THE STATE TRADING CORPORATION OF INDIA LIMITED

(A Government of India Enterprise)

5th Floor, Mogul's Court, Basheerbagh,
Hyderabad-500 001.

Tender for Supply of Forensic Equipment & Other Scientific Equipment to AP Police

Tender Notice No: STC/HYD/GID/2017-18/06
Dated 21.02.2018

Corrigendum No. 1 dated: 05.03.2018

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In the Tender for Supply of DNA Equipment for Forensic Analysis and Other Scientific Equipment to AP Police, the following amendments are made:

1. **Terms & Conditions (Annexure A): Clause No: 13 B Price Bid**

   - Price may be quoted inclusive of 3 -Years Comprehensive Warranty from date of installation (including Spares, Consumables & Service).
   - Price may be quoted separately for Comprehensive maintenance contract with warranty for fourth and fifth year. Annual Maintenance Contract for Sixth, Seventh & Eight year may also be quoted separately.
   - Conditions for CMC: breakdown call response within 48 Hrs.

2. **Quantity:**
   The number of instruments being tendered for can be increased or decreased at the sole discretion of Tendering Authority.

3. **Technical Specifications**

I. Drugs/Narcotics/Explosives and Chemistry Laboratory

1. ## GAS CHROMATOGRAPHY WITH FID, ECD, NPD AND HEAD SPACE SAMPLER G C Main Frame:
   - Gas Chromatography system for the analysis of Motor spirit, High Speed Diesel, Alcohols, Pesticides, Narcotic drugs etc.
   - Gas chromatograph with advanced / Electronic flow control for simultaneous Pressure, Temperature and Flow programming.
   - The system must be fully automated with programmable pneumatic control (digital control) for injector, detector and purge gas.
   - Gas Chromatography system with EPC/AFC/PPC control for carrier/detector zone gases.
   - EPC/ PPC/AFC should provide optimum performance with all types of columns and detectors.
   - Programmable leak test facility must be available in the instrument
   - Gas Chromatograph with one **Packed column injector** and **one Split-Split less Capillary injector**.
   - Digital Pneumatic Control for setting column flow with pressure, flow and linear velocity.
   - Split ratio programming with battery protected memory
   - High speed / fast GC analysis
   - Self-diagnostic function

- GLP/GMP support
- Fast data transfer, acquisition speed 250Hz (4ms) - able to "catch" very sharp peaks

Column oven:
- Programmable Oven temperature with ramping with Fast oven cooling speed 450 deg to 50 deg within 3 to 4 minutes
- Provision to install **three** Detectors simultaneously and should be individually temperature controlled
- Temperature range + 4°C to 450°C
- Total Oven Volume : 13 Liters or more
- Temperature accuracy : +/- 1%
- Temperature Deviation : < 2 °C Max
- Temperature variation Coefficient : < 0.01 °C / °C
- Temperature programming steps : up to 20
- System should have the capability to accommodate : Mini Bore to Micro bore capillary Columns i.e. from 0.1 mm i.d to 0.53mm i.d columns and Packed column.

Inlet configuration :
- Operating Temperature Range : +5°C to 450°C in 1°C increments
- Injector should be controlled by EPC/PPC/AFC.
- Removable glass liner for trapping non-volatile residues.
- Must be suitable for all types of capillary columns   10 µm to 530 µm.
- **Packed column injector – 1 No.**
- Operating Temperature range 50 °C to 450 °C in 1 °C increments
- **Split split less Capillary Injector - 1 No.**
- Operating Temperature range 50 °C to 450 °C in 1 °C increments
- PPC pneumatics include automatic control of split vent by split flow or split ratio
- Maximum split ratio should be 6000:1 or more
- Easy adjustment of Split vent
- Septum Purge facility
- Both the packed column injector and capillary column injector should be able to operate simultaneously with independent temperature control.

Flame Ionization Detector (FID) :
- Operating Temperature Range: upto 450°C or better
- Detection Limit : 1.5pgC/s (dodecane) or better
- Linear Dynamic Range : $>10^7$
- Auto Ignition, extinguishing and re-ignition features
- Electronic pressure/flow control
- Sensitivity: > 0.015 coulombs/g C
- Data acquisition rate: up to 500 Hz or better
- *Detector must be compatible with both Packed and Capillary columns.*

Electron CaptureDetector (ECD) :
- Operating Temperature Range: upto 400°C or better
- Minimum detectable quantity: 4fg/sec or better
- Data acquisition rate: up to 50 Hz or better
- Linear Dynamic range : 5×10^4 or better

Nitrogen Phosphorus Detector (NPD) :
- Operating temperature: 400 °C or better
- Minimum detectable quantity: < 0.4 pg N/s, <0.2 pg P/s with azo benzene/malathion/octadecane mixture or Equivalent
- Selectivity: 25,000:1 g (N/g C), 75,000:1g (P/g C) with azo benzene/malathion/octadecane mixture or Equivalent
- Linear Dynamic range: > 10^4
- Data acquisition rate: up to 200 Hz or better

Auto Injector :
- Not less than 12 sample vials or more with injection tower and stand alone turret.
- It should be capable of injecting both the injector ports without any manual/physical adjustment.
- The injector should support standard vial size - 2ml
- Waste and wash vial size - 4 ml
- Sampling volume - Capable to inject from 0.1 µl to 50 µl.

Head Space Sampler:

- Head space sampler is required for injecting Ethanol present in Blood and volatile compounds present in narcotic drugs, forensic samples etc.
- Automated PPC controlled Head-Space Sampler with Intuitive Touch Screen graphical user interface for easy control of the system with minimum 40 vials or more capacity.
- Sampling must be based on pressure balanced time controlled technology or Sample Injection Method: Sulfinert Sample Loop 1 ml.
- Variable Sample Volume Injection facility without any hardware change.
- Vial warming temperature: Room temperature ambient to 300^0C in 1^0C units with accuracy of $\pm 0.1^0C$
- Headspace sampler must have automatic leak check, programmable power saving and gas saving facility.

Data Communication:

- CFR 21 compliant, Single point control of all GC and its modules, customizable reports, GLP features should also have software for data acquisition, control, chromatographic data evaluation, reporting sequencing. IQ, OQ, to be provided by vendor after successful installation.

Complete System Control and Data Acquisition Software
- Software Compatible with Windows 7 or better
- Software should have has Security (log-in , User and group)
- Audit trail , System check , Software integrity &
- System Suitability test as standard functions
- System Check: Automatically checks all the system parameters including electronics
- Flexible Report format., i.e, for Method, chromatogram, Peak table , Quantization result

Calibration curve, Status Log , texts, graphics.
- Ease of Operation Single Point user friendly access through Icons.
- Real time Display of all Chromatograms with Data exchange facilities
- Software has Calibration Facility with Bracketing without Overlap and Bracketing by Grand average
- Built-in weekly Scheduler for automation the system for one complete week in addition daily automation.

Installation Accessories :
- Suitable Branded - Pentium i-5 Computer, 19" LED monitor, 500 GB HDD, 4 GB RAM, Windows 7 or better with Graphical User Interface, DeskJet Printer
- 6 KVA Online UPS with 1 hour Battery backup for GC system
- Filled Hydrogen, Nitrogen, Zero Air Cylinders
- Double Stage Gas Regulators for all the above Cylinders
  - Gas Panel for GC should include Molecular sieve, Moisture & Oxygen traps with necessary tubing's, Nuts & Ferrules.
  - Capillary Columns : DB1 (30m x 0.25 mm id) or equivalent – 1 No and DB-ALC 1 or equivalent – 1 No
  - Stainless steel Packed column: OV-17 (1.8m x 1/8 in x 2.1 mm) – 1 No
    The equipment should be provided with all necessary accessories and spare parts for a fully functional unit. List of consumables and spare parts along with operation and service manuals should be provided along with the instrument.
  - Comprehensive warranty – 3 years

Mandatory Requirements : Warranty & Service:
- Instrument should be strictly with 3 -Years Comprehensive Warranty from date of installation (including Spares, Consumables & Service).
- Price may be quoted separately for Comprehensive maintenance contract with warranty for fourth and fifth year. Annual Maintenance Contract for Sixth, Seventh & Eight year may also be quoted separately.
- Conditions for CMC: breakdown call response within 48 Hrs.

Training: Hands on training should be given to the staff members during installation until the satisfaction of the scientist. Demo of various specifications should be given by `the successful bidder before placing the order. A live demo nearby and analysis of our samples will have to be done by the bidder at his cost. Please provide complete details of your customer support laboratory in India.

2. Gas Chromatograph - Mass Spectrometer with Pyrolyzer and Head Space

Specifications:
High Speed Bench top Quadrupole Fast GCMS
Brand new quadruple mass spectrometer confirming to international safety standards and designed from original manufacturer. It should include a turbo molecular pump with inert CI and EI ion source.

1. **GC MAINFRAME :**
- Gas Chromatograph with Advanced / Electronic Flow control for Simultaneous Pressure, Temperature and Flow Programming
- Large Column Oven with temperature range from Ambient $+4^{\circ}c$ to $450^{\circ}c$
- Temperature Accuracy : $\pm 1\%$
- Temperature uniformity of $< 2\ ^{\circ}c$
- Graphical user interface with large LCD display
- Electronic Control of Detector Gases
- Constant Linear velocity mode/constant pressure/constant flow mode
- Split ratio programming with battery protected memory
- Self-diagnostic function with GLP/GMP support
- Fast data transfer, acquisition speed 400Hz (4ms) - able to "catch" very sharp peaks
- Fast oven cooling speed 450 deg to 50 deg within 3.5 minutes or less
- The system oven should support 15 oven ramps with 16 plateaus or more
- Functions such as analysis counter, automatic ON/ OFF scheduling, etc.
- The system should have a auto sampler with vial capacity of 15 vials or more.

2. **Injector :Split/Splitless Capillary Injector :** 2 Nos should be provided:
  i. Independently temperature controlled injection ports.
  ii. Split / Split less injector for capillary Columns with Septum Purge functions.
3. **Interface for Quadrupole Detector:**
- Over heat Protection facility
- Dynamic Range 10^7
- Filled helium gas cylinder

4. **MS Detector equipped with : EI – Electron Ionization & CI-Chemical Ionization**
- Mass Filter : Metal Quadrupole Mass filter with Pre-rods
- EI and CI must have separate source and switching between PCI, NCI shall be mandatory without change of source.
- Mass Range   : 1.5 to 1050 m/z
- Sensitivity EI Scan : 1 Pg OFN m/z 272 S/N ≥ 1500 RMS
- Sensitivity PCI Scan : 100 Pg Benzophenone m/z 183 S/N ≥ 500 RMS
- Sensitivity NCI Scan : 1 Pg OFN m/z 272 S/N ≥ 5000 RMS
- Mass Resolution : ≥ 2M (FWHM)
- Mass Marker Stability :±0.1 amu / 48hours
- Scan Speed : 20,000 u/sec, with 0.1u step scanning

- SIM : 64 channels x 128 ions sets
- Variable Ionization Voltage :   10 – 200ev
- Variable Ionization Current : 5 - 250µA
- Ion source Temperature: Variable between 140~ 300 ^{0}C and should be Independently controlled
- Filament : Dual (Automatic Switching during analysis)
- Maximum Carrier Gas Flow: 15ml/min
- Detector: 10KV conversion dynode detector with Overdrive lens.
- DUAL Differential air-cooled Turbo Molecular Pumps : 250 L/s and above pumping rates, having oil-impregnated bearings that can run without maintenance for atleast 2500 hrs.
- Foreline / Rotary Pumps with oil mist Filter for initial Vacuum build-up supporting for EI & PCI Source independently.
- Evacuation System Control: Fully automatic "Auto Startup" and "Auto Shutdown" automatically should execute Turning - on and - off of Turbo pumps, Foreline pump, and leak valves.
- The Ion Source should be Front access type for easy maintenance.
- EI and CI change over should be automatic.
- System should be capable of accommodating capillary columns from Wide-bore (0.53mm i.d and 0.25mm) to Narrow Bore (0.1mm i.d)

5.   **Pyrolyzer :**
- Multi/Double-shot pyrolyzer
- Temperature control range: Ambient +10^{0}C to 1050^{0}C or better
- Heating rate : 600^{0}C/min.
- Cooling time : 800^{0}C to 50^{0}C in 10 min max
- Cooling method: Forced cooling by nitrogen gas or compressed air
- Sampler: Double shot sampler, Liquid Sampler
- Inert sample cups (max capacity) : SF (50uL), LF (80uL)
- Over heat limit temperature: PY 1100^{0}C and ITF 500^{0}C.

6.   **Liquid Auto Injector/Sampler**
- A minimum of 12 to 15 sample rack to be quoted, also include all the necessary Vials, Cap & Septa atleast 500 no's .

7.   **Head Space Sampler:**
- Head space sampler is required for injecting Ethanol present in Blood and volatile compounds present in narcotic drugs, forensic samples etc.
- Automated PPC controlled Head-Space Sampler with Intuitive Touch Screen graphical user interface for easy control of the system with minimum 40 vials or more capacity.
- Sampling must be based on pressure balanced time controlled technology or Sample Injection Method: Sulfinert Sample Loop 1 ml.
- Variable Sample Volume Injection facility without any hardware change.
- Vial warming temperature: Room temperature ambient to 300^{0}C in 1^{0}C units with accuracy of ±0.1^{0}C
- Headspace sampler must have automatic leak check, programmable power saving and gas saving facility

2.   **Data Communication :**

- CFR 21 compliant, Single point control of all GC and its modules, customizable reports, GLP features should also have software for data acquisition, control, chromatographic data evaluation, reporting sequencing. IQ, OQ, to be provided by vendor after successful installation.

3.   Software for Control of GC as well as GCMS :

- 32 bit Software Should Provide Single Point Control of all GC Parameters, Injectors, detectors.
- Software should have Security (log-in , User and group) , Audit trail , System check , Software integrity and system Suitability test should be included as standard functions.
- Flexible report Format i.e for Method, chromatogram, Mass Spectrum, Peak table, Quantization result, calibration curve, Status Log , texts, graphics.
- It should provide automated tuning & File management functions with Library Search facility.
- Complete Software control of vacuum system with Auto Start-up / Shut-down and vacuum protection against Power Failures.
- It should have built-in weekly Scheduler for automating the system for one complete week in addition to daily automation. **GLP/GMP Compliance.**
- MS Navigator for maintenance procedures and trouble shooting guide.

4.   Library : Licensed version of latest NIST Library and Dedicated Forensic Library

5. Syringes & Column :
- 10 µl Auto-injector GC Syringe - 2 no's
- DB-5ms Column or equivalent (30M x 0.32 mm i.d , 0.25 µm)
- DB-1 Column or equivalent   (30M x 0.32 mm i.d , 0.25 µm)
- 5% phenyl methyl silicon Column   (30M x 0.32 mm i.d , 0.25 µm)

11. Essential Spares & Consumables for Trouble Free maintenance for 3 Years :
All essential Spares like, EI Filament, Spacer, Septa, Graphite ferrule, Vespal Ferrule, Washers, Nuts, Glass Inserts Split / Split less , O-ring, Standard Tuning Sample (PFTBA), Aluminum Packing, Standard OFN Sample, Vacuum pump Oil etc may be quoted.
The equipment should be provided with all necessary accessories and spare parts for a fully functional unit. List of consumables and spare parts along with operation and service manuals should be provided along with the instrument.

12. Warranty : Instrument should be strictly with **3 Years Comprehensive Warranty** from the date of Installation (Including all Spares, Consumables & Labor)

13. Installation Accessories :

- Suitable Branded - Pentium i-5 Computer, 19" LED monitor, 500 GB HDD, 4 GB RAM, Windows 7 or better with Graphical User Interface, HP DeskJet Printer
- 10KVA Online UPS with 4 Hour Battery backup for GCMS system
- Filled Helium Gas Cylinders
- Double Stage Stainless Steel Gas Regulators for all the above Cylinders
- Gas Panel for GCMS should include Molecular sieve, Moisture & Oxygen traps with necessary tubing's, Nuts & Ferrules.

- **Warranty & Service:**
  - Instrument should be strictly with 3 -Years Comprehensive Warranty from date of installation (including Spares, Consumables & Service).
  - Price may be quoted separately for Comprehensive maintenance contract with warranty for fourth and fifth year. Annual Maintenance Contract for Sixth, Seventh & Eight year may also be quoted separately.
  - Conditions for CMC: breakdown call response within 48 Hrs.

Training: Hands on training should be given to the staff members during installation until the satisfaction of the scientist. Demo of various specifications should be given by `the successful bidder before placing the order. A live demo nearby and analysis of our samples will have to be done by the bidder at his cost. Please provide complete details of your customer support laboratory in India.

