

**OFFICE OF THE DEAN, COLLEGE OF AGRICULTURE,  
R.V.S. KRISHI VISHWA VIDYALAYA GWALIOR 474002, M.P.**

**E-TENDER NOTICE FOR THE PURCHASE OF LABORATORY EQUIPMENTS/  
STRUCTURES**

**(IPRO/BTC/2019-20/111 Dt.06.12.2019)**

Following laboratory equipments/instruments/structures are to be procured at College of Agriculture, RVSKV, Gwalior for the establishment of Biotechnology Centre. This procurement will be carried out through the e-procurement system of [www.mptenders.gov.in](http://www.mptenders.gov.in). On-line bids, under Open Tender Enquiry, following the two bids system are invited for supply of these equipments/instruments/structures. Tender documents with specifications can be purchased from this site by paying the stipulated cost as mentioned below:

<b>Item #</b>	<b>Name of the Equipment/ Item/Structure</b>	<b>Document Cost</b>	<b>EMD</b>
<b>Third Call</b>			
1.	Zoom Stereomicroscope with Photographic attachment and desktop	₹ 2000	₹ 36000
2.	Bench Top Lyophilizer (Freez Dryer)	₹ 1000	₹20000
3.	UV-VIS Spectrophotometer Microlitre Capacity (Micro Volume Spectrophotometer)	₹ 1000	₹20000
4.	CO <sub>2</sub> Incubator	₹ 1000	₹ 12000
5.	Elisa cum multifarious Micro Plate Reader	₹ 1000	₹ 10000
6.	Refrigerated Incubator with Illumination and Shaker	₹ 1000	₹ 10000
7.	Automatic Autoclave	₹ 3000	₹ 64000
8.	Image Analysis System	₹ 2000	₹ 30000
9.	Glassware Washing System	₹ 2000	₹ 26000
10.	Phenomics facility with Climate controlled Green House	₹ 10,000	₹1600000
<b>First Call</b>			
11.	Ultra pure water purification	₹ 1000	₹ 20000
12.	DNA sequencer ( NGS)	₹ 5,000	₹600000
13.	Controlled Environment System (Mid and Short-term storage unit)	₹ 5000	₹ 300000
14.	Fragment analyzer (Advanced Capillary Electrophoresis System)	₹ 3000	₹ 80000
15.	Automatic DNA Extraction System	₹ 2000	₹ 40000
16.	Cryotome	₹ 2000	₹ 40000
17.	Bioreactor System	₹ 3000	₹ 80000

18.	Flow Cytometer	₹ 3000	₹ 70000
19.	Horizontal laminar air flow cabinet	₹ 1000	₹ 6000
20.	Genomics Softwares	₹ 1000	₹ 2000
21.	Computer with accessories	₹ 1000	₹ 3000
22.	UPS	₹ 1000	₹ 3000
23.	Photocopier	₹ 1000	₹ 2000
24.	RO system	₹ 1000	₹ 3000
25.	Water chiller	₹ 1000	₹ 3000
26.	Inverter with battery	₹ 1000	₹ 3000
27.	Air conditioner with voltage stabilizer	₹ 1000	₹ 3000

Please read and follow the instructions carefully to avoid the rejection of the tender. You may also send your representatives, duly authorized in writing to attend the Technical Evaluation and clarification regarding bids which is scheduled at 3:00 PM on 11<sup>th</sup> January, 2020.

**Dean, College of Agriculture Gwalior**

**OFFICE OF THE DEAN, COLLEGE OF AGRICULTURE,  
R.V.S. KRISHI VISHWA VIDYALAYA, GWALIOR 474002, M.P.**

**E-Tender Document**

**CRITICAL DATES**

<b>S. No.</b>	<b>Item</b>	<b>Date</b>	<b>Time</b>
a)	Publishing Date	06 December 2019	16 <sup>00</sup>
b)	Document Purchase Start Date	06 December 2019	10 <sup>30</sup>
c)	e-Bid Submission End Date	07 January 2020	17 <sup>00</sup>
d)	Physical bid document Submission end date in the Office	10 January 2020	15 <sup>00</sup>
e)	Opening of the Technical Bid at RVSKVV	11 January 2020	15 <sup>30</sup>
f)	Technical Evaluation of Bids	11 January 2020	16 <sup>00</sup>
g)	Financial/Price Bid e-Opening Date	25 January 2020	14 <sup>00</sup>

**DEPOSITING THE BIDS:**

The bids will be submitted through on-line mode of [www.mptenders.gov.in](http://www.mptenders.gov.in). However, certain documents would be required to be submitted physically to our office. Details are as follows:

**(A) On-line Submission:**

**(i) Cover-I:** Will contain the Technical Bids with the following documents:

- Detailed technical write-up highlighting the model Name/Number, features of the equipment offered and / or Technical literature/manuals.
- Certificate for acceptance of terms and conditions of tender enquiry on firms letterhead.
- Original equipment manufacturer (OEM) certificate or authorized dealership/distributorship certificate as applicable.
- Manufacturing Registration No.
- Company Printed Price List ( If available)
- Last 3 (three) years income tax return.
- Audited Balance Sheet for Last 3 (Three) years.
- TIN number/PAN Number/Certificate/GST number
- Business Registration Certificate.
- Supplier should have at least average annual turnover of Rs one Core for major equipments and 50 lakhs for minor items for last 3 years.
- Scanned Copy of EMD (or exemption proof, if exempted) as shown against each item.
- Compliance Certificate. Certificate of clause by clause compliance of specifications as mentioned in tender.

**(B) Physical Submission:**

Following documents to be submitted in hard copy physically in a sealed envelope by **Speed Post/Registered post** so as to reach prior to bid submission closing date & time. The responsibility to ensure this lies with the Bidder.

**Please do not submit the hard copy of “Commercial/Price bid”.**

- All the documents submitted on-line in Cover I.
- EMD as shown against each item (in original) or proof of exemption **(NIS Certificate against exemption from deposition of EMD should be strictly for only indigenous manufactured items not for items of foreign origin/manufactured in foreign countries other than India. Moreover tendered item should strictly be matched with the list of NIS for which any firm has claimed for exemption from EMD. Otherwise claim is not valid and tender will not be accepted.**
- Tender fee receipt copy (as applicable).
- Tender conditions Acceptance Certificate in form of downloaded Tender documents duly stamped and signed.
- Client list/ List of users on manufacturers’ letter head duly stamped and signed.
- User Certificate with Phone No. and E mail address.
- Guarantee/warranty on manufacturers’ letterhead.
- The supplier is bounded to supply spare parts of equipments for the at least next 10 years.

**GENERAL TERMS AND CONDITIONS:**

- 1.\*Only the manufactures and/or their authorized dealer/distributors/sole agents/Channel Partners need to submit their tender. The authorized firms should furnish a certificate from the manufacturer for their dealership/distributorship in original with the physical bid otherwise the offer will not be considered.
- 2.No person or firm shall submit more than one Tender for the same item. No offer should have more than one model quoted; in case of more than one alternate offer only the first option will be considered.
3. It is mandatory to provide all the relevant information in ***Annexure -I***.
4. Broad-based specifications of equipment/items/systems/works *etc.* are given in ***Annexure- II*** of purchased tender. The tenderer should also take note of the remarks, if any, given there in.
5. a. Last date for submission of e-Tender is 07.01.2020 up to 5:00 PM on www.mpeproc.gov.in.  
b. Tender must be submitted in sealed cover to the Dean, College of Agriculture, RVSKVV, Gwalior **474002** by **Registered/Speed Post**, so as to reach on or before dated 10-01-2020, 3:00 PM.  
c. Belated tender due to postal or any other delay will be rejected.  
d. The tender for each item should be sent separately. The duly sealed envelope should super scribe TENDER FOR THE ITEM №\_\_\_\_\_ (NAME OF THE EQUIPMENT) DUE ON 11 January 2020 with reference number.  
e. If offers for more than one item are clubbed together, tender will be rejected.

f. The tender offers should have a validity of 180 days or more from the due date. The tenders will be valid for 6 months from the date of opening and may be asked for extension by taking written concern of the firms.

g. **Price bid will be opened online at [www.mptenders.gov.in](http://www.mptenders.gov.in) on 25-01-2020 from 2;00 P.M. to 5.00PM. If date of opening of price bid will changed due to any circumstances. That will be informed to bidders.**

h. R.V.S. Krishi Vishwa Vidyalaya (RVSKVV) reserves the right to extend the opening due date and or the date of opening the tenders.

i. All the leaflets in the offer should be marked with signature and seal of authorized person.

6. a. The rates quoted should preferably in Indian Rupees (₹) for a **single complete unit** with F.O.R. delivery at RVSKV, Gwalior. The rates quoted should be inclusive of packing and forwarding charges/loading/unloading/handling charges/freight/full risk coverage/insurance, *etc.* In case of imported goods all the expenses towards custom duty, clearing charges and transportation with insurance will be borne by the firm/tenderer and they must quote the rates inclusive of all FOR, RVSKV, Gwalior .

b. Excise duty/Sales Tax/GST/Custom duty (with and without concession certificate) and other levies, if any should be shown separately and the **total price** of each item should be worked out incorporating the same.

c. The institute will provide the custom duty exemption certificate if necessary for the imported instrument.

d. Any other charges, such as technical service charges, cost of training, installation charges, TA/DA of tenderer's staff *etc.* if any, should be shown separately for each item and each sub-item and the total price of each item should be worked out incorporating the same.

7. All losses during transit will have to be made good by the tenderers at his cost within a period of 15 days.

8. The tenderers must provide guarantee/warranty on **manufacturers' letterhead** of satisfactory functioning of the equipment/system and free service including free replacement of parts for a period of at least **3 years** from the successful and satisfactory installation of the equipment/system. Original to be deposited by the successful bidder at the time of supply.

9. **Performance Guarantee:** The Successful bidder/supplier will be required to furnish a Performance Guarantee in the form of FDR from a public sector bank or a private sector bank authorized to conduct government business for a sum equal to **10%** of the Supply Order value within 30 days of

signing of the Supply Order. Performance Bank Guarantee will be valid up to 60 days beyond the date of guarantee/warranty.

**10.** Offer must be accompanied by **Earnest Money** as stated against each item must be submitted **on-line**. Without the deposition of earnest money, the offers will be rejected.

**11.** The standard terms and conditions of payment is in full only after the installation is affected to the satisfaction of RVSKVV authorities. In specific cases, Letter of Credit (LC) may be opened in any of the Nationalized Bank.

**12.** In case of equipment to be imported, import license NMI/CDE certificates, as applicable will be arranged by RVSKVV, as per the Government procedures.

**13.** Please quote maximum discounted price, as no further negotiations will be made.

**14.** Complimentary items/gifts offered will not be given any preference and will not be taken into account for calculating the cost of the item.

**15.\*The offer must mention make, model all the specifications of the item clearly. The company must enclose printed literature/catalogue/manufacturer's web-site showing detailed technical specifications required.** A folder showing many instruments without detailed technical specification, or tailor made literature mentioning "yes" or "as per your specifications" for the specifications asked for, will not be considered. Specifications given in the offer must match to the website and/or printed technical literature otherwise the offers shall be rejected.

**16.** Technical specifications of the equipment / items have been very clearly formulated by the users/experts of the field as per the requirement of the work to be conducted. It will be sole discretion of the bidder whether to quote or not for an equipment with particular specifications.

**17.\*Firm must provide a compliance statement vis-à-vis specifications in a following "tabular form" clearly stating the compliance, supported by technical literature with clear reference.** This statement must be signed, with the company seal, by the Tenderer for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification of the offer.

<b>Name of Equipment:</b>		
<b>Technical Specification</b>	<b>Compliance (Y/N)</b>	<b>Deviation, If any</b>

**18.\*Offer must be accompanied with a comprehensive list of users on manufacturers' letterhead, wherever possible bidders may also provide certificates for satisfactory working of the equipment from users of universities and institutions of repute.**

**19. a.** If so desired by RVSKVV, the bidders shall have to enter in to an agreement.

b. Any wrong information about item, any forged document and any deviation, variation of non-compliance of the terms and conditions by the tenderers shall be considered as a breach of contract and RVSKVV reserves the right to forfeit the amount of earnest money and/or security deposit in full and take action as per legal arrangement.

**20.** Should there arise any dispute, the Hon'ble Vice Chancellor, RVSKVV, Gwalior shall be the sole Arbitrator whose decision in the matter shall be final and binding. Each and every judiciary transaction shall be subjected to Gwalior only.

**21.\***Tender will not be considered if the firm does not supply a copy of the TIN/ GST& PAN allotted to it. PAN of the owner or any other persons will not be accepted.

**22.**This tender is being issued with no financial commitment and the Buyer reserves the right to change or vary any part thereof at any stage. Buyer also reserves the right to withdraw the tender, should it become necessary at any stage.

**23.**RVSKVV reserves the right to accept or reject any or all offers in full or in part without assigning any reason (s) thereof. It also reserves the right to place an order wholly or in part with one or more than one firm as it may be convenient to RVSKVV, Gwalior.

**24.**The tenderer shall have to give an undertaking that the terms and conditions as mentioned above of this tender are acceptable to the tenderers in form of downloaded Tender documents duly stamped and signed.

**25.**If firm wishes, they can send their representatives, duly authorized in writing, to attend the Technical Evaluation and clarification regarding bids which is scheduled at 3:30 PM on 29 March 2019.

