
(a) Maize (b) Wheat
(c) Soybean (d) Pigeopea

05. Which one in man made cereal ?
(a) Wheat (b) Maize
(c) *Secale cereale* (d) None of these

06. Which one is a not nitrogen fixing bacterium ?
(a) *Bacillus* (b) *Azotobacter*
(c) *Azospirillum* (d) *Rhizobium*

07. The site of protein synthesis is :
(a) Nucleus (b) Ribosome
(c) Centrosome (d) Nucleolus

08. The sugarcane inflorescence is known as :
(a) Spadix (b) Catkin
(c) Panicle (d) Arrow

09. Most common nitrogenous fertilizer in India is :
(a) Urea (b) SSP
(b) DAP (d) MOP

10. Statistical design suited for bi-directional fertility :
(a) RBD (b) CRD
(c) LSD (d) Split - plot

11. Gas responsible for Ozone depletion is :
(a) CO_2 (b) CH_4
(c) O_2 (d) CFC

12. The permanent property of soil is :
(a) Texture (b) Structure
(c) Aggregation (d) pH

13. Net cultivated area in the country is :
(a) 121 mha (b) 140 mha
(c) 188 mha (d) 328 mha

14. Growing of plants in water is called :
(a) Geoponics (b) Aeroponics
(c) Hydroponics (d) Horticulture

15. Olericulture refers to cultivation of :
(a) Spices (b) Fruits
(c) Vegetables (d) Flowers

ANSWERS
1. d 2. b 3. d 4. a 5. b 6. a 7. b 8. d 9. a 10. c
11. d 12. a 13. b 14. c 15. c

16. Which kind of fertilizers is not produced in India ?
(a) P fertilizers (b) K fertilizers
(c) N fertilizers (d) Complex fertilizers

17. High yielding dwarf varieties of wheat were developed by :
(a) Swaminathan (b) E W Burton
(c) Borlaug (d) B P Pal

18. Ratooning is associated with the cultivation of :
(a) Banana (b) Mustard
(c) Sugarcane (d) Groundnut

19. Drip irrigation is recommended for :
(a) Oil seed crops (b) Fruit crops
(c) Cereal crops (d) Legume crops

20. Which of the following vegetable does not belong to solanaceous group ?
(a) Tomato (b) Brinjal
(c) Chillies (d) Lady'finger

21. Study of soil in relation to higher plants is called :
(a) Edaphology (b) Geology
(c) Pedology (d) Tillage

22. International Research Institute dealing with tuber crops is :
(a) WARDA (b) CIAT
(c) CIMMYT (d) IRRI

23. The only mineral constituent of chlorophyll molecule is :
(a) Zinc (b) Mn
(c) Mg (d) N

24. The origin place of soybean is :
(a) India (b) USA
(c) UK (d) China

25. The endosperm of common bread wheat has chromosome number (2n) :
(a) 21 (b) 42
(c) 63 (d) 84

26. The real value of seed is calculated by using formula :
(a) 100 × Purity %/Germination %
(b) Purity % × Germination % / 100
(c) 100/Purity % × Germination %
(d) None of these

27. Dwarfing gene in wheat crop is :
(a) Dee - gee - woo - gen
(b) T cytoplasm
(c) Norin - 10
(d) Tift - 23A

28. Nitrification is a process associates with conversion of :
(a) Nitrate N to gaseous N2
(b) Ammonical to nitrate N
(c) Complex organic compounds in ammonical N
(d) Amide N to amino acids

29. Favr - savr is a variety of :
(a) Potato (b) Pumpkin
(c) Tomato (d) Rice

30. PPV & FR authority is located at :
(a) Chennai (b) Mumbai
(c) Kolkata (d) New Delhi

ANSWERS
16. b 17. c 18. c 19. b 20. d 21. a 22. b 23. c 24. d 25. c
26. b 27. c 28. b 29. c 30. d

ICAR - JRF (AGRONOMY)

201

01. Contour cultivation of crops is done :
(a) On plain land
(b) Along the slope of land
(c) On steep slope
(d) Across the slope of land

02. Crop tolerant to salinity :
(a) Sugar beet (b) Groundnut
(c) Citrus (d) Chick pea

03. The best method to determine the quality of sugarcane is :
(a) Purity test
(b) Brix reading
(c) Yellowing of the crop
(d) Tetrazolium test

04. Water productivity is observed highest in :
(a) Rice (b) Pearl - millet
(c) Chickpea (d) Finger - millet

05. Nutrient absorbed as both anion and cation ?
(a) P (b) Ca
(c) K (d) N

06. Two elements which bring about significant increase in the oil content of most of oil crops are :
(a) N and P (b) Zn and Cu
(c) Mg and S (d) Fe and Mn

07. The percent content of sulphur in SSP is :
(a) 4.5 (b) 12.8
(c) 17.8 (d) 22.4

08. The nutrient essential for energy transformation is
(a) K (b) N
(c) Ca (d) P

09. A total weed killer is :
(a) Glyphosate (b) Butachlor
(c) 2, 4 - D (d) Alachlor

10. Saltpeter also known as :
(a) $MnNO_3$ (b) $MgNO_3$
(c) KNO_3 (d) K_2SO_4

11. Element is not essential but useful for rice
(a) Cobalt (b) Na
(c) Silicon (d) Iodine

12. The state having maximum groundnu production :
(a) Tamil Nadu (b) Andhra Pradesh
(c) Uttar Pradesh (d) Gujarat

13. The most serious form of soil erosion in the country is :
(a) Sheet erosion (b) Rill erosion
(c) Gully erosion (d) Stream bank erosion