3. HIGH PERFORMANCE LIQUID CHROMATOGRAPHY SYSTEM

Specifications:
1. Solvent Delivery System
- HPLC should have a Quaternary Gradient high precision pump.
- It should have a flow rate resolution of 0.01 ml/min or better
- The flow rate should be set between 0.001 to 10 ml/min from micro to semi-preparative flow rates.
- Flow rate accuracy should be ±1% or better
- Flow rate precision should be less than 0.1% RSD.
- Pressure setting range should be 1-35 MPa (5000 PSI) or more.
- It should employ active check valves that allow stable delivery of even non-polar organic solvents such as hexane.
- Reservoir tray with Solvent Bottles (4No's) & Automatic rinsing kit must be supplied.
- It must have a leak sensor as safety feature.
- It should have functions for maintenance and validation which are accessible by a dedicated operation button.

2. On-Line Degassing Unit 1 No
- Membrane degassing unit upto **4** flow lines.
- Maximum operating flow rate upto 10ml/min per flow line.
- An internal capacity of 170 µL per flow line that allows a significant decrease in time required for replacing mobile phases and stabilization.
- It must have a leak sensor as a safety feature.
- Self-cleaning capability that extends vacuum pump life by drawing in air when the pump is running.

3. Photo-Diode Array Detector 1 No
- Wavelength range 190 nm - 790 nm.
- Number of Diode Elements : 512/1024
- High Resolution & High Sensitivity Mode(1.2nm & 8nm)
- Wavelength accuracy ±1 nm.
- Wavelength Precision 0.1nm.

- Drift Less than 5×10^{-4} AU/Hour.
- Noise Level $\pm 0.6 \times 10^{-5}$ AU.
- Linearity 2.0AU.
- PDA data collection in full range and simultaneously monitor 16 wavelengths (online-while acquisition is on)
- Peak Purity analysis through Ratio-chromatogram.
- Spectrum view, Wavelength scanning.
- Temperature controlled flow cell.
- A leak sensor and lamp replacement protection system (power to lamp automatically turned OFF) should be provided.
- Low Pressure Hg Lamp for wavelength accuracy check or HO membrane.

4. Auto-Sampler with cooler

- Sample injection volume should be variable between 0.1 µL to 100 l µL.

- Injection system should be variable injection volume type with zero sample loss during injection.

- Very fast injection time of 10sec/sample for 10 µL injection.

- Adequate number of samples to be processed automatically, random access.

- Sample cooler with de-humidifying function under temperature control from 4 to 45°C.

- Flow line rinse capability both before and after sampling should be possible

- Needle aspiration speed should be variable from 0.1 to 15 µL /sec

- Rinse aspiration rate should be variable from 1 to 35ul/sec

- Carry over must be within 0.005 % (Napthalene, Chlorhexidine and Caffeine) or better

- Injection volume accuracy within 1%

- The injection precision should be less than 0.2% of RSD value

- It should have a leak sensor, automatic rack and vial recognition as safety feature

- 1.5 mL Sample Vials along with cap & Septa . 500 No's to be included with crimpler.

5. Data Management System :

- Operation of the system should be easy and intuitive via a state-of-the-art suitable

Branded - Pentium i-5 Computer, 19" LED monitor, 500 GB HDD, 4 GB RAM, Windows 7 or better with Graphical User Interface, HP DeskJet Printer
- It should cover full digital instrument control with self-diagnosis functionality.
- Method file capability should have all LC analysis parameters, data processing parameters, report format, etc.
- The reporting format should be flexible and easy to use in any desired format
- Software must have its own log files for complete audit trails
- System suitability, System security as well as System check functions must be provided which comply with Good Laboratory Practice (GLP) and Regulatory Conformity
- Software should have a Data Base support either with SQL or Oracle for data security & compliance.
- Security features of software must comply fully with FDA, 21 CFR Part 11 guidelines.
- Reports can be output in PDF format
- Single point control of HPLC and its modules from PC .
- IQ, OQ to be provided by the vendor after successful installation.

Installation Accessories
- C-18 Column – (250 mm x 4.6 mm i.d x 5 um) – 2 No.
- C-8 Column – (250 mm x 4.6 mm i.d x 5 um) – 1 No.
- Branded latest Specifications PC & HP DeskJet Printer
- 5 KVA UPS with 3Hrs. Batter back-up --- 1 No
- Sample & Solvent filtration assembly with Aqueous & Organic Membranes (100 no. each) along with Vacuum Pump for filtration & degassing of mobile phase & sample.

Optional Item:

1. **Fluorescence Detector:**

- LKight source: Xenon flashlamp
- optical system: Holographic grating monochromators for both excitation and emission beam
- Excitation/emission wavelength range: 200-650 nm
- Spectral Bandwidth: 20 nm
- Wavelength accuracy: +/- 2nm
- Sensitivity: Raman S/N > 550 ASTM over the entire lifetime of the lamp
- Cell Volume: 8 ul
- Maximum cell pressure: 20 bar (290psi)
- Time Programmed functions: Excitation & emission, Wavelength Range response switching, Wavelength scan, Autozero etc.
- Power Consumption: 350 VA, 100-240V AC, 50/50 Hz

Warranty:
- Instrument should be strictly with 3 -Years Comprehensive Warranty from date of installation (including Spares, Consumables & Service).

- Price may be quoted separately for Comprehensive maintenance contract with warranty for fourth and fifth year. Annual Maintenance Contract for Sixth, Seventh & Eight year may also be quoted separately.
- Conditions for CMC: breakdown call response within 48 Hrs.

General conditions
- The supplier must provide training for the users of the instruments at site.
- The supplier must demonstrate that it has a proven appropriate set-up and capability to provide after-sales service efficiently and effectively.
- Software upgrades like version ups, if any, should be done without any cost.
- All modules must be GLP compliant
- A declaration of System Validation certificate must be provided

Training: Hands on training should be given to the staff members during installation until the satisfaction of the scientist. Demo of various specifications should be given by `the successful bidder before placing the order. A live demo nearby and analysis of our samples will have to be done by the bidder at his cost. Please provide complete details of your customer support laboratory in India.

4. HIGH PERFORMANCE THIN LAYER CHROMATOGRAPHY (HPTLC)

HPTLC with Scanner and Photo Recording Unit

HPTLC SYSTEM MANAGER:
software to control, document and manage all the instrumental steps of HPTLC analysis incl. application, development, scanning and photo recording. Communicates in both directions with all connected instruments. 32 bit analysis. Upgradable periodically. Methods can be created and stored. Single report per analysis. Enables analysis report to include all related data such as time, date, name of the analyst / sample / place etc. Random report no. - to be prevent mix-up of two prints of same analysis. GLP compliant. 3rd generation.

SEMI AUTOMATIC SPOT / BAND APPLICATOR:
5th Generation. Sprays sample to layer. Stand alone or System Manager Control. 4 mode applicator   1) Quantitative analysis 2) Micro-preparative chromatography (190mm band length & 500µl sample in one go) 3) Superimpose – int. std. or derivatization reagent in same method 4) in – situ clean-up (sample application at 110mm on y axis). 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 storage – 10 built-in or infinite through system manager. Method entry – Manual or download from System Manager. Can auto – test instruments (self-diagnosis).

CHROMATOGRAM DEVELOPMENT CHAMBER:
All glass, moulded, one piece, bubble free chamber for TLC/ HPTLC. Bottom divided into two equal halves with a sloping divider. Chamber top and bottoms (both outside the chamber and inside the two troughs) should be perfectly parallel to each other.
Chamber ground finish on top for good seal and at bottom for perfect level. Heavy chamber to minimise effects of vibration. One piece joint less moulded chambers prevent leakage and tough

to handle while cleaning. Stainless steel rust proof lid with overhang to completely seal the chamber. Appropriate sizes for 20x20 cm, 20x10 cm and 10x10 cm plates.

PHOTO RECORDING UV CABINET:
UV Cabinet with a digital camera mount.
Enables to inspect the plate as well as keep a record by photo documentation. Images transferrable to PC. Digital camera required. Image can be attached to System Manager report. Image annotation software included.
Dual wavelength 254 nm + 366 nm with guaranteed minimum intensity, as follows : UV lamp at 17 cm distance. Short wave UV (254 nm) 1600, long wave (366 nm) 1000,. Visible light (<400nm) 0.4. 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 10 min. Thermal sensor and tilt sensor built in.

FOR DERIVATIZATION
20 X 10 cm one piece, moulded Dip Tank with lid
MULTIPURPOSE CHAMBER FOR METHOD DEVELOPMENT
Multipurpose Chamber for a) Method development b) Rapid screening of samples c) Horizontal development. Chamber comprises layer scraping module and development module. Uses 10 x 10 cm glass plates. Can run six mobile phases on one plate, side by side at the same time, with or without saturation. New method developed in 3 – 4 runs. With mobile phase creation guide. For screening, run same sample with 6 different mobile phases.

TLC SCANNER WITH DATA EVALUTION :

Computer controlled Scanner / Densitometer for automatic spectrum scanning for identity check as well as purity check; Automatic quantitative measurement by absorbance & fluorescence; All TLC / HPTLC plate sizes acceptable; Scan speed 100mm/sec @ 25µm resolution; Wavelength range 190-900 nm; Monochromator flushing by nitrogen; Data sampling rate – 4000 / sec; Special optics Macro / Maicro for HPTLC measurements; Spectrum scan speed 100 nm / sec; Max 999 spectra / plate; Visible pilot slit image / scan compartment illumination with UV to check sample alignment with scan beam; D2, Hg, W lamps + self diagnostic + Service dialog + Universal filter for fluorescence all built-in; scan slit size variable; bandwidth selectable 5 or 20 nm.

Data evaluation 32 bit software (latest version), Excellent S/N ratio. High reproducibility; Controlled by System Manager, Automatic / Manual data integration, Auto baseline correction. Spot check facility. 3D display with data storage. Calibration - single level, multilevel, linear / non-linear. Statistics CV / CI. Reproducibility check facility. Auto calculation of data from wts and dil. factors , Computer generated random no. for each report (GLP compliance). Lamp use tracking. 2 level digital user manual. Service Dialog + self Diagnostics + Tutorial all built – in. Meets GLP. Optional IQ-OQ and 21 CFR Rule 11 certification.

Software should be latest version and future upgradable

General conditions: -

Specifications of high cost instruments: should be preferably confirmed using the website of the manufacturer or directly by the manufacturer.
Good support from Indian base is essential.

Maintenance: A good team of service engineers, trained by the manufacturer is essential. Detailed information of service engineers and their product training to be provided. AMC or CMC rates should be offered reasonably.

Live product demo where applicable, with our samples is necessary. The same may be arranged at supplier's cost.

Training: In view of the long life of the instrument, training should be offered wherever requested by us. It can be arranged preferably at our lab or supplier's application lab.

Analysis support: Since we deal with complex samples, support for analysis should be given by the supplier by sending their application.

Equipment should be future proof and manufacturer is expected to offer upgrade whenever available rather than change models.

A live demo nearby and analysis of our samples will have to be done by bidders at their cost. Please provide complete details of your customer support lab. in India and training charges, if any in the next three years after the installation.

Warranty

- Instrument should be strictly with 3 -Years Comprehensive Warranty from date of installation (including Spares, Consumables & Service).
- Price may be quoted separately for Comprehensive maintenance contract with warranty for fourth and fifth year. Annual Maintenance Contract for Sixth, Seventh & Eight year may also be quoted separately.
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5. FT-IR SPECTROPHOTOMETER

Specifications:
- Highest Signal to noise ratio of 30,000:1 peak to peak or better in its class of general use instrument
- The FTIR should have a measuring wave number range of 7300 cm^{-1} to 350 cm^{-1} with a best spectral resolution of 0.8 cm^{-1} or better.

- Automatic moisture protection for the beam splitter
- Sample compartment should have non Hygroscopic window material.
- The moving mirror mechanism should be non-contact, frictionless Flexible Joint Support mechanism with electro-magnetic drive to ensure smooth movement of moving mirror.
- Purging with Dry Nitrogen should not be an essential criterion.
- Sealed interferometer with reusable Silica gel desiccant.
- The beam splitter should be Germanium coated KBr with anti- humidity coating. Highly stable interferometer with Dynamic Alignment or equally good technology.
- Mechanism so as to get the spectrum under stabilized and optimum conditions. Also ensures short warming up time
- Sequential display of diagnostic results are monitored continuously by status monitor function so as to ensure and optimized measuring conditions
- Accessories are automatically identified and optimum measurement conditions are to be set
- Small installation space without compromising the sensitivity.
- Dedicated Licensed libraries for forensic application should be provided. Pirated or copied Library will not be entertained. (With no. of spectra – approx.)
  Original Equipment Manufacturer (OEM)/Genuine Spectral Libraries compounds including below:
  Georgia/Toronto State Crime Lab - Drugs and drug related compounds
  Narcotic Drugs & Psychotropic Substance - Canadian Forensics
  Pharmaceutical Library - OTC and Prescription drugs
  EPA Library
  Pesticides & Agricultural Chemicals - Bio-Rad Sadtler
- Powerful software, completely compliant to GLP with following features
- Real time Display of spectra
- Compact measurement menus
- Simple measurement mode
- Atmospheric correction mode
- Continuous measurement mode
- Standard Data processing functions like Kramers- Kronig, ATR Correction, Purity / Compare function, Kubelka – Munk Conversion, Search Function, Quantitation, Macro programming etc
- Quantitation software to be provided with single / multi-point calibration, Multi-linear Regression (Multi-Component analysis) capability.
- Detector: DLATGS/DTGS or with suitable detector.
- Software should have built-in Spectral search function with different algorithms. There should be a provision to create user defined database.
- IQ, OQ to be provided by the vendor after successful installation.

Sampling Accessories to be supplied with instrument:

1. NaCl demountable cell for Mull sample or for Nujol base sample.
2. KBr Press (pellet maker), Agate Mortar, Pestle, Pellet Holder, Liquid cell, KBr Powder set for Pellet Preparation.
3. ATR accessory with single beam diamond crystal

Should be supplied with Branded - Pentium i-7 Computer, 19" LED monitor, 500 GB HDD, 4 GB RAM, Windows 7 or better with Graphical User Interface, Colour Printer, suitable UPS with one hour backup.

Training: Hands on training should be given to the staff members during installation until the satisfaction of the scientist. Demo of various specifications should be given by `the successful bidder before placing the order. A live demo nearby and analysis of our samples will have to be done by the bidder at his cost. Please provide complete details of your customer support laboratory in India.

Warranty
- Instrument should be strictly with 3 -Years Comprehensive Warranty from date of installation (including Spares, Consumables & Service).
- Price may be quoted separately for Comprehensive maintenance contract with warranty for fourth and fifth year. Annual Maintenance Contract for Sixth, Seventh & Eight year may also be quoted separately.
- Conditions for CMC: breakdown call response within 48 Hrs.

6. UV-VIS SPECTROPHOTOMETER:

Double Beam UV VIS Spectrophotometer

Microprocessor based UV-VIS Spectrophotometer with high resolution LCD display with PC software and dedicated soft keypad, for operation on 220V / 50Hz.

- Stand-alone operation or complete control through PC with PC software supplied as standard
- True double beam optics with aberration corrected concave blazed holographic grating in Czerny – Turner mounting for high energy throughput and high quality monochromatic light
- Wide wavelength range of **1,100 nm to 190 nm**
- High resolution **1 nm** spectral bandwidth over entire wavelength range
- Wavelength setting and display in steps of 0.1nm
- Wavelength accuracy of $\pm$ 0.1nm for D2 spectral line
- Wavelength reproducibility of $\pm$ 0.1nm
- Variable wavelength scanning speed of 3,000 nm/min to 2 nm/min
- Ultra low stray light of <0.02%T at 220nm with NaI filter
- Wide Photometric range of -4 to +3.5 Abs and 0 to 400 %T or better
- High Photometric Accuracy of $\pm$ 0.002 Abs at 0.5 Abs
- High Photometric Repeatability of <$\pm$0.001 Abs at 0.5 Abs
- Very low baseline drift of 0.0003 Abs/hour or better
- High baseline flatness of $\pm$0.0006 Abs over entire wavelength
- Ultra low Photometric noise of <0.00005 Abs
- Dual source – high intensity Tungsten-Halogen and Deuterium lamp with automatic changeover

- High sensitivity matched pair Silicon Photodiode detector
- Sufficient number of USB ports for high speed PC and printer connectivity, data storage and transfer through USB pen drive
- Guaranteed compliance with all Pharmacopoeias requirements
- Built in validation program, diagnostic and security functions
- All operational modes as standard – Photometric; Spectrum; Quantization; Kinetics, Time Scan, DNA and Protein Quantization in standalone and PC mode.
- Large sample compartment compatible with wide range of accessories
- Two pairs of Quartz and glass cells of 10 mm path length to be included as part of equipment.
- IQ, OQ to be provided by the vendor after successful installation.

