

## [MIC]

### DEPARTMENT OF BIOTECHNOLOGY AND MICROBIOLOGY, GUJARAT UNIVERSITY.

#### **1. pH meter -5 number required**

- pH range: 0-14 pH
- Resolution: 0.01pH
- Temperature range: 0.0 -100<sup>0</sup>C
- Automatic Calibration check facility & Calibration Error indication for 7.00 & 4.00 pH
- Standard buffer solution (pH 4.0, 7.0)
- Digital display with 0.001 pH unit readability

#### **2. Autoclave -2 number required**

- Capacity:6 litres
- Microprocessor Based Semi-Automatic Digital Controller with Auto-Time Control System, after the set temperature is attained the timer starts automatically & on completion of set count down/up time the supply of heaters is cut-off & the system sounds a buzzer alerting the user that the cycle is over.
- Double walled unit mounted on a sturdy, heavy M.S. duly painted or stainless steel tubular stand.
- Both inner chamber and outer wall made of S.S.
- Pressure is adjustable from 10-20psi.
- Fitted with pressure gauge, safety valve and steam release valve.
- For units fitted with S.S. Boiler, separate valves for injecting the steam into the main chamber and releasing the steam in atmosphere after use are provided.
- Automatic Vacuum Breaker is provided to break the vacuum in case of formation of vacuum due to steam condensation.
- Lid is made of S.S. plate provided with radial locking system.

#### **3. Hot Plate with Magnetic Stirrer-5 number required**

- Speed control range 250-1250 RPM
- Max. stirring volume (water) 15 litres
- Plate temperature regulation range +30°C...+330°C
- Temperature uniformity on the plate  $\pm 3^{\circ}\text{C}$
- Working plate heating time till 330°C 15 min
- Diameter of working plate 160 mm
- Working surface material Aluminium alloy
- SR-1, attachable stand size  $\text{Ø } 8 \times 320 \text{ mm}$

- Length of magnetic stirring element 10–50 mm
- Max. stirring liquid viscosity up to 1170 mPa.s

#### **4. Vortex mixture -5 number required**

- Shaking Movement : Orbital
- Orbital Diameter (mm): 4
- Motor Type Shaded-Pole Motor
- Motor Rating Input / Output (W) : 58 / 10
- Permissible ON time: 100% power 30mins
- Speed range (rpm): 0-2500
- Run Type : Continuous / touch operation
- Dimensions (mm) : 127 x 130 x 160
- Weight (kg) : 3.5

#### **5. Centrifuge-1 number required**

- Stepless speed regulator with zero start interlock
- Digital speed indicator
- Dynamic brake
- Digital count down timer
- Imbalance cutout
- Speed: 20,000 RPM
- Rotor heads: 1) 8 x 50 ml angular  
2) 24 x 2 ml angular

#### **6. Cooling Centrifuge-1 number required**

- Stepless speed regulator with zero start interlock
- Digital speed indicator
- Dynamic brake
- Digital count down timer
- Imbalance cutout
- Digital temperature controller cum indicator
- Speed: RPM -20,000
- Rotor heads: 1) 8 x 50 ml angular  
2) 24 x 2 ml angular  
3) 6 strips of 8 x 0.2 ml, angular

### **7. Refrigerator-3 number required**

Double Door: 300 L Approx

### **8. Incubator Shaker-2 number required**

- Double walled inner chamber made of S.S.304 & outer M.S powder coated.
- PUF insulation between two walled, heavy angle frame structure from all sides, shaking assembly with ball bearing system, platform adjustable stainless steel platform, Flask holder (250ml: 25, 500ml: 15, 1L:3, 2L: 2 ) spring type clamp arrangement with easy interchangeability facility, motor (PMDC Motor), RPM 50 to 200 RPM controlled by regulator, stroke 25 to 30 mm stroke displacement, temperature controlled by digital temp.
- Controller cum indicator with accuracy of  $\pm 0.5^{\circ}\text{C}$ , temperature ranges  $10^{\circ}\text{C}$  to  $90^{\circ}\text{C}$  in cooling and heating, cooling by CFC free hermetically sealed compressor and heating by 'U' illumination light to view, RPM indicator in digital display.

