

**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/2020-21/113 Dated 05.02.2021)**

Following laboratory equipments/instruments/structures are to be procured at College of Agriculture, RVSKV, Gwalior for the establishment of Biotechnology Centre and Gene Bank at Biotechnology Centre, RVSKVV, Gwalior. 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 systems 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><i>Third Call</i></b>			
1.	DNA Sequencer ( NGS)	₹ 5,000	₹600000
2.	Bioreactor System	₹ 3000	₹ 80000
3.	Horizontal Laminar Air Flow Cabinet	₹ 1000	₹ 6000
4.	Genomics Softwares	₹ 1000	₹ 2000
5.	Phenomics facility with Climate controlled Green House	₹ 10,000	₹1600000
<b><i>Second Call</i></b>			
6.	Gel Documentation System	₹ 2000	₹ 30000
7.	BOD Incubator	₹ 1000	₹ 3000
8.	Gradient Thermal Cycler	₹ 1000	₹ 10000
9.	Hot Air Oven	₹ 1000	₹ 3000
10.	Automated System for Protein, Nucleic Acid Extraction and Cell Separation ( Automatic DNA extraction System)	₹ 2000	₹ 40000
11.	Tissue Lyser cum Homogenizer	₹ 2000	₹ 18000
12.	Herbarium storage racks/cabinet	₹ 1000	₹ 15000
13.	Seed germinator	₹ 1000	₹ 10000
14.	BOD (walk-in type)	₹ 1000	₹ 25000
15.	Seed packing machine	₹ 1000	₹ 10000
16.	Liquid nitrogen generator	₹ 5,000	₹500000
17.	Empanelment for running tissue culture laboratory, green house/polyhouses facilities at biotechnology centre under Rajmata Vijayaraje Scindia Agricultural University, Gwalior (M.P) for production, marketing and sale of plants for revenue generation	₹ 2,000	₹25000
<b><i>First Call</i></b>			

18.	Refrigerated High Speed Micro Centrifuge	₹ 1000	₹ 6000
19.	Shaker Water Bath (Water Bath and Chiller Circulating Water Bath)	₹ 1000	₹16000
20.	pH meter	₹ 1000	₹ 1200
21.	Election Microscope complete unit	₹ 5,000	₹400000
22.	Lab furniture for Gene Bank	₹ 5,000	₹100000
23.	Furniture for Conference Hall	₹ 2,000	₹40000
24.	Wall Paneling of Conference Hall	₹ 2,000	₹20000
25.	Computer and accessories	₹ 1000	₹5000
26.	Photocopier	₹ 1,000	₹5000

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 9<sup>th</sup> March, 2021.

**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	05 Feb, 2021	16 <sup>00</sup>
b)	Document Purchase Start Date	05 Feb, 2021	10 <sup>30</sup>
c)	e-Bid Submission End Date	06 March 2021	17 <sup>00</sup>
d)	Physical bid document Submission end date in the Office	08 March 2021	17 <sup>00</sup>
e)	Opening of the Technical Bid at RVSKVV	09 March 2021	15 <sup>00</sup>
f)	Technical Evaluation of Bids	09 March 2021	16 <sup>00</sup>
g)	Financial/Price Bid e-Opening Date	15 March 2021	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 lakh 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 on-line submitted and proof enclosed physically.**
- 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/ 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 06.03.2021 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 08.03.2021, 5:00 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 9<sup>th</sup> March 2021 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 15-03-2021 from 2:00 P.M. to 5.00 PM. 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 RVSKV, 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 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 and 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 9<sup>th</sup> March 2021.

**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:** 05-02-2021

**Dean, College of Agriculture, Gwalior**

**OFFICE OF THE DEAN, COLLEGE OF AGRICULTURE,  
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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 (%) livable. If no, state basis and terms of the exemption.	
11.	Is Service Tax extra? If yes, rate of Service Tax livable (%)	
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) deposited on line and proof has been enclosed	
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 DNA SEQUENCER (NGS) (THIRD 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.2 BIOREACTOR SYSTEM (THIRD CALL)***

- Bench top Glass bioreactor for cultivation of plant cell and tissue cultures with 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.
- Digital 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.
- Top of Assembly should be made up of SS lid suitable for inoculation of plant cell and organ Cultures.
- Design and fabrication of lid should be supplied as per guidelines given by concerned scientist for plant organ cultures.
- Bottom to station the assembly be made up of SS.
- Agitation both Airlift and low shear impellar mounted on head plate.
- Built in draft tube for gas mixing and low and high oxygenation.
- 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 bioreactor

### ***ITEM NO. 3 HORIZONTAL LAMINAR AIR FLOW CABINETS (THIRD CALL)***

#### **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 0.3µm.
- 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, Mini-helic 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 filters 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.4 GENOMICS SOFTWARES (*THIRD 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. 05 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/5.5 $\mu$ m x 5.5 $\mu$ m) 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, Conveyer 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 fustigation.

**(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 work station 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 NO. 6 GEL DOCUMENTATION SYSTEM (*SECOND CALL*)**

- With  $\geq 5$  megapixel digital camera with auto exposure.
- With large  $\geq 25 \times 30$  cm viewing area.
- With a viewing pane having universal 560nm amber filter for gel inspection.
- With an interchangeable filter slide having 620nm ethidium bromide filter as standard.
- Should include a front LCD indicator panel for safe and convenient gel inspection.
- With an option for blue epi-illumination module.
- With white light table for viewing visible gels and making the gel doc suitable for imaging most fluorescent and colorimetric gels.
- Should have a cabinet with door with pull out transilluminator.
- The system should include analysis software.
- Camera: CMOS scientific grade sensor with auto-exposure; pre-focused  $\geq 5$  mega pixel camera; Maximum CMOS resolution  $\geq 2400 \times 1800$  pixels; Pixel density RAW 8 bit/10 bit/12bit; with  $\sim 6$ mm focal length; F1.2 aperture size with manual adjustment.
- Software: With options to rotate image, flip image, brightness, contrast, zoom, selecting image lanes, addition and deletion of lanes, Lane analysis, auto find and adding the peaks. Should have image summarization option which includes calculation of density and calculation of molecular weight. Option for Dot/Blot positive and negative analysis. With automated software for rapid analysis of 2d protein spots between samples. Database Software to match unlimited number of primers in unlimited Gels; Genotyping capabilities, Create cluster analysis, RFLP, RAPD, SSR, Fingerprinting, VNTR analysis, Genotyping, etc. All the software 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.

- Transilluminator: Should be 312nm single wavelength transilluminator. Viewing area size should be  $\geq 25 \times 30$ cm; with at least 6x8W UV tubes.
- Darkroom: with 6x1W white lamp module; UV lights shuts off when the door opens.
- 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.7 BOD INCUBATOR (*SECOND CALL*)**

- Temperature ranging from 10°C to +50°C with excellent stability.
- Capacity: Minimum 550 liters
- Temperature Uniformity @ 37°C  $\pm 0.5$  °C.
- Microprocessor control with easy-to-read display shows actual temperature within 0.1°C.
- Push-button controls for temperature set point selection.
- Forced-air circulation for excellent temperature stability.
- CFC-free, foamed polyurethane insulation to prevent heat loss.
- RTD temperature probe and protected set point mode to prevent accidental temperature change.
- Door key lock to protect samples from unauthorized access.
- Temperature set point selection with high and low temperature protection and simple calibration.
- Available with dual lamp fluorescent lighting for plant growth studies and day/night cycles, programmable lighting conditions.
- Safety relay and alarm LED alert to over/under temperature conditions.
- Access port for independent sensors/connection of equipment inside unit.
- Cooling switch provides high temperature accuracy and saves energy at temperatures above to ambient.
- RS-232 and recorder jacks for data logging.

#### **TEM No.8 GRADIENT THERMAL CYCLER (*SECOND CALL*)**

- Sample volume 10 $\mu$ L to 100 $\mu$ L
- Flexibility of modular 96- and 384-well interchangeable blocks on the same system
- Max block ramp rate  $\geq 3.5$ °C /sec. Max sample ramp rate of  $\geq 3.0$ °C /Sec.
- Programmed methods for hot start PCR, cycle sequencing, long PCR, touchdown PCR and unlimited protocols on USB drive.
- Touch screen interface with real time display of program
- Gradient temperature range of  $\sim 30$ °C to  $\sim 99$ °C.
- Remote access feature to allow the access from web enabled device, start a run and stop a run or just to check on its status.
- Pre-loaded protocols for some of most popular protocols
- PCR Wizard feature for quick and customized protocol creation.
- Memory capacity of at least 10000 protocols.

- With USB ports.
- With compatible online UPS for 2 h backup.

#### **ITEM NO. 9 HOT AIR OVEN (*SECOND CALL*)**

- Programmable Microprocessor control with vacuum fluorescent/LED display.
- Broad temperatures range 50°C to 250°C.
- Temperature Uniformity at 150°C:  $\pm 3^\circ\text{C}$
- Stainless steel perforated shelf at least :3
- Capacity in liter: 400-500 liters
- Machine should have to 2 PT-100 Sensor for Sample protection.
- Inner chambers corrosion-resistant stainless steel 1.4016/AISI 430 with rounded corners for easy cleaning.
- Automatic over temperature alarm system to protect samples.
- Timer function to programme start or switch off times for additional energy savings.
- Interior W x H x D: 500-600 x 1300-1400 x 500-600 mm.
- Exterior W x H x D: 1500-1600 x 700-800 x 700-800 mm.
- Access port allows the introduction of sensors for independent data monitoring by appropriate Thermometer with range from 0 To 300°C.
- Ovens should come standard with a RS232 data interface with an optional facility for wireless temperature monitoring.
- Lockable casters for mobility and easy set-up in lab.
- Rated voltage: 230 volt 50 Hz with Less than 600 watt power consumption @ 150 degree Celsius.
- Machine must be supplied with compatible appropriate voltage stabilizer.

#### ***ITEM NO. 10 AUTOMATED SYSTEMS FOR PROTEIN, NUCLEIC ACID***

##### **EXTRACTION AND CELL SEPARATION (*SECOND CALL*)**

- Instrument should be compatible to Microtiter 96 deep well plates and 96 well standard plates depend on the sample volume.
- The principle should be a magnetic bead based, to purify nucleic acids, proteins, cells, bacteria in a convenient, rapid and reproducible manner from different starting materials with high quality and yield.
- The processing volume should be flexible for all type of sample volumes, with 96 well format it should be from 20  $\mu\text{l}$  – 1000  $\mu\text{l}$ .
- Entire processing time for 96 samples on instrument should be 30-40 min, depends on various kits.
- Instrument should not have liquid transfer step involved to avoid sample cross contaminations.
- The instrument should be able to run a maximum of 96 samples per run and a minimum of one sample per run.
- The instrument should have an open system, able to accommodate any kit from any manufacturer not closed spin column & pre-filled cartridges based system.
- The particle collection efficiency should be  $>95\%$ .
- The instrument should have an option of stand-alone mode and PC controlled mode.

- The system should have a memory for 100 internal protocols.
- The software and computer should be supplied with the instrument and the software should not have licenses key for unlimited users' access.
- The instrument should be open system for any magnetic bead based kits.
- The instrument should have a option heating block which should be capable of setting the temperature up to 115 ° C.
- Upgradable to 24 format magnet, large volume sample preparation with 24 format deep well plate.
- Equipment should be globally accepted standards and dully verified with literature available in website.

***ITEM NO. 11 TISSUE LYSER CUM HOMOGENIZER (SECOND CALL)***

- Sample throughput should be 1.5 and 2ml or both tube.
- Should be compatible for 24x2ml, 24x48ml, 24x4.5ml, 12x15ml, 2x50ml and provide adaptors for above sample quantity.
- Adapter compatibility: Adapter should be cool able at -20°C or less.
- Adapter cooling to operate in cryogenic conditions even without liquid nitrogen.
- Sample tube loading: Top-loading design for angular motion during processing.
- Sample type must be able to homogenize plants, animal, human, faces; insect, tissues, bacteria, bone, teeth & Environmental.
- Motion should have (3D-8 shaped) multi directional angular vibratory motion with typical sample processing time less than one minutes.
- Program memory up to 12
- Recommended programme >70
- Lid protection: Should have lockdown lid and safety interlock for operator protection and should have transparent for viewing of sample while lysis processing.
- Sample process time 1-120 Sec.
- Speed settings: Up to 10 m/s or equivalent or more if quoted in different units.
- Acceleration<2 Sec to maximum speed.
- Deceleration: <2 Sec to stop.
- Cycle between sample run1-9.
- Cycle pause: 1-300 seconds.
- Beads format should be able to use with different types of available beads like glass, ceramic and metal *etc.*
- Noise Less than 70db.
- Touch screen User Interface HD Monitor.
- Comply having certification with CE or equivalent

***ITEM NO.12 HERBARIUM STORAGE RACKS/CABINET (SECOND CALL)***

**Cabinet Construction:**

- Herbarium storage racks/cabinet with double doors, including 50-55 compartments.
- Size: 50-60"W x 20-24" D x 80-85" D.
- Suitable to keep botanical specimens safe from dust, light, insects and water.



- All-welded heavy-duty steel construction with 18 gauge doors, tops, bottoms, backs and sides and 12 gauge base.
- Steel inserts constructed of 20 gauge metal.
- All edges are folded for a smooth surface to prevent snagging of folders.
- Doors with four-point or six-point latching system for air-tight storage.
- Locking compression handles.
- Should be supplied with 100% non-off gassing silicon gaskets.
- Removable doors capable of lifting off of the hinges.
- Glass or solid doors.
- Leveling base.
- Solvent-free powder-coated finish.
- With large pull-out work shelf /Vents.

