Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya

Gwalior (M. P.)

Syllabus for the written test proposed to be conducted for Programme Assistant (Agriculture and Allied Subject) advertised vide University Advisement IPRO/Advt. No./30th/2023/Reg./3206 dated 25-09-2023

MARKS DISTRIBUTION:

A.	**Agriculture**	**-**	**130 questions**
1.	Agronomy & Agro-meteorology	-	15 questions
2.	Horticulture	-	15 questions
3.	Soil Science	-	15 questions
4.	Plant Physiology	-	05 questions
5.	Genetics & Plant Breeding	-	10 questions
6.	Extension Education	-	10 questions
7.	Entomology	-	10 questions
8.	Plant Pathology	-	10 questions
9.	Agriculture Economics	-	12 questions
10.	Seed Technology	-	08 questions
11.	Statistics	-	10 questions
12.	Agriculture Engineering	-	05 questions
13.	Animal Husbandry & Dairy	-	05 questions
B.	General Studies	-	30 questions
C.	Computer Knowledge	-	20 questions
D.	Hindi	-	10 questions
E.	English	-	10 questions
	Total	**-**	**200 questions**

SCHEME OF EXAMINATION:

- No. of questions : 200
- Time duration : Three Hours
- One mark for each correct answer.
- 0.25 marks will be deducted for each wrong answer.

DETAILED SYLLABUS:

A. AGRICULTURE

1. Agronomy& Agro-meteorology

General: Basic principles of crop production; cultivation of rice, wheat, chickpea, pigeon-pea, sugarcane, groundnut, rapeseed mustard and potato.

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, Organic farming, precision farming, integrated farming systems, principles of field experimentation. Climate shift and its ecological implications, Agro-ecological regions in India, Climatic factors and their effect on crop productivity, weather & climate, Earth's atmosphere, solar radiation, Atmospheric temperature and global warning. Crops and atmospheric humidity, weather forecasting.

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), fiber crops (cotton, jute, sunnhemp), sugar crops (sugarcane), fodder & forage crops (sorghum, maize, napier, berseem, Lucerne, oats), and commercial crops (potato, tobacco). 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 Application methods and equipments, special and problematic weeds and their management in cropped and non-cropped situations, weed management in field crops.

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 wheat, irrigation water quality and its management, water management in major field, crops (rice, wheat, maize, groundnut, sugarcane) Agricultural drainage.

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.

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 mid-season corrections for aberrant weather and its recycling. Watershed management.

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.

2. Horticulture

Importance & scope of horticulture. Climatic zones of horticulture crops. Orchard establishment including high density planting. Propagation methods & root stocks. Training & pruning methods, use of PGR. Production technology of fruit crops (Mango, Banana, Papaya, Ber, Apple, Guava, Citrus, Custard apple)

Importance & scope of vegetables. Classification of Vegetables. Package of practices of vegetables (Tomato, Brinjal, Chilli, Okra, Cucumber, Bottle gourd, Sponge gourd, Cabbage, Cauliflower, Onion, Garlic, Potato, Palak, Carrot, Radish, Drumstick, Peas & Cowpea) Establishment of Ornamental garden, uses of tree, shrubs, climbers & seasonal flowers in garden. Package of practices of Rose, Marigold and Chrysanthemum.

Importance & scope of spices, Aromatic, Medicinal and Plantation crops. Production Technology of Ginger, Turmeric Coriander, Fenugreek, Lemon grass, Coconut, Betel Vine, Diascoria, Opium, Aloe and Stevia.

Importance & Scope of Post Harvest Technology of Horticulture crops. Maturity indices, grading, packing & storage of fruits & vegetables. Importance & Scope of Fruit & Vegetable Preservation. Principles of preservation by heat, low temperature, chemicals & fermentation. Preservation methods by canning, bottling, freezing, drying &deheydration. Preparation of jams, jellies, candies, chutney, pickle, ketchup and squashes. Preservatives and colours permitted and prohibited in India.

3. Soil Science

Soil as a medium for plant growth, composition of earth`s crust, weathering of rocks and minerals, components of soil-their importance, soil profile, soil partials-physical mineralogical and chemical nature. Mechanical analysis, Stokes law, assumptions, limitation and applications. Soil, physical properties-density, porosity, texture, soil structure and their brief descriptions. Rheological properties in soils, calculations of porosity and 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 exchange 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. Pesticides.

