

# TECHNICAL SPECIFICATIONS

## **1. Microbilirubinometer with Microcentrifuge and Hematocrit Reader**

### **Technical specifications**

1. Single/one Beam analysis for precise measurement of bilirubin by eliminating the interference of the Hemoglobin automatically.
2. Scale range 4 to 30 mg/ dl or 68/ 510  $\mu$ mol/ Liter.
3. Display on LCD.
4. Use Disposable Capillary Tubes of all sizes and specifications.
5. It should give total Bilirubin in serum or plasma form a Micro value of blood.
6. Total error should be less than 1% of reading.
7. Should display date & hour.
8. Should be ISO 9001 2000; EN 46001-96, CE 0051 certified.
9. System to include Hematocrit centrifuge and Hematocrit reader with the following specifications:
  - Rotating head for 24 capillaries (should be compatible with any type of micro capillaries).
  - Electronic timer up to 15 minutes
  - Speed 12000 rpm.
  - Safety-cover with lock
  - Supply hematocrit-reader one with each equipment
10. Power supply  $220 \pm 20$  AC for both micro bilirubinometer as well as microcentrifuge.
11. CVT 1KVA of standard company with two years warranty.
12. List of essential spares & accessories should be provided and quoted separately. Prices so quoted to be frozen for 5 years.
13. Warranty period : 2 years.
14. CAMC for 3 years after warranty inclusive of spares/ accessories.
15. Original literature, and not the photocopy, to be supplied with the quotation, otherwise quotations will not be considered.
16. Company should certify that model quoted is latest and not obsolete, and spares are available for minimum 5 years after warranty.

Note: If required, Demonstration of machine will be taken by three experts at the expenses of bidder.

## **2. REAL TIME PCR**

### **Technical specifications**

- It should be an open system compatible with reagents/ kits/ all standard makes PCR tubes.
- Applications: provide specialized application specific software that collects and analyzes the fluorescence data for the applications of Absolute quantification, Relative quantification, Melt curve analysis, Allelic discrimination, genotyping, SNP detection and HRM
- The format of the PCR Block should be 96 well or rotor disc (sample carrying capacity upto 100 samples) with the temperature range upto 99.9 °C.
- Fast System : Heating and cooling Ramp rate :  $\geq 4^{\circ}\text{C}/\text{sec}$  (heating) and  $\geq 2^{\circ}\text{C}/\text{sec}$  (cooling)
- Temperature accuracy should be  $\pm 0.2^{\circ}\text{C}$  and uniformity at  $95^{\circ}\text{C}$  should be  $\pm 0.3^{\circ}\text{C}$ .
- Should have controllable lid temperature from 30 –  $110^{\circ}\text{C}$ , with control on automatic temperature and pressure settings.
- The Real time PCR should have 5 detection channels with 5 LED's has a Light source for excitation, 5 excitation filters as well as 5 emission filters or better.
- Excitation range should be 475- 640nm and for emission it should be 520 -740nm for running the different tests/assays.
- System should have excitation filters of 475-500nm, 515-535nm, 570-590nm, 600-640nm and 475-500nm.
- System should have emission filters of 520-550nm, 557-590nm, 615-650nm, 666-740nm and 520-590nm.
- Multiplexing minimum of 4 targets should be possible.
- Very sensitive system : Sensitivity should be as low as 1 copy number with Dynamic range of 10 order of magnitude
- The data analysis software and computer should be supplied with the instrument with operating system either windows XP and windows 7
- Compact system, save lab space and light weight.
- Power usage should be 200W maximum.
- Warranty for 5 year.
- ONLINE UPS FOR 2½ to 3 hrs back up.
- Necessary consumables to perform real-time quantitative PCR and assay including reverse transcription and real time PCR reagents (for 500 reactions) and plastic ware should be quoted separately. Computer and Printer should be quoted.
- HRM software should be provided free of cost with the instrument.
- CE (European Conformity) & UL marked.