**26. In case, if single manufacturer of the any item and having propriety rights. Items may be purchased with the permission of concerned higher authority.**

**27. The 75% payment will be made after successful installation of the equipment/structure and remaining 25% after six months of satisfactory smooth working.**

**Dated:05-12-2019**

**Dean, College of Agriculture, Gwalior**

**OFFICE OF THE DEAN, COLLEGE OF AGRICULTURE,  
R.V.S. KRISHI VISHWA VIDYALAYA, GWALIOR 474002, M.P.**

**SUPPLEMENT / CHECK-LIST TO BE PROVIDED WITH TECHNICAL BID**

ITEM No. \_\_\_\_\_ NAME \_\_\_\_\_

<b>S.No.</b>	<b>Information required</b>	<b>Proposed</b>
1.	Make of main item	
2.	Model of main item	
3.	Name of manufacturer of Main Item	
4.	Country of origin of main item	
5.	Name, Make and model of sub item I (if any)	
6.	Name, Make and model of sub-item II (if any)	
7.	Name, Make and model of sub-item III (if any)	
8.	Delivery within (days)	
9.	Rate of Excise duty (%) with surcharge, if applicable (item-wise if different ED is applicable)	
10.	Rate of GST (%) liveable. If no, state basis and terms of the exemption.	
11.	Is Service Tax extra? If yes, rate of Service Tax liveable (%)	
12.	Is Custom Duty Exemption (CDE) required? If yes, Rate of Customs Duty (%) payable.	
13.	Any other Taxes / Duties / Octroi / Entry taxes <i>etc.</i> in %	
14.	Order to be placed on	
15.	Guarantee/Warrantee (3 years)	
16.	Validity (at least 180 days)	
17.	FOR:RVSKVV, Gwalior?	
18.	List of current users (Attach, if any)	
19.	Certification of satisfactory working of the equipment (Attach, if any)	
20.	Compliance of equipment with current directives of ISI / CE / EEC / US / EU or equivalent standards	
21.	Whether manufacturer / authorized distributor/sole agent? (Attach original certificate)	
22.	Technical literature (Attach, if any)	
23.	Earnest money (EMD) attached in form of FDR (attach original)	



24.	Situations of Authorized service centers/ service personals <i>etc.</i> (Provide complete address)	
25.	Relevant documents such as ITCC, ST registration shop Act. establishment certificate, factory registration <i>etc.</i> (enlist and attach)	
26.	TIN and PAN allotted (Attach a copy)	
27.	GST number	
28.	Any other relevant information	

**DECLARATION**

The terms and conditions as mentioned in the tender are acceptable to us.

Authorized Signatory

(Seal of the Firm)

**SPECIFICATIONS**

**ITEM No. 1 ZOOM STEREOMICROSCOPE WITH PHOTOGRAPHIC ATTACHMENT AND DESKTOP ( THIRD CALL)**

- Optical System: Galilean / Parallel Optical Zoom System
- Zoom Body: Stereo Zoom Body
- Zoom Ratio: Minimum zoom ratio of 1:10
- Objective: Distortion free Plan Apochromatic Parafoval Objective for 1x with N.A 0.1 and W.D. ~80 mm.
- Distortion free Plan Apochromatic Parafoval Objective for 1x with N.A 0.05 and W.D. ~170 mm.
- Nosepiece to attach 2 objectives at a time.
- Resolution at least 600Lp/mm
- Inbuilt Aperture Diaphragm for improving resolution and depth of focus.
- 10X with 22mm Field Number and 15X paired eyepiece with Field No. 16
- Tilting Trinocular tube with tilting angle of 5° - 45° with two way light path selection of 100:0 / 50:50 along with interpupillary distance adjustment facility.
- Focusing: Coarse and Fine focus mechanism.
- Transmitted Illumination Base with LED Light Source with minimum three illumination mode for bright field, Oblique and dark field.
- Reflected Light Illumination Ring type Flexible LED illumination with long life.
- Reflected light fluorescence attachment with coaxial illumination. Four-step slide switch. Maximum 3 mirror units should be attachable. With shutter (that prevents flash-light caused by switching). Filters for GFP and RFP should be provided. 100W Mercury illumination with 2 extra HG burners.
- Glass heating stage for temperature from ambient to 60 degrees with controller. The glass should come with at least 10 years warranty on breakage.
- 5MP color digital camera for microscope, with USB 3.0 Micro, Single chip 2/3 inch color CCD camera. Progressive scanning, RGB primary color on-chip filters, Sensitivity Equivalent to ISO 100/200/400, Exposure control Auto/ Manual AE lock. Full HD.
- Imaging Software: Fully compatible for Bright field, Phase Contrast as well as immunofluorescence imaging and analysis; Overlay multiple images, document groups for side by side image comparison; Touch count/Object Count Facility to count objects, make several classes and name them and export to excel files or workbooks; Time-lapse imaging at specified interval; Phase Analysis; Region and line measurements.
- Computer Workstation: Branded All-in-one computer with i7 processor or better, 8 GB RAM, 1 GB Graphic Card, Preloaded Anti-virus software, DVD Writer, Original Windows 7 Professional, 1TB HDD, ≥20" LED Monitor or better, Keyboard & Mouse, Colour Printer & 1KVA Online UPS.
- The microscope, camera and software preferably from the same manufacturer for better integration and no issues with software updates.

## **ITEM No. 2 BENCH TOP LYOPHILIZER (FREEZE DRYER) ( THIRD CALL)**

- System should be compact bench mounted table top unit with condensation capacity 5-6 liters/24 Hrs.
- CFC-free refrigeration system to cool collector to - 80°C (or lower) by two compressors in cascade.
- System should have two different process oriented control system both PLC based and can adapt the unit of every requirement.
- System should have built in facility for pre-freezing.
- It should have automatic pressure control and shelves temperature control.
- Moisture sensor to prevent vacuum start up when moisture is detected in the collector chamber area.
- Vacuum control to maintain set point vacuum level.
- Control panel should be touch screen that display system operation parameters and alarm message.
- Pressure control should be manual or automatic for faster freeze drying.
- It should have side mounted vacuum and drain connection with valve.
- LCD that displays system operating parameters, set-up parameters and alarm messages.
- System should have heated shelves for fast freeze drying.
- It should have defrosting functions and condenser design should allow easy and quick cleaning and defrosting.
- Should have pre- freezing option.
- System should be provided with one cylindrical chamber 3 shelves for lyophilisation in bulk.
- With Hybrid vacuum pump.
- With side mounted vacuum and drain connections with valves.
- With facility to connect with PC and software.
- Separate graphical and wave display to indicate that conditions are right to add samples.
- With display of total number of hours of refrigeration operation and the total number of hours of vacuum pump operation.
- Vacuum break valve.
- Freeze dryer should restart and the refrigeration and vacuum system should resume operation once power is restored for a short duration power failure.
- Port to transmit data to computer.
- Acrylic clear drying manifold with 8 ports to connect flasks of different sizes complete with adaptors/ valves *etc.*
- Must be offer 3 tier product shelves for tray drying which is fitted in drying manifold.
- Rotary Vane Vacuum Pump with minimum displacement capacity of 90 L/min.
- Must be two stage, oil sealed. Pump must include vacuum oil (extra one liter), Exhaust filter, oil filter, odour filter and all necessary tubing's.
- Other important accessories such as flasks, ampoules, three way ampoule connector, three tier heated product shelves for tray drying *etc.* to be quoted in the optional.
- With 8 No. Flask and Adapter to accommodate various capacity flasks.

**ITEM No. 3 SPECTROPHOTOMETER MICROLITRE CAPACITY (MICRO VOLUME SPECTROPHOTOMETER) ( THIRD CALL)**

- Minimum Sample volume of 0.2 - 0.5  $\mu$ l.
- At a time 1 to 8 samples should be measured
- System must be ideal for DNA, RNA and Protein measurements.
- Purity scan over entire wavelength range, 198 to 1000nm
- Quick and easy to clean.
- Multiple USB ports for data storage
- Internal memory for methods & results (at least 10GB)
- Working voltage: 220-240 Volts/50 Hz
- Accuracy of absorption: 3% or more
- Range of absorption: 0-300 nm or more
- Detection range for ds DNA: ~2 to 10000 ng/ $\mu$ l
- Auto calculation for nucleic acid quantification.
- Data Processing Unit with Intel i7 Processor, 8GB RAM, 1TBROM, Licensed latest version Windows Professional, MS Office and Adobe Photoshop. Should be supplied with suitable on-line UPS.

**ITEM No.4 CO<sub>2</sub> INCUBATOR( THIRD CALL)**

- Capacity  $\geq$ 150 litre.
- Fan less six-sided heating elements to ensures stable temperature control, uniformity and rapid recovery.
- Large display LCD and intuitive controls.
- Real-time data graphing and programmable alarms.
- Diagnostics with 72 hours of continuous data logging of temp, alarms, door openings CO<sub>2</sub>, O<sub>2</sub> should be store.
- Temp. Range: 4°C above ambient to 50°C $\pm$ 0.1°C.
- Temp. control:  $\pm$  0.1°C.
- CO<sub>2</sub> Range: 0.2-20%; Control:  $\pm$ 0.1%; Stability:  $\pm$ 0.2%; Uniformity:  $\pm$ 0.1%; Recovery Rate:  $\geq$  0.5% per minute or better.
- Required gas pressure: ~5psi / 0.35 bar.
- Infrared [IR] CO<sub>2</sub> Sensor with automatic Auto-zero Programmable function.
- HEPA Filter on CO<sub>2</sub> Inlet provides added protection from potential contamination sources.
- The chamber should be seamless interior.
- Password protection and built-in system diagnostics.
- Humidity: Reservoir: removable stainless tray; volume: 2.5 L; control: 95% @37°C
- Perforated Shelves  $\geq$ 4 nos.
- With sealed inner glass door.
- Instrument should be quoted with CO<sub>2</sub> cylinder and Two stage CO<sub>2</sub> regulator.
- Instrument should be quoted with a suitable servo voltage stabilizer.

## **ITEM 5 ELISA CUM MULTIFARIOUS MICRO PLATE READER( THIRD CALL)**

### **(A) ELISA READER, FILTER BASED PLATE READER**

- Filter based ELISA reader with halogen lamp as light source and silicon photo detectors.
- Linear measurement range of 0 to 6 Abs.
- Wavelength range from ~340 to 850 nm.
- Photometric accuracy : $\pm 2$  % or better.
- Resolution: 0.001Abs.
- Variable speed plate shaking capability in 3 different modes.
- Easy access ~8 position filter wheel.
- Machine should be supplied with 3 standard filters of ~405 nm, 450nm and 620nm.
- Should have automatic filter selection option.
- Should have automatic calibration before each reading.
- Should able to read 96 well format.
- Capable of doing multi standard tests and controls.
- Should be capable of reading UV and flat type wells.
- Able to run both in stand-alone mode and with computer and software controlled.
- System should have USB port for external printer connectivity option for the data printout.
- Unlimited user license to analyze the data in different user / computer systems.

### **(B) ELISA WASHER / MICROPLATE WASHER**

- Capability to wash 96 well micro plates.
- Option for interchangeable wash heads option 1x 8 or 1 x12 way wash heads
- Programmable washing time, volume and soaking time.
- Should use non-pressurized bottles to minimize the risk of spillage and also choice for user to substitute bottles of different sizes.
- Should provide two 2 liter wash bottles & one 4 liter waste bottle.
- With aerosol cover to prevent aerosols of infectious diseases from spreading.
- Residual volume less than 1.5  $\mu$ l.
- Dispensing volume should be 50 - 400  $\mu$ l for 96 well.
- USB port for easy data transfer.
- Large colour screen for easy set-up of wash protocols.
- Liquid level sensors in both the wash and waste bottles to guarantee safe performance.
- With plate sensor to recognize if a plate is present or not.
- After using the instrument, the automatic rinse feature can be set to operate in a specified time sequence to ensure that the liquid channels do not get clogged.
- PC with Printer and 1 KV UPS WITH 30 MIN BACK UP should be quoted separately.

**Please quote the pooled rates for A and B items.**

## **ITEM No. 6 REFREGERATED INCUBATOR WITH ILLUMINATION AND SHAKER ( THIRD CALL)**

- Display: Digital display RPM

- Microprocessor control system
- RPM: 30 to 400 rpm: with  $\pm 1$  rpm control with shaking in orbital motion.
- Temperature Range: 20°C below ambient up to 80°C.
- Temperature accuracy should be within  $\pm 1^\circ\text{C}$ .
- Illumination: with CFL energy efficient tubes.
- Shaker should have an option for having UV Germicidal Lights and culture drawer.
- Auto restart in case of power failure
- Motor: Heavy duty maintenance free and brushless induction motor
- Universal platform
- Shaking Amplitude: Clamps to hold 24-30 Nos. flasks of 250 ml.
- Alarms: Audio Visual on temperature deviation from SET values

### **ITEM No. 7 AUTOMATIC AUTOCLAVES( THIRD CALL)**

#### **(A) CYLINDRICAL AUTOMATIC AUTOCLAVE**

##### **Horizontal Cylindrical Autoclave Capacity: 600 Liters (Approx.)**

Double Door, Hinge Type, Electrically heated, Automation, Vacuum Pump & S.S. 304 Quality Condenser with Touch Screen HMI with PLC., GMP Door to be Operated Manually.

##### **Working parameters**

- Chamber Working Pressure: 1.2 Kg/Cm<sup>2</sup>
- Jacket Working Pressure: 1.5 Kg/Cm<sup>2</sup>
- Chamber Working Temperature: 121 °C

##### **Hydro test chamber**

- One & half time the working Pressure.
- Jacket Twice the Working Pressure.

**Steam Generator:** Twice the Working Pressure.

**Chamber:** The Sterilizing Chamber is fabricated from S.S.316 quality with full argon welding. Chamber should be provided with Round Corners for Easy Cleaning and a 2 % slope for full draining of the condensate. A removable screen plug should be provided in the Drain Lines to prevent Clogging of the Drainpipes and fittings. A Steam Baffle should be provided at the top of Chamber. The Chamber should be provided with a Compound Gauge on both sides.

