



**Government of West Bengal**  
**Office of the Administrator, Forensic Science and laboratory,**  
**Home and Hill Affairs Department,**  
**37/1/2 Belgachia Road, Kolkata-700037.**

Memo No: 292/FSL

Date: 21/02/24

**Corrigendum to SFSL/KOL/ET-05/2024-25 (2nd Call),**  
**&**  
**Tender ID no-2025\_WBFSL\_818498\_1**

- 1) Amendment to Sl. no 13 (ii) of the NIT (SFSL/KOL/ET-05/2024-25 (2nd Call)).

Please to read as follows-

The supplier should undertake to execute AMC/CMC for three years after warranty is over at the cost of not more than 10% of the cost of instrument which will be paid during the period of AMC/CMC. The Cost of AMC should not be included in the price of instrument. The AMC will be negotiated at the end of warranty period.

- 2) Please find the revised specifications of instruments as per Annexure-'A' attached herewith.

Sd/-  
Administrator,  
Forensic Science and  
laboratory,  
West Bengal.

“Annexure-A” (Amended)

**CHEMISTRY DIVISION**

**Item No. 1 Gas Chromatography-Mass Spectrometer**

**General Specifications: -**

<b>For Gas Chromatography</b>		
1	GC	fully automated microprocessor controlled with extensive self-diagnostic facilities and with Auto sampler
2	Auto sampler	The system should have auto sampler to adjust at least 100 vials Injection cycle time should be less than 8 sec in specified conditions. The Auto sampler has to support a wide range of injection volumes. Auto sampler should be controlled by system software.
3	Oven Temperature	450 0C with 6 or more ramps facility settable from 0.1 0C to 50 0C/min or more
4	Injector- temperature	Up to 400 0C in 10C increment or more
5	Injector	split and split less injector for capillary column
6	Flow controller for carrier	automatic digital flow and pressure controller /EPC
7	Safety features	auto leak detection of carrier gas & automatic shut down of GC in case of a leak
8	GC system should have a gas saver mode	
9	Software	Windows-based
10	Validation	GC and software should have a validation facility
11	Column	DB-5 MS/ HP 5 MS, 15 m X 0.25 mm x 0.25 micro-metre one no.
12	ISO 9001 certification and GLP compliance	

<b>Mass Spectrometer</b>		
1	Mass 27pprox.27-	quadruple with pre-filter
2	Ionization source-	electron ionization ( EI) and chemical ionization ( CI) ( Positive and negative) equipped with advance non-vacuum breaking cleaning facility
3	Mass range-	10-1000 amu or more
4	Electron energy/ ionization voltage-	adjustable electron energy up to 150 eV or more
5	Tune facility -	should have auto & manual tune facility
6	Scan rate	variable up to 5600 amu/ sec or more
7	Vacuum pump capacity	200 lit/ sec or more air-cooled turbo molecular pump
8	Sensitivity/ detection limit	1 pgstd OFN scanning from 50- 300 u at m/z 272 with Helium as carrier gas should produce S/N 400: 1 or more in EI mode and equivalent with any other compound 10 pgstd BZP should produce S/N 10:1 or 100 pgstd BZP scanning from 80 to 230 amu in m/z 183 in methane gas should produce S/N 125:1 in PCI mode or better and equivalent with any other compound 1 pgstd OFN should produce S/N 1000:1 or 2 ul injection of 100 fgstd OFN should produce S/N 300:1 in NCI mode or better and equivalent with any other Compound at m/z at 272 amu
9	Calibration facility	should have built calibration facility with internal calibrating material with NIST/ ASTM or equivalent traceability

10	Scanning facility	simultaneous scanning in SIM and full scan (TIC) mode
11	Detector	Dynode/photomultiplier
12	Interface temperature	ambient to 325 0C or more
13	Source temperature	up to 350 0C or more
14	mass library	NIST Mass spectral library, pfliegermaurer weber library, wiley, pesticide
15	User-friendly mass software	should be windows based with validation facility