Should be supplied with Branded PC, Printer DeskJet and suitable UPS with one hour backup.

Warranty
- Instrument should be strictly with 3 -Years Comprehensive Warranty from date of installation (including Spares, Consumables & Service).
- Price may be quoted separately for Comprehensive maintenance contract with warranty for fourth and fifth year. Annual Maintenance Contract for Sixth, Seventh & Eight year may also be quoted separately.
- Conditions for CMC: breakdown call response within 48 Hrs.

Training : Hands on training should be given to the staff members during installation until the satisfaction of the scientist. Demo of various specifications should be given by `the successful bidder before placing the order. A live demo nearby and analysis of our samples will have to be done by the bidder at his cost. Please provide complete details of your customer support laboratory in India

7. Inductive Coupled Plasma Emission Spectrometer (ICP-OES)

SPECIFICATIONS:

SPECTROMETER:

1. True simultaneous and background correction reading ICP-OES system using solid-state detector technology.
2. System with bench-top design.
3. The Instrument must have an Echelle-based polychromator that utilizes a single charge coupled device (CCD)/charge induced detector (CID). The system must utilize a prism cross disperser for higher order resolution. The resolution of the system must be minimum 0.007nm at around 200nm. The entire optical system must be enclosed in a purged and thermo stated optical enclosure.
4. A system purge of the polychromator for determinations made at wavelengths below 190nm must be standard. Nitrogen may be used as purge gasses and the gas flows must be controlled by the system controller.

5. The ICP torch must be mounted axially/Vertically with high sensivity, to the instrument optical path and, there should be options for demountable torch as well preferably a system with vertical and horizontal viewing.
6. Viewing of the plasma must be computer controlled. Dual View is desirable (torch).
7. The system must utilize at least carbon and argon emission lines in situ to perform the function for calibration.
8. The instrument must be able to perform determinations across the entire spectrum, both UV and Visible 167-750 nm.

ICP SYSTEM

1. The instrument must monitor all gas pressures through mass flow control. The interlocks must be continuously monitored and if any interlock is interrupted, the plasma is shutdown automatically.
2. Plasma ignition and shut down must be computer controlled and totally automated.
3. The instrument must include a mechanism to eliminate the cool end of the plasma for minimizing self –absorption and physical interference.

SYSTEM DETECTOR

1. Solid- state detector optimized for performance across the entire emission spectrum, anti-blooming protection to enable the simultaneous measurement of trace level analytes in the presence of major matrix constituents.
2. The detector must have Auto –Integration that allows intense and trace signalea to be measured simultaneously.

RF GENERATOR

1. The solid state RF Generator must run at frequency of 40/27MHZ. The RF Power should be variable from 750/1500W or better with capability to use maximum available power.
2. Power output stability should be better than 0.1%.
3. The RF generator must have power transfer efficiency into the plasma of at least 75% to eliminate the need of an inefficient secondary matching network.

SAMPLE INTRODUCTION SYSTEM
1. The instrument must include appropriate ICP torch and standard Mein hard nebulizer spray chamber system as a standard with HF resistance spray chamber nebulizer system .System should have capability for analysis of organic solvent as well.
2. The system must include a four channel, variable speed, controlled peristaltic pump which allows for on- line addition of internal standards
3. The instrument must include accessories for low detection limits of Mercury and other hydride forming elements.

SYSTEM SOFTWARE

1. The instrument system software shall be based on the windows operating system.

2. The software shall provide full control of all instrument functions including plasma ignition, gas flows, viewing position, and monitoring of safety interlocks.
3. Software should also have comprehensive wavelength library with indication of preferred line for each element .It should feature automatic identification of possible spectral interferences when selecting wave lengths for analysis and should have search mode for identification of unknown wave lengths.
4. Software should be of 21 CFR part 11 compliant.

PERFORMANCE

1. The instrument must meet all EPA contract lab required detection limits.
2. The instrument must have analytical linearity in excess of 5-6 orders of magnitude with the ability to use alternate wavelengths that measured simultaneously.

INSALLATION UTILLITIES
Vendor should supply factory fabricated chiller re-circulator of appropriate capacity along with the system. The scope of supply should also include branded PC, 30" monitor, laser printer, Argon gas regulator, Nitrogen gas regulator, Fume hood, filters etc…along with suitable capacity UPS for inductive load with built in isolation transformer with 60 minutes back up.

MISCELLANEOUS

1. Tuning solution 100ml X6 Nos.
2. Sample Kits for aqueous &2 multi –elements standards should quoted as standard.
3. Essential spares for 2 years. (Tourches -5, Neubulizer-2, Peristatic pump tubing- 4 sets, Argon dehumidifier-2, Radial mirror-2, Spray Chamber-2 etc...)

Warranty :

- Instrument should be strictly with 3 -Years Comprehensive Warranty from date of installation (including Spares, Consumables & Service).
- Price may be quoted separately for Comprehensive maintenance contract with warranty for fourth and fifth year. Annual Maintenance Contract for Sixth, Seventh & Eight year may also be quoted separately.
- Conditions for CMC: breakdown call response within 48 Hrs.

General conditions: -

- The supplier must provide training for the users of the instruments at site.
- The supplier must demonstrate that it has a proven appropriate set-up and capability to provide after-sales service efficiently and effectively.
- Software upgrades like version ups, if any, should be done without any cost.
- All modules must be GLP compliant .
- IQ, OQ to be provided by the vendor after successful installation.
- A declaration of System Validation certificate must be provided

Training : Hands on training should be given to the staff members during installation until the satisfaction of the scientist. Demo of various specifications should be given by `the successful bidder before placing the order. A live demo nearby and analysis of our samples will have to be done by the bidder at his cost. Please provide complete details of your customer support laboratory in India.

8. Specifications for Automatic Distillation Apparatus for Petroleum Products

- The apparatus should confirm to test methods ASTM D86 (Group 1, 2, 3, 4), D850, D1078, ISO 3405, IP 123, IP 195.
- Instrument should test sample from 20 °C to 450 °C temperature.
- Instrument should have volume detection by LED based static light barrier system + Drop Count with volume accuracy of 0.1 ml or any equivalent technology.
- Temperature range - Vapor temperature: 0 °C to +450 °C
- Condenser temperature: 0 °C to +60 °C or better
- Chamber temperature: 13°C to + 45 °C
- Heating system should be as per ASTM/better technology with minimum 5 yrs. warranty.
- Apparatus should have integrated CFC free cooling system via, coolant circulation/ equivalent or better technology.
- Device should have automatic switch-over facility from group 1 to group 4 during Distillation.
- Inbuilt pressure sensor for automatic barometric pressure measurement and corrections.
- System should have Automatic fire extinguishing system and can be connected to CO_2 or N_2 supply.
- The apparatus should have safety feature and automatic shut off for overheat protection, over pressure, overflow protection and low-level detection of cooling.
- Facility for adding 50 Operators, password management system ensures access to selective access areas.
- Device should have memory of at least 500 results or more and 250 programs or more.
- Data export through USB, LAN etc.
- Device should be equipped with mechanical jack for precise and safe adjustment of flask.
- Safety door with top metal grid cover should be provided for safe placement of flask.
- Facility for Calibration of PT-100 temp sensor and volume detection mechanism.
- System should automatically calculate Cetane index on insertion of density value.
- The instrument should be microprocessor based standalone unit. Device should have embedded software with TFT color touch screen user interphase to show the progress of test live and display results and graphs in detail. Software should have 50 free user licenses.
- Heater should have optimized heating which will protect flask from critical overheating, improves flask life-time and prevents from potential fire.
- Instrument software should automatically recommend adequate heat parameters for the next test run, automatic heating optimization.
- Provision to edit the fix point table with unlimited points after the test run is completed.
- Should feature a manual heating curve method to optimize the distillation performance of complicated mixtures when the same sample is tested again.

- The equipment should monitor and alert the operators for absence or improper placing of temperature probe in distillation flask, distillate receiver cylinder, distillate drop plate.
- The apparatus should automatically set, monitor and control all distillation parameters including initial and final heating rates, distillation rate, condenser and receiver temperatures, receiver chamber conditions etc. on its own for any given unknown sample.

Standard Supply
Distillation flask 125 ml
Heater board, center hole Ø 38 mm (1½")
Heater board, center hole Ø 50 mm (2")
Measuring cylinder 100 ml with metal base
Holder for Pt100
Sample temperature sensor Pt100
Stopper, made of Arlon, with 3 O-rings
Drip plate
Cleaning-spiral for condenser tube
Grad. Cylinder, 5 ml, for meas. Recovery
Glysantin G48, Antifreeze, 1.5 L
Boiling stones, pack of 20g

9. Steam Distillation Unit for Volatile Poisons

Specifications:

Vacuum Switching Valve:
The vacuum switching valve can be collected in a row without affecting the vacuum distillation condition.

Heating Pot Cover
-The heating pot cover to prevent burns.
- Equipped with discharge valve at the bottom.

Controller Display
Rotation speed, heating temperature (set and actual value), lift .
Allows user to monitor all parameters at a glance.

Lifting Stroke
Electric lift, 0～190mm lift stroke

Collection flask with discharge valve
10l collection flask, PTFE bottom valve, easy operation for vacuum release.
Rotary flask: 3L
Rotary Motor: 40 W 3-phase AC
Condenser: Vertical double coiler
Heating bath: Stainless steel water bath
Temperature range: RT approx.99°C, digital display
Vaccume :<400.Pa (3mm Hg), Chiller for cooling condenser
Evaporative Power: H2O> 2L/hr, alcohol >4L/hr
Lift type: Electric lift
Power : 2.2KV
Best model

10. FLASH POINT APPARATUS

Sl.No	DESCRIPTION
1.	Automatic, fast and portable flash point tester for the determination of the flashpoint of liquids as well as of solid samples
	Measurement according to the latest flash point methods ASTM D 6450 & D 7094
	Results equivalent as ASTM D 93 / ISO 2719 Pensky Martens method Official ASTM D 7094 precision statement: '...no statistically significant bias was observed between this method and Test Method ASTM D 93.'
	Better precision than ASTM D 93 / ISO 2719 Pensky Martens method
	Excellent correlation to ASTM D 56 TAG and ABEL methods
	Excellent correlation to ISO 3679 and ISO 3680 methods
	Go/No-go thresholds can be programmed with audible and visible alarms
	Automatic fuel dilution program for used engine oil analysis
	Approved by US D.O.T. and R.C.R.A.
	The safest flash point tester available:
	Flash point measurement with Continuously Closed Cup (CCCFP)
	Sample volume at least 15 mL or better.
	No open flame: electric ignition inside closed measuring chamber
	No offensive fumes and practically no waste
	Stand alone analyzer with built-in peltier temperature control
	Short turnaround time due to fast thermoelectric cooling after the test
	Rugged and easy to clean design
	Large Color Touch Screen
	Runs on Microsoft® Windows® software
	Network, PC and LIMS integration via LAN
	USB printer support and USB data transfer
	User Rights Management (GLP)
	Applications: quality control and compliance tests of diesel fuel, jet fuel, biodiesel, lube oil, used oil, chemicals, solvents, flavor & fragrances, paints, asphalt, waste, beverages and many more
	Measuring time: 5 min per sample
	Sample throughput: 10 samples per hour
	Temperature range: user programmable from 0 °C to 400 °C (32 °F to 750°C) with external cooling
	Sample volume: 1 mL (ASTM D 6450) / 2 mL (ASTM D 7094)
	Data Storage: 1000 measurements or better

Interfaces:
- 3x USB
- 1x LAN
- 1x VGA for monitor
Environmental conditions:
temperature: 0 to 50 °C (32 to 122 °F)
relative humidity: 10% to 90% r.h., non condensing
Power supply: 100/110/230 V AC; 50/60 Hz; 150 W
Dimensions: WxHxD: 253 x 368 x 277 mm - 10 x 14.5 x 10.9
inch
Gross weight: 11kg
Scope of supply:
MINIFLASH FLPH TOUCH
1 pc. sample cup 4 ml for ASTM D 6450 (FL-M071016.02)
1 pc. sample cup 7 ml for ASTM D 7094 (FL-M041021.01)
1 pc. sample cup carrier (FLPG/TRÄGER)
1 pc. stirring magnet (MAGNET-D3X13)
1 pc. brass eraser (FL-RADIERER-MESSING)
1 pc. BioHIT 1ml automatic pipette (SPRITZE-BIOHIT1)
96 pcs. pipette tip for autom. pipette (SPRITZE-BIOHIT1-TIP)
200cm PVC hose for water cooling (SCHL-PVC 6/4)
1 pc. power supply cable
1 pc. USB device (USB-STICK)
1 pc. instruction manual and test certificate
2 CH-N-DODECAN n-Dodecane calibration liquid (100 mL bottle)

11. **AUTOMATIC VISCOMETER CUM DENSITY METER.**

SPECIFICATIONS
- System should fulfill requirements of ASTM D7042 , ASTM D 4052 ,EN 16896, EN ISO 12185
- Instrument should have one cell to measure viscosity ranging from 0.2 to 30,000 mm**2/**s.
- Instrument should have built-in Oscillating U-tube for measuring density from 0.6 to 3 g/cm3.
- Sample temperature for viscosity and Density measurement should get controlled at set temperature between -20 to 135 °C by built-in Peltier solid-state thermostat.
- Viscosity and Density should simultaneously get measured from single injection of sample volume.
- Typical sample volume should be 6 ml.
- Typical solvent volume for cleaning and rinsing should not be more than 15 ml.
- Instrument should have a standard mode for calculating VI according to ASTM D2270.
- Instrument should have integrated provision of calculating and displaying API density, API number and API specific gravity at 15 °C, 20 °C, 29.5°C & 60°F for the product groups A, B and D.
- Display resolution: Viscosity: 5 significant digits, Density: 0.0001 g/cm3, Thermostat: 0.001°C(Display).
- Reproducibility Viscosity: + 0.35% + uncertainty of standard
- Reproducibility Density: + 0.0005 g/cc + uncertainty of standard
- Instrument should have in-built Memory for storage of 348 data sets.
- Four, UKAS certified standards, 100 ml each, certified for Viscosity and Density at 20, 40, 60, 80 and 100 Deg. C. should be supplied.
- Instrument should be compact, lightweight bench top device for use in lab and industrial environment with a footprint of maximum 0.5 m².
- The complete system should not consume power more than 250 watt.
- Required sample volume for all parameter measurement: maximum up to 5 mL.
- Special functions - Temperature scan, Temperature table scan, Time scan, Viscosity and density temperatureextrapolation, Automatic repetition measurement, Automatic viscosity index measurement,Density FillingCheck™,

Built-in air pressure sensor, Full range viscosity correction of density,
LIMS connectivity.
- Controls Touchscreen, optional keyboardand mouse.
- Interfaces 4 x USB (2.0 full speed), 1 x Ethernet (100 Mbit), 1 x CAN Bus, 1 x RS-232, 1 x VGA.

14. **KJELDOHL STEAM DISTILLATION APPARATUS:**

1. Microprocessor controlled Steam distillation unit with computer for convenient operation.
2. It should meet all the requirements of established by standards for quality control and assurance such as ISO – 17025.
3. It should be suitable for all established methods for Kjel-dohl   determination and methods for determination of Ethyl Alcohol mentioned in BIS / Standard.

4. The unit should have chemical resistant and corrosive free plastic housing and an automatic maintenance free steam generator for distilled or de-ionized water.
5. Steam output to be adjustable from 10 to 100%.
6. It should have facility for calibration of dosing with statistical data total running period, runtime of pumps, number of distillations since installation and last run.
7. Transparent protective door for full view of distillation process, condenser & distribution head.
8. System should have safety features such as tube sensor, door sensor, excess temperature and pressure.
9. Sensors should be operational at 1600 W, 50-60 HZ frequency of 220 to 240 V.
10. It should be supplied with chiller.