Note: If required, Demonstration of machine will be taken by three experts at the expenses of bidder.

### **3. BIOSAFETY CABINET**

#### Technical Specifications

- Class II Biosafety Cabinet Type A2 design.
- Should include a germicidal UV lamp, set of arm rest, an electrical outlet, and a support stand provided with leveling bases.
- Size 4 feet width; Single Piece (for easy cleaning and prevent contamination) stainless steel (SS304).
- Motor should be Dual DC & must automatically adjust the airflow speed (balancing inflow and down flow) without the use of a damper to ensure continuous safe working conditions.
- 30% exhaust and 70% recirculation should be achievable through HEPA filters.
- The microprocessor must display the inflow and down flow air velocities in real-time on an LED/LCD display.
- The front window must be a 10" sash opening and be made of laminated safety glass to ensure containment of potentially hazardous samples in the case of accidental glass breakage.
- Separatorless Minipleat anti-microbial HEPA filters of EU 13 grade with an efficiency of 99.97% on monodisperse, 0.3 micron challenge for supply.
- Separatorless Minipleat anti-microbial HEPA filters of EU 13 grade with an efficiency of 99.99% on monodisperse, 0.3 micron challenge for exhaust.
- Interlocking of supply & exhaust motor blower with logic control to ensure the system stops if either motor stops. This is for additional operator safety.
- The front of the cabinet must be angled 10° to help minimize glare on the window to the user.
- The cabinet must automatically reduce fan/blower motor speed to 30% when the front window sash is in closed position to ensure reduced energy consumption when the cabinet is not in use.
- UV light must be programmable to allow for specific exposure times from 0 to 24 hours. The automatic shut off feature on the UV light saves money on replacement of the bulbs.
- Lightening power should >1100 lux(100fc).
- The cabinet noise level must be less than 65 dB(A).
- Alarm to trigger in case blower trips as a safety measure.
- Cabinet should be NSF (National Sanitation Foundation) standard no 49 as per recommendation by WHO for safety of user, EN certified and certificate of the quoted model should be attached.
- Energy saving mode should be there; Power Consumption Normal mode :200W ±10%
- CE (European Conformity) and UL model only to be quoted.
- Warranty: 5 years

Note: If required, Demonstration of machine will be taken by three experts at the expenses of bidder.

#### **4. -20 Degree DEEP FREEZER**

##### **Technical specifications**

- Finish: interior and exterior: hips & pre painted steel
- Anti-corrosive interior liner, clean & convenient to use.
- Insulation: hcfc and cfc free, polyethylene insulation.
- Upright Vertical Deep Freezer Capacity: 200-250 lit with temperature:-20 deg C at room temp.
- Door: solid door
- Microprocessor controlled with digital display for all functions.
- Storing configuration: multi level design to store: solid flaps and solid baskets
- Defrost: frost free
- Door gasket type: magnetic
- Control: electronic controller
- Set point: -20 c
- Settable range: -19 to -21 c
- Alarm: high temp alarm ( -15 deg c) , low temp alarm ( -30 deg c)
- Electrical circuit breaker, time delay for compressor switch on, overload cut off relay for compressor.
- Refrigerant : r600a
- Compressor hp: high energy & efficient
- Access port (16mm)
- Pre-wired cord and plug type: European
- Full load amperes: 1-4, however lowest will be preferred.
- Voltage: 220-230v 50Hz
- Temperature variation inside the cabinet: -18 ~ -25 °c
- Operating ambient temperature - min/nom/max (c) : 15c/25c/32c
- Supplied with compatible serve controlled stabilizer of the same brand of the freezer for better compatibility.
- Supplied with minimum two mini coolers with gel filled so that the samples kept in coolers can maintain the temperature of 0 to -20 deg C in case of power failure.
- Efficient back-up system in case of power failure (compatible online UPS for 3 hours backup).
- CE (European Conformity) & UL mark certified
- Warranty – 24 MONTHS

Note: If required, Demonstration of machine will be taken by three experts at the expenses of bidder.

