Category A-3

B.O.D Incubator (Humidity Controlled)

Type: Forced Convection type with double door chamber for inspection, Internal illumination with three fluorescent tubes
Temperature Range: 5 degree C to 60 degree C
Humidity Range: 5% above ambient from 50% to 95% RH at cool Temp. (Steam type /Mist Type)
MOC Chamber and trays made of Stainless steel (SS304)
Internal Chamber Capacity: 160 to 200 litres
No. of Shelves: 3 to 5
Controller: Microprocessor based PID digital indicator cum Temperature controller with Humidity controller with accuracy +/- 0.5 degree and +/- 5%RH respectively
Automatic voltage stabilizer 3 KVA
Timer: 0-20 hrs day night cycle
CO2 Air mixer nozzle
Circulation fan: to maintain uniform temperature and humidity

<u>Respirable High volume Sampler</u>

Technical Specifications :

The sampler unit should be in conformation of US-EPA standards

- (i) **Particle Size :** It should posses omni-directional air inlet for separation of particulate upto 2.5 microns through an impactor followed by separation through a WINS Impactor
- (ii) **Sampling rate :** Constant sampling rate of 1m³/hr unaffected by voltage fluctuation and filter choking maintained by critical orifice system.
- (iii) Filter Media : Filter holder designed to accept any standard 47 mm diameter filter media.
- (iv) Sample Volume : Dry Gas meter to record the total air volume sampled.
- (V) **Power Requirement :** Single phase AC 220 Volts, 50 Hz supply. Sampler unaffected by +/- 10%fluctuation in supply voltage
- (Vi) Attachments: It should be accompanied by the following attachments
 - A thermo electrically cooled compact Gaseous Pollutants Sampler (including required bubbler system) fitted with suction pump, time totalizer and timer suitable for sampling of SO₂, NO₂, Cl₂, H₂S, NH₃ & HCHO etc.
 - GF/A Filter papers 8"x10" size Whatman make in Sealed packet of 100 sheets.
 - PTFE filter with identification number for each filter, Whatman Make, Pore Size 2μm, dia 46.2mm with PP ring supported. Suitable for monitoring of PM 2.5 dust. sealed packet of 50 discs.
 - 37mm dia GF/A Filter paper, Nupore make, for WINS Impactor in a sealed packet of 50 discs.
 - Spare Glass Impinger 35 ml. Cap.
 - A Kit of containing essential reagents needed for absorption and analysis of gaseous pollutants. (for SOx. NOx) only
 - Silicone Oil for 'WINS' Impactor in 100ml bottle
 - Filter carrier with cover

Gas Chromatograph

Item	Item Description	Qty.	
No.			
1	MICRO PROCESSOR GAS CHROMATOGRAPH Microprocessor based Dual Column Gas Chromatograph with temperature controls for injectors, detectors and Oven, pneumatic system, auto diagnostic & Auto Cooling Facility, keyboard entry of process parameters and timing function, injection port and carrier gas pressure switch and suitable attachments for capillary column connections, digital display of set and actual temperatures of injector, detectors, oven, temperature program status. DETAILED SPECIFICATIONS: Oven Size : 13 litres having capacity for packed and narrow bore capillary columns. Column Oven with built-in overheat protection: Operating temperature range: Ambient to 400°C Temperature Programmer: Isothermal temperature range: Ambient to 400°C 4 ramps with ramp rate upto 30°C per min in 0.1°C steps Injection system: Dual vertical injectors suitable for packed and capillary columns (with split/splitless facility) Operating temp. Range: Ambient to 400°C in steps of 0.1°C Method Storage:	01	
	10 methods files can be stored simultaneously.		
2	Flame Ionization Detector (FID) with Control Module Thermal Conductivity Detector (TCD) with Control Module Electron Capture Detector (ECD) with Control Module	01 each	
3a	Recording Device :Windows based Single Channel Chromatography Data Station with Single Channel Chromatography Software.	01	
4	Computer for Data Station (Branded): I5 Processor, 320 GB HDD, DVD writer, 4 USB Ports, 17"TET, 4GB RAM, Keyboard, Optical Mouse with UPS & Laser Printer (HP)		
5	Fused Silica Narrow Bore Capillary Column of 25 mtr length x 0.32mm x 0.4 um film thickness suitable for ECD.		
6	Liquid syringe 10µl & 1µl capacity	01	
7	Gas Tight Syringe of 1ml capacity	01	
8	SS Packed Columns of 1/8" OD x 2 mtr Length	02	
9	Nitrogen Gas cylinder filled with ultra high purity gas and fitted with double stage pressure regulator.	01	
10	Hydrogen Gas cylinder filled with ultra high purity gas and fitted with double stage pressure regulator.	01	
11	Air Gas cylinder filled with ultra high purity gas and fitted with double stage pressure regulator.		
12	Servo Stabilizer suitable for Gas Chromatograph	01	
13	Accessories a. Soap Bubble Flow Meter b. Silicon Rubber Septums (20 Nos.) c. Set of Fuses and Tools d. Copper Tubing for Gas Connections e. Dust Cover	01	

Electronic Balance

The balance should be made of Chemical resistant material with weighing pan enclosed in a transparent chamber as a windscreen. **Capacity:** 200g approx, should have Overload Protection **Readibility:** 0.0001g **Tare Range:** 0-200g **Repeatibility (Std Dev):** 0.00015g **Linearity:** ±0.0002g **Pan size:** Circular 3.5" Diameter MOC SS304 Windscreen: Standard rectangular (7.5"W x 8.25"D x 9.5"H) Entire draft shield could be removed by screws. **Power supply:** 220 V with wall connector linecord It should be also operated On AA Size Battery also for full 8 Hours of Charge **Data interface:** Have a provision to transfer data to PC **External Calibration Mass:** 200g, 100g, 50g, 20g, 10g **Accessories:** Rechargeable battery kit

Evaporation cum RF Sputtering system

1) System suitable for 1 sputter source and 1 filament/boat assembly along with power supply for sputter source (DC 1KV 1 amp) and power supply for evaporation (100amps) with variac, transformer and current read out.