13. Water Purification system (De-ionized Water)

Technical Specifications
- Water Purification system (storage capacity 50 L) capable of independently dispensing both Type I and Type II water.
- Type II able to use tap water as feed able to accept up to 2000 micro Siemens conductivity.
- Tap water should be treated in a pre-treatment cartridge for efficient removal of particles, colloids, free chlorine and hardness
- Reverse Osmosis step should be water conservative and should ensure constant flow rate and optimal water quality.
- All the cartridges used should have considerable life.
- Should have electro deionization or other equivalent or superior technology for removal of Ions with absolute zero conductivity.
- The resin beads used should be of superior quality and should not degrade by exposure to harsh chemicals.
- The Resin beads should be able to be continuously regenerated without affecting its quality.
- The cartridges should be easily replaceable.
- The replacement cartridges should not be very expensive.
- The Equipment should have a low maintenance cost.
- The generated water should be treated with UV to destroy bacteria, before it is stored in the storage tank. UV lamp with dual wavelength (185 & 254 nm)
- The storage tank should be capable of maintaining the purity of stored water.
- A vent filter should be there for preventing airborne contamination.
- The water dispenser should be Ultra pure water free of particulates, pyrogens, nucleases.
- Should be able to dispense pre assigned volume of water.
- Production rate minimum 5 to 10 Liters per hour.
- Should have calibrated meters for continuous monitoring and display of water quality parameter
- Should have customizable alert and alarms.
- Should meet internationally recognized safety norms
- Prompt services should be available
   A minimum warranty for three years.

14. Electronic Balance

Specifications:

Complete with glass wind shield and one touch function key having sliding door opening/closing system.

- Overload Protection
- Leveling feet and Level indicator
- Anti theft device
- In built RS-232 WITH USB to connect PC.
- Back lit display
- Maximum Capacity : 220 gm.
- Readability : 0.1 mg.
- Repeatability : 0.1 mg.
- Linearity : 0.2 mg.
- Response time : 2 sec.
- AC Adapter 230 Volts.
- Tare range full.
- Platform dimension: 90 mm.
- Balance dimension : 347x204x345 mm (L X W X H) or standard
- Protective Covers.
- Should be provided with first time calibration certificate, IQ,OQ documents.

15. Up Right Deep Freezer -20 °C

Specifications:
1. Model should be up right (vertical).
2. Required capacity is about 500 litres.
3. Temperature Range should be up to -25˚C.
4. Should be able to maintain minimum temperature at up to 32˚C ambient temperature.
5. Should have 5 adjustable shelves.
6. Outer door should be lockable.
7. Digital temperature controller cum indicator with accuracy +/- 1˚C.
8. Robust, adjustable, lockable wheels are must.
9. Should be supplied with compatible, wall mountable stabilizer.
10. Should be CFC free, uniform cooling.
11. Warranty 5 years on compressor.
12. Installation, demonstration/technical presentation should be conducted.

16. Digital Melting Point Apparatus:

Specifications:
Digital Melting Point Apparatus incompliance with IP, BP & USP defined quality standards using the best and advanced technology.
1. Measuring Range of Melting point : Ambient to 400ºC

2. Resolution : 0.1°C
3. Rate of heating (°C/min) : 0.2,0.5, 1, 1.5, 2, 3, 4, 5..
 4. Accuracy : ±1°C
5. Capillary sample tube size : OD 1.4mm, ID 1mm
 6. Display of initial and final melting points.
7. Calculation of average value of initial and final melting points.
8. Platinum resistor sensor for the precise temperature measurement.
 9. Capillary sample tube as stipulated by pharmacopoeia.

17. High resolution Mass Spectrometer with Ultra Pressure Liquid Chromatograph

A High Resolution bench top LC-MS/MS equipment with Q-TOF/Orbitrap configuration that can perform qualitative and quantitative analysis of small molecules, synthetic organic compounds, compounds of forensic interest and characterization of large molecules such as proteins, peptides, nucleotides with respect to toxicology and forensic applications.

I. Mass Spectrometer
1. Analyzer: The geometry of the mass spectrometer should consist of quadrupole, collision cell followed by Time-of flight (TOF)/Orbitrap to perform high resolution MS and MS/MS experiments. It should be capable of connecting UHPLC using < 2 □m particle size columns for qualitative and quantitative analysis. It must be capable of performing MS and MS/MS experiments automatically in a single analysis.
2. Ion sources: The standard ESI, APCI and APPI sources.
3. Syringe pump: A suitable syringe pump to introduce samples directly into the mass spectrometer
4. Mass Range: For Q-TOF m/z 20- 10,000 or better. For Orbitrap m/z 50-6,000 or better.
5. Mass Resolution: TOF must be 30,000 (FWHM) or more
6. Mass accuracy: Should be <1 ppm in MS mode, < 2 ppm in MS/MS mode
7. Sensitivity: The instrument must be sensitive enough for detecting sub ppb/femtomole levels of compounds
8. Linear dynamic Range: Atleast 4 orders of linear dynamic range or better
9. Automatic negative/positive polarity switching.
10. Vacuum System: A high efficiency vacuum system with suitable turbomolecular pumps with back up of rotary pump(s).
11. Nitrogen generator should be supplied with system to take care of nitrogen gas requirements. Collision gas cylinder and pressure regulator, if needed, should be supplied

II. UPLC
12. UPLC system capable to run with < 2 □m particle size columns
13. Operating pressure of 15,000 psi or more
14. Quaternary/Binary pumps solvent manager
15. Flow rate: 0.01 – 2.00 mL/min
16. Flow precision: 0.075 % RSD or better, Flow accuracy: +/- 1.0% or better
17. Injection volume: 0.1 □L to 10 □L or higher

18. Photodiode array (PDA) detector capable of scanning from 190-700 nm range, flow cell volume should be 3 μL or less.
19. Autosampler capable of holding minimum 98 samples (2 ml vials) or better. Temperature control 4-40^{0}C programmable.
20. UPLC suitable C_{18} and C_8 columns two numbers each should be provided.
21. Computer: Latest branded computer with windows 7 or better OS, LED monitor, Laser printer and Computer table.
22. Software: Should be capable of performing all modes of operations of the LC-MS/MS instrument. Both LC and MS must be controlled with single software. Control software should be incorporated with elemental composition calculator as standard. Software should be capable of screening, component identification and structural elucidation studies. Must be capable to generate simulated isotopic patterns for given formula. Software should be featured with suitable deconvolution tool for determining the molecular weight of large molecules such as peptides, proteins and polysaccharides and biopolymers.
23. All the operation and maintenance manuals of the instrument and software must be supplied as hard copies.
24. Warranty: Three years comprehensive warranty which includes accessories and spares required for the smooth operation of the system.
25. Vibration free bench, for the bench top mass spectrometer
26. A 10 KVA UPS system, SMF batteries, atleast 1 hr back up time, built-in isolation transformer suitable for inductive loads to be quoted.
27. Necessary tool kit for routine maintenance should be quoted.
28. A suitable toxicants and metabolites database library for the quoted system should be provided if available.

Optional Items:

1. A suitable probe for direct analysis of solids using API technique
General Terms & Conditions:

Note:

a. All the parameters and technological features claimed should be supported with clear technical brochures for our reference and should be demonstrated at the time of demonstration.
b. On-site training for its operation and maintenance should provided at our site.
c. Training for two scientific personnel of the laboratory for operation and maintenance should provide at their authorized technical centre. The cost related to travel, boarding and lodging should be provided by the vendor.
d. The system should have GLP compliance and should strictly meet 21 CFR Part 11 guidelines.
e. The UHPLC and MS systems quoted should be controlled by single software and should be from the same manufacturers. No refurbished items

Warranty:

- Instrument should be strictly with 3 -Years Comprehensive Warranty from date of installation (including Spares, Consumables & Service).
- Price may be quoted separately for Comprehensive maintenance contract with warranty for fourth and fifth year. Annual Maintenance Contract for Sixth, Seventh & Eight year may also be quoted separately.
- Conditions for CMC: breakdown call response within 48 Hrs.

Training: Hands on training should be given to the staff members during installation until the satisfaction of the scientist. Demo of various specifications should be given by `the successful bidder before placing the order. A live demo nearby and analysis of our samples will have to be done by the bidder at his cost. Please provide complete details of your customer support laboratory in India.

18. Digital pH meter

Technical Specifications:
- Should have Working range from 0 to 14.
- Should have resolution 0.1/0.01 pH.
- Should have Temperature compensation zero to 100 degree C with ATC
- Should have Automatic calibration facility.
- Should have data storage facility and record maximum and minimum value.
- Should have 3 stage calibration.
- Should have digital display with 0.001 pH unit readability
- Should supply Tri-combination pH/ATC electrode
- Should supply Electrode + Standard buffer solution (pH 4.0, 7.0, 9.2) 1 x 50ml for each bottle + standard electrode holder +Ac /DC Adaptor.
- Should be provided with an electrode holder/arm with smooth movement.

19. Shaking Water Bath:
Technical Specifications:
- Should have a capacity of 30 Ltrs.
- Should have LED display and easy to set microprocessor based controls.
- Should have linear adjustable shaker with shaking speeds from 20-200 rpm.
- Should be supported by universal racks for 50 mL to 2 Ltrs.
- Should have removable shaking carriage for easy cleaning.
- Should have temperature range from +5°C to 99°C with accuracy of +/- 1°C.
- Should be supplied with transparent tight Lid with easy opening.
- Should have brushless motor for shaker.
- Should have electronic timer for setting running time.
- Should have drain screw for emptying water bath.
- Should have dry running protection.
- Should have integrated circulation pump.
- Should have over temperature, current protection capability.
- Floaters for 2mL, 15mL & 50mL tubes each two sets.

20. HOT AIR OVEN

Hot air oven with Microprocessor based, air circulation fan, three sides heating elements with double walled unit inner chamber made up of stainless steel and outer made up of mild steel with powder coating. Temperature range $50°c$ to $250°c$ and accuracy $+/- 1°c$. *Chamber size (L x B x H) 600 X 600 X 900mm with three trays.*

21. Hydrometers

Specifications:
Should have Working range: From 0.650 to 0.700 g/ml.
 Should have Working range: From 0.700 to 0.750 g/ml.
Should have Working range: From 0.750 to 0.800 g/ml.
Should have Working range: From 0.800 to 0.850 g/ml.

22. Thermometers

Specifications:
Should have Working Range: From -10 to 110°C.
Should have Working Range: From -10 to 150°C.
Should have Working Range: From -10 to 360°C.
Should have Working Range: From 0 to 400°C.

23. Ultra Sonicator:

Technical Specifications:
- Should have micro processor based in design
- Ultrasonic frequency: 38 to 40 KHz.
- Tank Capacity: 12 liters.
- Display : Yes
- Heating: Yes
- Heating Temperature: up to 80o C
- Digital Timer: 5 to 60 minutes
- Inner Tank Material: Stainless Steel
- Outer Housing Material: Stainless Steel
- Power supply: 230 volts ± 50 ± 2 Hertz.

24. Electrical Bunsen Burner:

- This apparatus should consists of heating element
- It is conically shaped refractory crucible
- It should be enclosed in an insulated S S casing
- Casing should be mounted on top of S S cylindrical housing.
- Max temperature: $350°C$
- It should have Temperature controlled by energy regulator

- It should work at 230 volts AC.

II. CYBER FORENSICS LAB

25. Digital Storage Media Seizure Kit (Incident Response Unit)

1. Should be a portable field kit which can be used at crime scene.
2. Should allow user to preview suspected storage media in read only mode.
3. Should support IDE/SATA/USB 3.0/USB 2.0/Multimedia Cards
4. Should allow user to open files on suspected storage media without changing time stamp.
5. Should allow user to make forensic image of suspected storage media.
6. Should support DD, E01,Ex01, AFF, SMART image format.
7. Should allow user to acquire RAM from Running PC.
8. Should allow user to obtain system protected files like windows registry.
9. Should allow user to create case to log seizure information.
10. Should allow user to enter various information required for creating seizure memo like location of seizure , Details of Crime, Details of seized exhibit etc.
11. Should allow user to export seizure memo to print.
13. Kit should have screwdriver kit to open hard drive from laptop and desktops in field.
14. Kit should have 21 Mega Pixel and 16x optical zoom Camera to capture the details of storage media.
15. Kit should have Faraday Bag to Isolate mobile phones from active mobile network to prevent incoming calls / SMS / Instant Message like Whats-app.
16. Kit should have evidence labels to label seized exhibits are to be supplied additional.
17. Kit should have at least 3 protective hard drive cases to carry suspect hard drives from crime scene to lab.
18. Whole kit should come in a portable Case.

26. Forensic Hard Disk duplicator / Imager Kit

S.No	Description/Specification
1	Extremely Fast Imaging speeds of 23GB/min, speed with SAS/SATA-3 should be 37GB/min.
2	Support multiple Imager Formats , native or mirror copy , dd image , e01,ex01(e01 and ex01 with compression) and file- based copy.
3	Multipal Imaging Ports: Write -Protected source ports include: 2 SAS/SATA 1 USB 3.0 (should be converted to SATA using an optional USB to SATA adapter) 1 Firewire 1 SCSI (using the SCSI Module Option)"
4	Destination Ports should include 2SAS/SATA , 2 USB 3.0
5	An optional USB to SATA adapter, 1 Firewire and 1 SCSI (using the SCSI Module Option)
6	Gigabit Ethernet port for network connectivity. The unit should include a USB 3.0 device port for drive preview and two USB 2.0 host ports
7	Capability of Parallel Imaging, Simultaneously perform multiple imaging tasks from thesame source drive to multiple destinations using different imaging formats.

8	The source should contain at least 4 ports i.e. SATA, SAS, USB and Firewire, similarly destination should also have atleast 4 ports i.e. SATA, SAS, USB and Firewire or better.
9	Web Browser/Remote Operation to allows to connect with device from a web browser
10	Broad Interface Support, Built-in support for AS/SATA/USB/Firewire storage devices. Supports 1.8″/2.5″/3.5″ IDE and 1.8″ IDE ZIF and microSATA. Adapters for eSATA, mSATA and flash drive
11	Support M.2 SSD hard drive that use the PCIe interface as well as the SATA interface, PCIe Express cards and mini-PCIe express cards.
12	PCIe Express Cards & Mini-PCIe Express Cards to support PCIe-based storage expansion cards for PCs and laptops
13	Image to External Storage Device such as a NAS, using the Gigabit Ethernet port, USB 3.0 or via the SAS/SATA connection.
14	Have SCSI Module , 1 write-protected SCSI source port and 1 SCSI destination portImage from a desktop or laptop computer without removing the hard drive from the computer
15	Image from a MAC system booted in "target disk mode" using the write-blocked FireWire port on
16	Detect and capture Host Protected Areas (HPA) and Device Configuration Overlay (DCO) hidden areas on the source (suspect) drive
17	Forensic, Filter-Based File Copy,users can filter and then image by the file extension (such as.PDF,.xls, .JPEG, .mov etc.).
18	Image to or from a Network Location using CIFS protocol and/or image from a networklocation using iSCSI
19	Ability to preview the drive contents directly
20	Network Push Feature to Push evidence files from destination drives to a network location in a very secure way
21	Concurrent Image and Verify
22	Generate Audit Trail Reporting/Log Files in XML, HTML or PDF format
23	Secure sensitive evidence data with whole drive AES 256 bit ncryption
24	Allow to manipulate the DCO and HPA area of the destination drive so that the destinationdrive's total native capacity matches the source drive
25	USB Host Ports and HDMI Port for connecting keyboard, Mouse and with Projector

27. Forensic Write Blocker Kit Specification

1. Should have forensic bridge to preview various types of storage media forensically in read only mode like

   a. IDE 2.5″ and 3.5″ Drives

   b. SATA 2.5″ and 3.5″ Drives

   c. SAS Drives

d. Fire-wire Storage Devices

e. USB 2.0 & 3.0 Removable and External Hard Drives.

f. Various types of Multimedia Expansion Cards like SD and Micro SD Cards.

2. Should allow users to copy , open or play and document or media file on suspected storage without changing its Hash Value.