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, luxury consumption, nutrient interaction and chelated micronutrients. Soil fertility,

evaluation and management for plant growth, soil testing and fertilizer recommendations. Soil classification- diagnostic surface and sub-surface horizons, soil survey- objectives, uses, land capability classification. Remote sensing and its application in agriculture, SIS, GIS and GPS-basic features and uses in agriculture, Soil micro-organisms, classification and their roles. Organic matter-decomposition, C:N ratio, mineralization and immobilization processes, humus, role of organic matter in soil quality. Soil erosion, types and control measures. Fertilizers and manures – classifications, NPK fertilizers, their reactions in soil, green manuring, recycling of organic wastes, composting. Soil and water pollution- sources brief idea about different pollutants in soils and their managements.

4. 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. Phyto-hormones and their physiological role. Photo-periodism, vernalisation; pollination / fertilization in flowing plants. Post- harvest physiology and its significance.

Seed structures of important crops viz. gram, maize, castor, wheat, soybean etc., Process of seed formation, morphological, physiological and biochemical changes accompanying seed development. Seed viability and vigour, Physiology of seed germination with steps and phases involved. Factors affecting seed germination. Phases of growth. Factors affecting growth. Measurement of growth, growth analysis –definitions and mathematical formulae, application. Properties and physiological functions of water in plants. Water potential and its components. Measurement of water status in plants. Kinds of soil water

Anti transpirants, bleeding and guttation, water use efficiency (WEU) Stomatal structure and function. Raw material, pigment system, structure of chloroplast, photo-phosphorylation, light and dark reactions, C3, C4 and CAM pathway, photorespiration, Phloem loading, translocation of assimilates, Source and sink relationship. Glycolysis, kerb's cycle, electron transport system. Pentose phosphate pathway. Glyoxylate cycle and fermentation. Factors affecting respiration. Measurement of respiration. Mengel's classification of nutrients, criteria of essentiality, physiological role, metabolic functions and deficiency symptoms of elements, foliar application, hydroponics. Mechanism of mineral salt absorption and translocation. Classification of plants, thermo-periodism, phyto-chromes. Definition, nature of process and application, devernalization, mechanism and application. Occurrence, biosynthesis, physiological role and mode of action of auxins, gibberellins, cytokinins, ethylene, abscisic acid, growth retardants

Seed dormancy, Storage physiology, Fruit ripening –Climacteric and non climacteric fruits. Hormonal regulation of fruit ripening with ethral, CCC, paleobuterozole and Polaris. Scope and importance of environmental studies. Multidisciplinary nature of environmental studies and need for public awareness. Natural resources and associated problems Forest resources, Water resources, Mineral resources, Food resources, Energy resources, Land resources Concept

Structure and function of an ecosystem Producers, consumers and decomposers. Energy flow, Ecological succession. Food chain, food webs and ecological pyramids. Structure and function of the various ecosystem: Cropland ecosystem, Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystem.

5. Genetics & Plant Breeding

Structure and function of cell organelles; mitosis and meiosis; Mendelian genetics; structure and functions of nucleic acids, Characteristics of prokaryotic and eukaryotic organisms, physical and chemical basis of heredity; chromosome structure; genes/operon concept; protein biosynthesis; transformation, recombination, Heterosis; elements of economic botany, Seed germination and dormancy; pollination/fertilization in flowering plant; methods of seed testing; breeders, foundation and certified seeds; seed production in self and cross pollinated crops, DUS testing & PPV & FR.

6. Extension Education

Extension Education-concept, meaning, principle, philosophy, scope and importance. Extension Programme Planning and evaluation-step and principle, models of organizing agricultural extension; historical development of extension, Rural development, meaning, importance and problems; Rural development programmes in India-Pre-independence era to recent ones; Extension Teaching Methods, definition and concept of sociology, differences between rural & urban communities, social stratification., social groups, social organization and social change. Rural leadership, educational psychology-learning and teaching, role of personality in agricultural extension Indian rural system-its characteristics; value system, caste and class; structure and customs, rural group organization and adult education.

Communication, principles, concept, process, elements and barriers in teaching methods. Different kinds of communication methods and media and AV aids/materials. Media mix, Campaign, Cyber extension- internet, cybercafé, Kisan Call Centers, teleconferencing, agriculture journalism, diffusion and adoption of innovations, adopter categories, capacity building of extension personnel and farmers- training to farmers, women and rural youth.

7. Entomology

Crop Protection Principles in field and storage. Major insect pests and diseases of agricultural crops like rice, cotton, pulses, oilseed crops like groundnut, soybean and mustard, vegetables like tomato, Cole crops; fruit crops like mango and banana and their management principles.

Classification of animal kingdom up to class level and the distinguishing characters up to orders in class insecta and the general organization of an insect external morphology with special reference to lepidopteron larvae, coleopteran adults; and honeybee; metamorphosis and moulting; different physiological systems; insect plant 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. Cultural, biological, insecticidal, quarantine, and regulatory aspects; insecticide classification and insecticide resistance management; and insect protective transgenic crops.