### **9. Laminar air flow-2 number required**

- Size: 4'X 2'X 2'.
- Main body: constructed in stainless steel/mild steel with power coating, work Surface: completely in stainless steel, safe: exhaust air is double –filtered through high quality HEPA FILTRATION for 99.99% typical efficiency, air flow: 100% exhaust, on & off synchronized with front door, auto manual switch facility( U.V light & F.L Light), comfortable: ergonomic 10 degree sloped front, seamless tabletop: allow easy cleaning, Air barrier at the work opening and the contaminated air plenum under positive pressure. An air barrier between the operator and the work zone maintained by flow of room air through a full width grille in the work opening. cabinet operates at negative pressure relative to the laboratory in order to prevent migration of pathogenic material out of the work area.

### **10. Incubator-3 number required**

- operated on 230V, 50Hz single phase AC supply, and having temperature ranging from ambient to  $60^{\circ}\text{C}$
- double walled with stainless steel inner chamber having a minimum of two inner stainless steel shelves with holes and powder coated outer surface.
- Inner chamber should be fabricated with ribs for adjusting shelves to convenient height.
- provided with three side heating elements.
- air circulating fan (Which can be turn ON/OFF on demand) for uniform temperature on all shelves.
- double door with acrylic transparent door.
- microprocessor based digital temperature controller with digital display.

### **11. Fumigation hood: Basic Lab Model -1 number required**

### **12. Spectrophotometer- 5 number required**

- Good resolution, reliable, single beam, manual
- Digital Wavelength with 0.1 nm increments
- 200 – 1000 nm Range
- 2 nm Bandwidth
- Manual 4 position sample changer
- Single Position 20/50 mm Cuvette Holder

### **13. SDS PAGE unit-1 number required**

- Gel Size : 8x7 cm
- Principal Material : Acrylic
- Upper Buffer tank dimension : 70x60x40 mm
- Lower Buffer tank dimension : 130x60x50 mm
- No. of combs : 7 well Teflon comb 0.5 mm - 1
- : No. 7 Well Teflon comb 1mm - 1
- : No. 7 Well Teflon Comb 1.5 mm – 1
- Teflon Spacer : 0.5mm Teflon spacer 2 Nos.
- : 1mm Teflon spacer 2 Nos.
- : 1.5mm Teflon spacer 2 Nos.
- Connecting Cord : red and black (1 each)
- No. of Platinum electrode : red and black (1 each)
- Lid : 1 No.
- Leveling screws : 3 Nos.
- Glass Plate : Notched and Rectangular- 2 sets
- Gasket : Fixed
- Clamp and Screws : 1 set
- Gel Casting Unit : 2

### **14. Salinity meter -1 number required**

- Automatic temperature compensation
- Automatic ranging
- Automatic buffer recognition
- Digital and analog outputs
- Data Hold

2 calibration points for Salinity  
Electrode status indication

- Range: 0 to 80 ppt
- Resolution: 0.1

#### **15. Conductivity meter-1 number required**

Automatic temperature compensation  
Automatic ranging  
Automatic buffer recognition  
Digital and analog outputs  
Data Hold  
5 calibration points for conductivity  
Electrode status indication  
Range: 0 to 1999  $\mu\text{S/cm}$   
Resolution: 1

#### **16. Water Bath -2 number required**

- Inside chamber S.S., Digital temp. Controller, stirring and circulation pump for uniform Temp., Temp. 5°C ambient to 95°C, Size 15' x 12" x 10"

#### **17. DNA Extraction Unit -1 number required**

- Mini Sub System: Small model gel size
- 10 x 7 cm (for 8 samples)