**Jacket:** The jacket should be fabricated from Stainless steel 304 Quality. The Jacket besides reinforcing the chamber also helps to maintain the temperature uniformity in the sterilizing space. The Jacket should be provided with a safety Valve and Pressure Gauge on Operating side.

**Insulation:** Resin Bonded Glass wool insulation of 50mm thickness which is held in place by an outer cover of S.S.304 Stainless Steel.

**Contamination seal:** S.S. flush mounting should be fitted between the sterilization chamber & the sterile area walls to avoid any cross flow of air between the sterile and non-sterile side.

**Door:** The Sterilization Chamber should be provided with Two Hinge type door. The Door should be made up of S.S.316 Quality Stainless Steel Plate. Door opening/closing should be

Manual. Locking Assembly & hinge would S.S. 304 Quality (Polished). The Door is sealed with the help of Silicon Door Gasket.

Door should be pressed by S.S. radial arms duly polished. The door should be fitted with an automatic self-pressure locking device by a special clutch to prevent it being open under pressure. This should be opened only when chamber pressure comes to zero.

- Door interlock (Mechanical) to prevent simultaneous opening of both doors.

### **Finishing**

- Inside Mirror - Finished
- Outside Mirror- Finished

**Mounting & control panel:** The sterilizer should be mounted on a tubular stand of S.S.304 Quality (duly polished). The control panel should be made up of S.S.304 Quality (duly polished).

### **Programmable Logic Controller (Automation)**

- The control System should be provided with a universal standard make Plc. and a user friendly TOUCH SCREEN HMI as a front-End user interface. The Key Salient Features are as follows:
- Password Protection for Process Security.
- Inbuilt Real Time Clock with Date & Time Function.
- F0 Value for Automatic Computation of process Lethality.
- Batch Printing Facility. With facility to save the last cycle data.

**Manual back up:** The control system is provided with Manual backup in case of PLC failure. Here all process will be operated with the help of Manual ON/OFF Switches.

**Electrical switch gears:** The Control cabinet is provided with a main isolator for the three-phase supply and a separate switch for the control supply. All cabling are flexible, all cabling for temperature signals are shielded for minimum electro-magnetic interface. Necessary Relays, Contactors, MCB's, *etc.* are also mounted in the control panel.

**Valve package:** The process Valves used is pneumatically actuated angle valves with threaded connections. These Valves are actuated by instrument air controlled *via* Solenoid Valve.

**Sensors:** PT 100 sensor (Simplex type) used for PLC and manual control & indication in the chamber.

**Baffle:** For effective distribution of steam throughout in the chamber and to avoid the entering steam from directly hitting onto the load.

**Vacuum pump:** The sterilizer is provided with water-ring type Vacuum Pump. This Vacuum Pump is used for creating Vacuum in the chamber for mechanical air removal prior to sterilization and subsequently for post sterilization vacuum drying. The Vacuum Pump Can be mounted near the Machine or on the Service Floor. (When Vacuum Pump is mounted on service floor all interconnecting piping and cabling will be in client's scope).

**Steam condenser:** The shell & Tube type condenser fabricated from S.S.304 is fitted in the exhaust/Vacuum line to condense the steam before entering the Vacuum Pump.

**Vacuum breaker:** Accidental vacuum breaker safety device to jacket against accidental vacuum in it.

**Safety valve:** One spring loaded safety valve provided to the jacket for safe guard against excess pressure.

**Validation port:** For inserting flexible PT-100 sensor for validation purpose.

**Baffle:** For effective distribution of steam throughout in the chamber and to avoid the entering steam from directly hitting onto the load.

**Ejector systems:** To create partial vacuum which helps in quick drying.

**Plug screen:** A device to prevent chamber discharge line from lint & sediment.

**Quick drying apparatus:** This allows the filtered & sterilized air to break the vacuum in chamber which helps in quick drying.

**Chamber condensate line:** Incorporated with steam traps and check valve for perfect condensation to get optimum temperature.

**Piping package:** All piping is made of S.S. 304 quality with full argon welding. Jacket & chamber is provided with pressure & compound gauge respectively.

**Ups back up:** UPS will be used only for single phase supply in case of power failure. It will be used to operate valves, relays, HMI & PLC.

**Air compressor:** Would be used to supply compressed air to the equipment.

**Steam generator:** Fabricated from S.S. 304 sheet with industrial immersion heaters. 18 KW load. The steam generator is provided with automatic pressure control & other safety features like low water cut off to safe guard heaters, safety valve gauge glass *etc.*

**Accessories:** All other necessary inlet, outlet & drain connection with valves should be provided.

## **(B) HORIZONTAL RECTANGULAR AUTOCLAVE CAPACITY 1250 LITRES**

**(APPROX)**

**Double Door, Hinge Type, Electrically Heated, Automation, Vacuum Pump & S.S. 304 Quality Condenser With 7" Touch Screen HMI With PLC., GMP Model. (Door to be operated Manually).**

### **Working parameters**

- Chamber Working Pressure: 1.2 Kg/Cm<sup>2</sup>.
- Jacket Working Pressure: 1.5 Kg/Cm<sup>2</sup>.
- Chamber Working Temperature: 121<sup>0</sup>C.

### **Hydro test**

- Chamber One & half time the working pressure.
- Jacket twice the working pressure.
- Steam Generator twice the working pressure

**Chamber:** The Sterilizing Chamber is fabricated from S.S.316L Quality with full argon welding. Chamber is provided with Round Corners for Easy Cleaning and a 2 % Slope for full Draining of the Condensate. A removable Screen Plug should be provided in the Drain Lines to Prevent Clogging of the Drainpipes and fittings. A Steam Baffle should be provided at the top of Chamber. The Chamber should be provided with a compound Gauge on both sides.



**Jacket:** The jacket should be fabricated with Stainless steel 304 Quality. The Jacket besides reinforcing the chamber also should be provided to maintain the temperature uniformity in the sterilizing space. The Jacket should be provided with a safety valve and pressure gauge on operating side.

**Insulation:** Resin Bonded Glass wool insulation of 50mm thickness which should be held in place by an outer cover of S.S.304 Stainless Steel. (24 SWG)

### **Finishing**

Inside Mirror Finish

Outside Mirror Finish

**Mounting** The Sterilizer should be mounted on a tubular stand of S.S.304 Quality (Mirror finish).The Control panel should be made up of S.S.304 Quality (Mirror finish).

**Door** The Sterilization Chamber should be provided with Two Hinge type door. The Door should be made up of S.S.316 Quality. Locking Assembly & Radial Arms are made up of S.S.304 Q and sealed with the help of Silicon Door Gasket.

### **The Following Door Safety Features should be provided for Operator Safety :**

- Should be pressed by S.S. radial arms duly polished. The door should be fitted with an automatic self-pressure locking device by a special clutch to prevent it being opened under pressure. This should be open only when chamber pressure comes to zero.
- Door interlock (mechanical) to prevent simultaneous opening of both doors.

**Contamination seal** S.S. flush mounting should be fitted between the sterilization chamber & the sterile area walls to avoid any cross flow of air between the sterile and non-sterile side.

**Programmable Logic Controller (Automation).**The control system should be provided with a universal standard make PLC and a user friendly 7” TOUCH SCREEN HMI as a front-End user interface.

The Key Salient Features are as follows:

- Password Protection for Process Security.
- Inbuilt Real Time Clock with Date & Time Function.
- F0 Value for Automatic Computation of process Lethality.
- Batch Printing Facility. With facility to save the last cycle data.

**Manual back up** The control system should be provided with Manual backup in case of PLC failure. Under such circumstances all process should be operated with the help of Manual ON/OFF Switches.

**Electrical switch gears:** The control cabinet should be provided with a main isolator for the three phase supply and a separate switch for the control supply. All cabling should be flexible, all cabling for temperature signals are shielded for minimum electro-magnetic interface. Necessary Relays, Contactors, MCB's, etc. are also mounted in the Control panel.

**Valve package** The process Valves used is pneumatically actuated angle valves with threaded connections. These Valves are actuated by instrument air controlled *via* Solenoid Valve.

**Sensors** PT 100 sensor (Simplex type) used for PLC and manual control & indication in the chamber.

**Baffle** For effective distribution of steam throughout in the chamber & to avoid the entering steam from directly hitting onto the load.

**Vacuum pump**

- The Sterilizer should be provided with water-ring type Vacuum Pump. This Vacuum Pump is Used for Creating Vacuum in the chamber for mechanical air removal prior to sterilization and subsequently for post sterilization vacuum drying.
- The Vacuum Pump should be mounted near the Machine or on the Service Floor.(When Vacuum Pump is mounted on service floor all interconnecting piping and cabling should be in client's scope).

**Steam condenser** The shell & Tube type condenser fabricated from S.S.304 should be fitted in the exhaust/Vacuum line to condense the Steam Before entering the Vacuum Pump.

**Vacuum breaker:** Accidental vacuum breaker safety device to jacket against accidental vacuum in it.

**Safety valve:** one spring loaded safety valve provided to the jacket for safe guard against excess pressure.

**Validation port:** For inserting flexible PT-100 sensor for validation purpose.

**Ejector systems:** To create partial vacuum this helps in quick drying

**Plug screen:** A device to prevent Chamber Discharge line from lint & Sediment.

**Quick drying apparatus:** This allows the filtered & sterilized air to break the vacuum in chamber which helps in quick drying.

**Chamber condensate line** Incorporated with steam traps and check valve for perfect condensation to get optimum temperature.

**Piping package:** All piping should be made up of S.S. 304 Quality with full argon welding. Jacket & Chamber is provided with pressure & compound gauge respectively.

**Steam generator** Fabricated from S.S. 304 sheet with industrial immersion heaters. 36 KW load. The steam generator should be provided with automatic pressure control & other safety features like low Water cut off to safe guard heaters, safety Valve gauge glass etc. All other necessary inlet, outlet & Drain connection with valves should be provided.

**Ups back up** UPS should be used only for single phase supply in case of power failure. It should be used to operate valves, relays, HMI & PLC

**Air compressor** Used to supply compressed air to the equipment.

**Handling Accessories**

**Railing** Pairs of S.S.316 Q Railings inside the chamber. Rail design should be suited for smooth and easy loading/ unloading of the carriage.

**Carriage** Fabricated from S.S.316 Q the loading Carriage should be designed to suit the specific application.

**Trolley:** The floor trolley should be fabricated from study S.S. 304 Q. tubular member welded together. The top frame should be on heavy studs for height adjustment. The trolley should be provided with 4 swiveling caster wheel made up of polypropylene & fitted with S.S. bracket.

**(C) VERTICAL AUTOCLAVE**

- **Capacity: 50 ltr**

- **Type: Vertical Autoclave**
- Water Level cut-off - Regular Series - Top Loading.
- SS 304 double wall construction.
- Pressure is maintained at 15.0 PSI (~ 121°C) through a spring loaded mechanical safety Valve.
- Low water level alarm & cut off.
- Supplied with SS-wire mesh carrier.
- Handy raise device for easy working.
- Hydraulically die press lid.
- Machine should be hydraulically tested, safety valves for over pressure, special energy efficient.
- Heater saves electric energy.
- Supplied with Test Report / Calibration cert. Traceable up to national standards.
- With one spare gasket.

**Note: Please quote rates for all capacities ( A, B and C) separately.**

#### **ITEM NO. 8 IMAGE ANALYSIS SYSTEM ( THIRD CALL)**

- The system is required for a wide range of standard fluorescence, advance chemiluminescence & visible light applications such as DNA/RNA imaging or protein gels.
- The system should be GLP compliant and driven by a computer with application driven control software having a database containing several application protocols and also provide functional control of the system. It should be possible to capture images automatically without adjusting the camera, optics, lighting and filters.
- The darkroom and its door should be fabricated out of steel and the door should be with a thermosetting polymer to create a hard finish on the exterior for protection against infiltration of weather elements like moisture so as to avoid any accidents from electrical leakage due to improper earthing *etc.*, and also improve its aesthetic appeal.
- The system should deploy a high resolution ultra peltier cooled camera with cooling range of -50°C absolute temperature, having at least 4.0 Million native pixels, with higher quantum efficiency and should be capable of producing images with a resolution of 4 Million pixels. It should be possible to produce publication quality images with an effective resolution of at least 15 million pixels.
- The camera optics should include a motor driven close up lens in combination with 6X zoom lens with an aperture of at least f1.2 or better with feedback system for storing and reproducing settings.
- At least 6 Position Computer Controlled Motorized Filter Wheel with appropriate Filter(s) for visualization of stains like: Florescent stains (EtBr), Coomassie blue, pink and silver stains, Sybr Stains, ProQ Diamond, deep purple, Sypro Ruby and Sypro Orange.
- UV lighting System with Image viewing area of at least 25 X 30 cm filter, UV-to-White light converter for viewing protein gels and Epi LED white light.
- System should be equipped with intelligent control system to automatically assess the gel, set its best exposure time and also set the best sensitivity setting [bin factor] and then display the image within the defined waiting period.