#### **Shelf Construction Details:**

- One-piece 18 gauge formed steel shelves with 20 gauge reinforcements.
- 16 gauge adjustable support rails for shelves.
- Shelves adjustable on 3/4" centers with no tools required (counter high cabinets adjust on 1" centers).
- Standard shelf load capacity 250 lbs; heavy-duty shelf load capacity 500 lbs of evenly distributed weight per shelf.

#### **Tray Construction Details:**

- 18-gauge welded construction.
- Adjustable on 3/4" center.

#### ***ITEM NO.13 SEED GERMINATOR (SECOND CALL)***

- Standard chamber with very high humidity control and uniformity.
- The interior should be made up of stainless steel and designed with 5 shelves on the base unit and up to 25 additional shelves available as an option.
- **Lighting:** Standard lighting of the chamber includes light fixtures mounted vertically on the sides of the cabinet separated from the germination area by dual pane sealed glass barriers.
- The base equipped with four lamps in each fixture with the option to upgrade to eight lamps per fixture.
- Observation Window 10-12" x 14-16" .
- **Light** options also should provide for use as a dark germinator.
- The unit provided with an adjustable fresh air intake port for air exchange.
- **Refrigeration:** Cooling self-contained air-cooled condensing unit with hot gas bypass for continuous compressor operation.
- Water cooled condensing unit.
- **Temperature/Humidity Control:** (Based on ambient condition) 5-50 °C.
- **Humidity Range:** Up to 98% RH, limited by a +25°C dew point. Control: ±3% RH. With wet bulb sensor complete with wet sock. An electronic modulating valve provides **temperature control** while ensuring noiseless operation.
- To be provided with pressure transducers for monitoring the status of the refrigeration system. User programmable alarms with user-defined set points without the need for adjustment every time the set point is redefined. Backup "high/ low" alarms.
- Exterior Dimensions: 35-40" W x 35-40" D x 75 -80" H.

- Interior Dimensions: 25-30" W x 25-30" D x 45-50" H
- Interior Capacity: (550-600 liters).
- Bonded paneling using CFC-free polystyrene insulation. Interior Finish: Stainless steel and water-tight. Trays: Five stainless steel trays 2.5" x 22.5" included with basic unit.
- Capacity: Up to 30 trays spaced 1½" apart.
- A full complement of 30 trays
- Instrument Port: One port, 1" with light tight cap.
- Additional stainless steel trays to a total of 25.

#### ***ITEM NO.14 BOD (WALK-IN TYPE) (SECOND CALL)***

- Walk-In BOD (Bio-Oxygen Demand) compact incubators to maintain temperature for tissue culture growth, storage of bacterial cultures and incubation to provide high degree of constant temperature accuracy. Pre-fabricated doubled walled modular panels with PUF insulation Inside Stainless Steel and Outside Mild Steel Powder Coated or Stainless Steel, Floor panels to withstand movement and sample load inside.
- Interior illumination for working area.
- Capacity 6000 liter
- Size: Approximate W x D x H: 2.0x1.5x2.0 Mts
- Temperature range 10°C to 60°C, Temperature Accuracy  $\pm 0.5^\circ\text{C}$  Temperature Uniformity  $\pm 1^\circ\text{C}$
- Multi panel vacuum sealed observation glass window.
- Heavy-duty door hinges and latches to maintain a secure and uniform seal.
- Racks & trays – Stainless Steel with adjustable height.
- Provision of Port hole with rubber seal to insert sensors for validation purpose.
- Interior illumination for working.
- Air heaters made up of Nichrome wires.
- Auto change over to stand by cooling system in case of failure of regular cooling system or *vice versa*.
- Compressor with Eco-Friendly refrigerant and system for continuous noiseless run of compressor.
- PLC based control system with touch screen display coloured screen. Web based online monitoring works on AC single phase 50Hz.
- Compressor remains off mode to save time. Electrical consumption, heat dissipation in the room and increasing the life of the compressor.
- Weather proof unit can be placed indoors as well as outdoors.
- Air distribution system with separate supply and return duct for ensuring uniformity of set conditions
- Safety & Alarms to cut off the supply in case of overshoot and undershoot of temperature giving audio visual alarm.
- Door Opening alarms.
- Emergency bell switch provided inside the chamber.
- Special door lock provided to open the door from inside.
- All the alarms are events are logged in the software
- Touch screen door access system.
- **Password based access control.**
- **Restricts access to unauthorized persons.**
- **To be supplied with complete documents.**
- **Operations and Maintenance manuals.**
- IQ, OQ, PQ, Calibration certificates.
- Training to end-users.

### ***ITEM NO.15 SEED PACKING MACHINE (SECOND CALL)***

- Should be suitable for semi-automatic filling combined with single channel counter.
- Should be suitable for use for accurate and fast seed counting and filling in bags, alu packets, vials, pots, cans *etc.*
- Should be suitable for small series like from 10-100 packets.
- The seeds should dropped automatically in each packet.
- Counter count from a small seed <math>\varnothing</math> 0.3 mm to 20mm size.
- Accessories: Sealer to seal Alu and poly bags.

### ***ITEM NO.16 LIQUID NITROGEN GENERATOR (SECOND CALL)***

#### **(A) Capacity: 50-70 liter per day**

- Fully integrated Liquid Nitrogen Generator with all the essential components *viz.*, Air compressor, N<sub>2</sub> generator, Cryo-refrigerator, Dewar storage and Level Indicators.
- Suitable for production and stable and continuous LN<sub>2</sub> supply for preservation of biological materials.
- Should have capacity to produce liquid nitrogen at least 50-70 liters per day.
- Should have facility to supply directly to LN<sub>2</sub>-cooled suitable cryogenic storage (Dewar) with 100-150 liter storage capacity.
- To be supplied with backup power supply.
- Should have an efficient nitrogen generation system with N<sub>2</sub> membranes to defect free separating layers.
- Purity should be 95% to 99.5%.
- Should have facility to deliver nitrogen directly without an additional booster, Dry gas, with dew point of (-) 60-70°C with online detection device for dryness.
- Low Maintenance.
- Easy to operate.
- Minimum Installation and Running Cost.
- Installation by supplier free of cost.
- Should be provided Operational manual and to train a person to get smooth running for supply of LN<sub>2</sub>.

#### **(B) Capacity: 100-150 liter per day**

- Should be a compact (mounted on a single skid) fully automatic unit.
- Should be easy to install and operate and needs minimum maintenance.
- The plant should be fully assembled system including Air compressor, Nitrogen gas generator, Liquefier, external chiller, storage tank *etc.* supplied for quick installation and production of LN<sub>2</sub>.
- Should use only electricity and atmospheric Air to run the unit.
- Completely automatic system that can be run unattended at nights and on holidays.
- No need for any skilled or dedicated person to operate.
- Should come with all necessary safety interlocks installed in the system.
- Should have high reliability with over 12,000 hours of maintenance intervals.
- Should have very simple and easy maintenance procedures.
- Should come with user friendly TOUCH SCREEN interface with controls & Display of parameters.
- Should be supplied with Non-Magnetic, vacuum jacketed LN<sub>2</sub> storage vessel.

- Once tank is full, the unit should stop and conserve electrical power until it is necessary to make more LN<sub>2</sub>.
- Should have provision for automatic fill operation of external LN<sub>2</sub> tanks.
- Should have auto-restart facility to enable restart of the unit when power supply resumes after a break.
- Should provide Nitrogen gas of purity of 99% or better.
- Production capacity ranging from 120 to 150 liter per day of liquid nitrogen generation.
- Storage capacity not less than 300 litres.
- Suitable external chiller should be provided.
- Should run on three phase power supply with minimum power usage.
- The unit should have a redundancy feature where one liquefier is shut while others are working during maintenance or during less requirement of Liquid Nitrogen. In other words production is not stopped even during maintenance.

**(C) Capacity: 220-240 liter per day**

- Production Capacity: Should have minimum of 240 litres per day.
- Purity of LN<sub>2</sub>: Better than 99% consistently; certification of purity to be provided by Bidder.
- Internal Dewar Volume 480-500 litres fitted with Level Sensor.
- Air Quality: Better than Class 1 as per ISO8573.1.
- Air Dryer: In-built Desiccant Type Air Dryer with Dew Point -60°C.
- Air Compressor should be System Integrated outside canopy of LN<sub>2</sub> Generator and Factory tested with LN<sub>2</sub> Plant.
- Closed Loop Water Chiller: should be System Integrated outside canopy of LN<sub>2</sub> Generator and Factory tested with LN<sub>2</sub> Plant.
- Air Filters: Must have PF, FF with filtration up to 0.01 ppm.
- Human Machine Interface Thru 8 inches Graphic Colour Display showing operational & diagnostic parameters and bar-graph display of LN<sub>2</sub> level continuously.
- Portability Plant on Wheels, fully portable.
- Sound Level, Low noise level < 65 dB @ 1 meter for LN<sub>2</sub> Generator, Major Maintenance Interval, Must be more than or equal to 30000 hours.
- Facility of Tuning Down should be inbuilt, Prod. Capacity can be tuned down 100%-75%-50%-25%, in case of variable requirement.
- Modular Configuration.
- Nitrogen Separation Should be thru efficient PSA only, factory tested with LN<sub>2</sub> Plant, based on Warm Gas Separation.
- Auto drains, should be in-built.
- Control should have PLC Control with HMI Touch Screen Display.
- System Diagnostics in a separate screen
- Operation: should be fully automatic with no requirement of manpower assistance for operation.
- Refrigerant, Ultra Pure Helium Gas to be used in Cryocooler Cycle.
- No Mixed Refrigerants with recipe of toxic, inflammable or costly mixtures of gases / fluids should used.
- To enhance the working life, reliability of system at Cryogenic Temperatures, eases maintenance & lowers cost of ownership.
- Automatic Restart, Plant should be able to restart itself when LN<sub>2</sub> Level depletes to a pre-set level.

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

**ITEM NO.17 EMPANELMENT FOR RUNNING TISSUE CULTURE LABORATORY, GREEN HOUSE/POLYHOUSES FACILITIES AT BIOTECHNOLOGY CENTRE UNDER RAJMATA VIJAYARAJE SCINDIA AGRICULTURAL UNIVERSITY, GWALIOR (M.P) FOR PRODUCTION, MARKETING AND SALE OF PLANTS FOR REVENUE GENERATION (SECOND CALL)**

Sealed “Notice Inviting tender” are invited in two bid systems. Technical bid and Financial bid, respectively, from ISO 9001:2000 certified reputed agencies, expertise in production of large scale tissue culture plants their marketing and sale to generate high revenues on Public Partner Participatory (PPP) mode in the already established facilities and well equipped plant tissue culture laboratory at Biotechnology centre, RVSKVV, Gwalior with capacity to produce more than 10 million saplings per annum. Initially the production would involve Banana, Bamboo, Sugarcane and Strawberry saplings but may be extended for other plants species too.

**Eligibility Criteria**

1. The agency must have expertise and experience in raising demand, production of tissue culture plants, sales and marketing, at least for the last three years.
2. The agency must have undertaken research technology innovation including field trials and has implemented similar project with all components and having proven record for running such facilities.
3. The experience detailed in the technical bid must be supported by literature in printed form (in original) along with the specifications of products produced on commercial level and marketed.
4. The firm should provide certificate that the company or its sister company, if any, is not black listed by any institute or department within the country and also in abroad.
5. The firm having approval under DSIR as R&D Company by Govt. of India and Department of Biotechnology, BCIL with ISO certification will be given preference.
6. The agency should also submit the non-black listing certificate issued by the non- judicial rotatory stamp paper.

**Available infrastructure Details**

<b>SNo.</b>	<b>Product detail</b>	<b>Qty</b>
01	Plant Growth Chamber	3
02	Media preparation & Sterilization room	1 each
03	Inoculation room	1
04	Laminar airflow	15
05	Store Room	1
06	Washing Area	1
07	Green House	1
08	Hardening facility	1

**Terms and conditions**

1. The Contractor/ Second Party shall manage, run and Up-keep the Tissue Culture Laboratory and attached infrastructure and facilities **for a period of three years which can be further extended subjected to performance based on revenue generation.**
2. The mother plants will be procured and confirmed from DBT recognized centers for virus indexing and genetic fidelity. Supply of desired plants will be worked up, so that disease free plants are available for tissue culture. The expenditure incurred for purchase of mother plants and their virus indexing shall be initially borne by **Second party.**
3. The Land and Lab and basic facilities will be provided by RVSKVV, Gwalior over which the captioned/said project will run. The laboratory will be handed over in as is where is basis along with equipments/facilities already available and successful bidder will be solely responsible for maintenance and daily running. Bidder may visit carry out site visit **with prior information** to assess facilities/laboratory.
4. Necessary electricity connection shall be made available by first party.
5. The RVSKVV Gwalior will retain legal identity of laboratory and various facilities and equipments provided.
6. The Second Party will provide Power back-up for the facility and will bear all running expenses, electricity bill *etc.* during the period of Contract.
7. The first party (RVSKVV) shall provide 10 Interns (B.Sc UG IV<sup>th</sup>Year Students) to work as intern for technical work. The stipend fixed shall be paid by the Second party.
8. The revenue shall be generated by virtue of the sale under joint Brand of RVSKVV and Second party.
9. **The distribution of the net profit shall be in suitable and agreed proportion between both the parties.** After deducting the entire expenses during the year so permitted and agreed upon by the parties the profit shall be vested to the first party who will make the suitable and agreed percentage of the net profit to the Second Party.
10. The Taxes applicable shall be deducted from the bill of the Second Party as per rule and law from time to time in operation.
11. A committee of experts constituted by First Party will supervise the Management and work of the Second Party and during supervision if any defect is found and pointed out by the committee, the Second Party shall carry out such rectification at their risk and cost as rectification defects of the project during that period as and when the same occur.
12. If during the validity of the contract, First Party, comes to the conclusion that Second Party is unable to perform its role, it may appoint another Agency, to take over the tasks and function being performed by in any or all the work allotted, or may assume the role of the Second Party itself and terminate the agreement with Second Party.
13. The firm may give a technical power point presentation before a high level technical committee, if asked to the compliance of the requirements of the University.
14. **Technical bid should consist of the following:**
  - Catalogue of the products.
  - GST No. should be mentioned clearly and Xerox copy of last three years & Income Tax clearance certificate.
  - List of Institute/Organization where the concerned firm work and set up the Tissue Culture unit.
  - The firms should enclose the photocopy of authorization certificate.
  - The firms should enclose the photocopy of sold quantity of Tissue Culture Plants of last two years.