3. Should allow users to make forensic image of connected storage media.

4. Should allow users to acquire RAM Dumps form running PC

5. Should allow user to calculate hash value of suspected storage media.

6. Should Have USB 3.0 Host connectors for IDE/SATA/SAS/USB and USB 2.0 for Firewire devices.

7. Should contain all needed cables, connectors and adapters for IDE, SATA, SAS and USB devices.

8. Should include disk imaging and hashing software.

9. All hardware should be packed in hard case for easy field movement and use.

Free installation and free training for two weeks should be provided in two spells at the customer's site. Free updates and warranty for three years from the date of installation

28. Encase Latest Version Forensic Analysis Software Disk Forensic Software

S.No	Specification
1	Should have gallery view option to quickly reveal all photographs and graphics file stored on hard drives and other media.
2	Should have timeline view option to provide an easily to search adjustable, graphical calendar like display for file activity of particular interest.
3	Should contain Full Unicode support to allow users to search text and fonts from any foreign county and in any language
4	Should support acquisition Restart facility: continue a window acquistion from its point of interruption.
5	Should have inbuilt LinEn utility to acquire evidence via boot disk
6	Should have inbuilt WinEn utility to acquire RAM evidence
7	Should do image verification by CR and MD5
8	Should have Inbuilt support for writing scripts & should have pre-built scripts
9	Should Support more than 150 Filters and Conditions

10	Should Support combining filters to create complex queries using simple "OR" or "AND" Logic`
11	Should have Inbuilt Active Directory Information Extractor
12	Should be able to automatically rebuild the structure of formatted NTFS AND FAT volumes
13	Should support Recovery of deleted file/folders
14	Should have Inbuilt windows event log parser, Link file parser to search in unallocated space
15	Should have Inbuilt support for Compound (e.g., zipped) documents and file analysis.
16	Should support file Signature analysis
17	Should have native viewing support for 400 file formats
18	Should have built-in Registry Viewer
19	Should Meet the mentioned criteria for searching: Unicode index search, Binary search, Proximity Search, Internet and emails search, Active Code Page: keyboard in many language, Case Senstive, GREP ;Right to Left Reading, Big Endian/Little Endian, UTF-8/UTF-7, Search file slack and unallocated space etc.
20	Should Support Internet and Emails Investigation for : Browsing History Analysis, WEB History & chche analysis, Kazaa toolkit, HTML carver, HTML page reconstruction, Internet artifacts, Instant Messenger toolkit - Microsoft Internet Explore, Mozilla Firefox, Opera and Apple Safari
21	Should Include Emails Support for: Outlook PSTs/OSTs ('97-'03), Outlook Express DBXs, Microsoft Exchange EDB Parser, Yahoo, Hotmail, MBOX archives, Netscape Mail, AOL 6.0, 7.0, 8.0, and 9.0 PFCs, Lotus Notes v6.0.3, v6.5.4 and v7
22	Should include system support for:
	a)Hardware and Software RAIDs
	b)Dynamic disk support for Windows 2000/XP/2003 Server
	c) Interpret and analyze VMware, Microsoft Virtual PC, DD and Safe Back v2 image formats.
	d))File System: Windows FAT12/16/32, NTFS; Macintosh HFS, HFS+; Sun Soloris UFS, ZFS; Linux EXT2/3; Reiser; BSD FFS, FreeBSD's Fast File System 2 (FFS2) and FreeBSD's UFS2; Novell's NSS & NWFS; IBM's AIX jfs, JFS and JFS with LVm8; TiVo Series One and Two; CDFS; Joliet; DVD; UDF; ISO 9660; and Plam
23	Should support reporting facillity with a)Listing of all files and folders in a case b)Detailed listing of all URLs and corresponding dates and times of web site visited c)Document incident response report d)Log Records e)Registry f)Detailed hard drive information about physical and logical partitions g)View data about the acquisition, drive geometry, folder structures and bookmarked files and images

	h)Export reports in Text, RFT (opens in Microsoft Office), HTML. XML or PDF formats.
24	Smart phone and Tablet support: Acquire data from devices running the following operating systems: Apple's iOS, Google's Android OS, Rim's Blackberry OS, Nokia Symbian, Microsoft's Windows Mobile OS etc.
25	Should have reporting feature for quickly share a report with field investigators, district attorney, supervision and with a few simple clicks select the exact information for your report and generate an easy to review HTML report that can be viewed in any web browser.
26	Should support acquisition of mobile evidence from all smartphone operating systems.
27	Should support more than 26.000 device profiles
28	Should be easily review parsed mobile device evidence from the widest variety of mobile devices including text messages, e-mails, call records, cloud repositories associated with mobile device, internet history, photos, application data, and deleted data.
29	Should have built-in bypass functions so that the evidence within a device can be hidden and unable to access.
30	Should support SQLite Plist, archives, PDF, HTML and others can be investigated using the file viewer feature.
31	Should be able to find, extract, and analyze data within graphic files using Optical Character Recognition. Evidence from graphic files such as PDFs, photos, and other file types will be found when running keyword searches, which uncovers even more critical and relevant evidence needed for the case
32	The device must be capable to gather and review evidence from a suspects cloud-based account such as Google Drive, Twitter, Facebook, and others.
33	Should allow investigators to locate credit cards, e-mail addresses, and phone numbers to find that extra piece of evidence to help finalize their collection
34	Should have several customizable reporting options including HTML, Timeline, PDF, and many other report variations. These reports are created to be shared in a compelling and easy to read way for every case.

29. Forensic Took Kit (FTK) Latest version

Sr. No.	Integrated Disk Forensic Software- FTK
1	Should have built in module to Create forensic images of suspected storage device in DD,EO1, SMART & AFF format with authentication with MD5 and SHA1 hash
2	Should analyze registry of windows based machine to extract vital information like Typed web address, USB device information, saved passwords, OS install date, OS name and version etc.
3	Should have built in module to Recover passwords (Password recovery Tool) from 100+ applications as MS Office up to version 2010, Financial Accounting software Tally, Adobe pdf, Win Zip, allow examiner to perform distributed password recovery by harness idle CPUs across the network to decrypt files and perform robust dictionary attacks, facility for generating biographical dictionary for password attack.
4	Should allow user to create physical drive from image
5	Should use Oracle or PostgreSQL database in background to store large amount of data.
6	Should have KFF hash library with 45 million hashes
7	Should have advanced data carving engine which allows examiner to carve allocated and unallocated data on mentioned criteria to reduce the amount of irrelevant data carved while increasing overall thoroughness: File size, file type, pixel size, over 50 custom data carvers for windows, MAC, Linux and Internet artifacts.
8	Should support RAM dump analysis.
9	Should support 32 bit or 64 bit windows .
10	Should support email analysis of various email clients as: Outlook PST/OST, Outlook Express DBX, Exchange EDB, Notes NSF, EML (Microsoft Internet Mail), Eudora, Thunderbird, Quickmail, Netscape, AOL etc.
11	Should Supports analysis of encrypted images with popular encryption technologies, such as Credant, SafeBoot, Utimaco, EFS, PGP and Guardian Edge with known passwords.

12	Should support for Mac like Process B-Trees attributes for metadata, PLIST support, SQLite database support, Apple DMG and DD_DMG disk image support, JSON file support etc.
13	Should Create reports and export them into native format, HTML, PDF, XML, RTF, and more - with links back to the original evidence.
14	easy-to-use GUI with pre-defined and customizable data views, advanced filtering, dockable windows and automated data categorization.
15	Should have integrated add-on malware analysis facility

Free installation and Certified training should be provided.
Free updates, support and warranty for three years from the date of installation

30. Belkasoft Evidence Center:

Should be able to perform acquisition, extraction and analysis of various digital storage media, data carving, Live RAM analysis, Cloud data downloading and analysis, generate reports accepted by courts.

Should be compatible for various types of Evidence viz.,
  o Office documents
  o Email clients
  o Pictures and videos
  o Mobile application data
  o Web browser histories, cookies, cache, passwords, etc.
  o Chats and instant messenger histories
  o Social networks and cloud services
  o System files, including jumplists, thumbnails and event logs
  o Encrypted files and volumes
  o Registry files
  o SQLite databases
  o Peer-to-peer software
  o Plist files
  o Geolocation data
  o Payment systems

Should have the following features:
  o Existing files search and analysis. Low-level investigation using Hex Viewer
  o Data carving and destroyed evidence recovery
  o Live RAM analysis including process extraction and data visualization
  o Cloud data analysis (iCloud, Google Drive, Google Plus)
  o In-depth Volume Shadow Copy support
  o Hibernation file (hiberfil.sys) and page file (pagefile.sys) analysis
  o Native SQLite analysis with freelist and WAL support
  o Discovers deleted SQLite records, e.g. Skype conversations or WhatsApp messages
  o Picture analysis including EXIF and GPS analysis, face/test/pornography/forgery detection
  o Video key frame extraction
  o Analysis of social communications with Social Graph Builder module
  o Encryption detection

- o Special files and folders analysis (e.g. Volume Shadow Copy, $OrphanFiles, $MFT etc.)
- o Hashset analysis
- o Flexible analysis
- o Advanced search and data filtering, various types of predefined search (card and telephone numbers, names, suspicions words, etc.)

Should support the following Data Sources and File Systems:
- o Storage devices - Hard drives and removable media
- o Disk images - EnCase (including Ex01), L01/Lx01, FTK, DD, Smart, X-Ways, Atola, DMG
- o Mobile devices - Mobile backups, UFED dumps, chip-off and JTAG dumps
- o Virtual machines - VMWare, Virtual PC, VirtualBox, XenServer.
- o Volatile memory - Life RAM dumps; fragmented memory set analysis with BelkaCarving
- o Memory files - Hibernation file and Page file
- o Unallocated space - Data carving discovers destroyed evidence
- o Network traffic - PCAP files
- o File systems - FAT, exFAT, NTFS, HFS, HFS+, ext2, ext3, ext4, YAFFS , YAFFS2

Should be compatible to the following Operating Systems:
- o Windows (all versions, including Windows 10)
- o Mac OS X
- o Unix-based systems (Linux, FreeBSD, etc.)
- o iOS: iPhone, iPad
- o Android
- o Windows Phone 8/8.1
- o Blackberry

Free installation and free training for two weeks should be provided in two spells at the customer's site.
Free updates and warranty for three years from the date of installation

31. MAGNET AXIOM COMPLETE:

Magnet AXIOM EVIDENCE ANALYZER Should recover data pertaining to several artifact types from various types of digital storage media viz., hard disks, pen drives etc.,
Types of artifacts:
1) Social media
- Bebo, Facebook, Google+, Instagram, LINE, LinkedIn, MySpace, Twitter, Sina Weibo, VK
2) Web-based email
- Gmail, GMX, Hotmail, Hushmail, Mailinator, MBOX, Outlook.com, Yahoo!
3) Instant-messaging/chat
- Adium, AIM, Chatroulette, GoogleTalk, iChat, iMessage, Mail.ru, MSN Messenger, MSN Plus!, ICQ, Mail.ru, mIRC, Omegle, ooVoo, Paltalk, Pidgin, QQ Chat, Second Life, Skype, TorChat, Trillian, WeChat, Windows Live Messenger, World of Warcra, Viber, Yahoo Messenger
4) Web browser
- 360 Browser, Chrome, Edge, Internet Explorer, Firefox, Opera, Safari, Xbox IE
5) Refined browsing results

- Classifieds URLs, Cloud Service URLs, Facebook URLs, Google Analytics Cookies, Google Maps Queries, Malware/Phishing URLs, Parsed Search Queries, Pornography URLs, Rebuilt Webpages, Social Media URLs

6) P2P file sharing applications
- Ares, Bitcoin, eMule, Frostwire, Gigatribe, Limerunner, Limewire, Luckywire, Shareaza, .torrent files, Usenet

7) Cloud services
- Carbonite, Dropbox (including Dropbox database decryption), Google docs, Google Drive, Flickr, Sharepoint, SkyDrive/OneDrive

8) Pictures and videos (with EXIF data)
- 3GP, AMR, AVI, BMP, DIVX, GIF, ICO, JPEG, JPG, MP4, MKV, MOV, MPEG, MPG, PNG, TIF, TIFF, WMP

9) Web video recovery
- Adobe Flash, Chatroulette, Camstumble, ChatForFree, iCU2, Shockrooms, YapChat

10) Mobile backups
- Android backups, iOS backups

11) Usenet files
- Binreader, Grabit, NewzToolz-EZ, Newsbin, Forte Agent, Xnews

12) Mapping
- Bing Maps, Google Maps

13) Search toolbars
- Bing Toolbar, Google Toolbar

14) Corporate email and messaging artifacts
- mbox email archives, MicrosoLync/OCS IM, Outlook OST & PST files, ZOOM

15) Document file artifacts
- .doc & .docx, .xls & .xlsx, .pdf, .ppt & .pptx

16) Windows OS artifacts
- Event logs, Jumplists, LNK files, Mounted network shares, OS and file system info, Prefetch files, Shellbags, Startup items, Time zones, User accounts, USB device history

17) Downloads: Android downloads, iOS downloads, .torrent files

Should be able to extract mobile phone data
- Phone logs: Android call logs, iOS call logs, Windows Phone call logs

Caches: Cell cache, iOS App Cache, iOS Snapshots, WiFi cache

3RD PARTY MOBILE OS APPLICATIONS

Chat: AIM, BBM, Burner, Google Hangouts, GTalk, Growlr, Grindr WhatsApp, Kik Messenger, LINE, QQ Chat, Snapchat, Skype, Textfree, TextNow, TextPlus, TextMe, Telegram, TigerText, Tinder, Touch, Viber, WeChat, Zoom

Social media: Face book, Foursquare, Instagram, Meet 24, Sino Weibo, Twitter, VK, Whisper, Yik Yak

Cloud services:

Drop box: Designed for investigators (or forensic teams) who work in a lab environment *and* in the field on live systems
- Get both standard and triage licenses together on a single USB dongle.
- Product Encrypted Disk Detector (EDD)

Free installation and free training for two weeks should be provided in two spells at the customer's site.Free updates and warranty for three years from the date of installation

32. Recon Mac complete Imaging and Analysis Tool

Forensic analysis platform for Mac OS X, iPhone, and iPad data

1) Should quickly Acquire a Snapshot of the User's Device and Provides a visual display of configurations and usage for each device case file, including:

a) Device type, OS version, serial number, UDID, and IMEI

b) Artifact summary statistics for documents, emails, movies, calls, voicemail, and more

c) Device user account information and common Internet account information for applications such as Twitter and iCloud

d) Recent usage history, including dialed phone numbers (with associated contact information), last running applications, and most recent web-based location searches.

e) Detect VMWare, Virtual Box & Parallels virtual machines

2) Should efficiently Sift through Large Data Sets Media view has built-in support for all commonly used picture and video file types, and it includes several helpful and examiner-oriented analysis features, such as

a)Built-in GPS Mapping:

b)All media files containing GPS data will be identified with a place mark badge

c)Examiners can view media geolocation data on a Mercator map (offline) or using Google Maps (online) directly from the built-in GPS view

d)Proprietary Skin Tone Analysis Algorithm:

e)Sort picture and video files by the skin tone percentage contained in the file

f)Video Frame Analysis:

g)Initially displays video files as 4x4 frame sequences, allowing examiners to quickly triage multiple video files in order to locate potential evidence

3) Recover Every Message from the Most Common Sources See a full log of calls, voicemail, social media activity, and more. Most importantly, examiners can view messaging threads in list view or in their native format, with support for data from:

Text Services
SMS/MMS
iMessage
iChat
Messaging Apps
Skype
Kik
TextPlus
TextFree
Social Media
Facebook
Twitter
LinkedIn
Foursquare

4) Reporting should be incredibly flexible. Examiners may export large data sets in an easily readable format, and can export reports in a variety of formats to enable easy information sharing with all interested third parties. Should be able to:

a)Easily tag evidence and include any and all relevant metadata in the examiner report

b)Export your report in your choice of formats, including

c)pdf   d)html   e)docx   f)txt

g)Export eDiscovery data to a generic Concordance load file that is compatible with all

major review platforms

h)Mask (blur) sensitive data contained within examiner reports that may be shared with non-authorized third parties"

5) Should analyze Mac OS and dual-boot disk and partition images in multiple formats

6) Should analyze configuration and log files from common OS applications, such as Mail, Safari, iChat and Address Book

7) Should perform rapid searches using metadata.

8) Should gather comprehensive machine usage information

9) Should list detailed information about every iPod and iPhone that has been connected to the machine

10) Should detect VMWare, Virtual Box & Parallels virtual machines

11) Should detect and analyze File Vault-encrypted user directories

12) Should support dd, EnCase, FTK, AFF, and Apple disk images

13) Should run on Microsoft Windows OS as well as Mac OS.

14) Should have full support for Mac OS both as an analysis machine and an investigative target

15 Should analysis of iCloud configuration data

Free installation and Certified training should be provided.