- 1D Gel Analysis Software with Automatic Band Matching.
- Software must have a GLP compliant format.
- Automated software for analysing 1D gels, 2D Spot blots, Egels, Multi-layer gels (multiple well lines per gel), Zyma Gels, Colony counting, band matching *etc.* It should have single window for simultaneous display of all data, images, and histogram, multiplexing of images captured under different conditions and overlay them Multi-layer gel analysis facility (multiple well lines per gel). Software should have direct link to Excel and Word to display data in a variety of different ways, Dendrograms, Matching coefficients and matching matrix.
- 1-D lane analysis, 2-D spot densitometry & Colony or cell counting Software.
- Automated software for rapid Microtiter plate analyses; Microarray analysis; Multiple experiments; Rf /Molecular weight calculations/Multiplexing of images captured under different conditions and overlay them Multi-layer gel analysis facility (multiple well lines per gel)
- Automatic background correction (multiple methods).
- Full GLP reporting (gel, lane. MW, Qty, track histogram).
- Software should have direct link to Excel and Word to display data in a variety of different ways, dendrograms, Matching coefficients, matching matrix.
- Database Software to match unlimited number of primers in unlimited Gels; Genotyping capabilities, Create cluster analysis, RFLP, RAPD, Fingerprinting, VNTR analysis and genotyping.
- Data Processing Unit with Intel i7 Processor, 16GB RAM, 1TB Hard Disc, Windows 12 or latest Professional (License).
- All softwares should be supplied with a lifelong license and should free upgrades as and they are introduced. Also, in the event of softwares being accidentally deleted from the PC they should be supplied free of charge.

#### **ITEM NO.9 GLASSWARE WASHING SYSTEM (THIRD CALL)**

- Capacity : 100 litre or more.
- Wash pump capacity should be not less than 500 l /min with automatic speed adjustment.
- Control panel display should consist of keypad with backlit LCD display having alpha-numeric intuitive user interface for hassle-free operation.
- Machine should have programming facility for all types of glassware and soils having vacant programme slots for user specific programmes.
- Machine should have at least one built-in peristaltic dosing pump with level fill monitoring & having facility to connect additional dosing pump if required.
- To avoid discharge of hazardous vapors to the surrounding during drying phase, built-in steam condenser with HEPA filter required.
- Wash chamber should be equipped with ceiling spray arm & bottom spray arm irrespective of trolley usage.
- Heater elements should be outside the wash chamber to eliminate risk of damage to plastic items & contamination.
- Auto close door preferred so that very less pressure applicable to avoid unwanted pressure application leading to damage of wash chamber door alignment & other operating system problems.

- Multi-stage filtration system is required to remove particulate soil from water in circulation.
- Spray arm rotation & spray pressure monitoring is required in order to prevent any loss in circulation pressure or to immediately identify obstacles in the path of spray arms.
- Built-in hot air drying systems with HEPA filter followed by Class C filter.
- Machine should have built-in water softener for main water washing cycles & facility to recharge same by means of using salt addition.
- Load trolleys should have rear basket docking system to increase loading capacity of trolley per run & use of same docking system to supply load carriers with water and hot air for internal drying.
- Machine should have two independent level of washing
- Machine should have capability of one dedicated injection trolley for 98 nos.of measuring & full pipettes with at least 32 nos.of vol. flask, conical flask, bottles, measuring cylinders, RB flask, at a time on single lower washing level.
- Machine should have capability of washing at least mix load of 18 to 30 qty. of glassware includes :1 ltr of measuring cylinder, 500 ml vol. flask & conical flask, 250ml & 500ml bottles with glass pipettes on a single wash level.
- Machine should accommodate injection trolley on both washing levels.

**Note: Please quote cost of main equipment, standard accessories and optional racks separately.**

## **ITEM NO. 10 PHENOMICS FACILITY WITH CLIMATE CONTROLLED GREEN HOUSE (THIRD CALL)**

### **PHASE : ONE**

Tender is invited for high-throughput non-destructive image based phenotyping platform with climate controlled green house for acquisition and analysis of high-dimensional phenotypic data on an organism-wide scale at desired time points during the entire life cycle of plants under non-stress and abiotic stress in controlled environmental conditions. This facility requires visual high resolution imaging progressive CCD camera system for 3D morphological and growth analysis. Imaging unit should suit the requirements of short plants such as chickpea to tall plants such as maize (up to 2.0 m height plant grown in each pot weighing more than 20 kg). The facility should consist of plant carrier conveyer system to carry a minimum of 100 pots (each pot weighing more than 20 kg) for plant randomization, delivery of plants to imaging unit and weighing and watering. Imaging units and conveyers should be arranged in such a way that the facility can be expanded to 1500 plant carrier system in future. The modules of imaging system should be fully integrated with plant handling conveyer system, weighing and watering system, data acquisition, achieving and analysis including necessary hardware and software. The platform should be fully automated, versatile and upgradable in capacity. The technical specification for non-destructive high throughput and high precision. Phenomics Facility with all Accessories are as follows:

### **(A) CLIMATE CONTROLLED GREEN HOUSE**

1. **Climate controlled Green House:** Three climate controlled Greenhouses with 12m x 8 m x 6m (L x W x H) dimensions for each greenhouse.
2. Of the three Green houses, the Greenhouse in the centre will be used as imaging area with car loading loop and a weighing and watering station. One greenhouse will be installed with conveyor system for plant culture and will be connected to imaging area for automated transfer of pots to the imaging unit and back to the Green house. One greenhouse will be used as normal greenhouse for cultivation of additional set of plants.

## Climatic Controlled Green house

### The following Climate parameters should be controllable in the greenhouses1

**Temperature Range :** 20 to 45°C±1°C(Throughout the Year). Temperature control should be programmable in sinusoidal mode (in greenhouse 1 and 3, while the greenhouse intended for imaging area should be maintained at 25°C±1°C.

**Humidity Range :** 45 to 95% in greenhouse 1 and 3 where plants will be cultivated.

**Light Intensity :** 600 micromole m<sup>-2</sup>s<sup>-1</sup> at plant canopy level in greenhouse 1 and 3 where plants will be cultivated.

**Foundation:** RCC Foundation with Piles & Beams; Under Reamed Piles suitable for black cotton soil up to a depth of 5 feet, dia of Piles 6"; Beams: RCC 1:2:4 size of beams 9" x 9" connected with column up to plinth level; Reinforcement details for Piles: 4 nos 12mm tested for steel for longitudinal main reinforcement 8mm dia for stirrups @ 6" C/C, Reinforcement details for Column : 4 nos 12mm tested for steel for longitudinal main reinforcement 8mm dia for stirrups @ 6" C/C; Reinforcement details for Beam: 4 nos 10mm tested steel for longitudinal main reinforcement 8mm dia for stirrups @ 6" C/C; C:C floor; 9" Thick brick wall both side plastered on all four Sides of shade with one entry door; CC foundation (1:3:6) Plastering :-1: 6 wall 2 feet . Buffer wall (brick) duly plastered above ground level. and 2' above the poly house floor level. 2' path all around the Poly house.

**Floor:** Should be made up of crushed bricks 4" thick with 2" graded stone ( Rodi ) which is further flushed with 4:3:1 (Rodi: sand: cement). Fixed with Anti Slippery Flooring Tiles, heavy duty Polymer (PVC) pipe being used for plumbing fittings. Path 1/2 m wide along the length of the Green House).

**Infrastructure & Super Structure:** Anti-corrosive, Humidity resistant GI pipe. Wind load 160 km/hr Glazing coat ISI standard IS 4736-1968/ISO65-1973 Galvanized steel ISI standard IS 1239 B class. Thickness 2mm 100 mm x 100 mm Colum, 50mm x50 mm truss 25mm x 25 mm cross 75mm x 75mm purlin Door Anodized Aluminum section size: 6'3" x 4' Lock Brass. side window imported section with rack and pinion 1m x 25 m both side window .

**Glazing:** Module covering with anodized aluminum stripping and Silicon (translucent) treatment for proper holding and thermal safety. High quality UV stabilized Polycarbonate sheet 6 mm thick GE multi-walled. Both Side UV treated with anti- fungal treatment with PC & HCP profile for side and roof fitting or Aluminum stripping for side and roof fitting. The polycarbonate sheet should be fixed to the purling without piercing any holes on the sheet. Thermal conductivity: DIN52612W/2°C -0.21. **Roof, end walls & side walls for the poly house-set along with buffer room with rigid covering.** 6 mm thick clear UV stabilized clear polycarbonate sheet (standard make), Aluminum Profile, Silicon sealant, and accessories. High quality UV stabilized Polycarbonate sheet **6mm thick GE (standard make)** multi-walled

**treated with anti -fungal treatment with PC & HCP profile** for side and roof fitting or Aluminum stripping for side and roof fitting. The polycarbonate sheet should be fixed to the purling without piercing any holes on the sheet.

**Grow Light system:** Photosynthetically active radiation Lamp-Intensity with fluorescent light and Photo synthetically Active Radiation lamps (PAR) W 1.7 to 2.6/60 are specific action spectra lamps for photosynthesis for research and commercial production. PAR with photo simulator are specific action spectra lamps for photosynthesis for research & commercial product. (1) Night break technique, (2) Day length manipulation, (3) Supplement the natural day light and (4) Higher rate of carbon fixation.

**Humidification system:** To achieve humidity optimum utilization of water. Instant start, No thermal losses. Low noise automatic water selection system. Auto off in case of non-availability of water. Low electrical consumption. Dual type water sensor. Adjustable water tank position 10 ltr Capacity 2 nos. (Ultrasonic Humidifier)

Compact control panel facility should also be provided with Mains ON/ OFF Switch (Standard Make) Light Indicator for main light, Cooling, Humidity, Heating, Audio visual alarm facility.

**Sensors and data loggers** for Temperature, RH, CO<sub>2</sub> and light: For climate control and logging the data.

**Control Panels:** All the modular parts and sections are subjected to seven tank process to ensure anti-rust conditioning, smooth finish and protection against corrosive atmosphere/ high humidity environment.

#### **Microclimatic Temperature Controller**

Real time microprocessor based user programmable PID Controller, 4 digit LED display for displaying measured values and another 4-digit LED display for displaying settings, Trim pot operation, Platinum sensor probe Pt- 100, Set point lock within the setting panel to protect setting changes, Level lock to ensure that the parameter can be read but cannot be changed, Sensor failure indication, Display resolution 0.1°C. Accuracy  $\pm 0.1^\circ\text{C}$ , Automatic hysteresis control. Wide selectable temperature ranges from 0° to 100°C, 4.4 KVA load can be directly connected to the powered output, Input- 200-240 VAC, 50 Hz. Single phase, Ambient 5°-50°C, RH up to 90%.

#### **Microclimatic Humidity Controller**

Real Time microprocessor based, On/Off control for Humidifying/ Dehum, Hysteresis / Differential 1% - 9%, Delay timer 0-240 sec, Direct / Reverse selectable, Lock functions to prevent miss operating, Feather touch operation, Fast response sensor – line resistance  $< 10\Omega$ , Display Accuracy- indicating value  $\pm 0.2\%$   $\pm 1$  digit.

#### **Photoperiodic Timer Programmable**

Real time microprocessor based, Accuracy  $\pm 2.5\text{sec/day@}20^\circ\text{C}$ , Week Program, 20 memory locations adjustable to the minutes/hrs. 150 Hrs. power backup, Random switching can be activated by pressing any key, Summer/ Winter time changeover, Program Saving By EEPROM. COMPLETE INSTALLATION of Electric and water connection.

**Floor Base:** RCC Foundation with Piles & Beams; Under Reamed Piles suitable for black cotton soil up to a depth of 8 feet, dia of Piles 6"; Beams: RCC 1:2:4 size of beams 9" x 9" connected with column up to plinth level; Reinforcement details for Piles: 4 nos. 12mm tested for steel for longitudinal main reinforcement 8mm dia for stirrups @ 6" C/C, Reinforcement details for Column : 4 nos 12mm tested for steel for longitudinal main reinforcement 8mm dia for stirrups @ 6" C/C; Reinforcement details for Beam: 4 nos. 10mm tested steel for longitudinal main reinforcement 8mm dia for stirrups @ 9" C/C; Should be made up of crushed bricks 6" thick with 2" graded stone ( Rodi) which is further flushed with 4:3:1 (Rodi: sand: cement). Fixed with Anti Slippery Flooring Tiles, complete labeling minimum 2' above the GL.

**Structure:** Pre-Fabricated structure: Termite, water and fire retarding structure safe in earthquake, robust, durable structures, built to withstand strong winds & snow loads. Sandwich insulated panels provided good sound proofing & insulation against hot and cold climates .Long life. Fire property; self extinguishing. Safety fire alarm should be provided. Electrical wiring with complete fittings with MCB and main On /off as per need of PHENOMICS system requirements. Temperature 25°C is required inside the structure to operate the systems. Two insect trapper should be provided to traps mosquitoes, insects, bugs and flies ultra-blue colors.

Double walled cabinet structure with dirt repellent Powder Coated GI 0.5mm thick, outer and inner surface. 60 mm polyurethane (Puff) insulation (Puff Density: 42±2 Kg/cum). Pre-fabricated panel system should be duly sealed to prevent leakage double walled flushed double door duly insulated should be provided. The door should be fitted with heavy duty Gravity Hinges with sweep gasket to prevent leakage. Provision of opening door from inside. The door should be fitted with heavy duty hinges & lock system. Forced air circulation for uniform temperature control.

### **Compressed air requirements (quality and quantity)**

Suitable compressor should be provided with all necessary accessories and connection to run the conveyer system and imaging unit of the entire phonemics facility.

## **PHASE: TWO**

### **(B) PHENOMICS FACILITY**

#### **1.Imaging unit:**

- a. Imaging unit namely visual high resolution imaging CCD camera system for high throughput image based phenomics of plants including 3D morphological and growth analysis. Imaging unit should suit the requirements of short plants such as chickpea to tall plants (>1 m height) such as maize. So the door height of imaging chambers needs to at least two meters. The height/position of camera/pot carrying cars or camera focus should be adjustable to required focal point for obtaining desirable quality images.
- b. Compatible with a max. plant size (including pot) of at least 200 cm height and pot diameter of 210 mm or more.
- c. Average time of imaging per plant should be 30-45 seconds per image or less.