14. The most important critical growth stage in groundnut for water availability :
(a) Flowering
(b) Sowing
(c) Pegging to pod formation
(d) Pod formation to flowering

15. The oilseed having highest protein content is :
(a) Sunflower (b) Groundnut
(c) Soybean (d) Safflower

ANSWERS
1. d 2. a 3. b 4. d 5. d 6. c 7. b 8. d 9. a 10. c
11. c 12. d 13. c 14. c 15. c

16. The fluffy nature of bread made up of wheat is due to :
(a) Gluten (b) Albumin
(c) Globulin (d) Casein

17. The term functional element was proposed by
(a) R. W. Willey (b) Tisdale
(c) Arnon (d) Nicholas

18. The normal range of temperature for the growth of most of agricultural crops is:
(a) 10 - 30°C (b) 15 - 40°C
(c) 20 - 25°C (d) 40 - 45°C

19. "Hollow heart" in groundnut is caused by :
(a) Fungus
(b) B deficiency
(c) Zinc deficiency
(d) Pod borer

20. A quick seed test conducted to assess the viability is
(a) Toluene distillation test
(b) Purity test
(c) Brick gravel test
(d) Tetrazolium test

21. Selection of sugarcane sets is made from :
(a) Top 1/3rd portion of the stem
(b) Middle 1/3rd portion of the stem
(c) Bottom 1/3rd portion of the stem
(d) Entire stem

22. The fruit of which oilseed crop is called siliqua ?
(a) Sesamum
(b) Safflower
(c) Rapeseed and mustard
(d) Sunflower

23. What is meant by crop logging ?
(a) Protection from logging
(b) Falling of the crop on ground
(c) Visual assessment of crop growth
(d) Graphic record of progress of crop containing a series of chemical and physical measurement.

24. Utilization of non - economic parts of crops for protection or soil improvement :
(a) Crop logging
(b) Crop residue management
(c) Crop technology
(d) Crop production strategy

25. The priming in tobacco is refers to
(a) Removal of suckers
(b) Removal of branches
(c) Removal of leaves
(d) Removal of inflorescences

26. Virginia tobacco is cured by
(a) Fire (b) Air
(b) Sun (d) Flue curing

27. The breakdown of nitrites and nitrates by bacterial activity is known as :
(a) Nitrification
(b) Nitrogen fixation
(c) Denitrification
(d) Nitrogen fixation

28. Collective farming system has originated from
(a) Poland (b) France
(c) Bulgaria (d) Soviet Union

29. India tops the world in the production of
(a) Fruits (b) Vegetables
(c) Wheat (d) Pulses

30. The cultivated species of rice is :
(a) *Oryza sativa*
(b) *Oryza glaberrima*
(c) Both (a) and (b)
(d) None of these

ANSWERS

16. a 17. d 18. b 19. b 20. d 21. a 22. c 23. d 24. b 25. c
26. d 27. c 28. d 29. d 30. c

31. The "miracle plant" useful for fuel, fodder and manure
(a) *Glycine max*
(b) *Ocimum sanctum*
(c) *Pennisetum pedicellatum*
(d) *Leucaena leucocephala*

32. Shifting cultivation is practiced in:
(a) Southern hills
(b) Western Ghats
(c) Western Himalayan region
(d) NE Himalayan region

33. Agro - forestry system involving integration of fruit trees with pasture is called
(a) Hortipasture (b) Agrisilviculture
(c) Silvipasture (d) Agrisilvipasture

34. Humus colloids are composed basically of :
(a) Ozone (b) Nitrogen
(c) Helium (d) Carbon

35. The element required by *Rhizobium* for the formation of leghaemoglobin involved in nitrogen fixation :
(a) Cu (b) Mo
(c) Zn (d) Co

36. A bio - herbicide used in rice cultivation :
(a) Paraquat (b) Fluchloralin
(c) Butachlor (d) Collego

37. Which among the following crop having highest protein ?
(a) Wheat (b) Rice
(c) Oats (d) Sunflower

38. Which of the following rotations is likely to leave soil richer in organic matter ?
(a) Continuous oats
(b) Maize - oats - clover
(c) Continuous maize
(d) Continuous sorghum

39. Raising crops one after another without seasonal fallowing is called :
(a) Sequential cropping
(b) Relay cropping
(c) Continuous cropping
(d) Multiple cropping

40. The ratio of total cropped area to the land area expressed in percentage is called :
(a) Crop rotation
(b) Cropping intensity
(c) Cropped area
(d) Cropping pattern

41. Saline and alkali soils commonly contain which carbonates and a relatively high concentration of soluble salts :
(a) Barium (b) Aluminium
(c) Iron (d) Alkaline - earth