<b>General Conditions</b>		
	<ul style="list-style-type: none"> <li>Warranty for at least 03 (three) years of the full system including computer, printer, UPS etc. should be provided and may provide extended free warranty for one year</li> </ul>	
	<ul style="list-style-type: none"> <li>Software- suitable for GC along with kinetic software, performance validation software, multi-component analysis software</li> </ul>	
	<ul style="list-style-type: none"> <li>Consisting of windows based software with features such as multilevel calibration, baseline correction, all methods of analysis, time programming, plotting and graphical representation of chromatography</li> <li>Software should be able to control the GC-MS system and data acquisition</li> <li>the latest configuration of the computer with 2nd gen intel core I 3-2120 ( 3.30ghz 1333, 3 MB, 2C), genuine windows ( R) 7 Home basic SP1 64 bit, 4 GB3 DDR3 SD RAM ( 1600 Mhz), 3.5 — 1 TB 7200 RPM SATA Hard drive ( 1 X 500 GB), DVD Combo drive, 21 — colour monitor ( TFT), optical mouse, keyboard, HP desk jet/ inkjet colour printer</li> <li>the original equipment supplier/manufacturer should supply the total computer data station preloaded in the factory</li> </ul>	
	<ul style="list-style-type: none"> <li>ISO 9001 certification and GLP compliance.</li> </ul>	
	<ul style="list-style-type: none"> <li>Training- on-site training for 5 scientists should be provided for at least 10 days of operational training and 5 days of application training.</li> </ul>	

**Item No. 2 Gas Chromatography-Mass Spectrometer with Head Space**

**General Specifications: -**

<b>For Gas Chromatography</b>		
1	GC	fully automated microprocessor controlled with extensive self-diagnostic facilities and with Auto sampler
2	Auto sampler	The system should have auto sampler to adjust at least 100 vials Injection cycle time should be less than 8 sec in specified conditions. The Auto sampler has to support a wide range of injection volumes. Auto sampler should be controlled by system software.
3	Oven Temperature	450 0C with 6 or more ramps facility settable from 0.1 0C to 50 0C/min or more
4	Injector- temperature	Up to 400 0C in 10C increment or more
5	Injector	split and split less injector for capillary column
6	Flow controller for carrier	automatic digital flow and pressure controller /EPC
7	Safety features	auto leak detection of carrier gas & automatic shut down of GC in case of a leak
8	GC system should have a gas saver mode	
9	Software	Windows-based

10	Validation	GC and software should have a validation facility
11	Column	DB-5 MS/ HP 5 MS, 15 m X 0.25 mm x 0.25 micro-metre one no.
12	ISO 9001 certification and GLP compliance	

<b>Mass Spectrometer</b>		
1	Mass 27pprox.27-	quadruple with pre-filter
2	Ionization source-	electron ionization ( EI) and chemical ionization ( CI) ( Positive and negative) equipped with advance non-vacuum breaking cleaning facility
3	Mass range-	10-1000 amu or more
4	Electron energy/ ionization voltage-	adjustable electron energy up to 150 eV or more
5	Tune facility -	should have auto & manual tune facility
6	Scan rate	variable up to 5600 amu/ sec or more
7	Vacuum pump capacity	200 lit/ sec or more air-cooled turbo molecular pump
8	Sensitivity/ detection limit	1 pgstd OFN scanning from 50- 300 u at m/z 272 with Helium as carrier gas should produce S/N 400: 1 or more in EI mode and equivalent with any other compound 10 pgstd BZP should produce S/N 10:1 or 100 pgstd BZP scanning from 80 to 230 amu in m/z 183 in methane gas should produce S/N 125:1 in PCI mode or better and equivalent with any other compound 1 pgstd OFN should produce S/N 1000:1 or 2 ul injection of 100 fgstd OFN should produce S/N 300:1 in NCI mode or better and equivalent with any other Compound at m/z at 272 amu
9	Calibration facility	should have built calibration facility with internal calibrating material with NIST/ ASTM or equivalent traceability
10	Scanning facility	simultaneous scanning in SIM and full scan (TIC) mode
11	Detector	Dynode/photomultiplier
12	Interface temperature	ambient to 325 0C or more
13	Source temperature	up to 350 0C or more
14	mass library	NIST Mass spectral library, pflegermaurer weber library, wiley, pesticide
15	User-friendly mass software	should be windows based with validation facility