#### **18. Specification for Cooling Centrifuge**

- RPM: 20,000 RPM
- Display: LCD display of temperature, RPM, time and rotor used
- Temperature Range: -10°C to 40°C
- Power : 200-240 VAC, 50 Hz, 30 A, single phase
- Operating mode: RPM or Maximum RCF (x g) 70,000 to 100,000 and or weight
- Variable run time: Timer setup for long run and also set time in hrs and mins, with alarm at completion
- System with auto lock facility, with safety for over speed / imbalance / temperature Limit / door detector
- Automatic functioning of speed and timing.
- Requirement of Multipurpose rotors: Centrifugation rotors for different volume tubes

Fixed Angle Rotor: 1lt x 4 tubes to minimum of 1.5/2 ml x 24 tubes, 5ml x 8 tubes, 15ml x 36 tubes, 50ml x 6 tubes

- The instrument should contain all the accessories, so that it is fully operational at the time of installation.

## 19. Specifications of HVG-AAS

### 1. FLAME with Auto Sampler:

Optics: Double beam – Flame & Furnace

Background Correction: Two Back ground correction MUST D2 Lamp with SR or Zeeman Method.

Grating lines: 1800 lines/mm

Detector: Dual detector – PMT & semi conductor

Lamp: Minimum 06 Lamp motorized turret

Burner unit: Titanium make with 10 mm slot for C<sub>2</sub>H<sub>2</sub> and N<sub>2</sub>O – C<sub>2</sub>H<sub>2</sub> with 5 mm Slot.- 1 no. each.

Nebulizer: Pt-Ir capillary with teflon orifice and ceramic impact bead

Chamber: Polypropylene type

Burner Height selection: Automatic through software with optimal height search capability.

Gas control unit: Fuel gas, support gas, automatic flow rate setting, automatic search for optimal gas flow rate through Software

Validation: Hardware validation through software.

Safety features: Support for safety inspections through software.

**2. Software:** 32 Bit Software based AA, Should have QA/QC Function & Electronic Signature as standard with high-tech Computer - Monitor, CPU, Keyboard and Printer.

### 3. Flame Auto Sampler:

Auto Sampler with auto dilution with Nozzle rinse: Solvent aspiration rinse method, 2 L rinse water bottle to be provided as standard.

Vial capacity: For reagent – 8 positions, & 60 samples with random accesses.

Controlled by: Software only.

## UPGRADABLE TO GRAPHITE FURNACE:

**1. Micro Sampling Kit – Auto Dilutor:** For Low volume 50 micro litre to 100micro litre of sample.

### 2. Graphite Furnace with Auto sampler:

Temperature control: Digital Temperature control of heating from PC.

Flow control: Built-in electronic flow controller for gas flow rate.

Optical Sensor & Current control: Built in high sensitive optical sensor and automatic current control over the entire temperature range

Gas line: Dual gas line with automatically switching.

Heating control Method: Drying though digital current control with automatic temperature calibration.

Ashing – Digital optical sensor control

Atomization- Digital optical sensor control

Heating Temperature range: Room Temperature to 3000 deg C.

Safety measures: Cooling water monitor, over current protection, furnace block cooling check

### **3. Auto Sampler For Furnace:**

Sampling function: Automatic dilution, reagent addition.

Automatic dilution with reanalysis: Diluted by factor so automatically calculated and fit into calibration curve range.

### **4. Hydride Vapore Generator of Same make for Se, As etc.**

Analysis System: Continuous flow system

Sample consumption: Variable

Reagent consumption: Variable

Atomizer: Heated absorption cell, standard system should uses air-C<sub>2</sub>H<sub>2</sub> flame

Operation through: Auto Sampler also.

Graphite Tube: Platform Graphite tube – 5 nos.

High density graphite tube- 5 nos.

Pyro coated graphite tube-5 nos

Installation Accessories: C<sub>2</sub>H<sub>2</sub> Cylinder with Regulator – 1no.

N<sub>2</sub>O Cylinder with Regulator – 1 no.

Fume Hood – 1 No.

Air Compressor – 1 No.

PC – Pentium IV with Deskjet printer -1 no.