42. Successful management of natural resources for agriculture to satisfy changing human needs while maintaining or enhancing the quality of the environment and conserving natural resources :
(a) Balanced farming
(b) Organic farming
(c) Natural farming
(d) Sustainable

43. Essential nutrient required by animals but not by plants is :
(a) Sodium (b) Boron
(c) Molybdenum (d) Zinc

44. Jute is largely grown in state of :
(a) West Bengal (b) Punjab
(c) Tamil Nadu (d) Maharashtra

45. Which crop among the following is grown in arid environments ?
(a) Rice (b) Potato
(c) Maize (d) Pearl millet

ANSWERS

31. d 32. d 33. a 34. d 35. b 36. d 37. d 38. b 39. a 40. b
41. d 42. d 43. a 44. a 45. d

46. The *Triticum aestivum* is :
(a) Monoploid (b) Tetraploid
(c) Hexaploid (d) Diploid

47. Heavy rainfall of irrigation during fruiting periods of cotton may cause :
(a) Shedding of flowers and young bolls
(b) Lodging of crop
(c) Heavy incidence of boll worm
(d) Yellowing of young bolls

48. Annidation is :
(a) Leguminous effect
(b) Allelopathy
(c) Competitive interaction
(d) Complementary interaction

49. Wet tillage :
(a) Destroy soil texture
(b) Improves soil texture
(c) Destroy soil structure
(d) Improve soil structure

50. Complete fertilizer contains :
(a) Two straight fertilizers
(b) Three major nutrients
(c) Fertilizer and organic manures in equal proportion
(d) All essential nutrients

51. Sunfiower oil is recommended for heart patients since it contains high percentage of this unsaturated fatty acid:
(a) Lauric acid
(b) Oleic acid
(c) Linolenic acid
(d) Linoleic acid

52. The phosphate fertilizer recommended for perennial crops in acid soils is :
(a) SSP
(b) TSP
(c) Ammonium phosphate
(d) Rock phosphate

53. The only mineral constituent of chlorophyll molecule
(a) Nitrogen (b) Magnesium
(c) Mn (d) Zinc

54. The Study of soil in relation to higher plants is called
(a) Tillage (b) Geology
(c) Edaphology (d) Pedology

55. The continuous use of straight fertilizers leads to decline in production due to
(a) Sharp fluctuation in soil pH
(b) Loss of soil life form
(c) Drastic depletion of micronutrients
(d) Crop response to fertilizers slow down over years

56. The inflorescence of sugarcane is called
(a) Arrow (b) Spadix
(c) Catkin (d) Panicle

57. Mechanism to improve water uptake by plants in dry farming areas
(a) Lipid deposition on leaves
(b) Reduction in leaf area
(c) Development of awns
(d) increased root growth and root shoot ratio

58. Cultivation of crop plants in water is called
(a) Horticulture (b) Hydroponics
(c) Geoponics (d) Aeroponics

59. The period from panicle initiation to its emergence in rice is termed as
(a) Lag phase
(b) Ripening phase
(c) Reproductive phase
(d) Vegetative phase

60. *Brassica juncea* is used for the phyto remediation
(a) Pb (b) B
(c) Cd (d) Zn

ANSWERS
46. c 47. a 48. d 49. c 50. b 51. d 52. d 53. b 54. c 55. c
56. a 57. d 58. b 59. c 60. a

61. The crop stage most affected in alkaline soil
(a) Germination (b) Maturity
(c) Tillering (d) Flowering

62. Pungency in mustard oil is due to
(a) Erusic acid
(b) Glucosinolates
(c) Allyl propyl disulphide
(d) Phytoalexins

63. Luxury consumption is related with excessive uptake of
(a) K (b) P
(c) N (d) Mg

64. Which elements needed for sugar translocation ?
(a) P (b) K
(c) Mg (d) Ca

65. Total fertilizer consumption in India is
(a) 10 mt (b) 15 mt
(c) 20 mt (d) 25 mt

66. Tailor fertilizer for legumes is
(a) MAP (b) DAP
(c) SSP (d) NPK

67. The average fertilizer use ratio of NPK in India is about
(a) 4.6 : 2 : 1 (b) 7.3 : 3 : 1
(c) 4 : 2 : 1 (d) 6 : 3 : 1

68. N content in protein is
(a) 8 - 10 % (b) 14 - 16 %
(c) 20 - 25 % (d) 25 - 30 %

69. Which one is CAM plant ?
(a) Pineapple (b) Sugarbeet
(c) Onion (d) Almond

70. Optimum pH for P availability is
(a) 2.2 (b) < 2.0
(c) > 8.0 (d) 5.5 - 6.8

71. Which one is denitrifying bacteria ?
(a) *Azotobacter*
(b) *Pseudomonas*
(c) *Rhizobium*
(d) *Azospirillum*

72. If there are 10 treatments replicated th in RBD design, then error degree freedom will be :
(a) 30 (b) 18
(c) 16 (d) 7

73. Which design has equal number replication and treatments ?
(a) CRD (b) RBD
(c) LSD (d) SPD

74. Ozone layer :
(a) Block incoming UV radiation
(b) Allow incoming UV radiation
(c) Block incoming IR radiation
(d) None of these