<b>Head Space</b>		
1	Head Space	<p>12 Vials upgradable to 120-vial capacity with vial loader and 3 removable 40-vial racks, further extendable to 240-vial capacity in future if needed. Vial size – 10 ml, 20 ml and 22 ml headspace vials with:</p> <p>Magnetic crimp or screw caps, flat or rounded bottom without any need of Vial adapter</p> <p>Oven capacity: Air ventilated oven with 12-seat electrically driven carousel</p>

<b>General Conditions</b>	
	<ul style="list-style-type: none"> <li>Warranty for at least 03 (three) years of the full system including computer, printer, UPS etc. should be provided and may provide extended free warranty for one year</li> </ul>
	<ul style="list-style-type: none"> <li>Software- suitable for GC along with kinetic software, performance validation software, multi-component analysis software</li> </ul>
	<ul style="list-style-type: none"> <li>Consisting of windows based software with features such as multilevel calibration, baseline correction, all methods of analysis, time programming, plotting and graphical representation of chromatography</li> <li>Software should be able to control the GC-MS system and data acquisition</li> <li>the latest configuration of the computer with 2nd gen intel core I 3-2120 ( 3.30ghz 1333, 3 MB, 2C), genuine windows ( R) 7 Home basic SP1 64 bit, 4 GB3 DDR3 SD RAM ( 1600 Mhz), 3.5 — 1 TB 7200 RPM SATA Hard drive ( 1 X 500 GB), DVD Combo drive, 21 — colour monitor ( TFT), optical mouse, keyboard, HP desk jet/ inkjet colour printer</li> <li>the original equipment supplier/manufacturer should supply the total computer data station preloaded in the factory</li> </ul>
	<ul style="list-style-type: none"> <li>ISO 9001 certification and GLP compliance.</li> </ul>
	<ul style="list-style-type: none"> <li>Training- on-site training for 5 scientists should be provided for at least 10 days of operational training and 5 days of application training.</li> </ul>

**Item No. 3: Fourier Transform Infrared Spectrometer (FT-IR)**

**General Specifications:-**

SL No.	Specifications	
1.	Optics	All optics should be self-aligned for easy replacement by the user. Suitable high stability interferometer with a minimum 3 years warranty.
2.	Spectral range	Spectral range 375-7500 cm-1
3.	Spectral resolution	0.5 cm-1 or better (Non-apodized)
4.	Signal to noise ration	30000:1 or more PP for 1 min. Scan
5.	Fast scan	Minimum 30 spectra/sec or more @16cm-1
6.	Detector	DLaTGS /DTGS in KBr windows
7.	Source	A mid-IR source with a 5-year warranty should be provided.
8.	Beam splitter	KBr beam splitter or suitable beam splitter to cover the spectral range.
9.	Wave number accuracy	0.05 cm-1 or better.
10.	KBr pellet press-hydraulic pellet press capable of making KBr/NaI pellets with controlled pressure	
11.	The system should have the facility for liquid sample analysis.	
12.	The firm should offer micro/ Diamond ATR analytical facility.	
13.	Should offer Auto validation facility with the NIST/ASTM traceable validation kit.	
14.	Software	The latest version of windows based IR software with the licence to control all functions of the offered FT-IR system like the facility for self-diagnostic, software-controlled auto tuning, auto alignment, auto component recognition and auto-optimization data collection, data processing, live data display, spectral quality check, spectral search from the commercial library, creation of the user-generated library, automatic atmospheric correction, spectral interpretation, GLP compliance, QC.

15.	FTIR Library	Georgian crime library / Canadian Forensic Library or equivalent library.
16.	Spares/Consumables	The manufacturer/supplier should certify that they will provide all the spares and consumables at least seven years from the date of installation of the system.
17.	The firm should offer FTIR Installation kit, validation kit, spares parts for smooth running the system with necessary certification wherever applicable.	
18.	Data station	The latest version of branded PC like DELL/HP/ COMPAQ/ LENOVO/ IBM etc. Along with the licence of the original operating system and preloaded software with 21" LED monitor and laser jet colour printer.
19.	Three-year warranty of the full system should be provided and may provide extended free warranty for one year.	
20.	The system/manufacturer should be ISO/GLP/GMP/CE complied.	
21.	On-site operation and application training should be provided for 05 days for scientists.	
22.	The firm should supply tool kit, hard and soft copies of operation manual and other relevant literature software and other items wherever possible.	