Ar Cylinder for HVG – 1 no.

Gas Purification panel – 1no.

Servo Voltage stabilizer or UPS – 5 KVA and 10 KVA online.

**Hollow Cathod Lamp** set which can detect the following metals up to **1 ppb**  
**Selenium, Iron, Zinc, Sodium, Potassium, Cupper, Arsenic**

- **The instrument should contain all the accessories, so that it is fully operational at the time of installation.**

## **20. Specifications of Orbital Shaker**

- Speed Range - 15 to 500 ±1rpm
- Temperature Range (Metric): Ambient +10° to 80°C

- Orbit - 1.9cm (0.75 in.)
- Capacity – 25 x 250ml, 5 x 500ml, 2 x 1000ml Flasks
- Load Bearing Capacity - 50 lb. (22.7kg)
- Temperature Accuracy: +/- 0.1°C
- Type - Shakers
- Electrical Requirements - 240V 50/60Hz
  
- The instrument should contain all the accessories, so that it is fully operational at the time of installation.

## **21. Specifications for Probe Sonicator**

1. System with microprocessor based Control
  2. Automatic tuning and frequency control
  3. Option to set the time and amplitude
  4. Should capable of simultaneous monitoring and controlling of both the temperature of the sample and the amount of energy that is being delivered
  5. Pulse mode with full function ON and OFF cycle. Continuous mode up to 30 minutes or preferably more.
  6. With sound abating enclosure and jack stand
  7. Power rating: 700-750 watt, Frequency: Up to 40 kHz or more
  8. Processing Capacity: up to 1000 ml
  9. Digital amplitude / Intensity control: Output amplitude can be set from 10 to 100%
  10. Display: Energy monitor, Watt meter, Amplitude, Time indicator, Pulser and Temperature.
  11. Probes: suitable for Processing Volume 150 µl to 5 ml and 10 ml to 250 ml • Multiple sample processing probes can be quoted optionally
  12. Set of standard tool kits to be provided with Ultrasonic Processor
- 
- The instrument should contain all the accessories, so that it is fully operational at the time of installation.



## **22. GEL DOCUMENTATION SYSTEM**

**Highly Advanced, Fully Automated Microprocessor Controlled Gel Documentation & Image Analysis System for Fluorescent, Colorimetric & Chemifluorescent.**

### **Unique Features:**

The system is driven by the intuitive, automated **software**. UV lighting employs RTD technology to prevent banding effect . **Software 21 CFR II Compliant.**

### **System comprises of Base unit (DARKROOM):**

- Microprocessor Controlled Darkroom with necessary electronics for controlling all functions of camera, lens and lighting via computer.
- Full safety interlock with override. Electromagnetic door latch.
- **Fully light tight darkroom with separate enclosure for camera and lens suitable for Fluorescence applications**
- **Auto UV shut off**

### **Camera & Lenses:**

- High speed USB Camera
- **TRUE16-bit Scientific Grade CCD Camera or better**
- **Resolution: 3.8 Mega pixels or more**
- **Pixel Array: 2176 x 1760 or advanced**
- Dynamic range: 4.8 OD or better
- Grey Scales: 65536 or modified
- **Close up lens: +2 diopter Close-up lens and adapter for 8 to 48mm lens or advanced**

**Motorized Lens with Adjustable Aperture (f 1.2) or latest**

**7-Position computer controlled motorized filter wheel or more position filter wheel**

#### **EMISSION FILTER:**

**UV (Mid Pass) Filter:** This yellow/orange filter has a wavelength range of 550 to 640 nm and for visualization of stains like:

- Florescent stains (Ethydiium Bromide)
- Coomassie Blue
- SYPRO Ruby
- SYPRO Orange