- Audited financial statement of the last three years should be enclosed.
- Each submitted sheet should be signed and stamped by the bidders.
- **The technical competence shall include agency profile, CV of Key and Technical Persons. Details of project undertaken in last three years, list of clients/list of purchasers**

15. **Financial bid should consist of the following:**

S.No.	Infrastructure details Available for Tissue Culture Facility	Minimum Rental annual Charges (Rs.)	Quoted prices (Rs.)
01	Available for Tissue Culture Facility	300000.00	

**ITEM NO. 18 REFRIGERATED HIGH SPEED MICRO CENTRIFUGE (FIRST CALL)**

- Microprocessor controlled table top refrigerated micro centrifuge for 1.5-2 ml tubes.
- Display speed in rpm and/or g-force.
- RCF: above  $\geq 24,000 \times g$
- Speed above  $\geq 15,000$  RPM
- CFC free rapid cooling system.
- Brushless maintenance free drive
- Temp range:  $-5^{\circ}\text{C}$  to  $+40^{\circ}\text{C} \pm 1^{\circ}\text{C}$ .
- Temp. Increments  $1^{\circ}\text{C}$ .
- Timer: 10 sec-99min.
- Last run memory.
- Automatic door opening facility after the run.
- 24x1.5-2 ml tubes rotor
- Large LED display for Time, Speed and Temperature.
- Max Noise Level:  $\leq 60$  dBA.

**ITEM NO. 19 SHAKER WATER BATH (WATER BATH AND CHILLIER CIRCULATING WATER BATH)**

**(A) Water Bath**

External control for on/off scheduling.  
 Ambient  $+5^{\circ}\text{C}$  to  $99^{\circ}\text{C}$ .  
 $0.1^{\circ}\text{C}$  setting resolution.  
 Drain tap & transparent lid.  
 Timer & presets.  
 Adjustable over temperature alarm.  
 230V models.  
 Must have set and forget technology.  
 Polycarbonate Lid.  
 12L capacity.

Stability 0.2 °C.  
 Wide angle viewed LED display.  
 Front panel lock facility.  
 Count down timer (1-999 minutes) with audible buzzer.  
 User calibration.  
 3 programmable temperature presets.  
 Advance dry run protection.  
 Non drip clear lid.

**(B) Chillier circulating water bath**

Temperature range	-25°C to 150 °C
External control for ON and Off scheduling	Must
Temperature stability	0.02 °C
Flow rate (max)	14 – 22 Ltr/ min (adjustable)
Pump pressure (max)	530 m bar
Tank volume L	6L
Working Area (D x W)	120-130 X 150-160
Min/Max liquid level	130/145
Calibration points	5
Programs	1 x 30 segments
Communication interface	USB
Temperature probe socket	6 pin mini DIN
Display	Full colour QVGA TFT
Languages	5 (EN, FR, DE, IT, ES)
Timer	1 min to 99 hrs 59 mins
Temperature presets	3
Alarms	High and low
Electrical power (max) W	2280/2760 (60/50 Hz)
Safety	Adjustable over temperature cut-out
Ready to use kits	Assembled and supplied with standard tubing, insulation, clips and connectors

**Note: Please quote the rate for both capacities (A&B) separately**

**ITEM NO.20 pH METER**

- pH Range not less than 0-14
- Resolution 0.001/0.01/0.1
- Relative Accuracy  $\pm$  0.05
- Calibration points: 4
- Auto calibration
- Temperature range -5 to 50°C
- Relative Accuracy  $\pm$  1.0
- Milli Volt Range Approx. 1600.0 M $\mu$
- Resolution: 0.1



- Relative Accuracy  $\pm 0.2\mu$  or  $\pm 0.05\%$  or better
- Display BNC, 2mm pin, ATC Power
- Real-time clock
- Data memory >100 records (measurement, temperature)
- Data output Display, interface for PC
- Analog interface – Corresponds to electrode potential, Analog output corresponding to display in combination with terminal Digital interface –Bidirectional RS 2
- Suitable electrodes: epoxy body and gel filled.
- Power requirements: 220V 50 Hz

**ITEM NO.21 ELECTION MICROSCOPE (FIELD EMISSION SCANNING ELECTRON MICROSCOPE (FESEM) COMPLETE UNIT (FIRST CALL)**

High resolution Field Emission Scanning Electron Microscope (FESEM) having fully automated microscope setup with Energy Dispersive Spectroscopy (EDS) and Sputter Coater, system should have specification similar or better than as given below.

1	Electron Gun	High brightness Field Emission Schottky Emitter
2	Image Resolution	<ul style="list-style-type: none"> <li>• Resolution with SE detector 1.2nm at 30 kV or better</li> <li>• Resolution with BSE detector 2.0 nm at 30 kV or better</li> </ul>
3	Accelerating voltage	Adjustable from 200 eV to 30 KeV
4	Probe Current	<ul style="list-style-type: none"> <li>• Variable from 2 pA to 400 nA or better.</li> <li>• Probe Current should be continuously adjustable by entering the desired value in [pA or nA]</li> <li>• Beam Spot Size should be continuously adjustable by entering the desired value in [nm]</li> <li>• Probe current setting must be fully automatic without need for column tuning or change of aperture</li> </ul>
5	Magnification	2x to 10,00,000x or better
6	Imaging Modes	<ol style="list-style-type: none"> <li>1) Resolution mode for high resolution imaging.</li> <li>2) High Depth mode for enhanced depth of focus.</li> <li>3) Wide Field mode for extra-large non-distorted field of view with measurement facility.</li> <li>4) Changing from one mode to another should be fully automatic and software controlled.</li> </ol>
7	High Vacuum System	<p>Should have IGP for GUN and TMP with dry scroll pump for ultra clean and fast pumping.</p> <ul style="list-style-type: none"> <li>• Chamber Vacuum: <math>10^{-3}</math> Pa or better</li> <li>• Gun vacuum: <math>10^{-7}</math> Pa or better</li> <li>• Pumping time: Less than 3.5 minutes after specimen exchange.</li> </ul>
8	Low vacuum mode	<p>The system should be able to image in the low vacuum mode for charge compensation of non – conducting samples with</p> <ul style="list-style-type: none"> <li>• Differential pumping systems for specimen chamber</li> <li>• Low Vacuum Range: 1 – 700 Pa or better, continuously variable</li> </ul>
9	SEM Chamber	<ul style="list-style-type: none"> <li>• Internal Diameter: 230 mm or more</li> <li>• Max specimen height- 54mm or better</li> <li>• Max sample size- 145mm(X) x 145mm(Y)</li> </ul>

		<ul style="list-style-type: none"> <li>Chamber ports 12 or more with ports for future upgradation like EDS, WDS, EBSD, etc.</li> </ul>
10	Specimen Stage	<ul style="list-style-type: none"> <li>All 5 axes fully motorized compucentric stage with</li> <li>X = 80 mm or higher</li> <li>Y = 60 mm or higher</li> <li>Z = 50 mm or higher</li> <li>Tilt from <math>-80^{\circ}</math> to <math>+80^{\circ}</math> or better</li> <li>Rotation: 360 degree continuous</li> <li>Multi sample holder for holding 7 or more sample stubs.</li> <li>Stage movements must be fully Software controlled for absolute or relative coordinate movements, storing of positions, resorting to saved positions, moving to pre-set specimen positions, mouse click to centre moving, drag with mouse, WD &amp; Z movement synchronization.</li> </ul>
11	Standard Detectors	<ul style="list-style-type: none"> <li>Chamber SE Detector preferable with YAG scintillator</li> <li>Chamber BSE detector. A fully retractable BSE detector with YAG scintillator will be preferred.</li> <li>Detector for Probe current measurement:</li> <li>Integrated Pico ammeter with faraday cup for continuous display of probe current / absorbed current.</li> </ul>
12	Anti-vibration support:	SEM Chamber and Electron Gun Should have a built in, fully integrated self-leveling pneumatic vibration isolation.
13	SEM Automated Operation	<ul style="list-style-type: none"> <li>WD (Focus) &amp; Stigmator</li> <li>Contrast &amp; Brightness</li> <li>Scanning Speed (According to Signal – Noise Ratio)</li> <li>Gun heating</li> <li>Gun centering</li> <li>Column Centering</li> <li>Vacuum Control</li> <li>Auto-diagnostics</li> <li>Direct and continuous control of beam spot size</li> <li>Direct and continuous control of beam current</li> <li>All parts including valves, apertures should be operated through computer controlled software.</li> </ul>
14	SEM Computer	Intel® Core i7-, RAM 16GB, HDD 1TB, Windows 10 64-bit 24 inch screen
15	Image Acquisition and display	<ul style="list-style-type: none"> <li>32-inch HD LCD screen</li> <li>Scanning Speed: From 20 ns to 10 ms per pixel adjustable in steps or continuously</li> <li>Image Size: Selectable up to 8,192 x 8,192 pixels or better</li> <li>Image Depth: Up to 16 bits per channel</li> <li>Image Formats: BMP, TIFF, JPEG, JPEG2000, GIF, PNG or PGM, PPM</li> <li>Point &amp; Line Scan, Image rotation, Image shift, Tilt compensation</li> <li>Dynamic Focus – in plane or folded plane</li> <li>Multi Detectors Display: Displaying of up to 4 live detector signals simultaneously in four frames side by side</li> <li>Detector Mixing: Provision for mixing in user defined ratios &amp; display of different live signals from same field of view.</li> <li>Signal averaging using Frame Accumulation or Line Accumulation</li> <li>Pseudo coloring: Provision for Images to be artificially colored using colour</li> </ul>

		mapping.
16	3D Imaging	<ol style="list-style-type: none"> <li>3D image acquisition with stage tilts / beams tilting / scanning around XY axis for 3D imaging.</li> <li>3-D Imaging Software for Live Stereo Imaging with storage in AVI format.</li> </ol>
17	SEM Software	<ul style="list-style-type: none"> <li>Image Operations</li> <li>Analysis &amp; Measurement</li> <li>Image Processing</li> <li>Image Measurement</li> <li>3D imaging using Beam tilting / scanning around XY axis for 3D scanning and imaging</li> <li>Remote control network software with internet TCP / IP open protocols.</li> <li>Built-in self-diagnostics for system readiness check</li> <li>3-D Imaging Software for Live Stereo Imaging with storage in AVI format</li> </ul>
18	EDS System:	<ul style="list-style-type: none"> <li>EDS X-Ray Micro Analysis System</li> <li>Liquid Nitrogen Free EDS detector</li> <li>SDD type crystal with active area 30 mm sq</li> <li>Resolution 129 eV or better.</li> <li>Silicon Nitride window</li> <li>Software capability for qualitative quantitative analysis</li> <li>ZAF algorithm for bulk samples</li> <li>Intensity mapping line scan multipoint analysis</li> </ul>
19	Spares and Consumables	Spare parts and consumable availability should be 10 years.
20	On-Line UPS	6kVA on-line UPS with minimum 30 minutes back up
21	Essential Accessories	<ul style="list-style-type: none"> <li>Track ball for imaging operations</li> <li>IR Chamber scope: Chamber view camera (IR CCD)</li> <li>Touch alarm safety detector for specimen stage and detectors.</li> <li>TCP / IP Remote control Network interface &amp; software for remote operations and on-line fault diagnostics.</li> <li>All essential operating accessories like air compressor, gas cylinders, regulators, chillier, etc, if required have to be included in the offer.</li> </ul>
22	Sputter Coater	<ul style="list-style-type: none"> <li>Rotary pumped sputter coater, suitable for coating specimens with noble metals, such as gold / palladium alloys,</li> <li>Should be combined with carbon coater, using carbon fibre to coat SEM specimens.</li> <li>Two stage rotary pump with oil mist filter.</li> <li>Should include all consumables including gold target and carbon fibre for one years of operations.</li> </ul>

### **ITEM NO. 22 LAB FURNITURE FOR GENE BANK**

S. No.	Description of Items	Nos. required
1	<b>Supply and Installation of tables</b> including granite worktops and other supporting structures/hardware's based on the specified areas of various sizes with Hanging Storage 750 Mm W, 535 Mm D & 485 Mm H . Furniture should meet the performance requirements and should follow SEFA 8 guidelines. All C-Frames assemblies should be manufactured from standard hollow metal sections; conforming to I.S. Code 7138:1973 (Indian Standard specification for steel tubes for furniture) and	