Free updates and warranty for three years from the date of installation

33. UFED ruggedized touch-2 (with Chinex, link analyser) (with camera attachment)

S.No.	Mobile Phone Forensic Bundle
1	The supplied Mobile Phone Forensic Solution must be capable of logical, file systems and physical mobile data extraction for wide range of mobile phones, mobile tablets and GPS devices with different operating system or chipset.
2	Should support proprietary custom boot loaders to ensure forensically sound extractions.
3	Should be possible to do Simultaneous operations like extraction, decoding and analysis, on a single platform.
4	Should come with a compact and lightweight case.
5	Extraction software should be touch screen enabled, allowing easy use on tablets.
6	Should be operated with a USB software license dongle.
7	Shall be able to recover deleted data e.g. image, SMS, emails, video, GPS locations etc.
8	Shall be able to decode mobile Apps such as Viber, Whatsapp, Skype, Facebook messenger, QQ etc
9	Should support Physical extraction and decoding while bypassing pattern lock / password / PIN from Android devices including Samsung Galaxy families, LG, HTC, Motorola, and more.
10	Physical Extraction using Boot Loader Method with Bypass of Lock for Android 5.x or below). Physical extraction while bypassing lock for the latest firmware up to Android 5.1, using the forensic recovery partition method.
11	Should support Physical extraction from BlackBerry devices running OS 4-7. Physical extraction should be performed using proprietary boot loaders, enabling a forensically sound process. Exclusive decoding: BBM data, apps, emails, Bluetooth and more. should support physical extraction for unlocked (including NAND and NOR memory)

	BlackBerry 7xxx/8xxx/9xxx devices, including atleast 9930 Bold, 9800 Torch and 8330 Curve.
12	should support file system extraction, backup acquisition & decryption for BlackBerry 10 based devices including Z10, Z30, Classic & Passport.
13	Should enables forensically sound data extraction, decoding and analysis techniques to obtain existing and deleted data from these iOS Devices based on either of Logical / File System or Physical extraction: iPhone 2G,iPhone 3G, iPhone 3GS, iPhone 4, iPhone 4S, iPhone 5,iPhone 5S, iPhone 5C, iPhone 6, iPhone 6Plus, iPod Touch 1G, iPod Touch 2G, iPod Touch 3G, iPod Touch 4G, iPod Touch 5G, iPad Mini, iPad 1, iPad 2, iPad3, iPad 4.
14	Physical extraction and decoding from locked Nokia BB5 devices – password extraction from selected devices. should supports bit-for-bit physical extraction from locked and unlocked Nokia BB5 devices using proprietary boot loaders. should support decoding of Symbian databases including Decoding of intact and deleted contacts, SMS, MMS and call logs; Decoding support for multilingual content.
15	Should support File system extraction from any device running Windows phone 7.5 and 8
16	Should support physical extraction and decoding of devices running Windows Phone devices running OS versions 8.0 and 8.1 and below including 6.0 and 6.5.
17	Should support physical extraction with password bypass for Nokia Lumia Windows Phone 8 devices. Should support recovery of deleted data from unallocated space in the device's flash memory.
18	Should support decoding of JTAG physical extractions of contacts, call logs and SMS from Windows Phone 8.x devices
19	Should enable physical extraction and decoding of data from a range of portable GPS devices . The Decoded data should include: Entered locations, GPS fixes, Favorite locations, GPS info. should support Data Extraction from Garmin & Mio devices. Extracted data includes: Favorites, Past journey (containing all the fixes during the journey),Deleted GPS fixes. Should support TomTom® trip-log decryption
20	Should support comprehensive analysis capabilities including timeline, project analytics, malware detection, and watch list.
21	Should decrypt WhatsApp's new encrypted chat history database i.e. Crypt8 or above.
22	Should support iCloud Backup to Decode the iCloud backup obtained from Apple devices
23	Shall be able to provide a phone power up cable, to be used on mobile device with damage batteries
24	Shall be able to provide generic Android, Windows phones file systems extraction
25	Shall be able to provide MD5 and SHA256 data integrity verifications
26	Shall be able to decode and extract password screen locks for certain devices
27	Shall allow extracted data to be searched, view and exported, including deleted data
28	Shall allow search of data either by specific parameters or open text
29	Shall be able to provide Analyst with ability to search and decode data using python scripting based programming
30	Shall be able to import 3rd party mobile device binary extractions for decoding
31	Shall be able to provide a comprehensive list of supported mobile devices and the their respective data and applications which could be extracted and decoded

32	GPS and location based data. - Shall be able to do physical extraction of GPS devices; - Shall be able to extract GPS data (Geotag, GPS coordinates) from mobile device; - Shall be able to decode GPS data e.g. previously entered locations etc
33	Shall be able to customize and generate reports in different format e.g. HTML, PDF, Excel etc
34	Shall be able to provide an application for report reading for non-licensed users
35	Shall be able to password protect sensitive reports
36	Shall be able to generate reports with organization logo
37	Shall be able to edit fields such as case name, number, examiner's name and more
38	Shall provide input cables for all phones that the system is able to support
39	Shall provide SIM ID Cloning Cards
40	Shall provide Micro, Nano SIM adapter
41	Shall provide either USB flash drive or memory card for saving of extracted data
42	Should support Entities bookmarks for Quick reference pointer set to analyzed data item and data file item.
43	Should support SQLite databases viewer for Viewing, searching and exporting tables and content (including deleted data) from SQLite database files.
44	Shall provide the support for chinese phones extractions with different connectors in kit. should have a connectivity box acts as the interface between the phone and the Tool , enabling the automatic pin-out identi¬cation. By selecting "Chinese phones physical extraction" , the phone pin-out should be detected and the extraction will start automatically.
45	Should support Chinese chipsets from MTK (Mediatek),Spreadtrum and Infeneon. Using proprietary boot loaders, it should perform a bit-by-bit physical extraction, from devices manufactured with Chinese chipsets, including knockoffs, accessing the device's memory, whilst maintaining forensic integrity. The boot loaders prevent the tampering of data, during physical extraction.
46	Should have link analysis software to quickly identify connection and communication method of different device used.
47	Should provide investigators and analysts an immediate visual picture of the communication methods, to help them understand the relationship between entities and put the puzzle pieces together.
48	Should reveal communication links between multiple mobile devices based on a complete range of existing, hidden and deleted data types: mutual contacts, calls, SMS, MMS, emails, chats, apps messages, locations etc.
49	Should help Visualize the communication directions between entities, pinpointing bidirectional and unidirectional communication.
50	Should support the following Features: • Entities analytics: Statistical data shows the frequency of communication and preferred communication methods • Timeline: Displaying a list of events in chronological order • Watch list: Automatically highlight case and category keywords from multiple devices • Advanced filters: Filter links and data based on variety of parameters such as date and time, communication methods, location types, distance and tags • Graph snapshot: Save an image of the current view • External data sources: Import from external sources – Excel, CDR, Text delimited, UFDR • Multiple data sources per person: Import and manage several extraction reports from other data sources, and assign them to the same person.

51	Should enable using login credentials extracted from a mobile device to extract private user cloud data from key social media, webmail and cloud storage sources, within pre-approved legal boundaries as well as using known username and password . should be possible to decode and use of cloud keys from Mobile device running on both Android and IOS Operating Systems.
52	should support extraction of the following information from a Facebook account using both Username + Password and cloud keys extracted from Mobile for both IOS and Android including Posts, Direct messages, Comments, Likes, Images, Videos, Files , Contacts, Embedded location information, Facebook Events .
53	should support extraction of the following information from an Instagram account using both Username + Password and cloud keys extracted from Mobile for both IOS and Android including Images and Video posts, Direct messages, Group messages, Comments, Likes, Contacts, Embedded location information .
54	should support extraction of the following information from a Gmail account using both Username + Password and cloud keys extracted from Mobile for both IOS and Android including Messages with attachments
55	should support extraction of the following information from a Google Drive using both Username + Password and cloud keys extracted from Mobile for both IOS and Android including Images, Video, Files and documents, Revisions
56	should support extraction of the following information from a Dropbox account using both Username + Password and cloud keys extracted from Mobile for both IOS and Android including Images, Video, Files and documents, Embedded location information, Revisions
57	should support extraction of the following information from a Google account using both Username + Password and cloud keys extracted from Mobile for both IOS and Android including Search history ; Voice search history ; Device history ; Visited pages (when signed into chrome) history , including Location data, including Contacts.
58	Should support dynamically visualizing and analyzing large cloud data sets in a unified format to bring key insights to the surface for easy analysis.
59	Should support a capability that enables forensic specialists to normalize and organize disparate data retrieved from various service providers into a unified format, to quickly uncover common connections and correlate critical evidence.
60	• Should provide two good quality 64 GB pen drives • Should provide TWO good quality 64 GB micro SD cards of class 10 • Should have Camera attached to UFED • Should be able to carry to crime scene
61	It should allow each piece of extracted data to be hashed separately and can be later compared against its origin.
62	Should generate and share easy-to read, PDF reports for entire data sets or filtered information.
63	Warranty- 3 years (should include free maintenance, upgradation and new cable released included in the price).

34. XRY complete with Pin Point

- Should be able to take logical & physical dump of all type of mobile devices from all type of manufactures of different OS based phones, Generic phones etc.,

- Should have capability to perform simultaneous extractions
- Should support Smart phones (Windows, iOS, Android, Palm, Blackberry etc.)
- Should extract data from portable GPS devices
- The device must be capable of extracting all kinds of data/information from the phone including: Phone book, Pictures & wallpapers, Videos of all possible formats, Audio content of all possible formats, Text/Pictures messages, MMS, Call logs (Received, dialled, missed), Manufacturing details (model no., OS, manufacturing date, chipset, supported/ forbidden networks), IMEI/ESN number, Log of access to internet related services (GPRS Wi-Fi and 3G). Deleted messages, contacts, pictures, videos etc.
- Should support DJI Phantom 3, DJI Inspire 1 and Flight data recorder DJI iOSD Mark II (Drones)
- Should have large set of available cables and connectors to interface the variety of cell phones and regular upgrades must be provided for any new kinds of connectors.
- Should support all kinds of operating systems (Symbian, Palm, Blackberry, Android, Apple, Windows etc.) and regular upgrades must be provided with new operating system releases.
- Should be able to extract data even if the phone is pin/pattern locked protected.
- The equipment should be able to generate a MD5/SHA verified evidence report in an interpretable manner.
- Should have feature of time stamping must be present.
- Should have a feature of indication of which cable is to be used for a particular handset.
- The device should support all known device interfaces i.e. USB, Infrared, and Bluetooth etc.
- Faraday's cage/bags must be included for isolation of the phone from the network.
- Should combine both mobile phone logical and physical solution in one package
- Should produce a combine report containing both live and deleted data from the same handset.
- Should be able to recover deleted data e.g. contacts, image, SMS, emails, VOIP Call Data, video, GPS locations etc.
- Should be able to decode Mobile Apps such as Viber, Whatsapp, Skype, Facebook messenger, QQ, etc.
- Extraction should support acquisition of internal memory and removable media.
- Should support GPS device physical extraction and examinations
- Should have Triage Mode
- Should allow search of data either by specific parameters or open text
- Should recover VOIP call data, GPS mapping information and instant messaging logs
- Should have Report Generator to generate and customize reports in different formats e. g. PDF, HTML, XML and Excel
- Should extract data from non-standard mobile devices.
- Shall provide the support for chinese phones extractions with different connectors in kit.

- Should support Chinese chipset
- Should include SIM (normal sim, micro sim and nano sim) reader module
- Should provide two good quality 64 GB pen drives
- Should provide two good quality 64 GB micro SD cards of class 10
- Should be able to carry to crime scene

Free installation and free training for two weeks should be provided in two spells at the customer's site.

Warranty

- Instrument should be strictly with 3 -Years Comprehensive Warranty from date of installation (including Spares, Consumables & Service).
- Price may be quoted separately for Comprehensive maintenance contract with warranty for fourth and fifth year. Annual Maintenance Contract for Sixth, Seventh & Eight year may also be quoted separately.
- Conditions for CMC: breakdown call response within 48 Hrs.

Training: Hands on training should be given to the staff members during installation until the satisfaction of the scientist. Demo of various specifications should be given by `the successful bidder before placing the order. A live demo nearby and analysis of our samples will have to be done by the bidder at his cost. Please provide complete details of your customer support laboratory in India.

35. Passware along with encryption analyzer (password recovery software)

- Should be able to take logical & physical dump of all type of mobile devices from all type of manufactures of different OS based phones, Generic phones etc.,
- Should have capability to perform simultaneous extractions
- Should support Smart phones (Windows, iOS, Android, Palm, Blackberry etc.)
- Should extract data from portable GPS devices
- The device must be capable of extracting all kinds of data/information from the phone including: Phone book, Pictures & wallpapers, Videos of all possible formats, Audio content of all possible formats, Text/Pictures messages, MMS, Call logs (Received, dialled, missed), Manufacturing details (model no., OS, manufacturing date, chipset, supported/ forbidden networks), IMEI/ESN number, Log of access to internet related services (GPRS Wi-Fi and 3G). Deleted messages, contacts, pictures, videos etc.
- Should support DJI Phantom 3, DJI Inspire 1 and Flight data recorder DJI iOSD Mark II (Drones)
- Should have large set of available cables and connectors to interface the variety of cell phones and regular upgrades must be provided for any new kinds of connectors.
- Should support all kinds of operating systems (Symbian, Palm, Blackberry, Android, Apple, Windows etc.) and regular upgrades must be provided with new operating system releases.
- Should be able to extract data even if the phone is pin/pattern locked protected.
- The equipment should be able to generate a MD5/SHA verified evidence report in an interpretable manner.

- Should have feature of time stamping must be present.
- Should have a feature of indication of which cable is to be used for a particular handset.
- The device should support all known device interfaces i.e. USB, Infrared, and Bluetooth etc.
- Faraday's cage/bags must be included for isolation of the phone from the network.
- Should combine both mobile phone logical and physical solution in one package
- Should produce a combine report containing both live and deleted data from the same handset.
- Should be able to recover deleted data e.g. contacts, image, SMS, emails, VOIP Call Data, video, GPS locations etc.
- Should be able to decode Mobile Apps such as Viber, Whatsapp, Skype, Facebook messenger, QQ, etc.
- Extraction should support acquisition of internal memory and removable media.
- Should support GPS device physical extraction and examinations
- Should have Triage Mode
- Should allow search of data either by specific parameters or open text
- Should recover VOIP call data, GPS mapping information and instant messaging logs
- Should have Report Generator to generate and customize reports in different formats e. g. PDF, HTML, XML and Excel
- Should extract data from non-standard mobile devices.
- Shall provide the support for chinese phones extractions with different connectors in kit.
- Should support Chinese chipset
- Should include SIM (normal sim, micro sim and nano sim) reader module
- Should provide two good quality 64 GB pen drives
- Should provide two good quality 64 GB micro SD cards of class 10
- Should be able to carry to crime scene

Free installation and free training for two weeks should be provided in two spells at the customer's site.
Free updates and warranty for three years from the date of installation

36. DVR Forensic examiner

DVR examiner (including DVR Format converter without compression effects and deleted data retrieval) Should perform forensically sound method of recovering video from various types of CCTV DVRs having proprietary File systems. Should be able to identify proprietary file systems in the CCTV DVRs. Should be able to recover data, including "deleted" data, in a completely forensically sound manner.
Should be able to access the data on the DVR hard disk drive in a write-protected environment.
Should be able to recover data from hard disk drive even if the DVR device is damaged or locked by a password.
Should be able to preview all CCTV video footage clips recorded in the DVR hard disk drive in write-protected manner.
Should be able to forensically recover data from the hard disk drive of a DVR in native format and also export relevant clips in generic file format (such as .AVI). Should generate a comprehensive report for data export and should generate HASH values for the exported clips.

Should be able to forensically recover data from a DVR, sometimes that is not accessible using the DVR itself.