#### **EXCITATION / ILLUMINATION SOURCES**

- **UV Transilluminator**
  - Employs RTD Technology to prevent banding effect & provide even illumination
  - Fully variable intensity between 50-100%
  - For viewing fluorescently stained Gels (DNA / RNA)
- **UV-To-VISIBLE LIGHT Convertor:**
  - For viewing **protein gels** and other **white light applications**
  - Imaging area 30.5 x 33cm or better imaging area
    - **DUAL EPI- White Light Illumination with Light Emitting Diodes**

#### **Software:**

1. **An Application Driven Control Software which can be used in either Automatic or Manual mode**

**With the new control software the user simply has to tell the system the sample type and dye and leave the rest to the automated capture system..**

- The Software contains database for all lighting, filters and cameras used on any system.
- The database contains data for over 220 dyes and substrates uses in the system
- Image annotation, enhancement and manipulation control Image sharpening and smoothing
- Image invert. Image cropping feature
- Effective pixel image output to increase image resolution for publication purposes.
- Style control (line size, colour, fonts)
- Image rotation function in single degrees [ 0 – 360°]
- 3D viewing with full rotational control



7. The system should support minimum reaction volume of 10 $\mu$ L
8. Instrument must not require reference dye
9. System should have the capability of auto calibration
10. Optics preferably contained in modular cartridges, for no cross talk and improved data resolution is desired. Scan time for all channels is 2 seconds or less irrespective of plex number/optical channels is preferred
11. The Instrument must offer 10 logs of linear dynamic range.
12. Instrument preferably should have easily changeable optics cartridges for genotyping via high resolution melt, gene-expression analysis and variety of complex research applications.
13. Should have an onboard diagnostic system which is capable for a quick pre-tested a comprehensive test. The onboard diagnostics can pinpoint potential problem points before they become serious.
14. It must have touch screen system, so that no additional PC or laptop is needed. It should have at least 2 USB ports and storage of 5GB or more

**Software:**

1. The system should come along with High Resolution Melting Curve Analysis Software. The vendor should have reagents for HRM Applications.
2. The system must offer preprogrammed assays for easy selection of calibrators, normalizers and sample associations.
3. The system must offer multiple customizable data analysis algorithms
4. The software must enable export of raw data in multiple formats.
5. The system should come along with software to support applications like absolute quantitation, RQ, multiplex PCR, Melt curve analysis, pathogen detection and plus minus assays.

**Supporting Chemistries and Applications:**

1. The system must be open to all chemistries including SYBR, Probe and HRM
2. The system must offer multiplexing capabilities, excluding the internal passive reference dye.
3. The system must be flexible to be used with 96-well plates, strips of 8 or individual tubes.

The instrument should contain all the accessories, so that it is fully operational at the time of installation.

## 24. SPECIFICATIONS FOR FERMENTER

<b>Specificatins for in-situ fully automatic 20Ltr. fermenter.</b>	
<b>Vessel</b>	<b>Insitu sterilizable 20 L total volume, Working volume 15 L, SS Jacketed vessel with baffles and air sparger, Longitudinal sight glass assembly sealed through silicone gasket covering the working volume. 6 blade Rushton Turbine impeller , adjustable, Diameter of impeller 40% of the inner diameter of the Fermenter. Inner surface finish of 220 grit Finished &amp; mirror polished <math>Ra \leq 0.5 \mu m</math> Doubled locked steam sterilizable sampling port and separate harvesting port,</b>
<b>Motor</b>	<b>Drive DC/AC maintenance free brushless motor, Top driven,</b>
<b>Measurement &amp; Control System</b>	<p>1) Automatic Temperature control, Operating temperature 0-80°C            2) Automatic Regulated air supply (0-22lpm approx.) with prefilter,            3) Autosterilizable facility with pressure measurement and control,            4) Automatic agitation measurement and control, RPM 50 to 1000 Approx.            5) Automatic nutrient feeding            6) Automatic pH control            7) Automatic monitoring and control of Dissolved Oxygen            8) Automatic foam control            9) Exhaust filter with condenser, Top plate SS with handle,</p> <p>pH and DO probes (FDA approved like Mettler Toledo.), pH and DO probe calibration, DO membrane kit,            Control accuracy- Temperature <math>\pm 0.2^\circ C</math>, pH 2-14 approx. <math>\pm 0.01</math>, speed (rpm) <math>\pm 5</math>, DO range 0-100%, Peristaltic pump 4 nos. (acid, alkali, antifoam, feed), Vessel temperature maintenance- cooling (through chiller) and heating (through electric heater located on fermenter),</p> <p>PLC Siemens , industrial LCD touch computer control, parameters can be set to store, can be remotely connected to the computer through the USB interface. Control Panel with</p> <ul style="list-style-type: none"> <li>• Color Touchscreen HMI</li> <li>• High Speed PLC</li> <li>• Digital &amp; Analog cards</li> <li>• Relays</li> <li>• TCP MODBUS Communication Protocol</li> <li>• Pneumatic Manifolds</li> </ul>
<b>Hardware &amp; Software</b>	<b>SCADA based computer software with following facilities: Batch data, initializing a batch, data acquisition, set point control, manual data entry in batch information, output in graphics or text mode, compare data between (a) present and old runs (b) old and old runs (c) present/old runs</b>