- d. Automatic opening and closing of doors in imaging unit and greenhouse upon entry and exit of pots on the conveyer system.
- e. Imaging unit provided with a lifting and turning unit to automatically lift and turn the pot for image capture at desired height and angles. Once the pot enters the imaging unit through conveyor, it should have lifting and turning unit to lift at desired height (40cm or more), and turn at one degree increment to 360° for taking side images at desirable angles for imaging accuracy.
- f. Imaging station should have fully integrated illuminations, besides automatic camera operations, allowing control & configuration, while they are documented and traceable within the image acquisition methods.
- g. The watering and weighing station should be positioned in sequence in the imaging area of the green house so that they are the last items encountered by a plant.
- h. Lifting height, turning angle, lighting and image per plant should be controlled by software.

## **2. Imaging Cameras**

Progressive scan CCD high resolution cameras (two numbers one for top and another for side imaging) with appropriate software for high resolution color imaging to measure 3D morphological traits, growth and biomass of the plants. The resolution of the cameras should be 6576 x 4384 pixels or better (sensor/pixel size: 35mm/5.5µm x 5.5µm) with a minimum frame rate of 4 frames per second. An F mount camera lens with a focal length of minimum 50 mm, and Ethernet (GigEVision compatible) data link to be provided. Appropriate illumination should be provided within the imaging unit. Camera Diameter: 66 mm (2.6") & Weight: 350 g (12 oz.) Aperture range/1.4 – f/16 (1/ 2 stop intervals), Image ratio at close range - 1: 6.7, Operating temperature : -20°C +50°C.

## **3. Plant handling and ancillary system**

- (I) Conveyor Belt system for 100 plant carriers of 240x240 mm or larger size, with a carrying capacity of more than 20 Kg load per pot/plant carrier, and each plant carrier should be RIFD tagged.
- The conveyer system should be designed in such a way to allow plant randomization and plant delivery to imaging chamber. PC workstation and Bar code reader located within reach for easy data recording. Movement of the conveyor should be fully integrated and traceable in the control software.
  - Conveyor system should be capable of handling full set of carriers/car with each car loaded with pot weighing more than 20 kg per car. Loading height should be about 800 mm with safe transportation of plants up to 2m height.
  - The conveyer system should have a speed of 9m/min or more with reliability of 99% uptime.
  - Conveyor systems manufactured with high-quality materials to ensure continuous use and are resistant to lubrication and cleansing agents that are common in an industrial environment.
  - Appropriate lifting and turning units for lifting and turning the potted plants to obtain different side and top view of the plants in each imaging Unit. This should be software controlled.

- The conveyor system construction made up of aluminum profiles made of extruded anodized aluminum, leadership profiles made of polyamide (PA), anti-static, Conveyor belt made of polyamide (PA) coated fabric, anti-static, drive belt of polyurethane (PU), with nylon sheath, anti-static or normal, and Steel with corrosion-proof surface or rust free as fasteners and connection parts to be provided.
- The plant carrier system should work in an operating temperature of 0 to 50°C and Relative Humidity of 5 to 90% (with no condensation).
- The system should have a protection rating of IP54 or better

**(II) Weighing and watering station: Two systems are required one in greenhouse and one in the imaging loop.** Automated weighing and watering station to weigh the pots before and after watering in order to administer various soil moisture levels to study abiotic stresses such as moisture deficit. The quantity, date and time of watering to each pot should be individually programmable to impose different levels of soil moisture deficit and completely integrated with phenomics system. It should have fully automated scales TCP/IP with graduation of 1 g or less and calibration value of 5 g. It should have dynamic inclusion of target weight data based on image analysis results, calculations for water used and deficit and automated weighing before and after watering or fertigation.

**(III) The features of the watering and weighing system should include**

1. Weighing and watering of individual pot
2. Multiple solution fertilizing
3. Top or bottom watering
4. Water use efficiency
5. Individual programming for watering and fertigation regime including target weight and dynamic constant average humidity watering.
6. Dynamic inclusion of watering and nutrient addition data with image analysis.

**(IV) RFID chip Reader:** To keep track of plant/carrier position and movement simulation.

**(V) It should be also provided with a barcode reader**

#### **4. Computing Hardware**

**One Motion Control PC, a Data base PC and Server and an image processing workstation suitable for Phenomics**

##### **(i) Motion Control PC**

- CPU: Intel i7 (2700,1333MHz, 6MB) or better
- RAM : 8GB 1333MHz DDR3 Dual Channel
- Hard Drive : 500GB Serial ATA II (7200RPM) 3.5in
- Hard drive second: 500GB Serial ATA II (7200 RPM)
- Two Professional 61cm (24") LED monitor VGA
- With all other essential accessories

##### **(ii) Data base PC and Server**

- Intel Xeon E7-2830 2.13GHz,24M Cache, 6.4GT/s QPI. 105W
- Chassis with up to 4/8 Hard Drives and 3 PCIe Slots
- DDR-3 1333 MHz RDIMMs
- Six units of 4GB RDIMM, 1333 MHz, Low Volt, Dual Rank, x8
- DIMM Blanks for Systems with 2 Processors
- Two 600GB SATA 7.2k 2.5" HD Hot Plug
- SAS 6Gbps HBA External Controller, Low Profile
- Integrated RAID Controller
- RAID Adapter for External JBOD, 1GB NV Cache
- DVD/RW, SATA, Internal
- Dual, Hot-plug, Redundant Power Supply (1+1), 750W
- Two 2M Rack Power Cord C13/C14 12A
- Broadcom 1Gb Network Card
- Ready Rails Sliding Rack Rails without Cable Management Arm
- Should support RAID 0,1 and 5

**(iii) IMAGE PROCESSING Work station:**

- Intel Xeon E3-1220 Processor (3.1GHz, 4C/4T, 8M Cache, 80W, Turbo)1U Rack
- 4GB Memory (2x2GB Single Rank LV UDIMMs) 1333MHz500GB SATA 7.2k
- 16X DVD +/-RW Drive SATA with SATA Cable
- 2M Rack Power Cord C13/C14 12A
- 2/4-Post Static Rack Rails
- C1 2HD - No RAID with On-board SATA Controller, Min. 1 Max 2 SATA only Drives

## **5. Computing Software**

All the necessary software to fulfill following requirements of high throughput image based phenome data collection, analysis and archiving. It should have the following features:

An integrated automated controlling software for imaging analysis, Watering, randomization plants in the green house, importing metadata from connected databases, linking plants to specific imaging modes, controlled placing of MTPs on different imaging positions, on and off switching of lights on heating. Calendar function to schedule jobs and start them automatically. A visual feedback of the current system status including location of all cars in the system.

- a. A software for controlling and monitoring of all required components including cameras, conveyors, robotics, illumination and enable trained users, with or without any technical background to use the system.
- b. The software should enable the user to initiate an Experimental Run on the phenomics rapidly and easily. An Experimental Run produces all data including images, watering or weight information and stores them into the database.
- c. Acquiring of image, analysis results and watering data directly linking to original configurations, thus providing sufficient data management for quality control. Checking the images that have been acquired. Viewing multiple images of the same plant at the same time using a split screen viewer. Sorting acquired data by different criteria such as time of measurement, plant ID, experiment name, creator.

- d. Image Analysis grid with GUI, for Image Analysis Protocols, and wizard base parameter configuration allowing transparency in entire data flow. The image analysis procedure needs to be completely modular and any kind of implemented image analysis modules as applicable without knowledge of specific computer or script language/internal parameters of each module would be easily configurable using the wizard mode.
- e. A wide range of flexible image processing grids and algorithms covering a wide range of agriculturally relevant analysis applications to be provided online.
- f. Image analysis allows matching of images from different cameras to provide synergy for plants shape extraction from all kinds of images.
- g. A data mining suit for extracting data from different database and organize them to visualize properly and allowing correlating the image analysis data with other experimental data to generate biologically relevant information. Database access, queries and calculation even of complex dynamic data within whole time series for specific plants (like growth rates) may be possible graphically without specific data base language skills.
- h. Data export and import for each specific plant or imaging run should have the option for complete automation. Data mining should allow accessing to all originally taken images and analyzed images as long as there is a connection to the main database containing such images. For specific analysis smaller analysis database can be demerged based on specific queries on local systems.
- i. Open interface software that allowed datasets up to 100 TB, and shows direct integration into any LIMS environment. Combining a minimum of access time and a maximum of transparency. Data should be stored in a postgres database structure with an open FTP image server to store the binary image data. Should be possible to split up databases into sub databases to split experiments of different users. Images and configuration can be copied between these databases with GUI based tools that do not require any SQL programming knowledge.
- j. Image and direct sensor data should be available in non-proprietary standard format.(Preferably different RAW standard with a description of the patterns used).
- k. The software should support R package, to load / export snapshot information and image analysis results directly within R, in an easy-to-use automated fashion. report-generation for customized reporting needs. Data browser and management data query and export using graphical user-interface should be provided.
- l. The software should use a graphical dataflow programming language (similar to Lab View or Microsoft Robotics Studio) which allows the rapid connection of different algorithms, creating an image processing pipeline to extract the desired properties from the original image.
- m. The image analysis grids to combine efficient development in a graphic interface with excellent surveys on image analysis protocols and wizard-based parameter configurations should be available. The entire data flow is kept fully transparent.

- n. The analysis should provide(among others) information for the growth and morphometric traits including biomass, Projected Area, Convex hull, Compactness, leaf traits (length, area and density), Plant height, Pooled area of spikes Time of first spike appearance, various growth rates, etc.

**OTHER CONDITIONS:**

1. All the above specifications of phenomics facility are minimum requirement. Any higher/better specifications that are desirable for phenomics are acceptable.
2. Two onsite trainings to the users for the routine operations, use in phenome analysis and routine maintenance of the facility.
3. All necessary licenses should be provided. Original technical literatures, drawing, and software should be provided.
4. The suppliers of high throughput phenomics platform provider should have established credentials of building and operationalization of image-based non-destructive high throughput phenomics facility for public sectors Nationally/Internationally but importantly Nationally because of the environmental factors and trained local support. The firm should have established three or more automated phenomics facility with three or more types of image analysis system for phenotyping of 500 or more large plants (for plants with more than one m height) with fully integrated facility for automated plant handling and randomization in greenhouse, plant delivery to imaging unit, weighing and watering system.
5. At least 10 user certificates for the satisfactory performance of similar system from the users should be provided. Videos of their system and Scientific research publications may also be provided.
6. Provision of engineering drawings of the planned system with all technical specifications(No. of plants, max. weight load capacity, exact position and dimensions of imaging cabinets, conveyors, motors, utility connections, wiring, pneumatic air, water and electricity.
7. Provision of a software simulation of the planned system showing that the throughput is at 30 – 45 sec. per plant based on 3 images per plant. Provision of a safety concept for emergency switches with a maximum reachable distance of 1m from all positions of the greenhouse.

**Note: Please quote the rates for both phases (A & B separately).**

**ITEM N0.11. ULTRA PURE WATER PURIFICATION SYSTEM ( FIRST CALL)**

**(A) Flow rate capacity  $\geq 5$  L/hr**

- Pre-filtration System with 10 micron and 1 micron depth filters and Activated Carbon Cartridge Type III & Type I Water Purification System producing Tap to Pure and Ultrapure water.
- Fully automated control system for pre-rinse, RO membrane fouling preventing flush RO membrane and cartridge life monitoring and other programmes for convenient operation.

- Dual wavelength (185 & 254 nm) UV lamp for organic & bacterial reduction with purification packs for removal of ions and organics in water with Ultra-filter cartridge unit prior to dispense point.
- Built in highly sensitive resistivity meter to measure resistivity of Type- I water with facility for recirculation of ultrapure water.
- Capable of automatic volumetric dispensing or programmable time dispensing with a choice of point-of-use final filter options including a point of delivery ultra-purification final filter cartridge or 0.2 micron filter.
- Type III Water Flow rate  $\geq 5$  L/hr.
- Type I Water flow rate  $\geq 1$  L/min with  $\leq 5$  ppbTOC.
- 18.2 M $\Omega$ •cm Resistivity.
- 0.05  $\mu$ S/cm conductivity.
- <1/ml particles with a 0.2  $\mu$ m final filter.
- Bacteria level  $\leq 1.0$  cfu/ml.
- Pyrogens (endotoxins) and  $\leq 0.001$  Eu/ml.
- Cylindrical PE reservoir with 5-10 L for storing.
- Type-III Water having sensor rod float switch tap to dispense water and air vent filter for bacteria & impurities retention to purify air entering tank; with  $\geq 150$  liter/hr water softener with auto-regeneration facility; with 12 each of 10 micron, 1 micron depth filters and Activated Carbon Cartridge; 1 extra point of delivery ultra-purification PES cartridge; 2-6 nos.

**(B) Flow Rate Capacity  $\geq 40$ ltr/Hr**

**Pre-treatment:**

Suitable 3 stage pre-treatment including 10, 5 and 1  $\mu$  filters and Activated carbon cartridge and suitable RO for added advantage over contaminated water quality and also enabling replacement “on demand” to save recurring cost.

**First Stage:**

A microprocessor controlled system to produce Laboratory grade ASTM Type II water suitable for General Lab applications including buffer and dilution preparations and feed to Type I system with a production rate of **at least 40ltr/hr**. It should have RO, DI and UV as standard technologies. It should be able to take a potable tap water according to International norms as a feed. System should be upgradeable to higher flow rates.

The system should be capable of bench/wall mounting installation with tank and clear backlit display with modes and reservoir fill-level status. The system should be GLP compliant and should be able to automatically collect data with RS 232/USB port in accordance with international guideline.

**The system should be capable of validation. System should have recirculation pump to recirculate water through tank.**

**The product water quality should be as follows:**

**Resistivity: Clearly 10-15 M $\Omega$ .cm**

**TOC: <30ppb**

**Bacteria removal: 99%**

**Particle : 99%**

**Second stage (storage)**

The water should be stored in a 100 liters compatible tank which should be made up of pigment free polyethylene. The tank should be cylindrical to minimize surface area. It should be supplied with a vent filter to avoid air borne contaminations. This water should go as a feed into microprocessor controlled Type I system which should be able to produce water for Molecular Biology applications.