	<p>all sheet metal components should be of CRCA confirming to IS Code 513:1994. The suspended under-bench welded units should be supported on heavy-duty steel frames fully carrying the load of worktops. C-frame should be constructed from a rectangular pipe with a cross section of 60mm x 30mm and should be 2 mm thick and should be without a vertical front leg to give a clean look. This should provide more knee space or leg space and would facilitate uninterrupted lateral movement of the under-bench units within the bench run. The C-frame legs should be supplied with adjustable feet (tolerance from -5mm to +20mm) to correct the unevenness of flooring. The tubular enclosed type construction shall discourage dust accumulation and unwanted development of bacteria &amp; fungus. Drainage gradient should be well adjusted throughout the length of table and should have horizontal supports for drainage systems. The structure should have a removable back panel to provide access for maintenance throughout the length of table. The C-frame shall also have skirting at back bottom side. The nominal table depths should be 770 mm for wall side and 1540mm for Island tables. The Corner Units shall fit well with table depths. All frame-work is should be pre-treated with superior pure epoxy powder coated finish. HORIZONTAL MEMBERS should be made from rectangular pipes of 2mm thickness. Cross-sectional dimensions of the pipe should be 60 x 30 x 2 mm. They should be made of CRCA MS and coated with pure epoxy powder. These connect two C-Frames together using C-clamps/U-clamps. Together with the C-Frames and Horizontal Members connected together, the skeletal structure of the work-bench should be formed on which the worktop can be placed and the hanging-type storage cabinets can be suspended. Horizontal Members determine the width of the lab workbench as they form the member (distance) between two adjacent C-Frames. Removable back panels should be covering the service lines that run behind them. These should be easily removable (unclipped) and the service line be accessed for maintenance. This allows the equipment on workbench to remain undisturbed. They should be made of CRCA MS with pure epoxy powder coating and are of 1mm thickness.</p>	
	<p>Master Upright should be of the dimensions: 300 x 150 x 1.2 mm. It should be made from 1.2mm thick CRCA MS with pure epoxy powder coating. It should have an open-able door for easy service maintenance and should extend till the false ceiling. VERTICAL UPRIGHT with option for internal distribution of GDS, Electrical supply systems Shelves and Top Units and should be constructed from 16 gauge CRCA formed steel panels with removable covers. Shelf height should be adjusted with an increment of 1inch / 25mm. Upright should also provide support to Top Units for hanging thus eliminating the danger of fixing the Top Units on non-rigid partition wall / panels. Uprights should be supplied with adjustable feet from -5mm to +20mm. ELECTRICAL TRUNKING should be mounted on Granite top for housing electrical switches and sockets, trunking should be made from 1.0 mm thick CRCA MS panel. It. It should be made from CRCA MS with pure epoxy powder coating. The front surface that houses the electrical points should have a slope. WELDED UNDER-BENCH STORAGE CABINETS: Welded cabinet body should be of flush face construction with intersection of vertical and horizontal members like LH and RH side panel along with front horizontal channel, back panel and bottom panel.</p>	
	<p>Cabinet should be of square non-sharp edge construction. Doors should be assembled with SS-304 hinge assembly. Removable back panel should be provided. Drawer tray should be of single piece construction. Drawer should be well supported on LH and RH ball slide suspension system. Steel door and drawer front is of double wall construction with sound dampening material filled inside. Doors should be easily removable and hinges should be easily replaceable. Knee space panel should be in 22</p>	

	<p>gauge construction. Thickness: LH/RH side panels, shutter front, Bottom panel, Top front, Drawer separator, shelf, Alignment channel should be of 1.2mm thk. Removable Back panel, Shutter cover, Fr. Rack strip, Top cover panel should be of 0.8 mm thick. Finish: Powder coating pure epoxy, thickness 40-50 microns. Units have a locking facility with 180° and 10 lever cam lock mechanism. WELDED OVER-HEAD STORAGE CABINETS construction should be the same as the under-bench cabinets. The height of these cabinets should be around 635mm while the depth should be around 340mm. The shutters should be Metal shutters. There should be one height-adjustable shelf inside each cabinet. Other construction should be similar to under-bench cabinet. WORKTOP should be 20 mm (+/- 2mm) thick Jet Black Granite worktop. The exposed edges of the worktop should be chamfered and smoothed. The bottom of the worktop should be polished and there should be a V-groove throughout the length of the exposed edges to protect the cabinets from coming in contact with the spillages. The overhang on the storage cabinet is 25 mm at the front side and 30 mm at the sides. The backing material used is a neoprene mat of 6 mm thickness.</p>	
A	<p><b>Lab 1:</b> Providing and fixing Table L shape: L1 5400 X L2 2600 D 770 mm with welded under beanch hinging storage cabinets with 1 drawer and 2 shelf, dimension should not be less than 750 mm W, 535 mm D &amp; 635 mm H - 6 Nos with Single Side Electrical Trunking 1500 mm – 5 nos and 750 mm -1 nos with cutouts: 6M + 6M + 6M. Height of bench should not be less than 890 mm. Size of Island unit should not be less than L 4200 X D 1520 mm – 2 nos with welded under beanch hinging storage cabinets of 1 drawer and 2 shelf, dimension should not be less than 600 mm W, 535 mm D &amp; 635 mm H - 8 Nos each Island units . There should be Fixed Type Reagent Shelf L 4200 mm with electric 6 module cutouts should be on each Island tables. Welded over head storage cabinet should be cabinet should be fixed on wall of W 600 X H 635 X D 340 mm with two shelf - 13 nos and W 750 X H 635 X D 340 mm with two shelf - 5 nos with metal shutters. Others components specification are as per above.</p>	1
B	<p><b>Lab 2:</b> Providing and fixing Table L shape: L1 3400 X L2 4090 D 770 mm with welded under beanch hinging storage cabinets with 1 drawer and 2 shelf, dimension should not be less than 600 mm W, 535 mm D &amp; 635 mm H - 6 Nos with Single Side Electrical Trunking 1350 mm – 4 nos and 1200 mm -1 nos Cutouts: 6M + 6M + 6M. Height of bench should not be less than 890 mm. Size of Island unit should not be less than L 3000 X D 1520 mm – 1 nos with welded under beanch hinging storage cabinets with 1 drawer and 2 shelf , dimension should not be less than 750 mm W, 535 mm D &amp; 635 mm H - 4 Nos . There should be Fixed Type Reagent Shelf L 3000 mm with electric 6 module cutouts each Island tables. Welded over head storage cabinet should be fixed on wall with dimension of W 600 X H 635 X D 340 mm with two shelf -12 nos and should be with metal shutter. Others components specification are as per above.</p>	1
C	<p><b>Lab 3:</b> Providing and fixing Table L shape: L1 2555 X L2 2800 D 770 mm with welded under beanch hinging storage cabinets with 1 drawer and 2 shelf, dimension should not be less than 600 mm W, 535 mm D &amp; 635 mm H - 3 Nos with Single Side Electrical Trunking 1200 mm – 3 nos and 600 mm -1 nos Cutouts: 6M + 6M + 6M. Height of bench should not be less than 890 mm. Size of Island unit should not be less than L 3080 X D 1240 mm – 1 nos with welded under beanch hinging storage cabinets with 1 drawer and 2 shelf , dimension should not be less than 750 mm W, 535 mm D &amp; 635 mm H - 4 Nos . Welded over head storage cabinet should be fixed on wall with dimension of W 600 X H 635 X D 340 mm with two shelves - 2 nos and should be metal shutter. Others components specification are as per above.</p>	1

D	<p><b>Lab 4:</b> Providing and fixing wall /Instrument tables length should be L 4255 X D 745 mm with welded under beanch hinging storage cabinets with 1 drawer and 2 shelf, dimension should not be less than 600 mm W, 535 mm D &amp; 635 mm H - 3 Nos with Single Side Electrical Trunking 1350 mm – 3 nos. with electric cutouts: 6M + 6M + 6M. Height of bench should not be less than 890 mm. Welded over head storage cabinet should be fixed on wall with dimension of W 600 X H 635 X D 340 mm with two shelves - 2 nos and should be with metal shutter. Others components specification are as per above.</p>	1
E	<p><b>OHSU:</b> Providing and fixing welded over head storage cabinet fixed on wall with dimension of W 600 X H 635 X D 340 mm with two shelf - 35 nos and should be with metal shutter. Others components specification are as per above.</p>	1
2	<p><b>Table:</b> overall size shall be 1199 Width x 590 Depth x 735 Height. The top panels shall be made from 18 +/- 0.5 mm thick Pre - laminated boards as per with 2 mm thick PVC edge banding on all sides. Understructure shall be made from 0.9 mm +/- 0.09 mm thick powder coated 50 microns (+/-10) CRCA MS. Tubular Frame shall be dia. 25.4 +/- 0.3 mm x 1.2 +/- 0.096 mm thick MS ERW tube .Modesty panel shall be made from 1.0 +/- 0.09 mm thick powder coated 50 microns (+/- 10). The Storage shall be having shell 0.5 +/- 0.07 mm thick CRCA MS plus drawer tray 0.5 +/- 0.07 mm thick CRCA MS plus drawer front 0.8 +/- 0.1 mm thick CRCA MS . Also there should be 10 lever cam lock plus handles built in plastic. The products should be ISO 9001:2008, ISO 14001:2004, OHSAS 1800:2007, BIFMA &amp; Green guard certified. Design as per approved by Technical Committee/Engineer In charge.</p>	2
3	<p><b>Table</b> overall size should not be less than W 1200X D 600. Work Surface should be made of 25mm Thick Pre-laminated twin board of E1-P2 grade and approved shade confirming to IS-12823:1990, Edge banded should be min 2 mm thick PVC lipping. Gromet provided on work surface for wire management Modesty Panel should be made of 25mm thick pre-laminate twin board of E1 - p2 grade and approved shade confirming to IS-14587:1998 with min 0.4mm PVC membrane pressed on to top. Understructure should be made of min 25mm Thick Pre-laminated twin board of E1-P2 grade and approved shade confirming to IS-12823:1990, Edge banded with matching 2 mm thick PVC lapping. Hinge Door Storage: Made of 25mm thick MDF one side pre-laminate board confirming to IS-14587:1998 with 0.4mm PVC membrane pressed on to top. Handle is provided for ease of opening. Storage should be provided with lock. The products should be ISO 9001:2008,ISO 14001:2004,OHSAS 1800:2007, BIFMA &amp; Green guard certified. Design as per approved by Technical Committee/Engineer In charge.</p>	2
4	<p><b>Table</b> overall size should not be less than W 1350X D 750. Work Surface should be made of min 25mm Thick Pre-laminated twin board of E1-P2 grade and approved shade confirming to IS-12823:1990, Edge banded with matching 2 mm thick PVC lipping. Gromet provided on work surface for wire management Modesty Panel: Made of 25mm thick MDF one side pre-laminate board confirming to IS-14587:1998 with 0.4mm PVC membrane pressed on to top. Understructure should be made of min 25mm Thick Pre-laminated twin board of E1-P2 grade and approved shade confirming to IS-12823:1990, Edge banded with matching 2 mm thick PVC lapping. Hinge Door Storage should be made of min 25mm thick MDF one side pre-laminate board confirming to IS-14587:1998 with min 0.4mm PVC membrane pressed on to top. Handle is provided for ease of opening. Storage should be provided with lock. The products should be ISO 9001:2008,ISO 14001:2004,OHSAS 1800:2007, BIFMA &amp; Green guard certified. Design as per approved by Technical Committee/Engineer In charge.</p>	2

5	<p><b>Rev Chair High back:</b> Providing and fixing of high back rev chairs GRIHA certified having SEAT/BACK ASSEMBLY made up of 1.2 ±0.1cm. Thick hot-pressed plywood and upholstered with-fabric upholstery covers and moulded Polyurethane foam. The back is designed with contoured lumber support for extra comfort. The seat has extra thick foam on front edge to give confort to popliteal area. The high back size is 47 cm W x 69.5cm H and the seat size is 47 cm W x 48 cm D. The HR PU foam is moulded with density 45+-2 kg/m cube and hardness load 16 +- 2 kgf as per IS:7888 fof 25% compression. The one piece armrest are injection moulded from black Co Polymer PP. Centre tilt syncro mechanism has 360 degree revolving type, upright position locking, tilt tension adjustment, seat/back ratio of 1:3. The pneumatic height adjustment has an adjustment stroke of 12+- 0.3 cm. Telescopic bellow assay: it is 3 pc telescopic type and injection moulded in black PP. The pedestal is injection moulded in black 33% glass filled Nylon 66 and fitted with 5 nos. twin wheel castors. the pedestal is 66.3 +- 0.5 cm. pitch dia (76.3 +- 1 cm with castors). The twin wheel castors are injection moulded in black nylon. The products should be ISO 9001:2008, ISO 14001:2004, OHSAS 1800:2007, BIFMA &amp; Green guard certified. Design as per approved by Technical Committee/Engineer In charge.</p>	2
6	<p><b>Rev Back Mid back:</b> Providing and fixing of chairs GRIHA CERTIFIED mid back having seat/back assembly made up of 1.2 ±0.1cm. thick hot-pressed plywood measured as per QA method and upholstered with-fabric upholstery covers and moulded Polyurethane foam. The back foam to be designed with contoured lumbar support for extra comfort. The seat should have extra thick foam on front edge to give comfort to popliteal area. Back Size should be 47.5 cm. (W) x 58.0 cm. (H) - SEAT SIZE 47.0 cm. (W) x 48.0 cm. (D). The Chair should have HIGH RESILIENCE (HR) POLYURETHANE FOAM.moulded with density =45±2 kg/m<sup>3</sup> and hardness load 16 ± 2 kgf as per IS: 7888 for 25% compression and ARMRESTS which are one-piece injection moulded from black Co. polymer Polypropylene. The chair should have CENTERTILT.SYNCHRO MECHANISM with the following features: • 3600 revolving type. Upright-position locking, Tilt tension adjustment, Seat/back tilting ratio of 1:3. The Chair shall have PNEUMATIC HEIGHT ADJUSTMENT at stroke of 12.0 ±0.3cm. With TELESCOPIC BELLOW ASSEMBLY with 3 piece telescopic type and injection moulded in black Polypropylene. PEDESTAL ASSEMBLY with injection moulded in black 33% glass-filled.Nylon-66 and fited with 5.nos. twin wheel castors. The pedestal shall be 66.3 ±0.5cm. Pitch-center dia. (76.3 ±1.0cm with castors). The twin wheel castors shall be injection moulded in Black Nylon. The products should be ISO 9001:2008,ISO 14001:2004,OHSAS 1800:2007, BIFMA &amp; Green guard certified. Design as per approved by Technical Committee/Engineer In charge.</p>	2
7	<p><b>Visitor Chair:</b> Providing and fixing of visitor chairs GRIHA certified having SEAT/BACK ASSEMBLY made up of 1.2 ±0.1cm. thick hot-pressed plywood and upholstered with-fabric upholstery covers and moulded Polyurethane foam. The back foam shall be designed with contoured lumbar support for extra comfort. The seat to be extra thick foam on front edge to give comfort to popliteal area. BACK SIZE shall be 47.5 cm. (W) x 58.0 cm. (H)and SEAT SIZE 47.0 cm. (W) x 48.0 cm. (D) with HIGH RESILIENCE (HR) POLYURETHANE FOAM to be moulded with density =45±2 kg/m<sup>3</sup> and hardness load 16 ± 2 kgf as per IS:7888 for 25% compression. The ARMRESTS: The one-piece armrests are injection moulded from black Co. polymer Polypropylene. The reading chairs shall have TUBULAR FRAME which is powder coated (OFT 40-60 microns) tubular frame is cantilever type &amp; made of 02.54 ±0.03cm. x 0.2 ±0.016cm.thk. M.S. ER.W. Tube. The products should be ISO 9001:2008,ISO 14001:2004,OHSAS 1800:2007, BIFMA &amp;</p>	10