75. Orobanche is a weed of :
(a) Tobacco
(b) Mustard
(c) Brinjal
(d) All of these

76. Most commonly used green manure crop in rice in NW region :
(a) *Sesbania* (b) Berseem
(c) Cluster bean (d) Sunhemp

77. Which one is cross pollinated crop ?
(a) Wheat (b) Oat
(c) Rice (d) Sunflower

78. Calculate the real value of seed if the germination and purity percentage of seed is 80 and 100, respectively ?
(a) 60 % (b) 80 %
(c) 20 % (d) 100 %

ANSWERS
61. a 62. b 63. a 64. b 65. d 66. d 67. b 68. b 69. a 70. d
71. b 72. b 73. c 74. a 75. d 76. a 77. d 78. b

79. 'The level of plant production can be no longer greater than that allowed by the most limiting of the essential plant growth factors' is :
(a) Law of marginal return
(b) Mitscherlich equation
(c) Bray's nutrient mobility concept
(d) Law of minimum

80. Which crop is sensitive both to drought and excessive moisture condition ?
(a) Pearl millet (b) Chickpea
(c) Sorghum (d) Maize

81. Crop which can be cultivated in acidic soil without liming ?
(a) Potato (b) Soybean
(c) Chickpea (d) Cauliflower

82. Calculate the water use efficiency, if ET is 200 mm and crop yield is 2000 kg/ha ?
(a) 10 kg/ha mm (b) 20 kg/ha mm
(c) 15 kg/ha mm (d) 1800 kg/ha mm

83. The maximum water consumption is by which crop ?
(a) Ragi (b) Rice
(c) Maize (d) Sugar cane

84. The base temperature of wheat crop is
(a) 4.5 °C (b) 7.0 °C
(c) 8.5 °C (d) 10.0 °C

85. The one percent concentration is equal to ppm ?
(a) 1 (b) 10
(c) 100 (d) 10000

86. The poplar based agro - forestry system is common in :
(a) Southern region
(b) Punjab - Haryana region
(c) Coastal region
(d) Northern hill region

87. Seasonal fallow is synonymous to :
(a) Crop rotation
(b) Relay intercropping
(c) Summer fallow
(d) None of these

88. The entry of water in the soil is referred as :
(a) Percolation (b) Infiltration
(c) Seepage (d) Osmosis

89. Inter - veinal chlorosis is the typical deficiency symptom of which nutrient ?
(a) N (b) P
(c) Zn (d) Fe

90. Phalaris minor belongs to the family
(a) Graminae
(b) Cyperaceae
(c) Sapindaceae
(d) Apocynaceae

91. The protein and oil content in groundnut, respectively :
(a) 45 and 20 % (b) 20 and 45 %
(c) 40 and 20 % (d) 25 and 25 %

92. Maximum hybrids are developed in which crop ?
(a) Pigeonpea (b) Soybean
(c) Wheat (d) Maize

93. Global area under transgenic crops is about :
(a) 50 mha (b) 75 mha
(c) 100 mha (d) 200 mha

94. The site of protein synthesis is :
(a) Nucleus (b) Ribosome
(c) Cytoplasm (d) Nucleolus

95. Which one is made cereal ?
(a) Wheat (b) Triticale
(c) Maize (d) Rice

ANSWERS
79. d 80. d 81. a 82. a 83. d 84. a 85. d 86. b 87. c 88. b
89. d 90. a 91. b 92. d 93. d 94. b 95. b

96. National Biodiversity Board is located at :
(a) Hyderabad (b) Kolkatta
(c) New Delhi (d) Rice

97. Dwarfing gene in rice :
(a) Norin - 10
(b) T - cytoplasm
(c) Tift 23A
(d) Dee - gee - woo-gen

98. Highest N containing fertilizer is :
(a) Anhydrous ammonia
(b) Urea
(c) Urea sulphate
(d) Ammonium nitrate

99. The arrangement of soil aggregates is referred as :
(a) Soil porosity (b) Soil structure
(c) Soil texture (d) Soil tilth

100. Which one of the following is announced by the government in support of a crop ?
(a) Maximum support price
(b) Moderate support price
(c) Influence support price
(d) Minimum support price

101. Which one of the following is the best example of catch crop ?
(a) Linseed (b) Toria
(c) Mustard (d) Groundnut

102. The permissible biuret level (%) in most of urea fertilizer is :
(a) 2 (b) 3
(c) 4 (d) 5

103. Match the set I (Crop) with set-II (Weedicide)

Crop	Weedicide
(i) Rice	(A) Atrazine
(ii) Wheat	(B) Isoproturon
(iii) Cotton	(C) Diuron
(iv) Maize	(D) Metribuzin
(v) Potato	(E) Anilophos

104. Match the set I (Crop) with set-II (Seed rate)

Crop	Seed rate (kg/ha)
(i) Maize	(A) 20 - 25
(ii) Hybrid rice	(B) 10 - 15
(iii) Lucerne	(C) 20 - 25
(iv) Pearl millet	(D) 4 - 5
(v) Oat	(E) 100

105. Match the set I (State) with set-II (Element toxicity/deficiency)

State	Element toxicity / deficiency
(i) Karnataka	(A) Arsenic toxicity
(ii) West Bengal	(B) Zinc deficiency
(iii) Punjab	(C) Al toxicity
(iv) NE region	(D) Fe deficiency
(v) Tamil Nadu	(E) Mn deficiency