**Third stage (ultrapure)**

System should be able to give at least 200Ltr/day of Type I water. It should have remote and volumetric dispensing system from 0.01-60 ltr. The system should be equipped with inbuilt high capacity ultra filtration cartridge in order to avoid frequent replacements. System should use Ultrafiltration and 0.22u filter simultaneously. It should have a provision of monitoring feed water quality and conductivity for accurate measurement enabling elongated consumable life. Conductivity should be displayed. It should have a suitable sensor/alarm to monitor UV intensity. It should be able to quickly replace a cartridge without wasting time and water avoiding air purging etc. **The systems should be GLP compliance and can be validated. System should have high capacity double bowl deionization cartridge for longer life.** The final water quality should be as follows:

Resistivity : 18.2 MΩ.cm

TOC: 1-5 ppb

Bacteria: <0.01 cfu/ml

Particles : <1/ml (0.22 micron)

Endotoxins: 0.001 EU/ml

DNase: <0.5 pg/μl

RNase: <0.1pg/ml

Flow Rate : up to 2 lit/min

**Note: Please quote the rates for each capacity (A&B) separately**

**ITEM NO. 12 DNA SEQUENCER (NGS) ( FIRST CALL)**

- The next-generation sequencing (NGS) system should be a bench top model with minimal foot print and should be based on ion semi-conductor technology or SMRT sequencing technology or sequencing by synthesis technology.
- The system should support a broad range of applications including metagenomics, amplicon sequencing, resequencing, smaller genome sequencing, target region enrichment and sequencing, transcriptomics/RNA/targeted RNA sequencing, small RNA sequencing *etc.*
- Instrument should perform template amplification, sequencing and data analysis (base calling, alignment variant calling and reporting).
- Both shorter and longer reads should be possible i.e., the system should offer a range of read lengths with different outputs so as to be amenable for a range of applications.
- The instrument must yield both single and paired end reads.

- System should offer data output of 10-15 Gb@ read length of 200 bp or more with paired end reads.
- The sequencing technology should offer accurate sequencing of homopolymers and repetitive regions in the genome of at least 15 bases and highest read quality score of Q30 for greater than 80% bases at the maximum possible read length.
- System should be able to sequence multiple samples at a time with option of using barcodes for sample multiplexing (up to 96; preferably 384).
- The system should have a reasonable runtime to perform integrated massively parallel sequencing of DNA/RNA libraries loaded directly on the system.
- The particular machine should be positioned with global dominance in NGS. It should produce high quality and accurate with minimum processing time.
- The system should also include an option to integrate with the genomic computing environment, an easy, secure and cost-effective way to store, analyze and share genomic data.
- The necessary accessories/ equipment required for library preparation (such as sonicator, Bioanalyzer) and sequencing shall be supplied along so that installation and further functionality of the equipment are not hampered.
- The system should have a minimum warranty of two years from the date of installation.
- Information on CMC charges from year 3-5 should also be provided along.
- The entire set of necessary test kits, reagents and other consumables needed for the test runs during the installations should be provided by the supplier at no extra cost.
- The system should have proven its worth in the scientific community with publications in high impact factor and refereed journals.
- **Suitable server at least with 256 Gb RAM, appropriate processing speed, core and internal memory should be supplied along with equipment to perform following analysis:**
  - Reference based alignment for eukaryotic genomes.
  - *De novo* assembly for eukaryotic genomes.
  - Quality check for NGS reads.
  - Complete software (analysis pipeline) suite for Transcriptome, RNA or targeted RNA sequencing analysis.
  - Complete software suite for metagenomic analysis.
  - Complete software suit for variant calling analysis.
  - Bacterial whole genome analysis.
  - Library preparation and sequencing reagents for 24 samples should be provided.

**ITEM NO.13 CONTROLLED ENVIRONMENT SYSTEM (MID AND SHORT-TERM STORAGE UNIT ( FIRST CALL)**

**Total area:** 53' x 17'11" x 8' (L x W x H) With two individual Chambers.

**Chamber A Size:** 22' x 17'6" x 8' (L x W x H)

**Chamber B Size:** 22' x 17'6" x 8' (L x W x H)

**Electrical Zone:** 4.5' x 17.11" x 8' (L x W x H) qty 2 ( Both Chamber Side)

**Temperature and Humidity range in chamber A:** 10°C ± 1°C and RH 35% ± 5%



**Temperature and Humidity range in chamber B:**  $4^{\circ}\text{C} \pm 1^{\circ}\text{C}$  and RH  $35\% \pm 5\%$

**Internal Dimensions:** 53 x 17'11" x 8' (W x D x H) This unit is divided into 2 areas by partition 60mm puff wall

Acclimatization Chamber A	:	$10^{\circ}\text{C} \pm 1^{\circ}\text{C}$ and RH $35\% \pm 5\%$ (Cooling & Humidity in 3 steps, it will help to maintain desired temperature inside the chamber)
Acclimatization Chamber B	:	$4^{\circ}\text{C} \pm 1^{\circ}\text{C}$ and RH $35\% \pm 5\%$ (Cooling & Humidity in 3 steps, it will help to maintain desired temperature inside the chamber)
Puff Panel Thickness	:	80mm PUFF minimum 0.5 mm/PPGI sheets on & Finish (All walls & both sides with galvanization to 180 Ceiling).
Insulated Door	:	Door of dimension 1200 mm x 2000 mm, flush with panels with automatic door closing mechanism and posiseal closure should be part of the door fixtures. The door should match the thickness of panel, with two window
Floor Insulation	:	Cemented floor, Aluminium floor plate.
Power Supply	:	415/3/50Hz
Generator Power Back-up	:	Genset as per required for both chamber
Racks Material	:	Made of SS, which can take load of seed bottles.
Number of Racks	:	Complete Rack facility for the whole chambers
Control System	:	By Intelligent Climate Control System for Temperature and Humidity with recorder and interface to monitor and operate the system through computer.

**Refrigeration Piping, Fittings & Valves (Installation Standards General):**

- The piping should be of refrigeration quality seamless copper tubes and the valves should be bras somatic / standard make. The piping should be include accessories such as filter, drier, sight glass, heat exchanger, sucti online accumulator *etc.* Adequate number of supports should be included for pipe installation pipe should be insulated with preformed sections of pipe insulation material.
- The suction air discharge lines should be designed for a maximum pressure drop corresponding to  $1.1^{\circ}\text{C}$  drop in saturated evaporating and condensing temperatures.
- The liquid line should be designed for maximum pressure drop corresponding to a drop  $0.5$  to  $1^{\circ}\text{C}$  instauration temperature.
- The piping should be designed with proper shape in the direction of Refrigerant flow and proper oil. Return to the compressor and should be installed with adequate supports to avoid undue vibration.
- The piping should be thoroughly cleaned as per standard practice prior to installation.
- Suction line in solution with 50 mm thick EPS covered with 0.6 mm thick aluminum cladding/25mm thick EPDM insulation/XLPE with proper sealing of joints and factory backed aluminum foil as per standard practice.

(a) Water piping complete with fittings, valves as necessary for supply from a common point near machine room.

(b) Drain piping with rigid PVC pipe from A.C. units to outside the machine rooms complete with 'U' traps and supports.

**Controls and Instrument as follows:**

**Intelligent Climate Control System:** It is a customized climate control system for complete lab which monitors and control temperature Humidity and Light with recording facility .

**Miscellaneous Items:**

- (a) Vibration isolators for condensing units *etc.*
- (b) Minor structural openings in walls/panels *etc.* for piping, cabling *etc.* and finishing.

**Electrical work for Refrigeration System:**

Electrical control panel cubical type, dust and vermin proof copper bus bars and suitable for 400 /440 Volts, 3 phase, 50 C/s A.C. supply and in cooperating the following:

- (a) Incoming MCCB 160 A.
- (b) Earth leakage current ELR and suitable ELCB.
- (c) MCBs and starters for condensing units, air handling unit, ACUs in entire chambers.
- (d) MCBs for control circuit
- (e) MCBs as spare.
- (f) MCBs for capacitors.

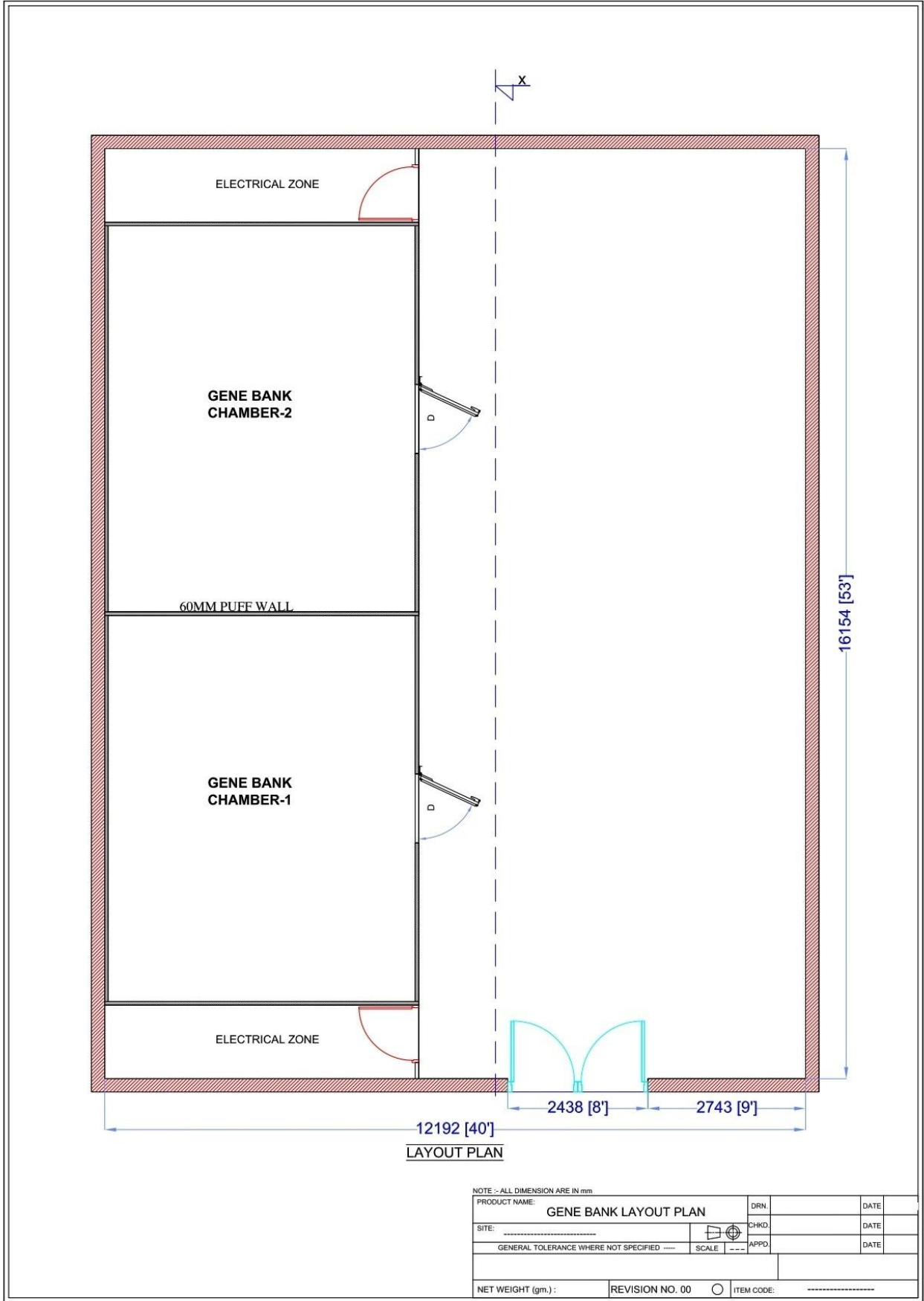
- The control panel should have provision for inter locking of various equipment as per standard practice.
- Power wiring with ISI approved PVC insulated copper conductors with supports, cable trays *etc* to be laid on walls/trenches/under the ceiling.

**Insulated Panel Structure:**

- This should cover supply of PUF insulated sandwich panels only with CFC free Polyurethane insulation of  $40\pm 2\text{Kg/m}^3$  density with internal metal skin of galvanized steel with plastic coating and external metal skin of galvanized. Steel should duly painted with corrosion resistance paint. The panel should be approx. 1180 mm width and should have required lengths to suit height of the seed storage unit.
- The joints should have metal/HIP cam lock or tongue & groove joint arrangement. The scope of work should cover all other ancillary material such as angles, metal sections, flashing, sealant, vapor barrier, adhesive and all other hardware for fixing the panels with the civil structure and pressure balancing ports as per requirement. The ceiling panels should be supported on the panel walls and should have additional support as necessary from the trusses/purlins of the main roof. In case the ceiling panels have joints, it should have supporting member below of the joints. The wall and ceiling insulation thickness should be with 80 mm PUF.