#### **Item No. 4 Accelerated Solvent Extraction System**

##### **General Specifications:-**

1	Accelerated Solvent Extraction System complete with pump & fittings which provides operation for a single sample at a time with the following features & ease of uses in preparing/extracting sample.
2	Unattended extraction of up to 24 samples.
3	Samples cell sizes to be available: - 1, 5, 10, 22, 34, 66, and 100 ml.
4	Collection vial sizes: 60 or 250 ml.
5	Operating pressure: 1500 psi (100 bar).
6	Automatic rinsing of the system between sample extractions
7	Solvent saver mode for further reduction in solvent consumption
8	Scheduling programming for automated method optimization
9	It should reduce extraction time and solvent consumption by use of elevated temperature and pressure during extraction
10	The requirement of solvent less than 50 mL so to extract a 20gm sample; reducing total solvent usage
11	It should extract automatically to provide filtered and ready for direct injection or final cleanup sample of interest.
12	It should have options for Easy-to-use collection bottles or vials (vials with via tray insert)
13	It should have convenient multiple-method storage for automatic operation.
14	It is to come with convenient front panel operation runs methods automatically.

15	It should have Sensors for temperature, pressure, and solvent and liquid leaks alert the operator to a problem, sound an audible alarm, and shut down the system if necessary.
16	It should include solvent bottle, snap-ring pliers, power cords, and gas line fittings with the following specifications:
17	Temperature control: Up to 200 °C; vertical cell orientation with the flow from top to bottom.
18	Pump: Fluid delivery pressure: 10 Mpa (1500 psi).
19	Pump flow: 70 mL/minute. Automatic pressure sensor and pressure relief during heat-up.
20	Fluid Sensors: IR sensors detect fluid level during the collection of extract
21	Display and Keyboard: Menu operated. LCD 8 × 45 OR similar character display. Method and schedule editor and storage
22	Extraction Cells: Seven capacities: 1, 5, 10, 22, 34, 66, and 100 mL cells. Cells feature finger tight cell caps with compression seal for high-pressure closure
23	N2 cylinder with Suitable high-pressure regulator & tubing.
24	Automated sample extraction using flow-through technology with pH-hardened pathways
25	Automatic extract filtration
26	Easy-to-fill sample cells with the finger- or hand-tight fittings
27	Easy-to-use collection vials and bottles
28	Convenient front panel operation with multiple method storage
29	Sensors for temperature, pressure, and solvent vapours ensure safe operation at all times
30	Easy method transfers between systems
31	3KVA UPS with 60 minutes backup
32	Should be for a period of at least 03 years with free upgrades of the software during the period. The supplier should undertake to execute AMC for 03years after warranty is over at the cost of not more than 10% of the cost of instrument which will be paid during the period of AMC.

#### **Item No. 5 Ion Chromatograph**

##### **General Specifications:-**

1.	<b>Pump System</b>
	a. Binary/Quaternary pumps-02 units (for gradient flow) or any equivalent system suitable for simultaneous detection of cations & Anions. The system should be suitable for gradient flow.
	b. Flow rate:- 0.01-10ml/min or more.