Free installation and free training for two weeks should be provided in two spells at the customer's site.Free updates and warranty for three years from the date of installation

37.Computer Forensic Work Station

Item	Specification
Processor	Dual High Speed Intel ® Xeon E5 or E7 family processors with 16 core or above
Processor Cooling	Liquid Cooling System for temprature control of Dual Processors
RAM	128GB DDR4 2133 Quad Channel Memory-ECC RAM; Expandable upto 1 TB
Graphic Card	NVIDIA GeForce GTX 1060, 6GB GDDR5, 8008MHz; with HDMI 2.0, DisplayPort 1.2 and Dual-link DVI
Network Adapter	2 x Gigabit LAN Controller(s)
I/O Ports	**Front Ports:** 6 x USB (min. 4 x USB 3.0) 1 x eSATA 6Gb/s; 1 x Microphone; 1 x Headphone **Rear Ports:** 6 x USB (min. 4 x USB 3.0); 2 x eSATA 3Gb/s; 2 x RJ-45; 1x S/PDIF Out; Audio Ports,
Operating System	Windows 10 64 Bit Professional along with licensed
Power Supply	1300 Watts or better SMPS with 80 Plus Gold Certified
Write Blocker	*Integrated write protection for IDE/SATA/SAS/FireWire/USB3.0/PCIe ports. * All Integrated write blocked ports should be simultaneously available for imaging/analysis.
Cable & Adapter Set	Should have Adapters/Cables for write protected ports: *3.5" IDE, 1.8" IDE, 1.8" ZIF *mSATA, microSATA and eSATA *PCIe SSD Adapter Kit
OS Drive	512 GB SATA 6 Gbp/s SSD Drive
Temp Drive	512 GB High Speed PCIe based Internal SSD (connected on-board M.2 port)
Cache Drive	512 GB SATA 6 Gbp/s SSD Drive
Active Evidence Drives	2 x 512 GB SATA 6 Gbp/s SSD Drives with RAID 0 setup giving total of 1TB high speed memory for Analysis Software like FTK & Encase.
Data Drive	1 x 4TB SATA 7200 RPM 6Gb/s Drive
RAID Configuration	4 x 4TB 7200 RPM 6Gbp/s Hard Disk Drive Configured as Raid 5
Onboard Expansion Slots	6 x PCI Express (x16 slots; Version 3.0)
Front Mounted Drive Bays	Optical Disk Drive - 1x 16 x Blu-Ray Burner Drive 4 x SATA SSD Trayless for OS, Cache and Active Evidence drives 1 x SATA Trayless for Data Drive; 3 x Hot Swap SAS/SATA 3.5 Trayless Bays
Cooling Bay	1 x Inserting/Extendable type integrated Drive Cooling Bay

Forensic Multi Card Reader	Should have Integrated Write Blocked Multi-Card Reader.
Peripherals	21.5" LED Monitor, Wireless Keyboard and Mouse
Warranty	3 years parts and labor warranty
Toolkit	Multi-Piece Security Toolkit to assist in Digital Evidence Gathering, CD containing system restore media.
Software	licensed MS office latest version and reputed antivirus with three years license Quick view plus software latest version
Priduct Repute	The product should have international presence

Free installation and free training for two weeks should be provided in two spells at the customer's site.

Free updates and warranty for three years from the date of installation

38. Desk-top computers

Sr. No.   Description/ Specification

1   Should have a high-end desktop having following features to perform analysis on the Go

Should have Quad Core Processor,i7-6820HK or better

Should have 64GB Dual Channel DDR4 RAM Memory.
Minimum of 512 GB Solid State internal SATA Drive for OS and Temp
2TB 7200RPM internal HDD for Data
Should have Nvidia GeForce GTX980M 8GB GDDR5 or better
Integrated ports: 1x USB 3.1, 3x USB 3.0, 1x eSATA/USB 3.0 Combo Port
Should provide 24" LED Monitor, Keyboard, Mouse and External Speakers
Should have Windows 10 Pro 64-Bit along with licensed MS office latest version and reputed antivirus with three years license
Integrated I/O Ports: 1 HDMI 1.4a output Port (with HDCP) 2 DisplayPort 1.2 output Ports 3 USB 3.0 Ports 1 eSATA / USB 3.0 Combo Port (1 x Powerd USB port, AC/DC) 1 Headphone Jack 1 Microphone Jack 1 Line-in Jack 1 S/PDIF output Jack 1 RJ-45 LAN (10/100/1000Mbps)

2   should come with 3 years warranty, update and maintenance.

Free installation and free training for two weeks should be provided in two spells at the customer's site. Free updates and warranty for three years from the date of installation

39. High End Laptop

Sr. No.   Description/ Specification

1   Should have a high-end laptop having following features to perform analysis on the Go

Should have Quad Core Processor,i7-6820HK 2.7GHz, 8MB L3 Cache

Should have 64GB Dual Channel DDR4 RAM Memory.

Minimum of 256 GB Solid State internal SATA Drive for OS and Temp
1TB 7200RPM internal HDD for Data
Should have 15.6″ FHD (1920×1080) IPS Matte Display with G-SYNC Technology
Should have Nvidia GeForce GTX980M 8GB GDDR5 or better
Integrated ports: Thunderbolt 3 Connectivity, 1x USB 3.1, 3x USB 3.0, 1x
eSATA/USB 3.0 Combo Port

Should have 10/100/1000 Mbps Ethernet LAN
Should have 802.11a/b/g/n Wireless LAN
Should have in-built Bluetooth (Intel 6235AGN)
Should have Kensington Lock Slot
Should have 6-in-1 Card Reader (MMC/RSMMC/SD/Mini-SD/SDHC/SDXC up
to UHS-II)
Should have High Definition Audio with minimum of: High Definition audio
interface Built-in Array Microphone 2 Built-in Speakers External 7.1CH audio
output supported by headphone, microphone, Line-in and S/PDIF jack
Should have Windows 10 Pro 64-Bit along with licensed MS office latest version
and reputed antivirus with three years license
Should have Full-Size Illuminated Keyboard with numeric keypad
Should have Touch Pad /with scroll functionality
Should have Biometric Finger Print Reader
Integrated I/O Ports: 1 HDMI 1.4a output Port (with HDCP) 2 DisplayPort 1.2
output Ports 3 USB 3.0 Ports 1 eSATA / USB 3.0 Combo Port (1 x Powerd USB port,
AC/DC) 1 Headphone Jack 1 Microphone Jack 1 Line-in Jack 1 S/PDIF output Jack
1 RJ-45 LAN (10/100/1000Mbps)
2   should come with 3 years warranty, update and maintenance.
3   The whole solution should come in strong wheeled carrying case
**Free installation and free training for two weeks should be provided in two spells at the
customer's site. Free updates and warranty for three years from the date of installation**

40. High End Mac work station

Model	**Mac Pro**	
8 - Core; 3.0 GHz		
Processor	Intel Xeon E5 with 12MB L3 cache and Turbo Boost up to 3.9GHz	
Memory	16GB (four 4GB) of 1866MHz DDR3 ECC memory	
Dual AMD FirePro D700 graphics processors with 6GB of GDDR5 VRAM each		
2048 stream processors 384-bit-wide memory bus 264GB/s memory bandwidth 3.5 teraflops performance		
Storage	256GB - PCIe-based SSD	
Audio	Combined optical digital audio output/analog line out mini-jack 3.5mm headphone jack with headset support HDMI port supports multi-channel audio output Built-in speaker	

Connections & Expansions	4 x USB 3.0 6 x Thunderbolt 2.0 Dual Gigabit Ethernet HDMI Ultra HD
Wireless	802.11ac Wi-Fi wireless networking3; IEEE 802.11a/b/g/n compatible Bluetooth 4.0 wireless technology
Display	27-inch (diagonal) Retina 5K display

Free installation and free training for two weeks should be provided in two spells at the customer's site. Free updates and warranty for three years from the date of installation

41. Digital portable cell phone signal jammer blocker

Should be able to suppress cell phone signals pertaining to 2G, 3G, 4G, GSM, CDMA, mobile data voice calls etc.,
- High-strength isolating performance;
- Strong electronic suppression

42.Portable magnetic strip cards writer/skimmer

Should be able to read data from smart cards viz., credit card / debit card
Should be able to work in windows environment
Should be able to connect the device to a desktop computer using USB connectivity

43. Recover my files professional edition (latest version)

Recover My Files should recover data from digital storage media:
- Deleted or lost files;
- Formatted Disks;
- RAW Disks;
- Missing Drive Letters;
- Windows Re-installs or Windows system restores
- The software should not alter the contents of the drive being searched.
- Should be able to save data files to other storage media (eg. another hard drive, external USB drive or network drive).
- Should facilitate drive recovery, partition recovery, file recovery
- USB Dongle should be provided along with the software

Free installation and free training for two weeks should be provided in two spells at the customer's site. Free updates and warranty for three years from the date of installation

44. 5KVA UPS SYSTEMS -

TECHNICAL SPECIFICATIONS
1. Should be 5KVA on-line UPS with 2 hours full load battery support.
2. Should work with input 200 to 240v ac 50Hz supply.
3. Should have zero delay changeovers.
4. Should be with output voltage and current monitoring.
5. Should have lead acid sealed battery based support.

6. Power outlet terminated in sockets with isolator protection.
7 . Complete wiring and installation inside the laboratory to be covered under the
    scope of this work.
8. Input DC in for the inverter :120V DC or more.
 9. Battery should be from standard and approved brands.
10. Should be with zero maintenance.

47. Technical Specifications for JTAG and Chip-Off

1) Should have UP-828P Series High Speed Universal Programmer for Forensic Use enables
    examiners the ability to acquire the data from a variety of flash memory, including: NAND
    FLASH, SERIAL FLASH, MoviNAND, iNAND, eMMC, eMCP
2) Should include adaptors as VBGA 221P, VBGA 529P, SBGA 137NP, SBGA 152P, VBGA 169P,
    199P, FBGA 167P, VBGA 162P, FBGA 137P, TSOP 48P, VBGA 186P
3) Should have different chip reading adaptors with SD Adapter like eMMC30 11.5 X 13_0.5,
    eMMC30 12 X 16 _0.5, eMMC30 12 X 18 _0.5, eMMC30 14 X 18_0.5, eMMC30 11 X 10
    _0.5, eMCP 11.5 X 13_0.5, eMCP 12 X 16_0.5, eMCP Test Socket_11.5 X 13_0.5,eMCP Test
    Socket_15 X 15_0.5.
4) Should have Dediprog NuProg-E UFS / eMMC Programmer.
5)   NuProg-E programmer supports Universal Flash Storage (UFS), eMMC and eMCP
    Should have Features

High speed programming
a. Built in high speed processor to achieve high programming speed（Write speed 50MB/s;
   Read speed 100MB/s）

UFS Support
a. To Support Descriptors, Attributes, Flags Setting
b. To Support LUN configured and advanced setting

eMMC Support
a. To Support User Area, Boot1/2 Partition and Extend CSD
b. To Support RPMB, GPP1~4 and Enhanced mode

IC package
a. To Support standard packages for UFS and EMMC or special packages for EMCP

Regular software update
a. To Support USB2.0 and USB3.0 (using power adapter)
b. To Support Windows7/8/8.1/10

6) Should have UFS BGA95 Chip adapter.
7)   UFS BGA153 adapter
8) Should have JBC Soldering station kit
9) Tagarno Inspection station: Digital microscope with magnification up to 48x
10) Should have Fume Extractor

11) Should have CODED Frame with 6 x Adjustable arms and spring tip probes, USB MMC Reader, Adapters and cables to connect MMC Reader to probes, Toolkit, iSesamo dismantling tool
12) Should have Bench Gear x 3
13) Should have pre heater
14) Should have Box Set 2
15) Should have milling system.
16) Should have polishing system.
17) Should have Infrared reflow oven.
18) Should have rework station.
19) Should have all support and maintenance for 1 year.
20) Tech JTAG + Chip-off certified Training for 9 Days with all hands-on for 5 People.

III.   Ballistics Lab Equipment Specifications

49. Ballistics Comparison Microscope with camera attachment

- **Magnification range:** 6 X – 100 X or better
- **Bridge observation modes:** split, superimposed, left and right
- **Magnification steps:** three or more / continuous
- **Stages:** should have Z-axis stage movement fine and coarse adjustment and Manual XY movement for left and right stages integrated into the base.
- **Optical source:** Ring Illuminator - LED/ coaxial, cold white, fluorescence with intensity and segment controls.
- **Camera and software:** should have high performance CCD digital camera (5 M pixel resolution or better) with latest software packages for relative comparisons, image analysis, enhancement, archiving of samples.
- **Holders:** Should have cartridge and bullet holders (both universal and on center projectile holder) for all calibers with 360^0 basic mount and +/- 180^0 angle fiction.
- **Work bench:** motorized vertical movement with preferably smart touch pad controller.
- **Data processing unit:**
- Branded PC with relevant imaging software for comparison microscope.
- 1 TB external Hard Disk for storing the images.
- Printer : Laser colour printer of 1200 X 600 dpi resolution
- UPS : 5 KVA on line UPS with 2 hours backup.

Additional Features (Optional):
The software consisting 3D Image processing, tilting, rotation and superimposition of images and 360º bullet comparison.

50. Bullet Recovery Box

Bullet Recovery Box made of stainless steel material (Rust Proof) with movable trolley with lock adjustment.

Dimensions (L X W X H) : 10 X 2 X 2 feet
Height from Ground : Proportionate to the remote firing Rest
Bullet Puller for Small Arms : The equipment should safely remove bullet from the cartridge and also to reload the bullet.
Calibers : 0.22" to .45"
It should consist a pacesetter dies, Puller, jig for removing bullet, Reloading kit, BMG press kit etc.

51. Bullet Puller for Small Arms :

The equipment should safely remove bullet from the cartridge and also to reload the bullet.
Calibers : 0.22" to .45"
It should consist a pacesetter dies, Puller, jig for removing bullet, Reloading kit, BMG press kit etc.

52. Fume Hood:

For examination of blood stained clothes, skin pieces and chemical testing.
  ➢ Cabinet Dimensions : 4 x 2 x 2 feet
  ➢ It should be well illuminated inside the cabin
  ➢ Suitable exhaust for eliminating fumes and bad odors.
  ➢ With U.V and LED lights
  ➢ 100 % Exhaust.

53. Bullet Velocity measuring equipment

Facility: Indoor with Doppler Radar System
Data presentation on standard PC (Desktop/Notebook)
Evaluation software suitable for Windows
Immediate display of velocity and rate of fire values
Presentation of statistically processes values (minimum, maximum, average)
Calculation drop of velocity
Measurement of velocity and rate of fire

Graphic presentation of time behavior of values
Technical parameters :

Range of velocity	: 50 to 2500 m·s^{-1}
Rate of fire	: 60 to 3000 min^{-1}
Range of projectile caliber	: 4 to 20 mm (All small arm calibers)
Velocity measurement uncertainty	**:** 1 m/s
Frequency	**:** 35 G Hz
Protection	**:** IP 63

- ➢ Banded PC / Laptop with latest OS, Optical DVD writer, 24" monitor, Licensed pre-loaded OS Microsoft windows 10 pro or better and good quality internet security Antivirus (licensed)
- ➢ Printer : Colour printer of 1200 X 600 dpi resolution

54. Mobile firing rest system

- ➢ It must be Suitable to fire various small arms of all known calibers including country made and also useful to measure the trigger pull.
- ➢ Should have the latest user friendly software for measuring trigger pull and archive the data and to generate report.
- ➢ **Elevation and azimuth range:** +/- 5^0.
- ➢ Should consist of transport tow bar.
- ➢ **Accessories:** 1. Remote firing control with electronics box.
  2. Rifle adaptors.
  3. Pistol and revolver adaptors.
  4. Laser guide
- ➢ **Data processing unit:**
- ➢ Branded PC / laptop with relevant measurement software,
- ➢ Optical DVD writer, 27" monitor, Licensed pre-loaded OS Microsoft windows 10 pro or better and good quality internet security Antivirus (licensed)
- ➢ Printer : Laser color printer of 1200 X 600 dpi resolution
- ➢ UPS : 1 KVA on line UPS with 2 hours backup.

55. Hand Held Energy dispersive X-Ray Fluorescence (ED-XRF)

- ➢ It is suitable for the detection & analysis of gunshot residues on cloths, swabs etc.
- ➢ It is suitable for the detection & analysis of traces of copper and lead around the bullet holes on clothes.

- ➢ Detection range : Mg to U
- ➢ Fluorescent X- Ray detector : Silicon Drift Detector (SDD)
- ➢ Weight : 1 to 3 kgs
- ➢ Excitation Source : Rh target
- ➢ Operating Temperature : -10^{0}c to 50^{0}c

➤ Analysis software	: latest user friendly software.	
➤ Data storage	: 1 GB or more micro SD	
➤ Data transfer	: USB	
➤ Power	: rechargeable Li-ion battery	
➤ PC interface	: supports for windows 7 or high version	

IV.   <u>Engineering & Physics Lab</u>

56. ENERGY DISPERSIVE X-RAY FLUORESCENCE SPECTROMETER (WITH AIR/PELTIER COOLING SYSTEM)

With the following specifications or better with all spares, accessories etc for pre-installation and ready to operate

1. Element Detection range	:	Carbon to Uranium
2. Sample compartment size	:	150 mm or more (W) & about 100 mm (H)
3. Collimator	:	four step variable (1 to 10 mm dia) or better
4. Detector	:	SDD(Silicon Drift Detector),thermoelectrically
cooled		
5. Resolution	:	135 ev or better
6. Optics	:	Built in camera for field view
7. Analysis	:	Both qualitative & quantitative analysis
8. Accuracy	:	about 0.5%
9. Sample	:	Solid, liquid & powder
10. Measuring atmosphere	:	Air, Vacuum & Helium

11.	Tube Voltage & wattage	:	50 KV or higher and 50 W
12.	Detection limit	:	1 ppm to 100 % or nearest
13.	Software	:	Measurement/ analysis software for

qualitative analysis and calibration curve method, FP method, film FP method and background FP method for quantitative analysis. Automatic energy calibration and FWHM calibration functions with port generations. Also with auto X-ray tube aging software or equivalent software.