## **5. ULTRA LOW DEEP FREEZERS (-80 degree)**

### **Technical specifications**

- Ultra-Low Temperature Freezer -50 to -86 degree, 230V/50Hz
- Ambient working Temp.: 15° C - 32° C
- Capacity: 540-600 lit Approx
- 2" Box Capacity: 400 or more
- Vial Capacity: system should be capable of keeping minimum 40000, 2ml cryo vial sample in plastic boxes.
- Safety and Security: feature an innovative, touch-screen control panel that allows 24/7 monitoring of the freezer's health provides access to a detailed event log—built-in USB port enables easy downloading of event log reports to a portable drive
- Cabinet with Vacuum Insulation Panel Technology
  - Consist of two 1 HP Hermetic Compressor
  - Sound Pressure Level (dBA):  $\leq 66$
  - Choice of Refrigeration Environmentally-friendly, CFC/HCFC free refrigerants
  - Brazed plate heat exchanger for more efficient heat transfer.
  - Power management system: protects against a wide range of voltage variation and is easily accessible through the touch-screen display.  
Two Modes: High Performance or Energy Savings
- Remote alarm contacts: with 4-20 milliamp output compatible with external alarm and monitoring systems (high temperature, power failure, filter check, part replacement notification).
- On-board data storage: Store up to 15 years worth of temperature and event data on our on-board computer
- Easily exchange data: Use the new USB port to download freezer temperature and event log data, or freezer settings from one freezer to another.
- Easy-to-remove, washable filter
- Outer door gaskets: 4x7 heated gasket provides four touch points of security and seven zones of protection, maximizing cabinet temperature and eliminating frost build-up
- Inner doors: at least 4 polystyrene insulated inner doors
- Several optional features including: LN2 feature for back up.
- Certifications: UL, CE (European Conformity) certified.
- Warranty: 2 year; 3 years additional on compressor.

5KV servo stabilizer should be supplied.

Note: If required, Demonstration of machine will be taken by three experts at the expenses of bidder.

## **6. BACTERIOLOGICAL INCUBATOR**

### **Technical specifications**

- Dual convection for versatility of application: forced air circulation by quiet air turbine and fan speed adjustable from 0 to 100% @ 10% steps for each segment individually.
- Advanced digital timer for daily or weekly on / off cycles
- Stainless steel interior SS304 is easy to clean and corrosion resistant
- Broad temperatures range from 5 °C above ambient to 105 °C – even suitable for drying application
- Temperature uniformity as good as  $\pm <\pm 0.5^{\circ}\text{C}$
- Temperature stability at  $\pm <\pm 0.5^{\circ}\text{C}$
- Chamber volume L / 150-200 liters.
- Intuitive user interface for setting temperature
- Large, easy to read LED or LCD
- Internal glass door allows sample viewing without impacting temperature
- Number of shelves supplied : three shelves
- Self diagnostics function for fault analysis
- Incl. work calibration certificate for +37 °C.
- Audible and visual alarm.
- Rated Voltage/Frequency; Rated Power; Max. Current; Plug: 230VAC 50/60Hz; 1100w; 4.8A
- Interior (at least) 450x605x450 MM
- Wt: 56 kg Approx CE European Conformity (230V, 50Hz models) & UL certified
- Warranty: 5 Years

Note: If required, Demonstration of machine will be taken by three experts at the expenses of bidder.