106. Match the set I (Crop) with set-II (Rhizobia)

Crop	*Rhizobium* species
(i) Soybean	(A) *R. japonicum*
(ii) Berseem	(B) *R. trifoli*
(iii) Lucerne	(C) *R. meliloti*
(iv) Lentil	(D) *R. leguminosearum*
(v) French bean	(E) *R. phaseoli*

107. Match the set I (P fertilizers) with set-II (P_2O_5 content)

Fertilizer	P_2O_5 content (%)
(i) SSP	(A) 16
(ii) TSP	(B) 48
(iii) Rock phosphate	(C) 20 - 33
(iv) DCP	(D) 34
(v) MAP	(E) 61

ANSWERS
96. d 97. d 98. a 99. b 100. d 101. b 102. a
103. i-E; ii-B; iii-C; iv-A; v-D 104. i-A; ii-B; iii-C; iv-D; v-E 105. i-E; ii-A; iii-B; iv-C; v-D
106. i-A; ii-B; iii-C; iv-D; v-E 107. i-A; ii-B; iii-C; iv-D; v-E

108. Match the set I (Crop) with set-II (Botanical name)

	Crop		*Rhizobium* species
(i)	Brown sarson	(A)	*Brassica compestris*
(ii)	Taramira	(B)	*Eruca sativa*
(iii)	Indian mustard	(C)	*Brassica juncea*
(iv)	Gobhi sarson	(D)	*Brassica napus*
(v)	Karan rai	(E)	*Brassica carinata*

109. Match the set I (Bacteria) with set-II (Equation)

	Bacteria		Equation
(i)	*Nitrosomonas*	(A)	$NO_2^- \rightarrow NO_3^{-2}$
(ii)	*Nitrobacter*	(B)	$NH_3 \rightarrow NO_2^-$
(iii)	*Thiobacillus*	(C)	$SO_3^- \rightarrow SO_4^{-2}$
(iv)	*Pseudomonas*	(D)	$NO_3^{-2} \rightarrow NO_2^- \rightarrow N_2$
(v)	*Rhizobium*	(E)	$N_2 \rightarrow$ Organic nitrogen

110. Match the set I (crop) with set-II (Economic part)

	Crop		Economic part
(i)	Cotton	(A)	Textile
(ii)	Jute	(B)	Coir
(iii)	Cocoa	(C)	Chocolate
(iv)	*Hevea brassilensis*	(D)	Rubber
(v)	*Cocos nucifera*	(E)	Oil

111. Match the set I (Botanical name) with set-II (family)

	Botanical name		Family
(i)	*Hibiscus sabderifi*	(A)	Malvaceae
(ii)	*Helianthus annus*	(B)	Compositae
(iii)	*Phalaris minor*	(C)	Graminae
(iv)	*Sesamum indicum*	(D)	Pedaliaceae
(v)	*Corchorus capsularis*	(E)	Teliaceae

112. Match the set I (Crop) with set-II (Extracting reagent)

	Element		Extracting reagent
(i)	N	(A)	Alkaline permanganate
(ii)	P	(B)	$NaHCO_3$
(iii)	K	(C)	NH_4OAC
(iv)	Mo	(D)	Acid Ammonium oxalate
(v)	Zn	(E)	EDTA

QQQQQ

ANSWERS

108. i-A; ii-B; iii-C; iv-D; v-E
109. i-A; ii-B; iii-C; iv-D; v-E
110. i-A; ii-B; iii-C; iv-D; v-E
111. i-A; ii-B; iii-C; iv-D; v-E
112. i-A; ii-B; iii-C; iv-D; v-E

ICAR - JRF
PLANT SCIENCE (Memory Based) 201

1. A bacterial cell having flagella around cell wall is known as
   (a) Peritrichous
   (b) Pseudotrichous
   (c) Atrichous
   (d) Holotrichous

2. National Seed Corporation was established in the year
   (a) 1965 (b) 1971
   (c) 1963 (d) 1973

3. Virus that attacks bacteria and destroy their bacterial hosts
   (a) Bacteriophage (b) Viroid
   (c) Cosmid (d) Clone virus

4. Which of the following term is used by Mendel for explaining genes ?
   (a) Variable (b) Indicator
   (c) QTL (d) Factor

5. Codons like UAG, UAA and UGA causes
   (a) Chain initiation
   (b) Chain termination
   (c) Chain elongation
   (d) None of the above

6. A chromosome segment, which has no centromere is called
   (a) Acentric (b) Acrocentric
   (c) Pericentric (d) Perinocentric

7. A type of mutation that involv replacement in DNA or RNA purine with another or o pyrimidine with another is calle
   (a) Translocation (b) Transit
   (c) Tranduction (d) Transis

8. Having unlike alleles at one or corresponding loci is called
   (a) Heterozygous (b) Homec
   (c) Homozygous (d) Homog

9. An advanced generation of a mixture of strains, clones, inbr hybrids among them, propagate limited number of generations b pollination is known as
   (a) Inbred cultivar
   (b) Synthetic cultivar
   (c) Hybrid cultivar
   (d) None of the above