	Green guard certified. Design as per approved by Technical Committee/Engineer In charge.	
8	<b>Almirah</b> With 4 Shelves shall have an overall size of 900mm (W) x450mm (D) x1830mm (H). The construction shall be rigid knock down construction and Material used shall be prime quality CRCA steel - panels from 0.6 mm thick & front frame. Shelf shall be 0.8 mm thick .Configuration (Door) shall be full height steel hinged door. Locking shall be Plastic Recessed Handle cum Cam lock with 3 way locking mechanism with shooting bolt arrangement. Height wise adjustable shelf mounting, Uniformly distributed load capacity per each full shelf shall be 80 Kg maximum. For Plain 4 Nos. of adjustable full shelves. The top shall be metal and Epoxy Powder coated finish to the thickness of 50 microns. The products should be ISO 9001:2008,ISO 14001:2004,OHSAS 1800:2007, BIFMA & Green guard certified. Design as per approved by Technical Committee/Engineer In charge.	1
9	<b>Rev Stool with Back:</b> The seat should be made up of 1.2±0.1cm thick flat plywood and with moulded Polyurethane foam and should be .upholstered with replaceable synthetic leather covers. SEAT SIZE should not be less than Diameter 40.0 cm with ADJUSTMENTS should be 360° Revolving type. BACK ASSEMBLY: The back foam should be designed with contoured Lumbar support for extra comfort. The upholstery should be in synthetic leather. BACK SIZE should not be less than 45.0 cm (W) covered with polyurethane foam. The_HR.polyurethane foam should be moulded with min density 45 +1-2 kg/m <sup>3</sup> and Hardness load 16 ± 2 kgf for 25% compression. The manual height adjustment should be easy to operate with a help of a knob. It can be easily locked at the most comfortable position. PEDESTAL ASSEMBLY: The five-prong pedestal should be fabricated from 0.2 ± 0.02 cm thick HR sheet (should be: DD 10791 HR), powder coated ( OFT 40-60 microns )and fitted with an injection moulded black Polypropylene Hub Cap and 5 nos. twin wheel castors. The pedestal should be 55.0±0.5cm pitch-circle diameter (65.0±1.0cm with castors). TWIN WHEEL CASTORS: The twin wheel castors should be injection moulded in Black Nylon. Overall dimensions shall be Width-65.0cm, Depth- 65.0 cm, Height- 66.0cm to 77.5cm, Seat Height- 45.0 to 56.5cm. The products should be ISO 9001:2008, ISO 14001:2004, OHSAS 1800:2007, BIFMA & Green guard certified. Design as per approved by Technical Committee/Engineer In charge.	98
10	<b>Rev Stool with back Hi base:</b> SEAT ASSEMBLY: The seat should be made up of 1.2±0.1cm thick flat plywood and with moulded Polyurethane foam and should be .upholstered with replaceable synthetic leather covers. Seat size should not be less than Diameter 40.0 cm, ADJUSTMENTS should be 360° Revolving type . The back foam should be designed with contoured Lumbar support for extra comfort. The upholstery should be available in synthetic leather. BACK SIZE should not be less than 45.0 cm (W) covered with polyurethane foam HIGH RESILIENCE (HR) POLYURETHANE FOAM: The_HR.polyurethane foam should be _moulded with density = 45 +1-2 kg/m <sup>3</sup> and Hardness load 16 ± 2 kgf for 25% compression. The manual height adjustment should be easy to operate with a help of a knob. It can be easily locked at the most comfortable position. PEDESTAL ASSEMBLY: The five-prong pedestal should be fabricated from min 0.2 ± 0.02 cm: thick HR sheet. Powder coated (min DFT 40-60 microns) and fitted with an injection moulded black Polypropylene Hub Cap and 5 nos. twin wheel castors. The pedestal-should be 55.0±0.5cm pitch-circle-diameter- (65.0±1,0cm-with-castors).-Circular-foot-ring of 052.0±0.2cm made up of 01.9±0.2 x 0.12±0.0096 cm thk MS ERW Tube for foot support in High-base stool. TWIN WHEEL CASTORS: The twin wheel castors should be injection moulded in Black Nylon. Overall dimensions shall be Width-	12



	65.0cm, Depth- 65.0 cm, Height- 88.0 to 99.5 cm, Seat Height- 67.0 to 78.5 cm. The products should be ISO 9001:2008, ISO 14001:2004, OHSAS 1800:2007, BIFMA & Green guard certified. Design as per approved by Technical Committee/Engineer In charge .	
11	<b>Three Seater Metal Perforated chair without arms</b> without cushion to be made of the following components: Cross Beam: To be made of black powder coated rectangular MS ERW tube size of 8+/-0.03 Cm. X 4 +/- 0.03 Cm. x 0.2 +/-0.016 Cm. Leg & Armrest: This is to be chrome plated and made of Cold Rolled steel with 0.12 +/- 0.013 Cm. thicknesses Seat / back Shell: This is to be made of 1.6 mm thick powder coated perforated shell made from cold rolled MS sheet 0.16 +/- 0.013 Cm thickness. The side bar is made from Chrome plated solid steel 3 +/- 0.03 Cm x 1.2 +/- 0.03 Cm (DIN174) with fluting and plastic inserts. The shell is to be assembled on the cross beam with the help of M8 bolts (n per seat- 8 Nos. – seat to bracket and 4 Nos. bracket to cross beam) Over all dimensions: W – 160 Cm. x D–56 Cm. x H–71 Cm. x SH – 41 Cm	2
12	<b>Stoarge units</b> : Providing and fixing of Storage units (W 500 mm main + W 1000 mm add-on) GREENGUARD, GRIHA certified having , Overall Dimensions of Floor Unit 500 W Main shall be 500mm(W)x500mm(D)x2100mm(H) . The construction shall be aesthetically appealing completely knock down construction. Legs shall be fitted with screw type leveler and material shall be from combination of CRCA 0.5 mm & 0.8 mm. The shelving shall be height wise adjustable shelf mounting, each full shelf shall have a load capacity of 40 kg UDL max. and 4 nos. of full adjustable shelves. Finish shall be epoxy powder coated to the thickness of 50 microns. Overall Dimensions of Floor Unit 1000 W Add On shall be 1000mm (W) x500mm (D) x2100mm (H). The construction shall be aesthetically appealing completely knock down construction. Legs shall be fitted with screw type leveler and material shall be from combination of CRCA 0.5 mm & 0.8 mm. The shelving shall be height wise adjustable shelf mounting, each full shelf shall have a load capacity of 40 kg UDL max. and 4 nos. of full adjustable shelves . Finish shall be epoxy powder coated to the thickness of 50 microns. The add on units shall be stacked widthwise to form a row of storage having a common side panel. Overall Dimensions of Floor Unit 500 W Metal Door shall be 498mm (W) x20mm (D) x2058mm (H) . The construction and Material shall be made from combination of CRCA 0.5 mm & 0.8 mm thickness. Steel Hinged Door with shelf closing hinges .The handle shall be Aesthetically appealing, Ergonomic, Made of Aluminum. The locking shall be 3 way and Finish shall be Epoxy Powder coated to the thickness of 50 microns. Overall Dimensions of Floor Unit 1000 W Metal Door shall be 498mm (W) x20mm (D) x2058mm (H). The construction and Material shall be made from combination of CRCA 0.5 mm & 0.8 mm thickness. Steel Hinged Door with shelf closing hinges .The handle shall be Aesthetically appealing, Ergonomic, Made of Aluminum. The locking shall be 3 way and Finish shall be Epoxy Powder coated to the thickness of 50 microns .The products should be ISO 9001:2008,ISO 14001:2004,OHSAS 1800:2007, BIFMA, GRIHA & Green guard certified. Design as per approved by Technical Committee/Engineer In charge.	1
13	<b>personal locker units:</b> Providing and fixing of 4 door personal locker units with lock (1 main +2 add-on) Overall size of 4 - Door PLU + Lkr (Base) shall be 380mm(W)x450mm(D)x1830mm(H). Stackability shall have add - on units that can be stacked width wise to form bank of lockers having common side panel. Locking shall have 10 Lever cam lock with lock lever plus option of hasp arrangement. Material shall be CRCA 0.6 mm thickness. Construction shall be Rigid Knockdown construction, shelf shall be uniformly distributed load capacity per each shelf level is	1

	<p>35 Kg maximum. Finish shall be epoxy polyester powder coated to the thickness of 50 microns. Handle/Label holder shall be Aesthetically appealing Snap fit ABS plastic handle. Ventilation shall be attractive punched pattern for ventilation. Overall size of 4 - Door PLU + Lkr (Add On) shall be 80 mm (W) x 450 mm (D) x 1830mm(H). Stackability shall have add - on units that can be stacked width wise to form bank of lockers having common side panel. Locking shall have 10 Lever cam lock with lock lever plus option of hasp arrangement. Material shall be CRCA 0.6 mm thickness . Construction shall be Rigid Knockdown construction , shelf shall be uniformly distributed load capacity per each shelf level is 35 Kg maximum . Finish shall be epoxy polyester powder coated to the thickness of 50 microns . Handle/Label holder shall be Aesthetically appealing Snap fit ABS plastic handle. Ventilation shall be attractive punched pattern for ventilation . Overall size of stand for three locker(black) shall be 1140mm(W)x450mm(D)x125mm(H) . The products should be ISO 9001:2008,ISO 14001:2004,OHSAS 1800:2007, BIFMA, GRIHA &amp; Green guard certified. Design as per approved by Technical Committee/Engineer In charge.</p>	
14	<p><b>Sliding door units</b> : Providing and fixing of Sliding door units :Overall Dimensions shall be 900mm(W)x450mm(D)x 710 mm(H) .The top shall be wooden top PLB(25 mm add in unit height ) . The Rigid Knock Down Construction , Back , Sides and Door shall be made from 0.7 mm high yield strength CRCA ,rest in 0.8 mm CRCA . CRCA - 'D' Grade as per IS-513. Sliding door arrangement shall have sliding door with top hanging arrangement to prevent derailment. Each door shall be provided with 2 plastic roller having steel ball bearing for smooth movement of door &amp; less noise. Locking shall be 5 lever cam lock for safe locking. Handle shall be plastic flush &amp; recessed handle. Shelving shall have Height wise adjustable shelf mounting. Uniformly Distributed Load Capacity of the shelf should be min 40 Kg maximum. Sliding door units shall have 1 no. of adjustable full shelves. Leveler shall be screw type leveler with hex plastic base and overall finish shall be epoxy polyester coated to the thickness of 50 microns. The products should be ISO 9001:2008, ISO 14001:2004, OHSAS 1800:2007, BIFMA, GRIHA &amp; Green guard certified. Design as per approved by Technical Committee/Engineer In charge.</p>	20
15	<p><b>Sliding door units:</b> Providing and fixing of Sliding door units :Overall Dimensions shall be 1200mm(W)x450mm(D)x 710 mm(H) .The top shall be wooden top PLB(25 mm add in unit height ) . The Rigid Knock Down Construction , Back , Sides and Door shall be made from 0.7 mm high yield strength CRCA ,rest in 0.8 mm CRCA . CRCA - 'D' Grade as per IS-513. Sliding door arrangement shall have sliding door with top hanging arrangement to prevent derailment. Each door shall be provided with 2 plastic roller having steel ball bearing for smooth movement of door &amp; less noise. Locking shall be 5 lever cam lock for safe locking. Handle shall be plastic flush &amp; recessed handle. Shelving shall have Height wise adjustable shelf mounting. Uniformly Distributed Load Capacity of the shelf should be min 40 Kg maximum. Sliding door units shall have 1 no. of adjustable full shelves. Leveler shall be screw type leveler with hex plastic base and overall finish shall be epoxy polyester coated to the thickness of 50 microns. The products should be ISO 9001:2008, ISO 14001:2004, OHSAS 1800:2007, BIFMA, GRIHA &amp; Green guard certified. Design as per approved by Technical Committee/Engineer In charge.</p>	5
16	<p><b>high back executive chair:</b> Providing and fixing chair, The seat / back should be made up of 1.2 cm thick hot pressed plywood, upholstered with fabric and moulded Polyurethane foam together with moulded seat and back covers. The back foam should be designed with contoured lumbar support for extra comfort. HIGH BACK SIZE should not be less than 50.0cm. (W) X 72.0cm. (H) SEAT SIZE should not be less than 50.0 cm. (W) X 46.0cm. (D). The Polyurethane foam should be moulded</p>	2