## 7. CO<sub>2</sub> incubator

### Technical specifications

- Working volume: Approx. 150-200 liters.
- CO<sub>2</sub> Control range: 0 to 20%
- CO<sub>2</sub> Control accuracy: + 0.1%
- Temperature control range: Ambient + 3 to 55° C
- Should be air-jacketed with heat resistant TCD sensor.
- System should have options for multi-gas operation (for three different gases in same equipment to give an option to create hypo and hyperoxic condition).
- System should have single tight inner doors
- System should incorporate exclusive touch screen with event logging details.
- System should alarm to indicate low water level.
- Interior should be made up of Stainless steel and should not have nuts or bolts for shelf supports.
- System should have features to ensure fast humidity recovery.
- System should have built in decontamination feature.
- System must include an independent over temperature function with independent temperature sensor to protect valuable culture from potential damage in the event of unexpected failure in primary temperature control system.
- Incubator must have a fully automatic start routine function.
- Incubator must offer direct access port on the interior incubator door to enable comparative CO<sub>2</sub> measurement by external device
- Incubator must have CE (European Conformity) & UL certification.

CO<sub>2</sub> Cylinder and Regulator with stabilizer should be quoted.

Warranty: 5 years

Note: If required, Demonstration of machine will be taken by three experts at the expenses of bidder.

## **8. ICE FLAKING MACHINE**

### **Technical specifications**

- Hygienic ice with maximum cooling capacity
- Lowest power consumption
- Hermetically sealed air cooled refrigeration system
- Eco Friendly refrigerant
- Fully Automatic control system
- Corrosion free stainless steel interiors
- Rounded corners of the interiors for easy cleaning
- Geared Motor with thermal protection

### Capacity

- 50Kg. /24Hr.

Note: If required, Demonstration of machine will be taken by three experts at the expenses of bidder.



## **9. ULTRAPURE WATER PURIFICATION SYSTEM**

### **Technical specifications**

#### **Pre-treatment system :**

- Three stage pre-treatment system with 10, 5 & 1 micron spun filters 10” long for removal of suspended particles and to take care of F.I. and Chlorine in feed water.
- The system should respond favourably to feed water having Fouling Index ( FI) approx 10, total Free Chlorine <0.5 ppm and Feed Water Conductivity upto 2000  $\mu\text{s}/\text{cm}$ ; maximum silica 30 ppm.
- Three stage purification process; primary purification by a Pre-filtration secondary purification through RO membrane, DI bacteria counts are low and provide Type II water. System should have unique integral recirculation ensures optimum water quality at point of dispense.
- System should be GLP compliance documentation. (GLP compliance is must as we require to work on ultra sensitive tests.
- System should have option to connect printer through RS 232 for data recording and traceability. (We need to record the data by taking printouts periodically for QA i.e no manual recording or manipulation).
- System should be supplied with 50 to 75L reservoir with vent filter and recirculation facility.

#### **Product Water Type II Quality :**

Resistivity	:	10 to 15 m $\Omega$ at 25 deg. C ( megaohm C).
TOC	:	<30 ppb
Removal, bacteria and particle, %	:	99.
Silica removal, %	:	>99.9%
Bacteria	:	<1 cfu/ml
Flow rate	:	6 - 10 liters / Hr at 25 deg. C.

- The system should have facility to remove Ionic and organic impurities by the ultrapure polisher cartridge, sterile 0.2 $\mu\text{m}$  filter, pressure regulator, UV lamp and Ultra filter.
- The water within the unit should be recirculated through the purification technologies to maintain purity. To reduce heat build up the recirculation is at reduced flow rate.
- The system should have recirculation of the purified water to maintain consistent peak quality.
- System should have dual wavelength UV lamp – UV photo oxidation 185/254nm.

#### **ULTRAPURE WATER Output Details:**

◆ Inorganic	:	18.2M $\Omega$ -cm @ 25°C
◆ TOC	:	1-5 ppb with RO water feed
◆ Bacteria	:	< 1 CFU/ml
◆ Bacteria endotoxin:	:	<0.001EU/ml
◆ Flow Rate	:	1 Ltr./min.
◆ RNase	:	<0.003 ng/ml
◆ DNase	:	<0.4 pg/ml
◆ Conductivity	:	0.055 $\mu\text{S}/\text{cm}$
◆ Particle,0.22 $\mu\text{m}/\text{ml}$	:	<1

System should have facility to validate at site from time to time as and when required.