8. Plant Pathology

Important plant pathogenic organisms. History of Plant Pathology. Survival and Dispersal of Plant Pathogens. Phenomenon of infection. Pathogenesis, Defense mechanism, Epidemiology, Forecasting. Principles of plant diseases management and integrated disease management (IDM). Etiological agents: rusts, smuts, powdery/downy mildews, wilts, yellows, mosaic, necrosis, enations, blights and witches- broom.

Major diseases of rice, wheat, sugarcane, red gram, cotton, potato, chilli, onion and cucurbits.

Sterilization, disinfection and pasteurization; Koch's postulates; History of Microbiology, Protection against infections. Characteristics of prokaryotic and eukaryotic organism, differences between fungi, bacteria, mycoplasma and viruses; Bacteriophages, viroids and prions.

9. Agricultural Economics

Importance of agriculture in national economy: Theory of consumer behavior, theory of demand, elasticity of demand, indifference of curve analysis, theory of firm, cost curves, theory of supply, price determination, market classification, concept of macro economics, money and banking, national income. Agricultural marketing-role, practice, institutions, problem and reforms, role of capital and credit in agriculture, crop insurance, credit institutions, cooperatives, capital formation in agriculture, agrarian reforms, globalization, WTO & its impact on Indian agriculture.

Basic principles of farm management, concept of farming system and economics of farming systems, agricultural production economics-scope and analysis, factor-product relationship, marginal cost and marginal revenue, farm planning and budging, agricultural finance: nature and scope. Time value of money, compounding and discounting. Agricultural credit: meaning, definition, need, classification. Credit analysis: 4R's, 5C's and 7P's of credit, repayment plans. History of financing agriculture in India. Commercial banks, nationalization of commercial banks. Lead bank scheme, regional rural banks, scale of finance. Higher financing agencies, RBI, NABARD, AFC, Asian Development Bank, World Bank, role of capital and credit in agriculture; credit institutions, co-operatives and agrarian reforms in India.

10. Seed Technology

Seed and seed technology: introduction, definition and importance. Deterioration causes of crop varieties and their control; Maintenance of genetic purity during seed production, seed quality; Definition, Characters of good quality seed, different classes of seed. Foundation and certified seed production of important cereals, pulses, oilseeds, fodder and vegetables. Seed certification, phases of certification, procedure for seed certification, field inspection. Seed Act and Seed Act enforcement. Duty and powers of seed inspector, offences and penalties. Seeds Control Order 1983, Varietal Identification through Grow Out Test and Electrophoresis, Molecular and Biochemical test. Detection of genetically modified crops, Transgene contamination in non-GM crops, GM crops and organic seed production. Seed drying, processing and their steps, seed

testing for quality assessment, seed treatment, its importance, method of application and seed packing. Seed storage; general principles, stages and factors affecting seed longevity during storage. Measures for pest and disease control during storage. Seed marketing: structure and organization, sales generation activities, promotional media. Factors affecting seed marketing, Role of WTO and OECD in seed marketing

11. Agricultural Statistics

Introduction: Definition of Statistics and its use and limitations; Frequency Distribution and Frequency Curves. Measures of Central Tendency : Characteristics of ideal Average, Arithmetic Mean, Median, Mode, Merits and Demerits of Arithmetic Mean. Measures of Dispersion: Variance, Standard deviation, and Coefficient of Variation. Probability: Concept of probability and definition; Normal Distribution and its Properties. Introduction to Sampling : Random Sampling; the concept of Standard Error. Tests of Significance – Types of Errors, Null Hypothesis, Level of Significance and Degrees of Freedom , Steps involved in testing of hypothesis; Large sample Test : SND test for means, Single Sample an Two Samples (all types); Small Sample Test for means ; Students t-test for Single sample, Two Samples and paired t test, F test : Chi-Square Test in 2x2 Contingency Table, Yate's correction for continuity. Correlation: Types of Correlation and identification through Scatter Diagram, Computation of Correlation coefficient 'r' and its testing. Linear Regression : Of Y on X and X on Y, inter-relation between 'r' and the Regression coefficients, fitting of regression equation. Experimental Designs: Basic Designs; Completely Randomized Design (CRD), Layout and analysis with equal and unequal number of observations, Randomized Block Design (RBD), Layout and analysis, Latin Square Design (LSD), Layout and analysis.