	<p>with density min 45 +/-2 kg/m<sup>3</sup> and Hardness = 20 +/- 2 on Hampden machine at 25% compression. The seat cover should be injection moulded in black co-polymer polypropylene and back cover is vacuum formed from ABS sheets. The one-piece armrests made of black integral skin polyurethane with 50-70 Shore 'A' Hardness and reinforced with M.S. insert. The armrests are scratch and weather resistant. The armrests are fitted to the seat with seat/armrest connecting strip assembly made of 0.5cm. thk. HR steel. The center pivot mechanism is designed with the following features: 360 degree revolving type, 17° maximum tilt on pivot, at center, Tilt tension adjustment, Upright locking, TUBULAR FRAME : The tubular frame is cantilever type &amp; made of min Dia.2.54cm. (1") x 14 BG M.S. E.R.W. tube and black powder coated, The pneumatic height adjustment has an adjustment stroke of 10.0 cm, Tele bellow is 3 piece telescopic type and injection moulded in black Polypropylene. The pedestal should be made of HR steel and fitted with 5 nos. twin wheel castors (castor wheel dia. 5.0cm.). The pedestal is covered with a P.P moulded cladding for modern and aesthetic looks. The pedestal is 65.0 cm. pitch-center dia. (75.0 cm with castors), 10) TWIN WHEEL CASTORS: The twin wheel castors are injection moulded in 30% Glass Filled black Nylon. Overall size should not be less than D-75 cm. x W- 75 cm. x H-105.0 to 117.0 cm., seat height 46.0 cm to 58.0 cm. The products should be ISO 9001:2008, ISO 14001:2004, OHSAS 1800:2007, BIFMA &amp; Green guard certified. Design as per approved by Technical Committee/Engineer In charge.</p>	
17	<p><b>Chair</b> Providing and fixing of chair: The seat and back should be made of injection moulded high impact strength polypropylene polymer compound with indoor grade UV Resistance. The Powder coated (DFT50+ microns) welded tubular frame should be made from 2.22 + 0.03 cm x 0.16 +/- 0.0128cm and 3.5 +/- 0.03 cm x 1.5 +/- 0.03 cm x 0.16 +/- 0.0128 cm M.S.E.R.W tub. The Shoes should be made of high impact strength polypropylene polymer compound with indoor grade UV Resistance and pressed fitted with tubular ram. SIZE size should not be less than (W) 52.5cm*(D) 55.8cm*(H) 84.5cm*(seat H) 45.0 cm. Back Size size should not be less than 51.6 cm(W)*40.5 cm (H). The products should be ISO 9001:2008, ISO 14001:2004, OHSAS 1800:2007, BIFMA &amp; Green guard certified. Design as per approved by Technical Committee/Engineer In charge.</p> <p><b><u>Note: Please quote the pooled cost for all items with required quantities mentioned in above table.</u></b></p>	12
<b>Terms and Condition for Lab furniture</b>		
1	<p>Tenders are invited from Manufacturers or their authorized dealers (from the principal of the brand being offered for at least Seven years with their local/M.P. service setup – response time – within 24 hours) for supplying of furniture items, in case of dealers quoting for the project authorization certificate from original manufacturer to be attached, also confirming that the delivery will be made as per the requirement of tender. For proof: Submit service invoices of furniture spares. (at least 5 year old)</p>	
2	<p>Manufacturers should be an ISO certified organization and considering growing concern on environment and human resource, the Furniture Manufacturer should also have Environmental Certificate. All these should be submitted with the Tender. The following supporting documents to be enclosed: ISO 9001:2015 (For Quality Management System- QMS), ISO 14001:2015 (for Environment Management System- EMS), ISO 18001:2007 (For Occupational Health and Safety Management System), ISO 50001:2011 (For Energy Management System for the entire organizations to manage energy).</p>	

3	Turnover of the company should be minimum 50 crores in each of last three consecutive years. In case of dealer, turnover should not be less than 2.0 Crores in each of the last three preceding consecutive years.
4	Tenderer should not have been black listed. (Self-Certification is required regarding conformity of contract from any state Government, Central Government, any PSU or any reputed institute and if found wrong, tender will be rejected).
5	Bidder should quote all the items as per the BOQ of tender, if any item is left unquoted the tender of that bidder will be summarily rejected.
6	Telegraphic/Conditional Tender will not be accepted.
7	Product sample should be arranged by the successful tenderer, if required within 7 days.
8	Any representative of the Office may visit the Manufacturing set up to verify the Manufacturing capabilities, testing methods, process of manufacturing <i>etc.</i> , to ascertain the technical specifications on the cost of the bidder If required.
9	The Manufacturer should have a Registered Office and GST Registration in the state of Madhya Pradesh. Proof to be submitted.
10	Earnest Money Exemption Certificate shall not be accepted and withdrawn by Govt. vide Govt. Reso. Dt. 22/2/2016.
11	Manufacturer should be a member of BIFMA – Business and Institutional Furniture Manufacturers Association.
12	Manufacturer should be a 100% Indian Organization and must be in the business of Furniture Manufacturing in INDIA for last 30 years. Certification of Incorporation/Origin shall be enclosed. their authorized dealers (from the principal of the brand being offered for at least 10 years with their local/M.P
13	Factory/Manufacturing plant license to be enclosed in compliance to Green – GRIHA/ IGBC/ NBGC or any other Green building national /International standard.
14	<p>Manufacturer shall have the documentary evidence of these machineries atleast as listed below, so as to ascertain the capacity of the manufacturer to complete the project in stipulated time.</p> <ul style="list-style-type: none"> <li>• Computer Controlled through-feed multi station edge preparation machine with gluing &amp; cutting for flush, trimming, scrapping &amp; butting.</li> <li>• Sheet Metal Folding Machine.</li> <li>• Computer Controlled Press Brake for Sheet Metal Bending.</li> <li>• Press Brake Machine 8 Ft.</li> <li>• Power Sharing Machine 8 Ft.</li> <li>• CO2 Welding Machine.</li> <li>• Spot Welding Machine.</li> <li>• Complete Powder Coating Line with baking oven and powder application.</li> <li>• Nine tank Anti-Rust Surface Pretreatment Plant.</li> </ul>
15	<p>Manufacturer/Dealer should submit the following documents:</p> <ul style="list-style-type: none"> <li>• Registration of Company (Manufacturer)</li> <li>• Factory License (Manufacturer)</li> <li>• Income Tax return copy of 17-18 ,18-19,19-20</li> <li>• PAN No.</li> <li>• WD Certificate (7 Years)/ Shop License at Gwalior or M.P.</li> <li>• GST No</li> </ul>
16	Orders of furniture and Lab furniture to be submitted along with the tender: One order of 45 lac or 2 orders of 25 Lac within the last 2 financial years of different Government Departments (Situating in Madhya Pradesh) preferably at Gwalior.
17	ISO 50001:2011 – The manufacturer must have ISO 50001- Energy management systems.

18	Lab furniture's Welded cabinets should be third party tested for SEFA 8M, SEFA 10M and EN 13150 and EN14727 by SEFA/NABL approved lab.
19	The bidder must have SEFA membership certificates for last five years on a continuous basis. Documentary evidence to that effect has to be provided.
20	The Manufacturer/Products should be certified for being Environment Friendly- the manufacturer should have products which are certified for being environment friendly, which are important to confirm that the products that have been offered meet rigorous emissions standards—helping reduce indoor air pollution and the risk of chemical exposure while aiding in the creation of healthier indoor environments. GRIHA prefers such products in order to achieve green compliance.
21	Manufacturing bidders must agree to undertake a comprehensive warranty for all the items supplied and installed and also agree for 3 years post warranty services and maintenance under Annual Maintenance Contract (AMC).
22	Certification of Individual Furniture should be submitted along with bid. Product green certificates, GRIHA company certificate, BIFMA Level Certificates, Indoor air quality, AIOTA

### **ITEM NO.23 FURNITURE FOR CONFERENCE HALL**

S.No.	Description of Items	Nos. required
1	<p><b>Conference Table</b> - 26 seater U shape: Overall size should not less than L 6000 X w 3000 mm X H 740 mm. WORK SURFACE should be made of min 36mm thick MDF one side pre-laminate board conforming to IS14587: 1998 with min 0.4mm PVC membrane pressed on to top and should having chamfered edge. Full length access panel should be provided with soft closing hinges in line with worktop edge. Worktop should be available in various shapes as require .UNDERSTRUCTURE: The understructure should be consist of mixture of min 18mm and min 25mm Thick Pre-laminated twin board of E1-P2 grade and approved shade conforming to IS-12823:1990, Edge banded with matching min 2 mm thick PVC lipping. Aluminum alloy 63400 - WP profile is used for connecting panels together. MODESTY should be Made of min 18mm Thick Pre-laminated twin board of E1-P2 grade and approved shade conforming to IS-12823:1990, Edge banded with matching min 2 mm thick PVC lipping. WIRE MANAGEMENT: An array of panels made of 0.8 mm and 1.2 mm CRCA MS IS: 513, epoxy polyester powder coated (min DFT 40-60 microns) is used for flow of wires and cables. Cutout for Standard Anchor Roma 4 module should be provided for electrical fittings in Straight two seater and single seater modules below access flap per seat. AV DETAILS: The table should be equipped with Extron cables cubbies along with cable retractors as standard offering only for 1800mm head module, 2350mm head module, 150° head module and 165° head module. For straight two seater and single seater modules, provision to mount AV cables should be provided (eg. HDMI, VGAA, etc). Only Corner 90°, 30° corner and 50° corner modules have provision for wire flow between adjacent tables. Additional Wire cover made of 0.8mm Thick CRCA, provided below worktop to conceal Microphone wires running from table top to wire tray. The products should be ISO 9001:2008, ISO 14001:2004, OHSAS 1800:2007, BIFMA &amp; Green guard certified. Design as per approved by Technical Committee/Engineer In charge.</p>	1
2	<p><b>Table</b> : Dimension should not be less than W 1000XL 1000 X H 740 mm, worktop should be Made of 25mm thick Medium density fibre board with one side pre-laminate board conforming to IS-14587:1998 with min 0.4 mm PVC membrane pressed on to top and having chamfered edge. Soft closing access flap provided for</p>	1

	<p>access to power supply and AudioVisual cables. Side panel should be Made of 25mm thick MDF-one side pre-laminate board conforming to IS-14587:1998 with min 0.4mm PVC membrane pressed on to top. Grommet should be provided for wire management. The Under-structure consists of an Inner Tube Assembly with Top for Worktop Mounting and Base plate with levelers. The Top Plate should be made of min 5mm thk hot rolled steel Plates (HR) (As per IS: 2062) &amp; the bottom plate is made of min 8mm thk hot rolled steel Plates (HR) (As per IS: 2062). The Inner Tube Assembly is made of 25.4mmx 25.4mm x 1.2mm thk round electric resistant welded tube (ERW)(As per IS:7138) welded together using Tungsten inert gas welding. The whole structure is epoxy polyester powder coated (DFT 40-60 microns). The product has a knock-down construction. Cutout should be for standard Anchor Roma 6 Module is provided for electrical fittings. An additional cutout with a plate is provided for mounting Audio Visual Cables (eg HDMI, VGA-A, etc.) . The products should be ISO 9001:2008, ISO 14001:2004, OHSAS 1800:2007, BIFMA &amp; Green guard certified. Design as per approved by Technical Committee/Engineer In charge</p>	
3	<p><b>High back rev chairs:</b> Providing and fixing of high back rev chairs having SEAT ASSEMBLY: The Cushioned seat should be made of Injection molded Plastic outer &amp; inner. Plastic Inner is upholstered with pure leather and moulded High Resilience (HR) Polyurethane foam of Density should not be less than 45±2 kg/m<sup>3</sup>,and hardness load 16 ± 2 kgf as per IS:7888 for 25% compression. Seat SIZE should not be less than 47.6 cm. (W) x 49.2 cm. (D), BACK ASSEMBLY: The Cushioned back should be made of PU Foam with in situ molded MS E.R.W Round Tube of size 1.9±0.03cm x 0.16 ±0.0128cm. It upholstered with Pure Leather. HIGH BACK SIZE should not be less than 47.5 cm. (W) x 77 cm. (D). The armrest top should be moulded from polyurethane (PU), upholstered in pure leather and mounted on to a drop lift adjustable type tubular armrest support made of 03.81±0.03 cm x 0.2±0.01 cm thk M.S E.R.W tube having chrome plated finish. The armrest height should be adjustable up to 6.5±0.5cm in 5 steps. ACTIVE BIO-SYNCHRO MECHANISM: The adjustable ting mechanism should be designed with the following features:  • 360° revolving type, • Front-pivot for tilt with feet resting on ground and continuous lumbar support ensuring more comfort., • Tilt tension adjustment can be operated in seating position.  • 5-position Tilt limiter giving option of variable tilt angle to the chair. • Seat/back tilting ratio of 1: 2, • The mechanism housing is made up of HPDC Aluminium black powder coated.  Seat depth adjustment should be integrated in the seat through a sliding mechanism. Seat depth adjustment range is of 6.0±0.5 cm. Back Frame should be connected to the Up/Dn mechanism housed in Plastic T spine. It can be adjusted in the range of 7.42±0.5 cm for the comfortable back support to suit individual need. The pneumatic height adjustment has an adjustment stroke of 10.0±0.3 cm. The pedestal should be High Pressure Die cast polished Aluminium and fitted with 5 nos. twin wheel castors. The pedestal is 65.0 ± 0.5cm. Pitch-center dia.(75.0 ± 1.0cm. With castors.).TWIN WHEEL CASTOR: 5 Nos. twin wheel castors are injection moulded in plastic should having 6.0±0.1cm wheel Diameter and assembled to pedestal. The products should be ISO 9001:2008, ISO 14001:2004, OHSAS 1800:2007, BIFMA, GRIHA &amp; Green guard gold, GREENPRO, SCS IAQ certified. Design as per approved by Technical Committee/Engineer In charge.</p>	2
4	<p><b>High back rev chairs:</b> Providing and fixing of high back rev chairs GRIHA certified having cushioned seat/back assembly. The Cushioned seat should be made of Injection molded Plastic outer &amp; inner. Plastic Inner should be upholstered with</p>	2