Front door for easy access to chamber

2) Appropriate Diffusion pumping system (HHV make VS150D)

3) sample holder for 1" sample with capability of heating to 800C with mask holding capability and rotation. with PID programmable controller.

4) appropriate frame to mount controls etc, Elbow to connect the pumping system to the evaporator.

5) Rotameter with shut off valve for gas inlet

6) General: Shipping, integration and installation at user site. Company must have a good after sale service setup.

SCANNING ELECTRON MICROSCOPE

High resolution Thermal Schotkey emitter FESEM with HIGH RESOLUTION FIELD EMISSION and EDS with following details

1.	Resolution	Best resolution at 15KV and 1 KV
2.	Magnification	X20 to x800,000
3.	EHT	100V to 30KV
4.	Chamber	Large chamber with at least 5 accessory port.

5.	Stage	5 axis motorized stage with motorized stage movements
6.	Probe Current	Upto 20 nA
7.	Detectors	 a) Chamber SEI detector. b) In-Lens detector c) Retractable BSD detector
8.	User Interface	As per system requirement
9.	Electron Optics	Beam Deceleration technology or equivalent for high resolution imaging at low KV
10.	Display	At least 19" TFT Monitors for FESEM
11.	Vaccum System	Suitable vacuum system having ion pump, Turbo Pump & R.P.
12.	Essential Accessories	Like RCCD camera, Chiller, Compressor, Interface between SEM and EDS and at least 1 spare Schottkey emitter
13	EDS System	LN2 free EDS with 127ev resolution at MnK with crystal area of 20mm sq or more with Quantitative/Qualitative and mapping facility
14.	General	FESEM quoted must be compete in all respect. It must have capability to image thin films, polymers, ceramics, semiconductors and magnetic/metallic specimen. FESEM should have suitable technology for optimum performance of all the detectors particularly In-Lens SEI. Company must have good installation base to ensure good after sale service.

X-RAY DIFFRACTOMETER

The Fully Automated X-Ray Diffractometer should have minimum of the following capabilities / functions inclusive of all the required components based on system configuration.

S.No.	Component	Specification
1.	X-Ray source	Continuous power output: 0-3.0 kW or better, High voltage output minimum 50 kV or better, Continuously variable tube current upto 60 mA or better, Output stability 0.01% or better (for 10% mains variation), rotatable fine focus Cu target tube with requisite beta filters
2.	Goniometer	Automated high-resolution Vertical with theta-theta geometry with minimum radius of 500mm and provision for scanning in theta-two theta mode from 10 to160 deg. or better. Angular reproducibility: +/- 0.0001 deg. or better. Smallest addressable Step size: 0.0001 deg. or better

		Scanning mode: Continuous scan, step scan, theta or 2 theta scan, fast scan. Position reading: The theta – 2 theta position reading should be controlled by digital optical encoders.
3.	Component Recognition	The XRD system should be equipped with automatic component recognition features for conflict detection including X-ray tube, optics in both primary and secondary side along with the detector to be used.
4.	Sample Stages & Holders	Suitable no. of sample holders for analysis with Standard and spinning stages should be guoted
5.	Calibration Standards	The vendor must provide data quality guarantee on the angular position and intensity ratio which is to be carried out on NIST sample to be supplied by the vendor.
6.	Detector	9.1 Scintillation counter detector suitable for most diffraction experiment and it must not use any gas in its operation.
7.	Misc	Requisite Beam Optics (Bragg-Brentano and parallel beam geometry with automatic software controlled interchanging) suitable for thin film and solid samples, Data acquisition, Search-Match and data analysis Softwares with suitable no. of licenses. Branded latest configuration computer system with preloaded software, data storage, HP color printer or better, appropriate Chiller Unit, manuals & documentations
8.	Installation & Commissioning & Training	The instrument to be installed tested and commissioned by representative of manufacturer at the final destination/campus. All safety norms must be fulfilled. The supplier should provide the training for Operation, Software and handling of various components.
9.	Warranty	The vendor should give warranty for the complete system for minimum 12 months after successful installation/commissioning, with no cost to our Campus for any repair work / part replacement during this mandatory warranty period.
10.	Spare Parts	The vendor to quote the spares kit separately, with item description, unit total price sufficient for at least 1 years, after the 12 months mandatory warranty is over.
11.	Supply Under warranty	Supply of the failure part under warranty period should be cleared and supplied by the vendor till the final destination of the instrument installed, No duties, handling charges or any other charges will be bearable by us.
12.	Optional item: High Speed Detector	High speed detector should be quoted optionally and it should have the

NOTE:- All vendors must quote their most advanced version and certify in the quotation that the quoted model is the latest and with highest capability. Spares availability of the said model to be ensured for next 10 years. Offer may be rejected if latest model is not quoted.