	between fermentors, Alarms, recipe based algorithms, data export to convenient windows based program. Computer with laser printer b/w compatible with the above system and of MNC make.
Power supply	Suitable online UPS power supply to support the system for at least 2 hours in the absence of power.
Accessories	3 sets of 1000&2000 ml each feed bottle with disposable disc filter, silicone tube 50 meters, sufficient no of O-rings, septa etc required for smooth running of the system for five years.
Utilities	Suitable for above specification. Chiller with circulator: 4-10 <sup>o</sup> C @ 25 lpm Air compressor: Oil free, @ 0-50 lpm, can store air upto 4 bar. Steam generator (for steam sterilization): SS steam boiler, Single phase, Quick steam generation, Compatible with the system.
Warranty	Three years from the date of installation.

25. Specifications for High Pressure Binary HPLC system

<b>Specification for High Pressure Binary Analytical system upgradable to semi preparative in future.</b>	
<b>Delivery System</b>	<b>High Pressure Binary Gradient Pump with wide range of Flow Mode of operation: Isocratic and gradient Flow rate range from 0.001 to to 20 ml/min with 0.01 ml/min increment. Flow Accuracy : +/- 1.0% or better Max. Operating pressure : 6000psi or better Flow Calibration : Programmable Flow Precision: ≤ 0.1% RSD Corrosion resistant pump with safety measures and almost no maintenance pump. Multiple gradient curve facility. Gradient kit should be housed inside the pump chamber.</b>
<b>Auto Injector</b>	<b>Autoinjector with 140 sample tray capacity Injection volume range for analytical: 50ul Syringes capacity: 10ml and 50 ml (5 each)</b>
<b>Column Heater</b>	<b>Compartment with temperature regulator The temperature range should be room temperature to 80 °C or higher. Temperature control precision: 0.1°C Column capacity: 3 columns of 250 mm or better.</b>
<b>Software</b>	<b>The software should be original, Authenticated and compliant for GLP/GMP/CFR. Provision of manual integration Versatility for multitasking without multiple software packages Customizable data reports. Data integrity along with advanced security Maintain security and regulatory compliance Analytical cum preparative analysis/support with same software.</b>