10. Completion of pollination fertilization in unopened flower called
    (a) Protoandry
    (b) Protogyny
    (c) Cleistogamy
    (d) Chasmogamy

11. Kranz type of anatomy is found
    (a) C_3 plants
    (b) C_4 plants
    (c) Both 'a' and 'b'
    (d) None of the above

ANSWERS

1. a 2. c 3. a 4. d 5. b 6. a 7. b 8. a 9. b 10. c
11. b

12. The crossing between two varieties of the same species is called
(a) Intraspecific (b) Interspecific
(c) Intrageneric (d) Intergeneric

13. The main purpose of emasculation in crop plants is to
(a) Prevent selfing
(b) Prevent crossing
(c) Both 'a' and 'b'
(d) None of the above

14. The procedure in which proteins are electrophoresed in polyacrylamide gel, transferred onto a nitrocellulose or nylon membrane, and the protein bands are detected by their specific interaction with antibodies, lectins and some other compounds is called as
(a) Eastern blotting
(b) Southern blotting
(c) Western blotting
(d) Northern blotting

15. In 1993, the information on Polymerase chain reaction and directed mutagenesis is given by
(a) Waldeyer
(b) Darlington
(c) Longley
(d) Kary mullis and Michael Smith

16. Loose smut of wheat is an
(a) Internally seed borne
(b) Externally seed borne
(c) Insect borne
(d) Air Borne

17. The presence of stamens and pistils in different flowers on different plants is called as
(a) Dioecious (b) Dihybrid
(c) Monohybrid (d) Monoecism

18. The condition in which only one allele of a pair is present, as in sex linkage or as a result of deletion.
(a) Heterozygous (b) Homozygous
(c) Hemizygous (d) Homogenous

19. In 1978, the scientist who had given boom and bust cycle was
(a) Negaheru (b) Priestley
(c) Nelson (d) Palmer

20. *'Albugo candida'* causes white blisters or white rust of crucifers is a/an
(a) Obligate parasite
(b) Facultative parasite
(c) Obligate saprophyte
(d) Facultative saprophyte

21. Sedimentation coefficient of a virus is the rate of sedimentation per unit centrifugal field measured in
(a) Sedimentation units
(b) Sucrose gradient units
(c) Swedberg units
(d) Wycoff units

22. In tomatoes, red fruit colour is mainly due to a chemical known as
(a) Lycopene (b) Mixopene
(c) Oxylolytes (d) Proteins

23. Plants produced from male gametophyte is called as
(a) Gynogenic
(b) Mixogenic
(c) Androgenic
(d) None of the above

ANSWERS
12. a 13. a 14. c 15. d 16. a 17. a 18. c 19. b 20. a 21. c
22. a 23. c

24. *'Vigna radiata'* is the scientific name of
(a) Mung bean (b) Tur dal
(c) Urd bean (d) Soybean

25. Meiosis occurs in
(a) Stem (b) Root
(c) Leaves (d) Anther

26. Which of the following line is used as female in a hybrid seed production?
(a) 'A' line
(b) Maintainer line
(c) 'B' line
(d) Restorer line

27. Identical twins are also called as
(a) Dizygotic twins
(b) Monozygotic twins
(c) Multizygotic twins
(d) None of the above

28. The average performance of a strain or genotype in a series of crosses or hybrid combinations and a measure of additive gene action is known as
(a) General combining ability
(b) Specific combining ability
(c) Standard error
(d) Directed combining ability

29. The causal organism for collar rot of groundnut is
(a) *Drechlera nodulosus*
(b) *Alternaria sesami*
(c) *Aspergillus flavus*
(d) *Aspergillus niger*

30. A mycotoxin called aflotoxin is produced, when growing on groundnut and cereals by
(a) *Alternaria solani*
(b) *Botryodiplodia theobromae*
(c) *Aspergillus flavus*
(d) *Aspergillus niger*

31. In which of the following stage of meiosis, crossing over takes place ?
(a) Zygotene (b) Pachytene
(c) Metaphase (d) Leptotene

32. In which of the substage of meiotic prophase I, synapsis begin between homologous chromosomes ?
(a) Zygotene (b) Pachytene
(c) Diplotene (d) Leptotene

33. Damping off of seedlings is caused by the pathogen
(a) *Ustilago sp.*
(b) *Verticillium sp.*
(c) *Pythium sp.*
(d) *Helminthosporium sp.*

34. Which of the following is responsible for falling off the ripened fruits from the plants ?
(a) Abscissic acid (b) Ethylene
(c) Cytokinin (d) Gibberellin

35. Which of the following gases contributes maximum to global warming ?
(a) CFC (b) Carbon dioxide
(c) Methane (d) Oxygen

36. Which design is mostly used in laboratory experiments, which are homogenous ?
(a) RBD (b) LSD
(c) CRD (d) Split plot design

ANSWERS
24. a 25. d 26. a 27. b 28. a 29. d 30. c 31. b 32. a 33. c
34. a 35. b 36. c

37. The capacity of a cell to develop into a complete plant is called
(a) Tissue culture (b) Haploidy
(c) Fecundity (d) Totipotency