Introduction to Computers, Input and output Devices, Units of Memory. Hardware, Software and Classification of computers. Types of Processors. Booting of Computes, warm and cod booting, computer viruses, worms and Vaccines Operating System – DOS and DOS commands. Operating system WINDOWS and its elements. MS- WORD, features of word processing. Creating, Editing document in word MS-EXCEL-Electronic spreadsheet, concept, packages. Creating, editing and saving a spread sheet. Editing cell contents. Commands for work sheet. Use of in-built Statistical and other functions and writing expressions. Use of Data Analysis tools, Correlation and Regression. Entering expressions, Creating graphs. t-test for two samples and ANOVA with one way classification. Introduction to MS Power Point, features of power point package. Creating new presentation, power point views. Introduction to MS Access, concept of data base, creating data base. Creating tables in data base. Principles of programming. Flow charts. Algorithms, illustration through examples. Introduction to Internet. World wide web, information retrieval. Introduction to electronic mail. Advantages of E-mail.

12. Agriculture Engineering

Soil and Water Conservation, causes of soil erosion. Definition and agents of soil erosion, water erosion: Forms of water erosion. Gully classification and control measures. Soil loss estimation by universal Loss Soil Equation. Soil loss measurement techniques. Principles of erosion control: Introduction to contouring, strip cropping. Contour bund. Graded bund and bench terracing.

Grassed water ways and their design. Water harvesting and its techniques. Wind erosion: mechanics of wind erosion, types of soil movement. Principles of wind erosion control and its control measures.

Classification of energy sources, contribution of these of sources in agricultural sector, Familiarization with biomass utilization for biofuel production and their application, Familiarization with types of biogas plants and gasifiers, biogas, bio-alcohol, biodiesel and biooil production and their utilization as bioenergy resource, introduction of solar energy: solar radiation, spectral distribution of solar radiation, beam and diffuse radiation, air mass. Collection and their application, solar radiation measuring instruments,

Green house technology: Introduction, Types of Green Houses; Plant response to Green house environment, Planning and design of greenhouses, Design criteria of green house for cooling and heating purposes. Green house equipments, materials of construction for traditional and low cost green houses, Naturally ventilated solar greenhouse, high-tech greenhouse, concept and construction of low tunnel greenhouse, use of shade net house in protected cultivation.

13. Animal Husbandry & Dairy

Role of livestock in the national economy. Reproduction in farm animals and poultry. Housing principles, space requirements for different species of livestock and poultry. Management of calves, growing heifers and milch animals. Management of sheep, goat and swine. Incubation, hatching and brooding. Management of growers and layers. Important Indian and exotic breeds of cattle, buffalo, sheep, goat, swine and poultry. Improvement of farm animals and poultry. Digestion in livestock and poultry. Classification of feedstuffs. Proximate principles of feed. Nutrients and their functions. Feed ingredients for ration for livestock and poultry. Feed supplements and feed additives. Feeding of livestock and poultry. Introduction of livestock and poultry diseases. Prevention (including vaccination schedule) and control of important diseases of livestock and poultry.

B. GENERAL STUDIES

- History, culture, Literature, Geography, Constitutional System, Tribes and Current affairs/ events of M.P.
- Major wildlife sanctuary and national park
- Major personalities of Madhya Pradesh
- Irrigation planning
- Culture
- Main general knowledge of Madhya Pradesh
- Sports
- Major rivers
- Economic Science
- History
- Geography
- General Policy
- Books and Authors, Science and innovations, Important Dates, Music & Literature, National Dance, Famous Places, Tourism spots of Historical Importance, Geography of India,

Economic issues in India, National News (current), International issues, Indian Culture, Countries and capitals, Political Science, Scientific observations, About India and its neighboring countries, World organizations

C. COMPUTER SCIENCE

- Use of IT and Artificial Intelligence in crop production and management, disease and pest identification, generation of district and block level agrometeorology advisories through Web and Mobile applications
- Basics of e-governance applications like- e-office, e-HRMS, e-Store Management, academic management system, e-library etc.
- Use of software packages like MS Word, MS Excel, MS Power Point, Video Conferencing systems like ZOOM, Google Meet, Webex, MS Team etc.

D. ENGLISH

- Spellings/ Detecting
- Close Passage
- Idioms & Phrases
- Conversion into Direct/ Indirect narration
- Synonyms/ Homonyms
- Improvement of Sentences
- Antonyms
- Spot the Error
- Shuffling of Sentences in a passage
- Mis-spelled words
- Shuffling of Sentence parts
- Comprehension Passage
- Fill in the Blanks
- One word substitution
- Active/ Passive Voice of Verbs

E. HINDI

- संधि
- उपसर्ग–प्रत्यय
- समास
- वाक्य भेद, तत्सम–तद्भव
- वाक्य शुद्धि
- मुहावरे
- लोकोक्तियॉ / कहावतें
- वाक्य में क्रमबद्धता
- अनुच्छेद में क्रमबद्धता
- अपठित गद्यांश
- पाठबोधन
- रिक्तस्थानों की पूर्ति