	c. Reproducibility/Accuracy of flow-<0.1% or better
	d. Flow precision-0.1% or better
	e. Maximum pressure range-not less than 5000 psi
	f. Pump heads and all fluid path should be metal-free (PEEK) or any other good polymer suitable for analysis of anion and cations.)
	g. Online degasser or equivalent facility
	h. Leak sensor facility
2.	<b>Injector Port System:</b> Dual Rheodyne injector port (Metal-free, PEEK or any other good polymer) for simultaneous anions and cations analysis. The firm should offer adequate no of injection port for simultaneous anions and cations analysis for the offered system.
3.	<b>Suppressor System:</b> <ol style="list-style-type: none"> <li>Chemical suppressor should eliminate background conductivity &amp; increase the signal to noise ratio and with continuous regeneration/automatic regeneration or any equivalent technology delivering the same result. The operation should be automatic and should be able to withstand high backpressure and high loading or any equivalent suppressor system.</li> <li>The principal /manufacturer will submit an undertaking to supply the suppressor Kit for 7 years from the date of installation.</li> </ol>
4.	<b>Detector (Metal Free)</b> Conductivity detector with cell: The firm should offer two (02) nos of detectors for simultaneous anions and cations analysis for the offered system. Conductance range: 0-15000 microsemens/cm. or better. Block should be thermostated (lower range-350C or more), Temperature stability +- 0.010 C Auto zero function should be present and should not control through software. The detector should be suitable to give results up to ppm level or better.
5.	<b>The Quoted System</b> (including column and guard column 2 Nos each type and any other consumables like connectors rings etc.) should be self-sustaining and capable of 38pprox.38g the following anions and cations simultaneously. Anions- Nitrate, Nitrite, Fluoride, Chloride, Sulfate, Bromide, Bromate, Phosphate, Perchlorate, Chlorate, Acetate, Formate Cations- Lithium, Sodium Potassium, Calcium, Ammonium, Barium.
6.	<b>General Conditions</b>
	a. The entire offered system for the simultaneous analysis of cations and anions through a single PC and integrated software. The firm should quote the latest version of the software.
	b. The product should be ISO 9001 certified /CE compliance
	c. Three years warranty of the full system will be provided and may provide extended free warranty for one year.
7.	<b>Data Station</b>
	a. Consisting of windows based software with features such as multilevel calibration, baseline correction, all methods of analysis, time programming, plotting and graphical representation of chromatograph.
	b. The software should be able to control the ion chromatography system and data acquisition.
	c. The latest version of branded PC like DELL/HP/COMPAQ/LENOVO/IBM etc. along with the licence of original operating system and preloaded software with 21" LED monitor and laserjet printer.



	d. The original equipment supplier/manufacturer should supply the total computer/data station
8.	<b>Training</b> – At least 2 weeks of operational and application on-site training must be provided for 5 user scientists.

## **Item No. 6 Viscosity Meter and Density Meter**

### **1. System**

Instrument(s) should fulfil requirements of international standards. Viscosity and Density may get measured simultaneously from one instrument or may be measured separately by two instruments.

### **2. Sample**

Hydrocarbon products, mainly petroleum products. Sample required should be 10 ml or less. Sample temperature should get controlled by built-in thermostat within the range of +15°C to +90 °C.

### **3. Measuring Range**

Viscosity : 0.5 to 25,000 mPa.s (mm<sup>2</sup>/s)

Density : 0.65 to 2.5 g/cm<sup>3</sup>; Automatic bubble warning

➤ Display Resolution

- Viscosity: Four significant digits, Density: 0.0001 g/cm<sup>3</sup>, Thermostat: 0.001°C.

➤ Reproducibility:

- Viscosity: +0.50% of the measured value
- Density: +0.0001 g/cm<sup>3</sup>
- Temperature: +0.05 °C

### **4. Controls**

Ten inch (10”) or better touch screen, keyboard, mouse and bar code reader.

Interfaces: 2 x USB, 1 x Ethernet, 1 x CAN Bus, 1 x RS232 and 1 x VGA

Instrument(s) should have in-built Data Memory of at least 100 data sets.

At least four certified standards, each 100 ml or more, certified for Viscosity and Density at 20, 40, 60, and 80 °C should be part of standard delivery.

### **5. Training:**

Training should be imparted for FSL West Bengal personnel for 3-5 working days on operation, maintenance and troubleshooting problems at the place of installation.

### **6. Warranty and AMC:**

Should be for a period of at least 03 years with free upgrades of the software during the period. The supplier should undertake to execute AMC for 03years after warranty is over at the cost of not more than 10% of the cost of instrument which will be paid during the period of AMC.

### **7. Miscellaneous:**

- Instrument(s) should be compact device for use in forensic lab and industrial environment.

- Vendor should have proven track record of supply/ installation in various Forensic Labs, Government Institutes.
- Vendor should have a service engineer stationed in Kolkata/ eastern region or preferably have a branch office for attending to problems, if any during the warranty/ AMC period.

### **Item No.7 Handheld Raman Spectrometer**

#### **1. General**

- It should be handy and weigh less than 2 kg.
- Should be able to work continuously at temperatures +10 to +50°C.
- Should be of dust, water and shock proof rugged construction with compliance to international standards.
- Should have a battery life of more than 4 hours of continuous operation and charging time of not more than one hour.