	<p>stitched cover and moulded High Resilience Polyurethane foam of Density should be min <math>45 \pm 2</math> kg/m<sup>3</sup>, and hardness load <math>16 \pm 2</math> kgf for 25% compression. The stitched cover should be made from spacer fabric. Cushioned back should be made of PU Foam with in situ molded MS E.R.W Round Tube of size <math>1.9 \pm 0.03</math>cm x <math>0.16 \pm 0.0128</math>cm. It upholstered should be spacer fabric. size should not be less than Seat SIZE : 47.0 cm. (W) x 48.0 cm. (D), BACK SIZE : 45 cm. (W) x 75.5 cm. (D).The armrest top should be moulded from polyurethane(PU) and mounted on to a drop lift adjustable type tubular armrest support made of <math>03.81 \pm 0.03</math> cm x <math>0.2 \pm 0.01</math> cm thk MS E.R.W tube. The armrest height adjustable up to <math>6.5 \pm 0.5</math>cm in 5 steps. The Armrest structure should be powder coated (DFT 40-60 micron). There should be SYNCHRO mechanism with their adjustable tilting mechanism should be designed with the following features: • 360° revolving type, • Front-pivot for tilt with feet resting on ground and continuous lumbar support ensuring more comfort. • Tilt tension adjustment can be operated in seating position. • 5-position Tilt limiter giving option of variable tilt angle to the chair. • Seat/back tilting ratio of 1: 2. • The mechanism housing should be made up of HPDC Aluminium black powder coated. Seat depth adjustment should be integrated in the seat through a sliding mechanism. Seat depth adjustment range should be of <math>6.0 \pm 0.5</math> cm. Back Frame should be connected to the Up/Dn mechanism housed in Plastic T spine. It can be adjusted in the range of <math>7.42 \pm 0.5</math> cm for the comfortable back support. The pneumatic ht adjustment has an adjustment stroke of <math>10.0 \pm 0.3</math> cm. TWIN WHEEL CASTOR: 5 Nos. twin wheel castors should be injection moulded in plastic having <math>6.0 \pm 0.1</math>cm wheel Diameter and assembled to pedestal. The products should be ISO 9001:2008, ISO 14001:2004, OHSAS 1800:2007, BIFMA, GRIHA &amp; Green guard certified. Design as per approved by Technical Committee/Engineer In charge.</p>	
5	<p><b>Mid back rev chairs:</b> Providing and fixing of Mid back rev chairs having cushioned seat/back assembly. The Cushioned seat should be made of Injection molded Plastic outer &amp; inner. Plastic Inner should be upholstered with stitched cover and moulded High Resilience Polyurethane foam of Density should be min <math>45 \pm 2</math> kg/m<sup>3</sup>, and hardness load <math>16 \pm 2</math> kgf for 25% compression. The stitched cover should be made from spacer fabric. Cushioned back should be made of PU Foam with in situ molded MS E.R.W Round Tube of size <math>1.9 \pm 0.03</math>cm x <math>0.16 \pm 0.0128</math>cm. It upholstered should be spacer fabric. size should not be less than Seat SIZE : 47.0 cm. (W) x 48.0 cm. (D), BACK SIZE : 45 cm. (W) x 60.5 cm. (D).The armrest top should be moulded from polyurethane(PU) and mounted on to a drop lift adjustable type tubular armrest support made of <math>03.81 \pm 0.03</math> cm x <math>0.2 \pm 0.01</math> cm thk MS E.R.W tube. The armrest height adjustable up to <math>6.5 \pm 0.5</math>cm in 5 steps. The Armrest structure should be powder coated (DFT 40-60 micron). There should be SYNCHRO mechanism with their adjustable tilting mechanism should be designed with the following features: • 360° revolving type, • Front-pivot for tilt with feet resting on ground and continuous lumbar support ensuring more comfort. • Tilt tension adjustment can be operated in seating position. • 5-position Tilt limiter giving option of variable tilt angle to the chair. • Seat/back tilting ratio of 1: 2. • The mechanism housing should be made up of HPDC Aluminum black powder coated. Seat depth adjustment should be integrated in the seat through a sliding mechanism. Seat depth adjustment range should be of <math>6.0 \pm 0.5</math> cm. ADJUSTABLE BACK SUPPORT Back Frame should be connected to the Up/Dn mechanism housed in Plastic T spine. It can be adjusted in the range of <math>7.42 \pm 0.5</math> cm for the comfortable back support. The pneumatic ht adjustment has an adjustment stroke of <math>10.0 \pm 0.3</math> cm. TWIN WHEEL CASTOR: 5 Nos. twin wheel castors should be injection moulded in plastic having <math>6.0 \pm 0.1</math>cm wheel Diameter and assembled to pedestal.</p>	22

	The products should be ISO 9001:2008, ISO 14001:2004, OHSAS 1800:2007, BIFMA, GRIHA & Green guard certified. Design as per approved by Technical Committee/Engineer In charge.	
6	<b>Visitor chairs:</b> Providing and fixing of visitor chairs GRIHA certified having -1) SEAT/BACK ASSEMBLY: The Cushioned seat should be made of Injection molded Plastic outer & inner. Plastic Inner should be upholstered with stitched cover and moulded High Resilience Polyurethane foam of Density should be min 45±2 kg/m <sup>3</sup> , and hardness load 16 ± 2 kgf for 25% compression. The stitched cover should be made from spacer fabric and leatherette. Cushioned back should be made of PU Foam with in situ molded MS E.R.W Round Tube of size 1.9±0.03cm x 0.16 ±0.0128cm. It upholstered with spacer fabric and leatherette. Seat size should not be less than 47.0 cm. (W) x 48.0 cm. (D) and BACK size should not be less than 45 cm. (W) x 60.5 cm. (D). 2) Visitor TUBULAR FRAME: The powder coated (min DFT 50-60 micron) tubular frame should be cantilever type & should be made of 02.54±0.03 cm x 0.2±0.016 cm thk MS ERW tube. The back connected to frame through powder coated (DFT 40-60 micron) high pressure die cast connector piece. The products should be ISO 9001:2008, ISO 14001:2004, OHSAS 1800:2007, BIFMA & Green guard certified. Design as per approved by Technical Committee/Engineer In charge.	32
7	<b>Sliding door units :</b> Providing and fixing of Sliding door units GREENGUARD, GRIHA certified having :Overall Dimensions shall be 900mm(W) x450mm(D)x1192.5mm(H) .The top shall be wooden top PLB(25 mm add in unit height ) . The Rigid Knock Down Construction , Back , Sides and Door shall be made from 0.7 mm high yield strength CRCA ,rest in 0.8 mm CRCA . CRCA - 'D' Grade as per IS-513. Sliding door arrangement shall have sliding door with top hanging arrangement to prevent derailment. Each door shall be provided with 2 plastic roller having steel ball bearing for smooth movement of door & less noise. Locking shall be 5 lever cam lock for safe locking. Handle shall be plastic flush & recessed handle. Shelving shall have Height wise adjustable shelf mounting. Uniformly Distributed Load Capacity of the shelf is 40 Kg maximum. VSDU - 5 shall have 2 no. of adjustable full shelves. Leveler shall be screw type leveler with hex plastic base and overall finish shall be epoxy polyester coated to the thickness of 50 microns. For VSDU 5 - A4 size box file can be stored vertically on two shelves and clear space above third shelf is 295 mm .The products should be ISO 9001:2008,ISO 14001:2004,OHSAS 1800:2007, BIFMA & Green guard certified. Design as per approved by Technical Committee/Engineer In charge.	4
8	<b>Laser Projector</b> - DLP, 4000 Lumens, Full HD (1920X1080pixels), Laser Projector, Lens Shift, Laser Diode with 20000 Hours life, Wireless Presentation capability, Built in speaker-10W. Mke: standard make	1
9	<b>Motorized Screen</b> with remote control Size : 8`X5`, Make: standard make	1
10	Ceiling Mount for Projector	1
11	<b>Storage units :</b> Providing and fixing of Storage units (500 main + 1000addon) GREENGUARD, GRIHA certified having , Overall Dimensions of Floor Unit 500 W Main shall be 500mm(W)x500mm(D)x2100mm(H) . The construction shall be aesthetically appealing completely knock down construction. Legs shall be fitted with screw type leveler and material shall be from combination of CRCA 0.5 mm & 0.8 mm. The shelving shall be height wise adjustable shelf mounting, each full shelf shall have a load capacity of 40 kg UDL max. and 4 nos. of full adjustable shelves. Finish shall be epoxy powder coated to the thickness of 50 microns.	4



	<p>Overall Dimensions of Floor Unit 1000 W Add On shall be 1000mm (W) x500mm (D) x2100mm (H) . The construction shall be aesthetically appealing completely knock down construction. Legs shall be fitted with screw type leveler and material shall be from combination of CRCA 0.5 mm &amp; 0.8 mm. The shelving shall be height wise adjustable shelf mounting, each full shelf shall have a load capacity of 40 kg UDL max. and 4 nos. of full adjustable shelves . Finish shall be epoxy powder coated to the thickness of 50 microns. The add on units shall be stacked widthwise to form a row of storage having a common side panel.</p> <p>Overall Dimensions of Floor Unit 500 W Metal Door shall be 498mm (W) x20mm (D) x 2058mm (H) . The construction and Material shall be made from combination of CRCA 0.5 mm &amp; 0.8 mm thickness. Steel Hinged Door with shelf closing hinges .The handle shall be Aesthetically appealing, Ergonomic, Made of Aluminum. The locking shall be 3 way and Finish shall be Epoxy Powder coated to the thickness of 50 microns.</p> <p>Overall Dimensions of Floor Unit 1000 W Metal Door shall be 498 mm (W) x 20mm (D) x2058mm (H) . The construction and Material shall be made from combination of CRCA 0.5 mm &amp; 0.8 mm thickness. Steel Hinged Door with shelf closing hinges .The handle shall be Aesthetically appealing, Ergonomic, Made of Aluminum. The locking shall be 3 way and Finish shall be Epoxy Powder coated to the thickness of 50 microns .The products should be ISO 9001:2008,ISO 14001:2004,OHSAS 1800:2007, BIFMA &amp; Green guard certified. Design as per approved by Technical Committee/Engineer In charge.</p>	
12	<p><b>personal locker units</b> : Providing and fixing of 4 door personal locker units with lock (1main +2 addon) GREENGUARD, GRIHA certified having , Overall size of 4 - Door PLU + Lkr (Base) shall be 380mm(W)x450mm(D)x1830mm(H). Stack ability shall have add - on units that can be stacked width wise to form bank of lockers having common side panel. Locking shall have 10 Lever cam lock with lock lever plus option of hasp arrangement. Material shall be CRCA 0.6 mm thickness. Construction shall be Rigid Knockdown construction, shelf shall be uniformly distributed load capacity per each shelf level is 35 Kg maximum. Finish shall be epoxy polyester powder coated to the thickness of 50 microns. Handle/Label holder shall be Aesthetically appealing Snap fit ABS plastic handle. Ventilation shall be attractive punched pattern for ventilation.</p> <p>Overall size of 4 - Door PLU + Lkr (Add On) shall be 380 mm (W) x 450 mm (D) x 1830 mm (H). Stack ability shall have add - on units that can be stacked width wise to form bank of lockers having common side panel. Locking shall have 10 Lever cam lock with lock lever plus option of hasp arrangement. Material shall be CRCA 0.6 mm thickness. Construction shall be Rigid Knockdown construction, shelf shall be uniformly distributed load capacity per each shelf level is 35 Kg maximum. Finish shall be epoxy polyester powder coated to the thickness of 50 microns. Handle/Label holder shall be Aesthetically appealing Snap fit ABS plastic handle. Ventilation shall be attractive punched pattern for ventilation. Overall size of stand for three locker (black) shall be 1140mm (W) x450mm (D) x125mm (H) . The products should be ISO 9001:2008, ISO 14001:2004, OHSAS 1800:2007, BIFMA &amp; Green guard certified. Design as per approved by Technical Committee/Engineer In charge.</p>	4