Note: If required, Demonstration of machine will be taken by three experts at the expenses of bidder.

## **10. Liquid Nitrogen container**

### **Technical specifications**

- LN2 Capacity: 70- 100 lit
- Vial storage capacity (2ml):2000 or above
- Neck Diameter: 8.5 in. / 21.5 cm
- Static Evaporation Rate: Not more than 0.8 lit/day
- Static Holding time: 80 days or more
- Outstanding temperature uniformity: samples are stored below -180°C, even when less than 2 in. (5cm) of liquid nitrogen remains in the vessel
- With Ultrasonic Level Monitor safeguards irreplaceable samples with minimal liquid nitrogen evaporation and conduction
- Monitor should provides continuous LED readout of liquid nitrogen level in 1/8 increments;
- Audible alarm sounds when nitrogen level falls below safe range; dry remote alarm contact for remote monitoring
- Advanced vacuum insulation minimizes liquid nitrogen evaporation and reduces operating costs
- Secure locking hasp prevents unauthorized entry
- Regulatory Listing: CE
- System should be supplied with full capacity of 2ml Racks
- Warranty: 5 years

Note: If required, Demonstration of machine will be taken by three experts at the expenses of bidder.

## 11. Refrigerated Centrifuge

### Technical specifications

Temperature Range:-10 to +40 Degree C

#### Technical Specification

**Bench top refrigerated Centrifuge.**

**Max RCF:** 30200 X g or better

**MAX Rpm:** 17800 RPM or better

**Control System:** Microprocessor

**Drive System:** Direct, brushless induction low profile motor

**Rotor Locking System:** System should have in-built rotor locking system for safety. System should have push button system for exchange of rotors (should not require any tool for exchange of rotors).

**Imbalance Detection System:** Continuous vibration measurement, with rotor mass correction

**Programs:** 3 direct program buttons, plus 96 additional programs accessible

**Pre-Cooling Function** Yes, with direct button

**Refrigerator System** CFC Free

**Pulse (short) Run** Yes

Imbalance detection system

**Acceleration/Detection Rates** 2

**Centrifuge Chamber** Stainless Steel

**Max Timer Range** 9h, 99min + continuous

**Certifications** CE European Conformity Marked, UL, Certified Biosafety (Please Attach Certificates)

**Machine should be supplied with following rotor:**

Fixed Angle Rotor 6 x 50 ml with 15 ml tubes adaptors RPM: 9000 or more

Fixed angle rotor 24 x 1.5/2ml RPM: 17800 & RCF 30000xg or more

Adapter for 0.5 & 0.2 PCR tubes.

Warranty : 5years

Special RPM/RCF convertor button

Automated rotor recognition with speed limitation for safety, automated imbalance detection and cut off.

Power supply upto 230V/50 HZ.

Swinging bucket rotor with speed of 4000 rpm or above for 96-well cell culture plates and cell culture flasks.

Note: If required, Demonstration of machine will be taken by three experts at the expenses of bidder.

## **12. Dry Bath**

### **Technical specifications**

- Double Block Digital Dry Bath Heater
- Microprocessor control with large digital display
- Temperature accuracy of  $\pm 0.3^{\circ}\text{C}$ , and uniformity of  $\pm 0.2^{\circ}\text{C}$
- Wide temperature set range from ambient +5 to  $150^{\circ}\text{C}$
- Stainless steel block cavity for corrosion resistance
- Voltage 230V/50/60Hz
- Accessories
- Single Block, 20 x 2.0 mL tubes
- Single Block, 48 x 0.2 mL PCR tubes or 6 x 0.2 mL strips
- Single Block, 12 x 15 mL centrifuge tubes
- CE Certified
- Should Be ISO certified
- Should have inbuilt Shaking System .
- Heating Time <20 Min
- Accuracy :0.1 degree C
- Should Have Peltier Heating & cooling System .
- Shaking Speed : 200-1500 RPM
- Should have beep –Signal / Stop Program Completion .