38. The phenomenon of a single major gene affecting more than one character is known as
(a) Pathogenecity (b) Inheritance
(c) Plasticity (d) Pleiotrophy

39. Determination of the relative positions of genes on a DNA molecule can be done by
(a) Gene map
(b) Inheritance map
(c) Genome map
(d) Gene library

40. Among the following, which is a day neutral plant ?
(a) Tomato (b) Cotton
(c) Tobacco (d) Sunflower

41. The term Green Revolution was coined by
(a) Norman E Borlaug
(b) W Gaud
(c) Verghese Kurien
(d) Swaminathan MS

42. The number of base pairs per turn in B DNA is
(a) 7 (b) 9
(c) 8 (d) 10

43. Guanine and cytosine connects with
(a) Single hydrogen bond
(b) Double hydrogen bond
(c) Triple hydrogen bond
(d) None of the above

44. Regular occurrence of several phenotypes in a genetic population due to superiority of heterozygotes over homozygotes is called
(a) Homeostasis
(b) Adaptability
(c) Coadaptation
(d) Balanced polymorphism

45. Enzyme that synthesizes daughter strand of DNA from DNA template is
(a) DNA ligase (b) DNA polymerase
(c) DNA helicase (d) DNA gyrase

46. In which of the following enzyme, RNA is a substrate ?
(a) Helicase (b) DNAase
(c) RNAase (d) Catalase

47. The enzyme that synthesizes RNA using DNA template is
(a) RNA ligase (b) RNA polymerase
(c) RNA helicase (d) RNA gyrase

48. Each strand in a chain of nucleotides are held together by
(a) 3 hydrogen bonds
(b) Glycosydic bonds
(c) 2 hydrogen bonds
(d) Phosphodiester bonds

49. The improvement in the mean genotypic value of the selected individuals over that of the base population is known as
(a) Genetic advance
(b) Selection difference
(c) Genetic differential
(d) Inbreeding depression

ANSWERS
37. d 38. d 39. a 40. a 41. b 42. d 43. c 44. d 45. b 46. c
47. b 48. d 49. a

50. Canola is a group of plants belongs to
(a) Mustard (b) Niger
(c) Safflower (d) Sunflower

51. The largest element within a gene, which is a unit of function is called
(a) Muton (b) Cistron
(c) Recon (d) Exon

52. Vertical and horizonthal resistance first described by
(a) Butler (b) Flor
(c) Vanderplank (d) Swaminathan

53. Common bread wheat is
(a) Hexaploid (b) Tetraploid
(c) Diploid (d) Monoploid

54. Nitrogen fixation in cereals is caused by
(a) Azotobacter (b) Azospirillum
(c) Both a and b (d) None of these

55. The first phytoalexin to be purified is
(a) Rishitin (b) Camalexin
(c) Pisatin (d) Wyerone

56. Test cross ratio of duplicate gene action will be
(a) 1 : 1 (b) 3 : 1
(c) 1 : 1 : 1 : 1 (d) 1 : 3

57. Two dominant genes produce the same phenotypic effect whether they are alone or together, the alternative phenotype being produced only when both are in the recessive state is called as
(a) Duplicate gene action
(b) Complementary gene action
(c) Additive gene action
(d) Supplementary gene action

58. *Brassica juncea* is an amphidiploid of
(a) *B. compestris* × *B. tourneforti*
(b) *B. nigra* × *B. tourneforti*
(c) *B. compestris* × *B. nigra*
(d) *B. nigra* × *B. rugosa*

59. Chlorosis in rice is due to deficiency of
(a) Fe (b) Cl
(c) S (d) Va

60. Golden rice is a rich source of
(a) Vitamin A (b) Vitamin B
(c) Vitamin C (d) Vitamin D

61. Mushroom belongs to class
(a) Bacteria (b) Virus
(c) Fungi (d) None of these

62. Deficiency of zinc in rice plant is called as
(a) Albino (b) Khaira
(c) Stunty grass (d) None of these

63. Present Director General of ICAR is
(a) S. Ayappan (b) Paroda
(c) Mangala Rai (d) H. S. Gupta

64. Flavr savr is GE variety of
(a) Cotton (b) Soybean
(c) Tomato (d) Brinjal

65. Major form of translocation of carbohydrates in plants is in the form of
(a) Maltose (b) Glucose
(c) Fructose (d) Sucrose

66. The synthesis of an *RNA* copy from a sequence of DNA (a *gene*) is known as
(a) Transcription (b) Transistion
(c) Translation (d) Trans - substitution

ANSWERS
50. a 51. b 52. c 53. a 54. c 55. c 56. b 57. a 58. c 59. a
60. a 61. c 62. b 63. a 64. c 65. d 66. a

67. Protein involved for joining the DNA during replication is
(a) DNA ligase
(b) Helicase - II
(c) SSB protein
(d) Topoisomerase

68. The gene pool in which inter-mating is easy and leads to production of fertile hybrids i.e., includes plants of the same species or of closely related species is called as
(a) Secondary gene pool
(b) Teritiary gene pool
(c) Primary gene pool
(d) None of the above