#### **2. Laser**

- It should have outstanding user safety with no need for laser safety trainings or a laser safety program or any special laser safety requirements or special precautions like personal protective equipment.
- Laser Wavelength/ Max Power – 785 to 1075 nm/ 100 to 350mW
- It should come with adjustable laser power (Auto Mode) of 5, 10, 25, 50, 75, 100%

#### **3. Spectral Requirements**

- The instrument should have broad spectral range and provide for maximum unambiguous verification of materials.
- Spectral Library should include 1000+ reference Raman spectra for General Chemical, General Precursor, Cutting Agent, Explosives, Narcotic, Narcotic Precursor, Pharmaceutical, Solvent, Steroid etc. Custom libraries based on measured data are to be easily setup, anytime.
- Spectral Range – 200 to 3000 cm
- Spectral Resolution – 6 to 12 cm
- Spectrometer Type – Transmissive Volume Phase Grating

#### **4. Software, Computer and other Accessories**

- Suitable software with IT Act and rules compliance. Reputed Brand of PC with latest OS, touch screen monitor and LaserJet Printer with 5 KVA Online UPS with 30 minutes battery backup of latest model should be supplied.
- Connectivity to Desktop or Mobile Device through waterproof USB-Type C / Wi-Fi/ Peer-to-Peer

#### **5. Warranty and AMC:**

Should be for a period of at least 03 years with free upgrades of the software during the period. The supplier should undertake to execute AMC for 03years after warranty is over at the cost of not more than 10% of the cost of instrument which will be paid during the period of AMC.

#### **6. Miscellaneous:**

- Instrument should be compact device for use in field, forensic lab and industrial environment.
- Vendor should have proven track record of supply/ installation in various Forensic Labs, Government Institutes.
- Vendor should have a service engineer stationed in Kolkata/ eastern region or preferably have a branch office for attending to problems, if any during the warranty/ AMC period.

## **Item No. 8 High Performance Thin Layer Chromatography (HPTLC)**

### **1. General**

New generation complete system with system managed software for data acquisition, link, control, integrate, manage the individual instruments for application, development, scanning and image documentation.

### **2. Semi Automatic Spot / Band Applicator**

- 5th Generation 4 mode Applicator for 1) Quantitative analysis 2) Micro-preparative chromatography 3) Superimpose 4) in-situ clean-up.
- Sample syringe – 100µl (for analytical work) 500µl (for micro preparative work).
- Sample position on X & Y axis freely selectable.
- Automatic rate of sample dispensing.
- Method of storage – built-in or infinite through system manager.
- Method of entry – Manual or download from System Manager.
- Self-diagnosis ability.

### **3. Chromatogram Development Chambers**

- The operating range 20°C to 200°C
- Heating area: 240mm x 240 mm or equivalent
- An acoustic signal on defined time or requested temperature.
- Able to save 7 or more programs.
- High conductive heating surface with the large area of the heating element to ensure uniform temperature distribution.

### **4. TLC Plate Heater**

- For in-situ derivatization and layer activation.
- Stain resistant glass top or equivalent.
- Digital display of set and actual temperatures as long as plate is hot.
- Use up to 200mm x 200mm size plates.

### **5. TLC Scanner with Data Evaluation**

- System Manager controlled Scanner / Densitometer for automatic spectrum scanning for identity check as well as purity check;
- Automatic quantitative measurement by absorbance & fluorescence;
- Reproducibility of positioning better than 50µm in Y direction & 100µm in X direction.
- Scan speed 100mm/sec @ 25µm resolution or better;
- Wavelength range 200-1000 nm; bandwidth selectable 5 nm.
- Wavelength accuracy better than 1nm and reproducibility better than 0.2 nm.
- Monochromator flushing by nitrogen or equivalent;
- Data sampling rate 4000/sec or better;
- Macro optics for HPTLC;

- Apochromatic suprasil – fluorite lens system or equivalent;
- Spectrum scan speed 100 nm/sec or better;
- Max 999 spectra / plate;
- Scan compartment illumination with UV to check sample alignment with scan beam;
- D2, Hg, W lamps built-in.
- Excellent signal to noise ration.

## 6. Manual Reagent Sprayer

- Glass reagent sprayer with spray head for ultra fine and uniform spray.
- 100 ml flask.