**Note: Please quote the pooled cost for all items with required quantities mentioned in above table.**

**Terms and Condition for Furniture for Conference Hall**

1	Tenders are invited from Manufacturers or their authorized dealers (from the principal of the brand being offered for at least Seven years with their local/M.P. service setup – response time – within 24 hours) for supplying of furniture items, in case of dealers quoting for the project authorization certificate from original manufacturer to be attached, also confirming that the delivery will be made as per the requirement of tender. For proof: Submit service invoices of furniture spares. (7 year old)
2	Manufacturers should be an ISO certified organization and considering growing concern on environment and human resource, the Furniture Manufacturer should also have Environmental Certificate. All these should be submitted with the Tender. The following supporting documents to be enclosed: ISO 9001:2015 (For Quality Management System-QMS), ISO 14001:2015 (for Environment Management System- EMS), ISO 18001:2007 (For Occupational Health and Safety Management System), ISO 50001:2011 (For Energy Management System for the entire organizations to manage energy).
3	Turnover of the company should be minimum 50 crores in each of last three consecutive years. In case of dealer, turnover should not be less than 2.0 Crores in each of the last three preceding consecutive years.
4	Tenderer should not have been black listed. (Self-Certification is required regarding conformity of contract from any state Government, Central Government, any PSU or any reputed institute and if found wrong, tender will be rejected).
5	Bidder should quote all the items as per the BOQ of tender, if any item is left unquoted the tender of that bidder will be summarily rejected.
6	Telegraphic/Conditional Tender will not be accepted.
7	Product sample should be arranged by the successful tenderer, if required within 7 days.
8	Any representative of the Office may visit the Manufacturing set up to verify the Manufacturing capabilities, testing methods, process of manufacturing etc., to ascertain the technical specifications on the cost of the bidder If required.
9	The Manufacturer should have a Registered Office and GST Registration in the state of Madhya Pradesh. Proof to be submitted.
10	Earnest Money Exemption Certificate shall not be accepted and withdrawn by Govt. vide Govt. Reso. Dt. 22/2/2016.
11	Manufacturer should be a member of BIFMA – Business and Institutional Furniture Manufacturers Association.
12	Manufacturer should be a 100% Indian Organization and must be in the business of Furniture Manufacturing in INDIA for last 30 years. Certification of Incorporation/Origin shall be enclosed. their authorized dealers (from the principal of the brand being offered for at least 10 years with their local/M.P
13	Factory/Manufacturing plant license to be enclosed in compliance to Green – GRIHA/ IGBC/ NBGC or any other Green building national /International standard.
14	Manufacturer shall have the documentary evidence of these machineries at least as listed below, so as to ascertain the capacity of the manufacturer to complete the project in stipulated time. <ul style="list-style-type: none"> <li>• Computer Controlled through-feed multi station edge preparation machine with gluing &amp; cutting for flush, trimming, scrapping &amp; butting.</li> <li>• Sheet Metal Folding Machine.</li> <li>• Computer Controlled Press Brake for Sheet Metal Bending.</li> <li>• Press Brake Machine 8 Ft.</li> <li>• Power Sharing Machine 8 Ft.</li> </ul>

	<ul style="list-style-type: none"> <li>• CO2 Welding Machine.</li> <li>• Spot Welding Machine.</li> <li>• Complete Powder Coating Line with baking oven and powder application.</li> <li>• Nine tank Anti-Rust Surface Pretreatment Plant.</li> </ul>
15	<p>Manufacturer/Dealer should submit the following documents:</p> <ul style="list-style-type: none"> <li>• Registration of Company (Manufacturer)</li> <li>• Factory License (Manufacturer)</li> <li>• Income Tax return copy of 17-18 ,18-19,19-20</li> <li>• PAN No.</li> <li>• WD Certificate (7 Years)/ Shop License at Gwalior or M.P.</li> <li>• GST No</li> </ul>
16	Orders of furniture and Lab furniture to be submitted along with the tender: One order of 18 lac or 2 orders of 12 Lac within the last 2 financial years of different Government Departments (Situating in Madhya Pradesh) preferably at Gwalior.
17	ISO 50001:2011 – The manufacturer must have ISO 50001- Energy management systems.
18	Lab furniture's Welded cabinets should be third party tested for SEFA 8M, SEFA 10M and EN 13150 and EN14727 by SEFA/NABL approved lab.
19	The bidder must have SEFA membership certificates for last five years on a continuous basis. Documentary evidence to that effect has to be provided.
20	The Manufacturer/Products should be certified for being Environment Friendly- the manufacturer should have products which are certified for being environment friendly, which are important to confirm that the products that have been offered meet rigorous emissions standards—helping reduce indoor air pollution and the risk of chemical exposure while aiding in the creation of healthier indoor environments. GRIHA prefers such products in order to achieve green compliance.
21	Manufacturing bidders must agree to undertake a comprehensive warranty for all the items supplied and installed and also agree for 3 years post warranty services and maintenance under Annual Maintenance Contract (AMC).
22	Certification of Individual Furniture should be submitted along with bid. Product green certificates, GRIHA company certificate, BIFMA Level Certificates, Indoor air quality, AIOTA

### **ITEM NO.24 WALL PANNELLING OF CONFERENCE HALL**

<b>S.No</b>	<b>Detail Specification</b>	<b>Quantity required</b>
1	Fixing of wooden paneling on wall of the conference hall with necessary hardware of the following specifications: Providing and fixing of wall paneling made of 18 mm thick ply in proper level with required support frame work. Face of the wall paneling shall be finished/covered with 4 mm thick teak ply duly polished with melamine finish or 1 mm thick sunmaika bonded to the surface of the ply using high strength cross linked PVAC based adhesive..The core/base or interior of the frame shall be filled with resin bonded rockwool/glass wool of a minimum density of 64 kg/cum and a 3 mm thick sound damping layer covered with black coloured cloth of minimum 2 mm thickness to fix glass wool properly on the wall surface.	92 square meter
2	P/f of acoustical Door: P/F of acoustical door at the netry of the conference	3 square

	<p>hall. The door frame shall be of hard wood of size 50 mm thickness, including making necessary grooves for fixing of hollow bulb type EPDM Gasket on the rebates. The core of the door shutter shall be filled with resin bonded rockwool of a minimum density of 64 kg/cum and a 3 mm thick sound damping layer. Face panels shall be 12 mm thick BWP ply confirming to IS 770 on both sides of the core of the shutter. Both the faces shall be finished with 4 mm thick teak ply /1mm thick sunmaika bonded to the surface of the ply using high strength cross linked PVAC based adhesive. The door assembly shall be fixed to the door frame with heavy duty stainless steel hardwares like SS hinge with 4 ball bearings, Each door leaf to be fixed with 4 nos SS hinges. The door shall also be provided with Brass door handle 300mm C shaped, Brass Tower Bolt 300 mm and Mortice lock with lock body, C shaped round bar handle and Pin cylinder lock with 6 pin mechanism and one side key and one side knob, and door closer also be provide . All these items shall be included in the cost of the door.</p>	meter
3	<p>P/f of loopile carpet of 5-6 mm +- 5 mm thickness to be pasted on the floor with good quality adhesive .Providing and fixing of good quality hitsheet of 8 mm thickness below the carpet. The carpet should be pasted above hitsheet.</p>	85 square meter
4	<p>Providing &amp; Fixing premium quality Manually operated Roller blinds with pelmet with Prestressed Micro-Aerated Solar protection fabric of high tenacity Polyester Yarn with PVC Coating &amp;Fungistatic Treatment and should block the light flux &amp; offer elimination of glare and sunlight. Fabric for Blinds: Composition: 40% Polyester / 60% PVC, Weight:400 g/m2 (+/-5%), Thickness:0.45 mm (+/-5%), Fabric Openess Factor: 4% , Tensile Strength (Warp/Weft): 220/220 daN / 5cm, Tearing Strength (Warp/Weft): 30/25 daN, Fire Retardancy:M2 (NFP92-507)- Roller Tube shall be of extruded Aluminum alloy 38mm O.D (or as per system dimension) with a minimum wall thickness of 1.0mm duly anodized for long life. Clutch shall be wrap spring design with high strength fiberglass reinforced Polyester assembly and high carbon steel springs to transmit motion from driving to driven members of clutch mechanism. Clutch shall operate directionally with the use of an endless beaded chain. Clutch mechanism shall be crash proof, prevent slippage and shall raise and lower smoothly to any desired height. Clutch shall never need adjustment. Idler shall be of high strength fiberglass reinforced polyester, consisting of an outside sleeve and center shaft. Sleeve shall provide bearing surface for roller tube and rotate freely on enter shaft, providing smooth, quiet and long wearing operation. Brackets shall be of tomised steel powder coated to give superior finish. Bracket shall accommodate overhead, side or face mounting with clutch assembly on either end of the roller. Bottom of the blind shall be provided with aluminum tube powder coated in a colour matching to the fabric. The fabric shall be enclosed in the suitably created pocket along with the tube. The tube shall be closed from sides with end caps to give a neat look</p>	22 square meter

**Note: Please quote the pooled cost for all items with required quantities mentioned in above table.**

**Terms & Conditions for wall Paneling of Conference Hall**

1. The companies who have been in the business of furniture or interior works for more than 2 years or their authorized dealer can participate in the tender. The proof of manufacturer should be attached.
2. The bidder must be either a manufacturing company/firm or authorized vendor/dealer of the company.
3. The bidder or their OEM or the company of whom the bidder is a dealer in case the dealer is participating in bid should possess prevalent certifications like ISO 9001, ISO 45001, OHSAS 18001 and BIFMA. Attested copies of such certificates should be attached with the technical bid.
4. The tenderer must have GST Number and must Submit legible attested copies of PAN No. and GST NO. with Technical Bid. Technical Bid not accompanied by these documents would be summarily rejected.
5. The bidder must give warranty of at least 12 months in written and should undertake to rectify /attend to the complaints within 2 days excluding Sundays/ Holidays during the warranty period..
6. Ordered work shall be completed within stipulated period failing in which the contract of the said firm /supplier may be terminated and the order will stand cancelled.
7. Preference will be given to the firm registered in PWD and having experience of doing similar work.

### **ITEM NO.25 COMPUTER AND ACCESSORIES**

#### **(A) LAPTOP**

Processor Description	Intel Core i7
Form Factor	Standard/ convertible
Video graphics	Intel Graphics
Operating System (Factory Pre-Loaded)	Windows 10 Home 64
RAM Size (GB)	16 GB
RAM Expandability up to	32GB
Type of Drives	SSD
Hard drive	512 GB M.2 SSD
Wireless Connectivity	Should be provided
Bluetooth Connectivity	Should be provided
Display Size (Inch)	14 inch
Panel Technology	IPS
Display Resolution (Pixels)	FHD with Touch Screen
Availability of Webcam	Should be provided
Resolution of Webcam	720p HD
External storage device	1 TB HDD USB
MS office	13 or latest

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

Processor	9 <sup>TH</sup> Generation Core i7
Ram	8 GB
Hard Disk	1TB
Graphics	HD Graphics
Port	HDMI,USB 3.0

Display	19.5 Inch
Camera	Web Cam
CD/DVD items	Available
Key board/Mouse/USB	Wired
WAN Port/Wi-Fi connecting port:	Available
O.S	Windows 10
MS office	13 or latest

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

Processor	9 <sup>TH</sup> Generation Core i7
Ram	8 GB
Hard Disk	1TB
Graphics	HD Graphics
Port	HDMI,USB 3.0
Display	21.45” Full HD
Camera	Web Cam
CD/DVD items	Available
Key board/Mouse/USB	Wired
WAN Port/Wi-Fi connecting port:	Available
O.S	Windows 10
MS office	13 or latest

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

Processor	9 <sup>TH</sup> Generation Core i7
Ram	16GB
Hard Disk	1TB
Hard drive ssd	512 GB M.2 SSD
Key Board -Mouse	Wireless
Port	HDMI,USB 3.0
Display	23.8” HD
Camera	Web Cam
CD/DVD items	Available
Key board/Mouse/USB	Wired
WAN Port/Wi-Fi connecting port:	Available
O.S	Windows 10
MS office	13 or latest

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

Processor	9 <sup>TH</sup> Generation Core i5
Ram	8 GB
Hard Disk	1TB

Graphics	HD Graphics
Port	HDMI,USB 3.0
Display	21.45” HD
Camera	Web Cam
CD/DVD items	Available
Key board/Mouse/USB	Wired
WAN Port/Wi-Fi connecting port:	Available
O.S	Windows 10
MS office	13 or latest

**(F) Display: 21.45” HD (All in One)**

Processor	9 <sup>TH</sup> Generation Core i7
Ram	8 GB
Hard Disk	1TB
Graphics	HD Graphics
Port	HDMI,USB 3.0
Display	23.5” HD
Camera	Web Cam
CD/DVD items	Available
Key board/Mouse/USB	Wired
WAN Port/Wi-Fi connecting port:	Available
O.S	Windows 10
MS office	13 or latest

**(G) 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)

**(H) 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

**(I) Colour LaserJet Printer**

- Prints up to 17/4 ppm (ISO) (Blk/Clr)1, letter
- Duty cycle up to 15,000 pages per month
- RMPV: Up to 200 to 850 pages2
- 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

**(J) 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& J) separately.**

***ITEM NO.26PHOTOCOPIER (FIRST CALL)***

***(A) MONO PHOTOCOPIER ( FIRST CALL)***

Print Technology	Laser
Type of machine	Multifunction machine
Type of printing	Mono
Cartridge technology	Separate drum and toner
Platen/Flatbed size	A3
Paper Size (Original/Image)	A3/A3
RAM size (MB)	512MB
Minimum speed page per minute	27 Pages
Scanning feature	Yes
Availability duplex 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

**(B) COLOUR PHOTOCOPIER ( FIRST CALL)**

Type of Machine	Multifunction Machine
Print Technology	Laser
Type of Printing	Color
Cartridge Technology	Separate Drum and Toner
Developer Unit	Yes
Platen/Flatbed Size	A3
Paper Size(Original/Image)	A3/A3
RAM size (MB)	2048
Hard Disk Capacity(GB)	320
Minimum Speed per Minute as per A4 Size-Mono	20
Minimum Speed per Minute as per in A4 Size-Color	20
Minimum Speed per Minute as per A3 Size-Mono	12
Minimum Speed per Minute as per in A3 Size-Color	12
Scanning Feature Availability	Yes
Duplex Feature Availability	Yes
Networking Feature Availability	Yes
If yes, Type of Network Interface	Ethernet 10/100/1000
Wi-Fi Availability	Yes
Wi-Fi Type	Wi fi 802.11 b/g/n & Wi Fi Direct
Original Document Feeder Type	DADF/RADF
Number of Main Paper Tray	2
Each Main Paper Tray Capacity (Number)	1100
Bypass Facility	Yes
Bypass Tray Capacity	100
Duty Cycle	40000
Black Toner Cartridge Life in pages	16100
Black drum unit Life in pages	60000
Cyan Toner Cartridge Life in pages	5500
Cyan drum unit Life in pages	48000
Magenta Toner Cartridge Life in pages	5500

Magenta drum unit Life in pages	48000
Yellow Toner Cartridge Life in pages	5500
Yellow drum unit Life in pages	48000
On side Warranty in year	2

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

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