<b>Hardware</b>	<p>Latest Desktop computer of standard make like HP, Dell or Lenovo/IBM should be supplied with latest specifications such as 19" TFT monitor, Windows 8 Operating software, antivirus software for at least 1 year etc.</p> <p>Laser Printer</p>
<b>Columns</b>	<p>Analytical column C18 (250 x 4.6 mm ;5<math>\mu</math>)- 1No Chiral Column 1 no. Column should be quoted with guard column and required accessories.</p>
<b>PDA Detector</b>	<p>Wavelength range: 190-800 nm or better Wavelength accuracy : +/- 1nm or better Resolution : 1.2nm per photodiode or better Noise Level &lt;=0.7x10<sup>-5</sup> AU or better Path-length : 10 nm-standard No. Of photodiodes bits: 512 or more. Light source: Pre-aligned, deuterium and tungsten lamps, dual lamp design for optimum sensitivity along with lamp warranty of minimum 2000hrs. May have Integral cuvette holder to be used as a qualitative bench top Spectrophotometer Data acquisition upto 80 Hz.</p>
<b>Power Requirements</b>	Online UPS with ½ hr backup compatible with the complete system. 200-240V/50-60Hz
<b>Warranty:</b>	3 years from date of installation.
<b>Spares</b>	Provide spares of minimum essential components and consumables (such as tubing, connectors, o-ring, PEEK tubing, PEEK ferrules etc.) for smooth running of equipment for at least 3 years. Quote any component (if left above) essential required for the functioning of equipment.
<b>OPTIONAL ITEMS</b>	
<b>AMC Charges</b>	Quote price for AMC charges for 2 years after expiry of warranty period.
<b>Pump</b>	Quote the price for an additional pump.
<b>Refractive Index Detector</b>	<ul style="list-style-type: none"> <li>● Measurement range: 7.0x10<sup>-9</sup> to 5.0x10<sup>-4</sup> RIU.</li> <li>● Flow rate: 0.1 to 10.0 ml/min.,</li> <li>● Flowcell: Fused, quartz.</li> <li>● Cell volume: 8-10ul.</li> <li>● Cell pressure: &lt;100psi maximum with built-in pressure relief valve</li> <li>● Linear Dynamic Range: &lt;5% over +/- 5.0 x 10<sup>-4</sup>RIU.</li> <li>● Temperature control: Internal oven: 30 - 55 °C, +/-0.5 °C, settable in 1°C increments.</li> <li>● Refractive Index range: 1.00 to 1.75 RIU.</li> <li>● Noise: <u>less than 2.5</u> x 10<sup>-9</sup> RIU mode.</li> <li>● Drift: &lt;+/-1.0 x 10<sup>-7</sup> RIU/hr.</li> <li>● Auto zero facility.</li> </ul>
<b>Service and support</b>	The Vendor should have a good service and application support available at short notice. The Vendor should provide comprehensive Training on the operation of the instrument, Chemistry options and software.

## **26. TECHNICAL SPECIFICATION OF Laminar flow**

**Stainless steel (Type 304) construction**

**Working area : Minimum- 120cm W x 70cm H x 60 cm L**

**Cleanliness : Class 100**

**Particle retention : 0.3 micron & above**

**Velocity :  $90 \pm 20\%$**

**Standard : US Federal Standard 209 E**

**Noise level :  $65 \text{ db} \pm 5\%$**

**Illumination : 750 to 800 lumen & uv germicidal light**

**Power supply : 220 V single phase 50 cycle**

**Fitted with UV Germicidal lamp for sterilization**

**Fitted with Acrylic/Glass Front Door sliding type**

**Fitted with Pressure gauze, manometer for measurement of HEPA Filters**

**Choking system Fitted with Cock for Gas Connection**

## **27. HEAVY DUTY SINGLE TIER ROTARY SHAKER**

### **TECHNICAL SPECIFICATIONS :-**

<b>Capacity</b>	169 clamps of 250 ml flasks OR 116 clamps of 500 ml OR 63 clamps of 1000 ml. ( select any one) Threaded holes can be made to hold assorted clamps.
<b>Platform Size</b>	54" x 44" approx.
<b>Overall Dimension</b>	D x W x H = 45" x 54" x 21" approx
<b>Rotary Stroke</b>	50 mm
<b>Speed</b>	50 – 250 rpm controlled by AC Frequency Drive
<b>Indication</b>	Digital
<b>Electric Motor</b>	0.5 H.P. A C motor
<b>Mechanism</b>	Five Crankshaft Assembly
<b>Power Required</b>	230 V, 50 Hz, Single Phase, 5 Amps Stabilized
<b>Grouting</b>	Required at the base