**Door Specifications:**

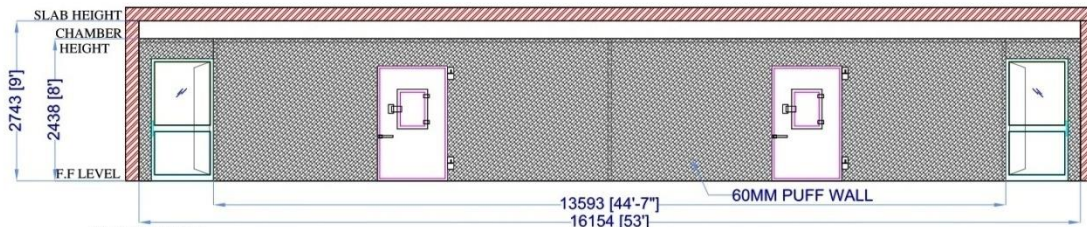
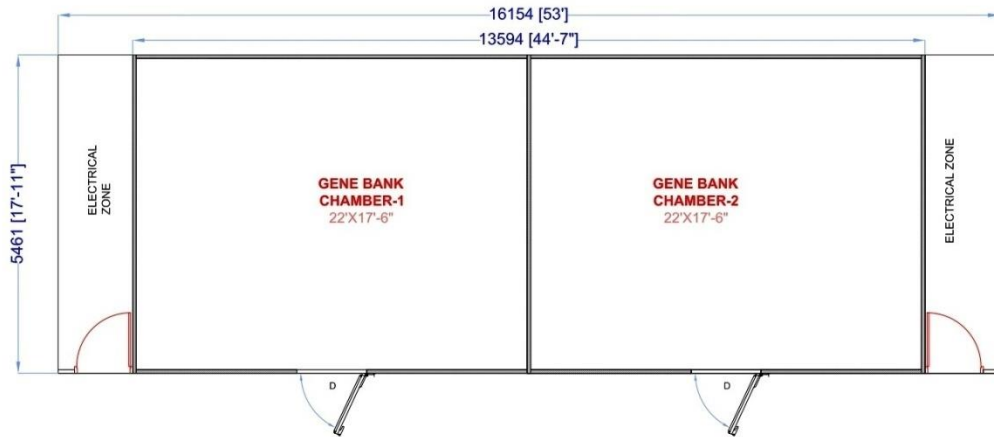
- Door should be of standard dimension of W 1200 x H 2000 mm and should be fitted on panel opening. Automatic door closing mechanism and positive seal closure should be part of the door fixtures. The door should match with the thickness of the wall panel. The door panel should be hinged to door frame and line panel should rise while opening to prevent bottom gasket from scraping on floor.



12192 [40']  
LAYOUT PLAN

NOTE :- ALL DIMENSION ARE IN mm

PRODUCT NAME: <b>GENE BANK LAYOUT PLAN</b>		DRN.	DATE
SITE: _____		CHKD.	DATE
GENERAL TOLERANCE WHERE NOT SPECIFIED ---	SCALE ---	APPD.	DATE
NET WEIGHT (gm.):	REVISION NO. 00	ITEM CODE:	_____



**CHAMBER DETAIL**

- 60MM PUFF
- \* - CHAMBER SIZE = 22'X17'-6"X8' (L X W X H)
- \* - INNER / OUTER SIDE = RAL 9002
- \* - DOOR ( D ) = 1200X2000MM 60MM PUFF 02 NOS. WITH VIEW WINDOW ( FLUSH TYPE DOORS REQUIRED)
- \* - FLOOR NOT REQUIRED
- \* - ALL ACCESSORIES FLASHING ,CAM CAPS, PANEL ASSEMBLY FULLY CAM LOCK.

**SECTION VIEW**

NOTE - ALL DIMENSION ARE IN mm

PRODUCT NAME: GENE BANK ELEVATION		DRN:	DATE:
SITE: _____		CHKD:	DATE:
GENERAL TOLERANCE WHERE NOT SPECIFIED ---		SCALE: ---	APPD:
NET WEIGHT (gms):	REVISION NO. 00	ITEM CODE:	-----

## ITEM NO.14 FRAGMENT ANALYZER (ADVANCED CAPILLARY ELECTROPHORESIS SYSTEM) ( FIRST CALL)

**Array format:** 12 capillary variable length arrays.

**Unattended sample capacity :** Permissible up to 270 samples.

**Sample injection :** Electro kinetic injection technology.

**Resolution :**  $\leq 3$  bp.

**Sizing accuracy :**  $\leq 5\%$ .

**Detection sensitivity :**  $\leq 5$  pg/ $\mu$ l for fragments and 40-50 pg/ $\mu$ l for a smear.

**Light source :** LED.

**Detector :** Charged coupled device Camera; 500-600 nm emission.

**Software :** Controller software to manage the queue, RFLP analysis, CRISPR plugin, cfDNA analysis, Single-guide RNA quality assessment, Genomic DNA quality check.

**Data Export Format :** CSV, PDF, Flexible numerical or binary output options.

**Marker Range detection :** 1 base pair to 50 kilo base pairs.

**Data Storage Devices :** To be accompanied with dedicated desktop.

## ITEM NO.15 AUTOMATIC DNA EXTRACTION SYSTEM( FIRST CALL)

- System should have capacity to run 12 samples per run.
- System should have purification technology by using membrane column method.
- Sample Volume should be 200-400 $\mu$ l.
- Elution volume should be 50, 100, 150 and 200 $\mu$ l.
- System should have Stream-line work flow to avoid cross contamination.
- System should have inbuilt UV treatment facility to avoid contamination.
- System should be compatible for forensic application for samples like bone, hair, blood *etc.*
- System should have wide applications for DNA, RNA and Viral DNA/RNA from wide ranges of samples.

## ITEM NO.16 CRYOTOME( FIRST CALL)

### General specifications of Cryostat

High performance **Cryostat** with intuitive software, touch screen option for simple, efficient operation. To be supplied with High and Low profile Disposable Blade holder and high and low profile Disposable Blades ( pack of 50 Blades), OCT/Cryo compound, glass antiroll guide with following specifications :

### Cryo-chamber features:

- Spacious stainless steel chamber for work flow.
- Chamber temperature should be about  $-35$  °C or less.
- System should be 27-30 numbers cryo-bar storage positions including 4 quick freeze/peltier location.
- Integrated peltier fast freezing device rapidly cools to  $-55$ °C or less should be available.
- Programmable and immediate defrost options should be available.

### Microtome features :

- Section thickness should be from 1  $\mu\text{m}$  to 500  $\mu\text{m}$  or more.
- Precise stepping motor blade advance for minimal vibration when sectioning.
- Vertical stroke length should be 64 to 70 mm.
- Horizontal feed range should be 28-30 mm.
- Automatic specimen retraction on return stroke should be available.
- XY specimen orientation with 360° z axis rotation should be available.
- UV Disinfection should be available.
- Quoted model should be ISO,CE and US FDA approved.
- Supply should provide Prominent user's name and contact details of quoted model model.

### **ITEM NO.17 BIOREACTOR SYSTEM( FIRST CALL)**

- Bench top bioreactor for cultivation of plant cell and tissue cultures with interchangeable autoclavable glass assemblies of different sizes 2.0, 5.0 and 10.0 L.
- Working volume 70%.
- Touch screen electronic control interface with user customizable display.
- Control scheme for pH, DO<sub>2</sub> and temperature with online control devices.
- Feed control through peristaltic pump for adding material.
- Antifoam control.
- Intake control Air /manual/Auto digital remote pressure.
- Pressure detection device. Provision of off-site.
- Assembly should be made up of SS lids suitable for inoculation of plant cell and organ cultures. Design and fabrication of lid should be supplied as per guidelines given by concerned scientist.
- Bottom to station the assembly be made up of SS.
- Agitation both Airlift and low shear impellar.
- Built in draft tube for gas mixing and low and high oxygenation.
- Provision of external white fluorescent light.
- Equipment should be supplied with anti-vibration table for stationing of the equipment.
- To be supplied with oil-free air compressor with pre-filters for continuous supply of air to the bioreactor.

### **ITEM No.18 FLOW CYTOMETER( FIRST CALL)**

- **High Throughput sensitive bench top flow cytometer** for wider application in plant materials for measuring ploidy level of starting material and tissue cultures, purity of seeds, to screen haploids, diploids, triploids and endopolyploidy for detection of chimeras after artificial polyploidation. Nuclear genome size determination in absolute values, specific detection of pathogenic strains and tissue specific gene expression.
- The instrument should equipped with light source to use the DAPI & PI fluorochrome. (*e.g* UV for DAPI excitation and Blue/Green for PI excitation). Instruments provided with flow cuvette and having laminar sample transport with sheath fluid for fluorescence light detection. Linear data acquisition with signal display.

- Optical parameters with selected photomultiplier tubes (PMT) and filters for propidium iodide (PI) and/or DAPI/SSC. (Standard set-up and filters for propidium iodide (long pass filter 590 nm) and/or DAPI /SSC (long pass filter 435 nm).
- **Flow system:** Quartz flow cuvette for laminar sample transport and hydrodynamic focusing sample port with bio-safety cleaning function and adjustable flow rates from 0.1 – 20  $\mu\text{L/s}$  fluid and waste reservoirs with fluid level sensors.
- **Electronics and signal processing:** Selectable linear or 4-decade logarithmic scale 16-bit analogue-to-digital converters, selectable trigger parameter and individual threshold level settings.
- **Software/Operating system:** Microsoft Windows™ operating software for real-time data acquisition, display, analysis and reporting.
- **Data format:** Flow cytometry standard (FCS). To be supplied with additional data analysis software like Flow Jo or FCS Express.
- **Computer system:** The Instrument should be supplied within built and external PC Integrated Microsoft Windows PC with Microsoft Office®. with monitor (Latest version) and Laser color printer.
- The instrument should be supplied with the reagent of 750 Test for Plant DNA analysis. Starter kits and reagents should be quoted with the system which includes sheath fluids, tubes, tracking beads and cleaning, compensation kits and consumables reagents.
- To be supplied with 1 KVA compatible online UPS (battery backup of 30 min.) to support the system.
- Training for system and software should provided by company peoples.

## ITEM NO. 19 HORIZONTAL LAMINAR AIR FLOW CABINET

### Dimension : 1200x 600x 600 mm (4'x2'x2')

- Cabinet lighting located away from Laminar Air Flow Area.
- Ultraviolet lamp to sterilize and decontaminate work zone and cabinet contents between operating periods.
- Optional Night Door/Cover to protect cabinet interior when blowers are off. Contains UV radiation when UV activated.
- Disposable polyester fibber pre filter with 85% arrestance.
- Long-life Camfil-Farr ULPA main filter with efficiency of 99.999% at particle sizes between 0.1 to 0.3 $\mu\text{m}$ .
- Side window that allows ambient illumination into the chamber and provides users with an unobstructed view of its contents from three sides.
- GFCI outlet to power equipment in cabinet.
- Appropriate external rotor blower.
- Control panel On/Off switch for fan, lighting, GFCI outlets, Minihelic ULPA pressure gauge to measure filter performance, UV lamp key switch.
- Fan speed control.
- Base Stand: Optional mobile cart with locking casters, includes a convenient lower shelf.
- Stainless steel Work Surface with ULPA filter spill-retention lip on HLF units.

- Ergonomically angled front improves reach and comfort.
- Appropriate antimicrobial coating on all painted metal surfaces minimizes contamination – white colour.
- Protected work zone environment created for optimum product performance.
- Optional IV Bar with "S" hooks.
- Optional petcock service fixture (Maximum 4 per unit).
- Large, easy-to-read LED display presents a menu of functional readouts.
- A pre-filter traps large particles to extend the life of the ULPA filter.
- Alarms programmed to warn of ULPA Filter when it is blocked.
- Quiet, variable speed internal blower provides step less air velocity control.
- Glare-free fluorescent lamp/UV lamp for illumination and disinfection purposes.
- Non-glare stainless steel work surface for easy cleaning.
- UV lamp with Night door/cover Ultraviolet lamp for contamination of interior surfaces.
- Includes a timer, and key switch UV operation must comply with local codes and facility safety practices.

### Filter Specifications

Pre-Filter	Disposable polyester fibbers with 85% arrestance
Main Filter (2)	ULPA, 99.999% efficient at particle sizes between 0.1 to 0.3µm
Size	Full size of Work Zone
Clamping	Spring loaded, adjustable tension adjusts for gasket aging
Cabinet Lighting	Compact Fluorescent Bulb Removed from Air Stream
UV Lamp (3)	Compulsory
Noise,	dBA, 1 meter <65

### Side Windows

Construction	Tempered Glass
Visible Opacity	Transparent
UV Opacity	UV Absorbing
Colour	Colourless

### Construction

Colour	Epoxy coated steel frame
Working Surface	Stainless Steel
GFCI outlet	Standard
Finishing	Standard Anti-microbial Powder Coat
Monitoring	Mini helic ULPA pressure gauge

## ITEM NO.20 GENOMICS SOFTWARES( FIRST CALL)

Rate of an advance and latest versions of following genomic softwares are invited:

1. **Mol Quest:** For gene prediction.



2. **DNASTAR:** For Assembly and data analysis.
3. **Join Map:** For Linkage map construction.
4. **Multi QTL:** For QTL identification.
5. **Turnitin:** For plagiarism checking.
6. **CLC Genomics Workbench:** For Genome assembly.
7. **Omics Box/ BioBam:** For genomics, transcriptomics and metagenomics data analysis.
8. **SAS :** For statistical data analysis.