## 7. UV Cabinet

- UV Cabinet with facility of digital image transferrable to System Manager.
- Dual wavelength UV lamp with guaranteed minimum intensity at 15-20 cm distance
  - Short wave UV 1600 lumen, long wave UV 1000 lumen.
- Visible light
- Full protection to viewer's eyes and skin from UV light for safety.
- High tech 50 kHz power supply for flickerless, instant illumination.
- Portable darkroom.
- Auto switch off after set timing.
- Built-in thermal sensor and tilt sensor.

## 8. Software, Computer and other Accessories

### HPTLC Software

- System manager software to link, control, integrate, manage the individual instruments for application, development, scanning and image documentation.
- To guide the user through chromatography steps.
- Built-in automatic back-up and restore tool for data.
- To produce a comprehensive GLP compliant analysis report with instrument, analyst, date, time, place, method parameters etc. and complete details. Random and unique report ID to be given to each report.
- Communicates in both directions with instruments.

### Scanner Software

- Data evaluation software of latest version shall be provided.
- Controlled by System Manager, Automatic / Manual data integration, Auto baseline correction. Spot check facility.
- 3D display with data storage and auto calculation of each peak at its  $\lambda_{max}$ .
- Sub-component evaluation.
- Calibration - single level, multilevel, linear/non-linear.
- Track profile subtraction. Reproducibility check facility. Auto calculation of data from wts and dil. Factors.
- Computer generated random number for each report.
- Lamp use tracking.
- User manual.

- Service Dialog + Self-Diagnostics + Tutorial all built-in.
- Software should have –
  - a) Spectrum Scanning option
  - b) Scanner Quantification
  - c) Scanner Multi Wavelength

#### Spectrum Library

Around 1000 spectra stored with search facility for  $\lambda$  max as well as Rf should be available for narcotic, toxicological and other forensic use. Facility to create own library.

#### Hardware

Reputed Brand of PC with suitable OS and LaserJet Printer with 5 KVA Online UPS with 30 minutes battery backup of latest model should be supplied.

#### **9. Training:**

Training should be imparted for FSL West Bengal personnel on operation, maintenance and troubleshooting problems at the place of installation.

#### **10. Warranty and AMC:**

Should be for a period of at least 03 years with free upgrades of the software during the period. The supplier should undertake to execute AMC for 03years after warranty is over at the cost of not more than 10% of the cost of instrument which will be paid during the period of AMC.

#### **12. Miscellaneous:**

- The system must be factory tested and a certificate should be provided.
- Vendor should have proven track record of supply/ installation in various Forensic Labs, Government Institutes.
- Vendor should have a service engineer stationed in Kolkata/ eastern region or preferably have a branch office for attending to problems, if any during the warranty/ AMC period.

#### **Item No.9 Bench-Top Digital Centrifuge Apparatus**

##### **1. General Specifications**

- The centrifuge should be versatile having multiple rotor options such as swing out, micro or high volume angled rotors;
- It should have a large splash-proof LCD display, motor-driven lid lock and a maintenance-free induction drive;
- It should have an automatic radio-frequency rotor identification system (RFID) with over speed protection, immediately upon rotor insertion;
- The control panel should be easy to use even with gloves on, allow one-hand operation;
- The centrifuge should allow selection of speed in both rpm and g-force, with increments of 10 and pre-selection of running time from 10 seconds to 100 hours or continuous;
- Speed Range 200 to 15,000 rpm
- The display should show pre-set & actual values, temperature and quick-key for short runs;
- It should give an audible signal at the end of each run with several melody options;
- The device should allow storage of up to 100 runs including rotor type;
- Noise level under 65 dB at maximum speed;
- The device should have been manufactured according to international safety regulations;
- The centrifuge should be supplied with a fixed angle rotor.

**2. Warranty and AMC:**

Should be for a period of at least 03 years with free upgrades of the software during the period. The supplier should undertake to execute AMC for 03 years after warranty is over at the cost of not more than 10% of the cost of instrument which will be paid during the period of AMC.

**3. Miscellaneous:**

- Instrument should be compact device for use in field, forensic lab and industrial environment.
- Vendor should have proven track record of supply/ installation in various Forensic Labs, Government Institutes.
- Vendor should have a service engineer stationed in Kolkata/ eastern region or preferably have a branch office for attending to problems, if any during the warranty/ AMC period.