69. Which is not an antibiotic ?
(a) Streptomycin (b) Tetracyclin
(c) Penicillin (d) Carbofuron

70. Breeder seed is the progeny of
(a) Nucleus seed
(b) Certified seed
(c) Foundation seed
(d) Registered seed

71. Gundi bug is a pest of which crop ?
(a) Red gram (b) Wheat
(c) Soybean (d) Rice

72. In 1957, the terms recon, muton and cistron was given by
(a) Davis (b) Blackeslee
(c) Benzer (d) Darlington

73. Source of dwarfing gene in wheat is
(a) Norin 10
(b) Tift 23A
(c) Dee - Geo - Woo - Gen
(d) None

74. The process in which ammonium salts are oxidized to nitrate ions by certain group of bacteria like nitrosomonas and nitrosococos etc., is called as
(a) Ammonification
(b) Denitrification
(c) Nitrification
(d) None of the above

75. An important solute in osmoregulation of plants in stress conditions is
(a) Proline (b) Butanol
(c) Nitrogen (d) Glutamate

76. The gene for gene concept of disease resistance and susceptibility in 1946 is given by
(a) Kuhn (b) Burril
(c) Flor (d) Stanley

77. The concept of plant ideotype was first given by
(a) Walter Sutton
(b) Donaid
(c) Watson and Crick
(d) Johnson

78. An organism or organ having tissues of different genetic constitutions or origin as a consequence of gene mutation, natural or artificial fusion of different zygotes or organs is called
(a) Chimera (b) Hybrid
(c) Cybrid (d) Vybrid

79. The haploid of a tetraploid plant is called as
(a) Haploid (b) Monoploid
(c) Dihaploid (d) Polyploid

ANSWERS

67. a 68. c 69. d 70. a 71. d 72. c 73. a 74. c 75. a 76. c
77. b 78. a 79. c

80. The first hybrid in pigeon pea in the world is
(a) ICPH 12 (b) PH 102
(c) IIPH 4 (d) ICPH 8

81. In 1909, cytoplasmic inheritance was described by
(a) Correns
(b) Dewey
(c) Eberhart and Russel
(d) Dhawan

82. In 1928, the term 'Transformation' was coined by
(a) Galton (b) Navashin
(c) Koelreuter (d) Griffith's

83. A bacteria which have a large number of flagella all over the cell is categorized as
(a) Atrichous
(b) Lophotrichous
(c) Peritrichous
(d) Amphitrichous

84. The square root of the variance refers to
(a) Variance
(b) Standard deviation
(c) Standard error
(d) Mean deviation

85. Which of the following test is used to know the significance of several means ?
(a) Z test (b) t test
(c) F test (d) Chi - square test

86. Green ear is a disease of
(a) Bajra (b) Red gram
(c) Soybean (d) Rice

87. Mendel law of inheritance rediscovery was not done by
(a) Correns
(b) Tschermark
(c) De Vries
(d) Johannsen

88. The number of chromosomes present in the endosperm of common wheat is
(a) 21 (b) 42
(c) 63 (d) 14

89. A gene carried on the Y chromosome and therefore transmitted from father to son is called as
(a) Ward body
(b) Navashin body
(c) Barr body
(d) Holandric gene

90. The causal organism which is involved in early blight of potato is
(a) *Macrophomina phaseolina*
(b) *Cercospora concors*
(c) *Alternaria solani*
(d) *Rhizoctonia solani*

91. The concentration of ozone is found maximum in
(a) Troposphere
(b) Upper stratosphere
(c) Lower stratosphere
(d) Mesosphere

92. In 1910, the explanation for Sex linked inheritance, Sex limited character, Sex linkage was given by
(a) Morgan (b) Brown
(c) Navashin (d) Sturtevant

ANSWERS

80. d 81. a 82. d 83. c 84. b 85. c 86. a 87. d 88. c 89. d
90. c 91. c 92. a

93. **The random distribution of alleles to the gametes that occurs when genes are located in different chromosomes can be explained by**
    (a) Law of segregation
    (b) Law of independent assortment
    (c) Law of multiple alleles
    (d) None of the above

94. **A mutant converted into a wild species is known as**
    (a) Silent mutation
    (b) Giant mutation
    (c) Point mutation
    (d) Reverse mutation

95. **Colour blindness controlling genes are situated on**
    (a) X chromosome (b) Autosome
    (c) Y chromosome (d) None of these

96. ***Raphanobrassica* was developed by**
    (a) Winkler (b) Karpechenko
    (c) Darlington (d) White

97. **Neurotoxin present in lathyrus is called**
    (a) OBAA (b) AABO
    (c) BOAA (d) ABAO

98. **The scientific name of the jassid, which is involved in transmission of little leaf disease in brinjal caused by mycoplasma is**
    (a) *Hishimonas phycitis*
    (b) *Ramularia areola*
    (c) *Sclerotium phycitis*
    (d) None of the above

99. **PPV & FR is located at**
    (a) Ludhiana (b) New Delhi
    (c) Hyderabad (d) Chennai

100. **The process in which seeds are formed but the embryos develop without fertilization is known as**
    (a) Apogamy (b) Apospory
    (c) Anagenesis (d) Apomixis

QQQQQ

ANSWERS

93. b 94. d 95. a 96. b 97. c 98. a 99. b 100. d