**Note: Please quote pooled cost of all softwares.**

**ITEM NO. 21 COMPUTER WITH ACCESSORIES( FIRST CALL)**

**(A) LAPTOP**

Processor Description	Intel Core i7
Form Factor	Standard
Dedicated Graphic Card (GB)	2 GB Graphics
Operating System (Factory Pre-Loaded)	Windows10 Pro
RAM Size (GB)	16 GB
RAM Expandability up to	32GB
Type of Drives	HDD, SSD
Total HDD Capacity (GB)	About 1000GB
Total SSD Capacity (GB)	About 256GB
Wireless Connectivity	Should be provided
Bluetooth Connectivity	Should be provided
Display Size (Inch)	15.6
Panel Technology	IPS
Display Resolution (Pixels)	HD with touch screen
Availability of Webcam	Should be provided
Resolution of Webcam	HD

**(B) Display: 19.5 Inch (Desktop)**

Processor	Core i7
Ram	16 GB
Hard Disk	1TB
SSD	256 GB
Graphics	HD Graphics
Port	HDMI,USB 3.0
Display	19.5 Inch
Camera	Web Cam

CD/DVD items	Available
Key board/Mouse/USB	Wireless
WAN Port/Wi-Fi connecting port:	Available
O.S	Windows 10
MS office	12 or latest

**(C) Display: 21.45” Full HD (Desktop)**

Processor	8 <sup>th</sup> Generation Core i7
Ram	16GB
Hard Disk	1TB
SSD	256 GB
Graphics	HD Graphics
Port	HDMI,USB 3.0
Display	21.45” Full HD
Camera	Web Cam
CD/DVD items	Available
Key board/Mouse/USB	Wireless
WAN Port/Wi-Fi connecting port:	Available
O.S	Windows 10
MS office	12 or latest

**(D) Display: 23.8” Full HD (Desktop)**

Processor	8 <sup>th</sup> Generation Core i7
Ram	16GB
Hard Disk	1TB
SSD	512 GB
Graphics	4 GB Graphics
Key Board -Mouse	Wireless
Port	HDMI,USB 3.0
Display	23.8” Full HD
Camera	Web Cam
CD/DVD items	Available
Key board/Mouse/USB	Wireless
WAN Port/Wi-Fi connecting port:	Available
O.S	Windows 10
MS office	12 or latest

**(E) Display: 21.45” Full HD (All in One)**

Processor	8 <sup>th</sup> Generation Core i5
Ram	8 GB
Hard Disk	1TB

SSD	128GB
Graphics	HD Graphics
Port	HDMI,USB 3.0
Display	21.45” Full HD
Camera	Web Cam
CD/DVD items	Available
Key board/Mouse/USB	Wireless
WAN Port/Wi-Fi connecting port:	Available
O.S	Windows 10
MS office	12 or latest

**(F) Compact laser printer**

- Print speed: Up to 15 ppm1 (ISO)
- Up to 600 x 600 x 2 dpi (1200 dpi effective output)
- HP FastRes 600, HP FastRes 1200
- 234 MHz processor with 2MB RAM
- Duty Cycle up to 5,000 pages per month
- RMPV: Up to 250 to 2,000 pages<sup>2</sup>
- Hi-speed USB 2.0 port
- Toner – 2000 pages (full toner)

**(G) Multi-Function Laser Printer**

- Print, Scan, Copy from a single compact device
- Prints up to 14 ppm1 (ISO) – A4 print & copy
- Duty Cycle up to 5,000 pages per month
- RMPV: Up to 250 to 2,000 pages<sup>2</sup>
- 600 x 600 dpi print resolution
- 230 MHz with 32MB RAM
- Hi-speed USB 2.0 port
- Black Original LaserJet Toner- 2000 pages

**(H) Colour LaserJet Printer**

- Prints up to 17/4 ppm (ISO) (Blk/Clr)<sup>1</sup>, letter
- Duty cycle up to 15,000 pages per month
- RMPV: Up to 200 to 850 pages<sup>2</sup>
- 266 MHz processor; 128MB DRAM (CP1025)
- 64MB DRAM, 4MB Flash (only on CP1025nw)
- 1 built in 10/100 Ethernet, 1 Wireless
- 802.11b/g/n (only on CP1025nw)
- Black Toner- 1,200 pages

**(I) Duplex LaserJet Printer**

- Prints up to 28 ppm1 (A4)

- RMPV: Up to 2,50 to 2,500 pages
- Duty cycle (monthly): 20,000 pages
- Resolution: Up to 1200 x 1200 dpi
- Memory: 256 MB, Processor: 800 MHz
- **M203d**: HP Print; AirPrint1.5 with media presence sensor; Google Cloud Print™ 2.0
- **M203dw**: HP Print; Wi-Fi Direct printing; AirPrint1.5 with media presence sensor; Google Cloud Print™ 2.0
- Toner- 1600 pages

**Note: Please quote the rates for each items ( A, B, C, D, E, F,G H & I) separately.**

**ITEM NO.22 UPS ( FIRST CALL)**

**(A) UPS 600 VA**

Battery	Single
Backup	10-15 minutes
Capacity	600 VA
Input Voltage Range	140 - 300V
Input Frequency	50 Hz
Output Voltage	230 V
Output Frequency	50 Hz
Communication option	RS 232
Operating Temperature	0 - 40 ° C

**(B) UPS 1000 VA**

Battery	Double
Backup	20-30 minutes
Capacity	1000 VA
Input Voltage Range	140 - 300V
Input Frequency	50 Hz
Output Voltage	230 V
Output Frequency	50 Hz
Communication option	RS 232
Operating Temperature	0 - 40 ° C

**(C) ONLINE UPS 3 KVA WITH BATTERY A HOUR BACKUP**

General	Rating: 3 kVA, Capacity: 3 kVA, Overall Efficiency: > 90%, Inverter Efficiency: 88% ECO Mode
Input Parameters	Input Voltage: 230V AC Input Voltage Range: 110 - 300 V Input Connection: 1W+N+G Input Power Factor: > 0.99

	THDi: < 10% Input Frequency Range: 40- 70 Hz Input Resettable Breaker: Yes
DC Characteristics	DC Voltage: 72 V Standard charging current: 6.5 A
Battery Type	12 V VRLA 12 V Tubular 2 V VRLA
Output Parameters	Output Connection: 1W+N Output PF: 0.8 Output Frequency: 50 / 60 Hz Output Waveform Type: Sine wave Output Voltage (in VAC): 200 V / 208 V / 220 V / 230 V / 240 V
Protections	Ingress Protection: IP 20 Input Low / High Protection: Should be provided Output Low / High Protection: Should be provided Short Circuit Protection: Should be provided Surge Protection: Should be provided
Environment Features	Operating Temperature: 0 - 40 ° C
Certificates	UE / CE Certificate RoHS

#### **(D) ONLINE UPS 5 KVA WITH BATTERY A HOUR BACKUP**

General	Rating: 5 kVA Capacity: 5 kVA Overall efficiency: > 91% Inverter efficiency: 88% ECO mode
Input Parameters	Input voltage: 1W+N Input voltage Range: 110 - 300 V Input connection: 1W+N+G Input power factor: > 0.99 Input frequency range: 46 - 54 Hz Input MCB: Should be provided
DC Characteristics	DC Voltage: 192 V Standard charging current: 4A
Battery Type	12 V VRLA 12 V Tubular 2 V VRLA
Output Parameters	Output connection: 1W+N Output PF: 0.8 Output frequency: 50 / 60 Hz Output waveform type: Sine wave Output voltage (in VAC): 208 V / 220 V / 230 V / 240 V

Protections	Ingress protection: IP 20 Input Low / High Protection: Should be provided Output Low / High Protection: Should be provided Short Circuit Protection: Should be provided Surge Protection: Should be provided
Environment Features	Operating Temperature: 0 - 40 ° C
Certificates	UE / CE Certificate RoHS

**(E) ONLINE UPS 10 KVA WITH BATTERY A HOUR BACKUP**

General	Rating: 10 kVA Capacity: 10 kVA/9 Overall Efficiency: > 91% Inverter Efficiency: 88% ECO Mode
DC Characteristics	DC Voltage: 192 V Standard Charging Current: 4A
Battery Type	12 V VRLA 12 V Tubular 2 V VRLA
Output Parameters	Output Connection: 1W+N Output PF: 0.8 Output Frequency: 50 / 60 Hz Output Waveform Type: Sine wave Output Voltage (in VAC): 208 V / 220 V / 230 V / 240 V
Protections	Ingress Protection: IP 20 Input Low / High Protection: Should be provided Output Low / High Protection: Should be provided Short Circuit Protection: Should be provided Surge Protection: Should be provided
Environment Features	Operating Temperature: 0-40 °C
Certificates	UE / CE Certificate RoHS

**Note: Please quote the rates for each items ( A, B, C, D & E) separately.**

**ITEM NO. 23 PHOTOCOPIER( FIRST CALL)**

Print Technology	Laser
Type of machine	Multifunction machine
Type of printing	Mono
Cartridge technology	Separate drum and toner
Platen/Flatbed size	A <sub>3</sub>
Paper Size (Original/Image)	A <sub>3</sub> /A <sub>3</sub>
RAM size (MB)	512MB

Minimum speed page per minute	27 Pages
Scanning feature	Yes
Availability duplexing feature	Yes
Networking feature	Yes
Type of network	Ethernet 10/100/1000
Wi-Fi availability	Yes
Wi-Fi type	Wi K 802.11 b/g/n
Original document feeder	DADF/RADF
Feeder capacity (Number)	50
Number of main paper tray	1
Each main paper tray	500
Bypass facility	Yes
Life of drum	60000
Separate drum and toner cartridge technology	Black
Duty cycle	30000
Maximum operating temperature °C	32°C
Minimum operating temperature °C	15
Maximum operating humidity (% RH)	80
Print technology	Laser

### **ITEM NO.24 RO SYSTEM( FIRST CALL)**

- RO Capacity: 500-1000 (Liter/hour)
- Max Water Recovery Rate: 65-70 %
- Voltage: 380 V.
- Frequency: 50 - 60 Hz.
- Power Source: Electric.
- Automatic Grade: Automatic.
- Plant Application: Industrial **RO** Plant.

#### **(A) Ro System Capacity : 500 L/Hour**

- RO Capacity: 500 Liter/hour
- Stand made up of SS 304
- Raw Water Pump ½ H P
- Vessel Hydrosheel/E Sheel
- Multi Port Valve 1”
- Sent Media: Marvel Granule
- Carbon :IV Value
- Micron Cartage 20/4.5 Inch
- High Pressure Pump : standard make
- Membrane Housing 40-80: Made up of S.S 304
- Membrane 40-40
- Dosing Pump

- Control Pannel
- Flow Meter 1200 Lph
- Pressure Gauge made up of SS
- Alkaline filter system
- HNST System
- Fitting : Complete

**(B) RO System Capacity : 1000L/Hour**

- RO Capacity: 1000 Liter/hour
- Stand made up of SS 304
- Raw Water Pump ½ H P
- Vessel Hydrosheel/E Sheel
- Multi Port Valve 1”
- Sent Media: Marvel Granule
- Carbon :IV Value
- Micron Cartage 20/4.5 Inch
- High Pressure Pump : standard make
- Membrane Housing 40-80: Made up of S.S 304
- Membrane 40-40
- Dosing Pump
- Control Pannel
- Flow Meter 1200 Lph
- Pressure Gauge made up of SS
- Alkaline filter system
- HNST System
- Fitting : Complete

**Note: Please quote the rates for each items ( A & B) separately.**

**ITEM NO.25 WATER CHILLER( FIRST CALL)**

- Chiller 500liter storage
- Type: VERTICAL ,S.S , 500 liter storage
- Cooling capacity:300/L P H
- Water tape: 03 S.S.
- Refrigerant : R-22
- Compressor: Hermetic type Emerson
- Condenser fan :Propeller type
- Thermostat: Automatic control temperature
- Power supply: 230 V + - 10% 50Hz,Single Phase

**ITEM NO.26 INVERTER WITH BATTERY ( FIRST CALL)**

**Inverter**

Over Temperature protection.



Reverse phase protection.  
Silent operation.  
Battery Fuse down display.  
Selector switch for normal/UPS mode.  
Normal/High charging system.  
High surge load capacity.  
Wide input voltage range.  
Battery high protection  
Capacity: 600 VA to 3.5 KVA.  
**Note: Please quote cost of each capacity separately.**

### **Battery**

- Capacity: 120 Ampere to 500 Amperes.

### **Dry Battery**

- Capacity: 12V /40 AH/20HR

**Note: Please quote cost of each capacity separately**

### **ITEM NO. 27 AIR CONDITIONER WITH VOLTAGE STABILIZER ( FIRST CALL)**

- Split Type
- Capacity 1.5/2 Ton.
- As per bio-safety guidelines.
- Acquired by using power saving and start with low voltage.
- At least 3 Star rating 5 star rating is preferred.
- Low noise level preferred.
- With appropriate voltage Stabilizer

**Please quote rates for each capacity and voltage stabilizer separately.**

### **College Level Technical Purchase Committee**

1. Dr. V.S. Kandalkar Professor & Head, Department of G&PB, COA, Gwalior (Chairman)
2. Dr R. K. Pandya, Professor, Department of Plant Pathology, COA, Gwalior (Member)
3. Dr Ashok Ahuja, Guest Faculty, Department of PMB&B, COA, Gwalior (Member)
4. Dr M. K. Tripathi, Senior Scientist, Department of PMB&B, COA, Gwalior (Member)
5. Dr Akhilesh Singh, Scientist Senior Scale, Department of Agricultural Engineering(Member)
6. Dr Sushma Tiwari, Scientist, Department of PMB&B, COA, Gwalior (Member Secretary)

## **College Level Purchase Committee**

1. Dr. V.S. Kandalkar, Professor & Head, Department of Genetics & Plant Breeding, COA, Gwalior  
(Chairman)
2. Dr R. K. Pandya, Professor, Department of Plant Pathology, COA, Gwalior (Member)
3. Dr. V. B. Singh, Professor & Head, Department of Agricultural Statistics, COA, Gwalior (Member)
4. Dr. Amita Sharma, Scientist, Department of Environmental Science, COA, Gwalior (Member)
5. DDO, Dr. S. P. S. Tomar/ Dr. Rashmi Bajapai, COA, Gwalior (Member)
6. Dr. M. K. Tripathi, Principal Scientist, Department of PMB &B, COA, Gwalior (Member Secretary)

**Dean College of Agriculture, Gwalior**