Note: If required, Demonstration of machine will be taken by three experts at the expenses of bidder.

## **13. ELISA READER**

### **Technical specifications**

Should be True Monochromator based dual beam spectrophotometer Elisa Reader for absorbance and turbidity measurements using 96 or 384 –well microplates using halogen lamp as light source and silicon photo detectors.

1. The system should have a linear measurement range of 0 to 6 Abs. with a photometric accuracy of  $\pm 2\%$  or better and resolution of 0.001 Abs.
2. Able to read Plate, Strip and have automated wavelength selection option.
3. Measurement wavelength range covers both UV and VIS wavelengths (from 200 nm to 1000 nm).
4. Reading speed for 96 well plates less than six seconds, capable of doing multi standard tests and controls.
5. It should have variable speed plate shaking capability in 3 different mode
6. Internal USB port for data transfer and storage using USB memory drives when internal user interface is used.
7. A reference channel system to compensate Xenon lamp flash to flash variations.
8. Possibility of upgradation to measure RNA, DNA & protein samples with very low volume (2-5 $\mu$ l) with specially designed low volume micro drop plate.
9. On- board pathlength correction for the correction of the variations in the photometric pathlength.
10. The instrument should be compatible for automation purposes. The instrument should have a power Save function for low energy consumption. The instrument should meet RoHS (Restriction of Hazardous Substances) directive
11. Low power consumption: Maximum 110 W, typical during operation <22W, in Power Save mode <2.5W
12. Measurement data stored in database without possibility to modify or accidentally delete any results.
13. The instrument should run in stand –alone mode and also with computer and software controlled.
14. Internal Software: The system should have inbuilt internal software for the measurement of samples with plates. The inbuilt software should be able to perform all calculations and save the data within the system. The data export should be through USB device.
15. Computer Controlled Software: The instrument should have the ability to choose free selection of plates from any manufacturer. The software should be able to display the results in the table or list format. The results can be exported in the excel or PDF format. The software should be able to perform parallel line assays.
16. The instrument should be provided with compatible branded computer and printer.
17. The company should provide training along with wet demonstration of the equipment at site & must provide consumable like Elisa Plates (at least 100 Plates with lids to be provided), for the initial wet demo & training.
18. Instrument should be quoted with standard warranty of 3 years.

Note: If required, Demonstration of machine will be taken by three experts at the expenses of bidder.

## **ELISA READER (WASHER)**

1. It should have capability to wash 96 well micro plates, option for interchangeable wash heads option 1x8 or 1x12 way wash heads with programmable washing time, volume and soaking time. It should use non-pressurized bottles to minimize the risk of spillage and also choice for user to substitute bottles of different sizes but should be provided with two 2 litre wash bottles & one 4 litre waste bottle.
2. Should provide aerosol cover to prevent aerosols of infectious diseases from spreading.
3. Should have residual volume less than 1.5  $\mu$ l and dispensing volume should be 50- 400  $\mu$ l for 96 well.
4. Should have a USB port/RSB port for easy data transfer and should have large color screen for easy set-up of wash protocols.
5. Should have the liquid level sensors in both the wash and waste bottles to guarantee safe performance. And should have plate sensor to recognize if a plate is present or not.
6. The automatic rinse feature can be set after using the instrument, to operate in a specified time sequence to ensure that the liquid channels do not get clogged.
7. **Training and warranty**:-The company should provide training along with wet demonstration of the equipment at site.
8. Instrument should be quoted with standard warranty of 3 years.

Note: If required, Demonstration of machine will be taken by three experts at the expenses of bidder.

## **14. ANALYTICAL BALANCE**

### **Technical specifications**

- 1) Product should be on International Repute. (ISO & CE European Conformity Certified)
- 2) Max Capacity :220 gm Readability : 0.1 mg
- 3) Repatability: 0.1 mg, linearity: 0.2 mg, response time: < 3 sec
- 4) Weight: < 5 kg.
- 5) Calibration: FACT Calibration.
- 6) Should Have MonoBloc Weighing Technology for Better repeatability &Stability.
- 7) Should Have LCD Back Light / HCD Display.
- 8) Should Have over Load protection in case of Accidental over Weight.
- 9) Should Have RS 232 Interface / GLP, GMP Compliant Model.
- 10) Should Have Other Features Like Piece Counting, Percentage Weighing , Dynamic Weighing & Totalization Functions .
- 11) Pan Size :90 mm
- 12) Easy to clean
- 13) Supplier should have Nearest Service Station.
- 14) Supplier should be able to perform test like Repeatability , Linearity , Eccentricity With Manufactures Original Weight box Duly Certified by NPL
- 15) Compliance should be submitted along with each product
- 16) Provided with AC adaptor.

Note: If required, Demonstration of machine will be taken by three experts at the expenses of bidder.

## **15. Rotary Evaporator**

### **Technical specifications**

- Should have easy to read large 3.5" digital LCD or LED screen displays heating temperature, rotation speed and timing.
- Should have speed range from 20 to 280 rpm
- Should have water-oil heating bath with heating temperature range of RT to 180°C
- Should have heating bath with precise temperature control and adjustable safety circuit
- Should have condenser (cooling surface 1,500 cm<sup>2</sup>) with excellent cooling effect
- Should have motorized lift with quick-action, automatic release evaporating flask to top position in case of power failure
- Should have adjustable final position recognition to protect operator and sample against breakage
- Should have evaporating flask with an ejector, convenient to remove
- Should have available with timer function to precise control processing
- Should have chemical-resistant double PTFE system.

Note: If required, Demonstration of machine will be taken by three experts at the expenses of bidder.



## 16. Atomic Absorption Spectrophotometer (AAS) for detection of trace elements up to ppb levels in human blood or urine

### Technical specifications

Fully automated PC controlled true double beam multi element Atomic Absorption Spectrophotometer system with absorption and emission capability with deuterium and Zeeman/ Self Reversal background correction and should have the capability of measuring multielements in rapid sequence with following specifications

**Operation:** The instrument should have automatic operation and integrated, flame and furnace system, flame atomic absorption/emission measurement, true dual atomization, furnace vision system included as standard. The change of flame and furnace should be through software.

**Optics and background:-** The instrument should be provided with 6-8 lamp auto alignment turret with dedicated power supply for each lamp, double beam stockdale optics, high energy, silica coated, sealed optical system with self calibrating Echelle monochromator. It should have Reciprocal Linear Dispersion 0.5 nm/mm at 200 nm, Wavelength range 185-900 nm, Spectral band pass of 0.1, 0.2, 0.5 or 1.0 nm should be automatically selectable, deuterium and Zeeman/ Self Reversal lamp background correction system upto 2.5 Abs at 2ms response time with electronic modulation and automatic attenuation. The optical gratings should be of minimum 1800 lines/mm.

**Wavelength range:-** 185 - 900 nm

**Flame system:-** Universal Finned Titanium 50mm burner suitable for air/acetylene and nitrous oxide/acetylene flame types supplied as standard, an inert fluoroplastic spray chamber incorporating an externally adjustable inert impact bead and flow spoiler, an inert over-pressure membrane should be housed in the rear of the spray chamber for maximum operator safety.

Automatic gas system using binary flow control and programmable array state logic for reliability

Fuel and oxidant flow rates should be software controllable, One spray chamber configuration and burner for all gas mixtures and sample types, automatic flame optimization should be provided. The burner height should be automatically optimized and there should be controls for the rotational and transverse position of the burner.

**Graphite Furnace System:-** The instrument should have choice of Deuterium and Zeeman/Self reversal background correction furnaces, deuterium and Zeeman/ Self Reversal furnace should also have capability to use Deuterium background correction, Furnace should be mounted directly in dedicated compartment, Furnace head should be in all graphite containment with end loaded contacts. Furnace auto-sampler should also be included with furnace head and power supply. Graphite furnace atomizer temperature upto 3000<sup>0</sup> C

The system should be capable enough for the detection of trace elements upto ppb levels in human blood or urine samples so the system should also be quoted with Automated Mercury Hydride system: automated Continuous Flow Vapour Generation. It should have high sensitivity for determination of Mercury and Metallic hydride forming elements such as Bi, As, Sb, Sn, Se, and Hg.

**Safety System:-** Safety interlocks for burner, liquid trap, pressure relief bung, flame shield, flame operation, mains power, gas pressure, safety reservoir, spray chamber should be there

The Instrument should be with **suitable software** to control the complete system and virus protected.

The system should be supplied with hollow cathode lamps for detection of minimum 12 elements (Arsenic, lead, mercury, cadmium, copper, zinc, iron, aluminium, chromium, nickel, selenium and cobalt). All required accessories mentioned below should be either quoted or should be supplied along with the system :-

Note: If required, Demonstration of machine will be taken by three experts at the expenses of bidder.

- 1) Fume hood
- 2) Suitable UPS with half an hour back up for entire system
- 3) Branded PC with lazer jet printer
- 4) Air acetylene , N2O and argon cylinder with regulator with preheater and oil free compressor
- 5) Chiller for graphite furnace
- 6) Graphite tubes 50 nos
- 7) Standard solutions for the desired elements

The instrument should be provided with 5 year warranty. Installation and training should be at the site of installation to the persons of concerned departments.

Rates for AMC/CMC should be quoted separately for 5 years after the expiry of warranty period.

Certificate of assurance should be provided that the spare parts are available for at least 10yrs.

Note: If required, Demonstration of machine will be taken by three experts at the expenses of bidder.

## 17. FOUR CHANNEL SEMI AUTOMATED COAGULOMETER

### SPECIFICATIONS

1. Range of Tests PT, APTT, FIB, TT, RT, FACTORS-II, V, VII, VIII, IX, X, XI, XII, Protein-C, Protein-S, Anti-Xa heparin assays.
2. Should be able to detect Fibrinogen and Factor VIII in lower clotting positions
3. 16 incubation wells at 37° C.
4. 2 Positions of Reagents at 37° - (One with magnetic stirrer)
5. 4 Independent built-in timers for incubation with audible alarm
6. Attached Cabled Micropipette for measurement of sample & reagent.
7. LCD display for results
8. It should generate the standard curve for factor assays
9. Electromagnetic clot detection system
10. Integrated Key board having numerical and function control keys
11. Divisible cuvette strips
12. No sample interferences like turbidity, lipemia.
13. PT CV's <2% at normal & Pathological levels
14. Working range for fibrinogen should be from 0.9 to 10 g/L
15. Pre Programmed test setting which should be easily modifiable
16. Incubation time should be manageable by audible signals
17. Calibration Curve should be stored and printable for each parameter
18. Automatic start of test measurement with connected pipette
19. Reportable results in Sec, INR & mg/dl, Gm/L
20. Management of quality control
21. Equipment should meet standard electrical safety specifications.
22. The unit shall be capable of operating continuously in ambient temperature of 10 - 40° C and relative humidity of 15-90%.
23. Power input to be 220-240V AC, 50Hz fitted with Indian plug.
24. RS 232 interface
25. Integrated thermal Printer
26. The unit should be European CE/American FDA approved
27. Manufacturer should be ISO 9001 and ISO 13485 certified by European/American/Japanese certifying body
28. Warranty : 2 years, followed by AMC rates for subsequent 5 years
29. Suppliers should have a good number of installation base with efficient after sales support with proven track record
30. The firm shall submit a certificate from manufacturer that the quoted model is not obsolete and all spares will be available for next 10 years.
31. On line UPS of standard make with minimum 30 minutes back up & appropriate calibration to be supplied.

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Note: If required, Demonstration of machine will be taken by three experts at the expenses of bidder.