14.	Filters	:	software selectable filters
15.	Sample Holders	:	For examination of solid, liquid and powder
16.	Accessories	:	Standard tool kit, mylar films and other accessories
17.	Standards	:	for system calibration as well as other

standards for analysis of gold, silver, aluminum, copper, iron and nickel (CRS standards)

18.	Computer	:	I-5 with Multi core processor, 16 GB RAM, 2

TB hard disc, 27" LED Monitor or better suitable computer

19.	Printer	:	Colour laser jet printer of 1200 dpi resolution

and of standard company

20.	UPS	:	Standard ISI certified UPS with required KVA
21.	Warranty	:	Three years and two years extended warranty

57. EYE PIECE LESS STEREO MICROSCOPE with digital camera attachment with measurement software

With the following specifications or better

1.	Zoom Ratio	:	10:1 or better
2.	Magnification	:	6 X to 60 X and upgradable facility up to 120X
3.	Working distance	:	30 to 175 mm or better
4.	Optical Head	:	dynoscopic stereo optical head, ergonomic design with eye piece less technology, expanded pupil design using
	a		multi-lenticular disc
5.	Field of view	:	10 mm to 50 mm or more
6.	Iris diaphragm	:	double iris diaphragm built into focus module to allow greater depth of field or advanced.
7.	Focus	:	co-axial coarse and fine focus knobs
8.	Illumination	:	integrated LED illumination for both Transmitted and incident lights with built in power supply and LED ring illumination with continuosly tunable power source.
9.	Measurement facility	:	with measurement reticle
10.	**Modular Camera facility:**		
➢	Resolution	:	2560 X 1920 pixel or more, 5 M Pixels or more

➢ Colour depth	:	12 bit or better
➢ Live Image	:	Full size live image
➢ Refresh rate	:	about 15 fps
➢ File formats	:	bmp, jpeg, png, avi etc.,
11. **Computer**	:	I-7 or better Multi core processor, 16 GB RAM, 2TB hard disc, 32" LED Monitor, with colour Laser jet printer with 1200 dpi of reputed brand and UPS
12. Software	:	Windows 10, Latest software for image transfer, analysis and Measurement software.
13. **Warranty**	:	Three years and two years extended warranty

58 .Weigh balance with density measurement Kit

Weigh range	: 0.1 mg – 110g or better with best accuracy
Least measurement	: 0.0001g
Display	: Digital Display
Calibration	: Internal calibration facility
	Sliding transparent doors on the top, left and right

Density measurement Kit should include
- 2 Beakers (7mm and 55mm dia.)
- Bar frame
- Thermometer with retainer clip
- Glass plummet
- Sieve for immersing samples (pan hanger assembly)
- Sample holder (pan hanger assembly)
- Metal platform

59. High Temperature Muffle furnace with digital display

Inside Chamber Size vertical lift	:	6" x 6" x 12", approx with swing aside door at the front or
Furnace construction	:	(i) Double shell steel case with cooling fan to keep outside case cool
		(ii) High purity alumina fiber insulation for max. energy saving
Heating element	:	The chamber section should be heated by six to eight Super Kanthal Molybdenum disilicide heating elements (Super 1800 grade MoSi2) suspended in a chamber made of high temperature refractory fiber lined with a combination of ceramic fibre blankets or equivalent or better technology.

Standard Working Temperature: 1300° C (continuous)
Maximum Working Temperature: 1400° C (< 3 hours)

Temperature Control : The temperature controller should be a PID automatic control power control and programmable with necessary safety features.

Heating Rate : The furnace should be of fast heating type with the maximum attainable temperature should reach as a ramp function in less than one hour.

Temperature Accuracy: +/- 1.0 °C

Thermocouple : Pt. Pt. Rh. Thyristor controller will be provided along with the furnace to measure the temperature with connecting holder complete set.

Cooling Fan/ : Attached with Furnace, should provide inside the Air Circulation control unit.

60. Abbe's Digital Refractometer

Product Description:
1. Hard glass prism
2. Visual aim and LCD display
3. Automatic correcting of the effect of temperature.
4. Measuring refractive index transparent or translucent liquid and solid substances.
5. Reference glass & liquids

Measuring range	1.3000~1.7000 or better
Refractive index accuracy	±0.0001 for all temperatures
Temperature range	10~90°C
Power supply	AC 220V±10%, 50HZ

61. Magneto-optical device for identification and detection of vehicle numbers falsification with Eddy-current magneto graphing device for Ferro and non-Ferro (aluminum etc) to restore obliterated identification numbers

Case with a USB device for magneto-optical imaging
- Examined object material — ferromagnetic
- Magnetic tape width, mm — 25,4
- Image file format — .BMP, .GIF, .JPG, .PCX
- Power supply voltage from a USB port, V — 2,5

Tool kit for magnetic copying
- Magnetic tape length, m — 10
- Dimensions (length×width×height), mm — 120×80×40

Width of the scanning area — 20 mm or better

- With scanners , *controller &* charging unit scanner for all non ferromagnetic materials (Al) and all ferromagnetic materials (Fe) with Scanner power supply
- Rechargeable batteries
- time of non-stop operation with minimum 40 min
- charging time with 8 hours or less
- Laptop (i5 or better)

62. Micro Raman Spectrometer

A fully automated and fully integrated computer controlled confocal Raman spectrometer with the capabilities of recording Raman spectrum and Raman Imaging. The Spectrometer should be inclusive of research grade microscope with objectives, detector, Lasers, optics and other necessary accessories, along with computers & software for data acquisition and data analysis. The machine should be capable of performing Raman measurements with a spectral resolution (FWHM) better than 0.5 cm^{-1}.

Technical Specification for Raman Spectrometer:

Spectrograph equipped with research grade microscope capable of producing

Raman Spectra in the range : 100 cm^{-1} to 3500 cm^{-1} or better
Spectral Range : 200 nm – 2200 nm
Spectral resolution (FWHM) : 0.5 cm^{-1}
Spatial resolution: 1 micron or better lateral and 2 micron axial
Scan to Scan repeatability : 0.05cm-1
Gratings: 1200gr/mm, and 2400 gr/mm mounted on an encoder feedback

Controlled grating stage and must be controlled by software. The gratings should be quickly and easily interchangeable without realignment.

The spectrograph should allow spectral coverage: 100 cm^{-1} to 3500 cm^{-1} or better range in one single continuous acquisition without any step and stitches maintaining high spectral resolution.

Set of Edge Filters – 100cm^{-1} for 532nm and 785nm

The spectrometer should have a filter wheel with neutral density filters or equivalent technology offering different power levels from 0.00005% to 100% and is software controlled.

Raman system should be fully automatic with no manual change of Laser/optics including following

☐ Auto alignment and optimization of input laser power.

☐ Auto switching and auto alignment of laser

☐ Built-in Silicon and Neon light source for auto Validation, auto calibration and intensity correction

☐ Motorized switching between laser and white light sample images using integral video

Lasers:

All the lasers should have air cooled/ better cooling system for maximal confocal performance and should be directly coupled/ equivalent/better technology to the spectrometer. Lasers switching should be software controlled.

☐ Air cooled, Diode Laser 532nm, 50Mw or equally good
☐ Air cooled, Diode Laser 785nm, 250mW or equally good

Microscope:

A high stability research grade microscope

Microscope should be branded research grade with colour camera for viewing.

Microscope should be directly coupled to the spectrometer. Microscope to include Reflected Light illumination1 Included Aiming for the Best

Binocular head with color video camera

Objectives - 5X, 20X, 100X

Microscope Enclosure for open lab operation.

Detector

A multichannel Charge coupled device (CCD) detector:

High efficiency thermoelectrically cooled CCD: A fully automated multichannel Detectors suitable for Raman measurements -

Pixel Size: 1024 x 256

Peltier cooled to: -70°C

Quantum efficiency better than 40 %

Imaging Speed 1000 spectra/sec

Computer and software:

The state-of-the-art computer control system compatible-with and optimized for the application software to perform the various measurement options automatically.

The desktop computer Dual Core processor 4 GB RAM, 500 GB HDD, DVD-RW, Windows 10 (64 bit) Operating system, 24" LCD display.

Software license for 2 additional offline workstations

63. Scanning Electron Microscope (SEM) with Energy Dispersive X-ray Spectrometer (EDS)

Requirement of SEM for high resolution, morphological and compositional analysis of materials suitable for biology, metallurgy, conducting, non-conducting, semiconducting, metals, metal oxides, nanocomposites and polymer applications.

Sl. No.	Description	Specifications
1	Source	Tungsten electron source or advanced, Factory pre-centered filaments are must.
2	Resolution in high vacuum	3 nm at 30 kV or better.
3	Resolution in low vacuum	4 nm at 30 kV or better.
4	Probe Current	At least 1pA to 1uA.
5	Acceleration voltage	0.5 - 30 kV, adjustable or better.
6	Magnification	5x to 300,000x or more, continuously variable.

7	Specimen stage	• Computer controlled compucentric or equivalent 5 axis or more motorized movements stage • X = 80 mm or better, Y = 40 mm or better, Z = 45 mm or better. • Specimen tilt: -10 to 80^0 or better, Rotation: 360^0. • The position of the stage has to be graphically displayed on the monitor for sample positions.
8	Specimen size	80 mm diameter or more.
9	Detectors	• Imaging with Secondary electron (SE) and Back scattered electron (BSE) with required resolution mentioned above. • IR CCD/CCD camera for chamber view.
10	Non conductive samples	Should have low vacuum facility for imaging non conductive samples.
11	Vacuum mode	Menu selectable, switching between high and low vacuum without involving any mechanical / electronic alignments. The column vacuum should be separated from chamber vacuum.
12	Pressure Range in low vacuum mode	10-100 Pa or better.
13	Image display mode	19 inch LCD/TFT monitor, live images of different detector to be viewed simultaneously, full image live display, split live image, built in digital zoom, built in magnification, Pseudo colour, Histogram display, Digital images should have resolution better than 2000 X 2000 pixels and should be saved as BMP, TIFF or JPEG format.

14	Computer	Compatible computer with latest configuration and Windows operating system.
15	Software	• Should have the capability for performing 3D data analysis. • Software should be capable to do measurement of data. • Auto contrast, auto focus, auto stigma, auto gun alignment and biasing, maintenance videos, click center zoom, frame step move, saving position coordinate and seamless auto bias.

16	Other requirements	• Safety measures against vacuum and power. • Suitable anti-vibration platform, tool kit, spares filaments for two years (approx. 25 hrs per week). • Calibration of magnification, dimension and resolution. • Support kit/tool for specimen handling, stage and sample mounting stubs (including 45/90 degree SEM mount -4 nos.), stub holder.
17	Sputter Coater	Sputter coater with gold and carbon targets, oil free vacuum.
18	Energy dispersive X-ray detector (EDS)	• EDS should have a minimum area of 10 mm2. It should be peltier cooling system . • Elemental detection from Boron to Uranium. • Resolution at least 129 eV. • Should be capable of qualitative, quantitative and mapping analysis. • Software: Automatic peak labeling, qualitative and quantitative analysis, elemental mapping, selective area analysis and multipoint analysis. • Suitable elemental standard. • Standard and standardless techniques should be possible. • Customizable report generation.
19	Installation and Training	• The installation of the instrument should be done by service engineers at free of charge. • Operational training should be provided free of charge at the premises.
20	User manuals	User manuals: Soft and hard copies.
21	List of users	Please provide a list of users.
22	Warranty	3 year warranty and 5 years CMC.
23	Power Requirements	As per Indian Electrical Standards.

Tools/Instruments
64. Digital Camera

Effective angle of view	Approx. 1.5x lens focal length (35 mm format equivalent)
Effective pixels	24.2 million
Image sensor	23.2 x 15.4 mm CMOS sensor or better
Total pixels	24.7 million

Dust-reduction System	Image sensor cleaning Image Dust Off reference data (optional Capture software required)
Image size (pixels)	6,016 x 4,000 or better
Media	SD (Secure Digital) and UHS-I compliant SDHC and SDXC memory cards
Shutter	
Type	Electronically-controlled vertical-travel focal-plane shutter
Speed	1/4,000 to 30 s in steps of 1/3 EV
Flash sync speed	X=1/200 s; synchronizes with shutter at 1/200 s or slower
Release	
Frame advance rate	7 fps (manual focus, mode M or S, shutter speed 1/250 s or faster, and other settings at default values) or better
Exposure	
Metering	TTL exposure metering using 420-pixel RGB sensor
Active D-Lighting	On, off
Focus	
Lens servo	- Autofocus (AF) - Manual focus (MF)
Focus point	Can be selected from 11 focus points
Interface	
USB	Hi-Speed USB
Video output	NTSC, PAL
HDMI output	Type C mini-pin HDMI connector
Accessory terminal	MC-DC2 Remote Cord, GP-1 GPS Unit
Power source	
Battery	Rechargeable Li-ion Battery
AC adapter	AC Adapter
Tripod socket	
Tripod socket	1/4 in. (ISO 1222)

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65. Laser color printer (high quality)

- **Technology**   :   laser
- Built-in Devices   :   status LCD
- Connectivity Technology :   wired
- Interface   :   USB, Gigabit LAN
- PostScript Support   :   standard
- Media Type   cards, envelopes, glossy paper, plain paper, transparencies

PRINTING
- Max Resolution : 1200 x 600 dpi
- Max Printing Speed : 30 ppm
- Media Sizes

Letter A Size (8.5 in x 11 in), Legal (8.5 in x 14 in), Executive (7.25 in x 10.5 in), Executive (7.25 in x 10.5 in), A4 (8.25 in x 11.7 in), A5 (5.83 in x 8.25 in), B5 (6.93 in x 9.83 in), C5 (6.38 in x 9 in), JIS B5 (7.17 in x 10.12 in)

66. Diamond multi tester (for measuring thermal and electrical conductivity)

- Retractable thermoelectric probe tip that ensures constant pressure between probe and diamond
- Should have thinnest probe tip for testing gemstones as small as 0.02ct
- Metal alert buzzer to ensure that probe tip is in contact with diamond during testing
- Ergonomic design with rubberized anti-slip grip for better handling during testing
- multi-viewing LED display
- Low batter indicator
- Automatic power off
- Should Identify simulants, moissanites. and colorless diamonds instantly
- Should have enhanced accuracy and consistency with improved functionality and usability
- Accurate testing on diamonds as small as 0.02 ct
- Enhanced functionality and usability
- Clear and visible display for ease of reading measurements
- No waiting time between tests
- Simple and easy to use
- Light and portable for convenience
- Optimal Operating Temperature: 18.0 — 27°C or better

67. Gem stone / coloured stone tester (for measuring thermal conductivity)

- Should have facility to differentiate between nearly 30 types of gemstones by measuring thermal conductivity
- Color input function to further separate gemstones for more accuracy
- Easy-to-read results on clear digital LED screen
- Industry, thinnest probe tip (0.45mm) for testing gemstones from 0.02ct
- refined probe tip

- Metal buzzer alert and low battery indicator
- ergonomic grip
- USB port for alternative power source and connectivity
- Internal library database function of gemstones and their colors
- Retractable thermoelectric probe tip that ensures constant pressure between probe and gemstone, for enhanced accuracy
- handheld for convenience
- Operating Temperature: 23°C — 27°C or better

68. Scanner

Type: : Full-color scanner
Scan method: : Flatbed scanning
Image sensor type: : CCD Image Sensor
Scan type: : Sheet, book
Original sizes that can be scanned:
Length : 10–297 mm (0.4–11 inches) or better
Width : 10–432 mm (0.4–17 inches) or better
Tone: : Black and white : 2 tones
Full color / Gray scale : 256 tones or better.
Basic scanning resolution: 200 dpi
Selectable scanning resolutions when using the E-mail function:
100 dpi, 200 dpi, 300 dpi, 400 dpi, 600 dpi or more.
Interface : USB 2.0 (Type A) port (on the control panel)

69. Test Sieves and sieve shaker

Electrically operated and mechanically driven	Sieve Diameter 3 in, 5 in or 8 in
Adjustable timer Digital or Analog	Perfect for dry sieving
ASTM C136	Simultaneous tapping 500per minute
Rotation of sieve stage 12 per minute	Oil bath for machine parts
Sieving Capacity	(10) 8" sieves (12)5"sieves (16)3"full-heightsieves, (18) 8" half-height sieves.
Construction	Cast Iron, Painted Mild steel
Motor	¼ HP
Timer	0 - 60 Minutes
Timer Type	Digital / Analog
Standard	ASTM C136

Power Supply	220 Volts
Certifications	CE and ISO

Including sieves from 60 microns to 150 microns.

70. Hot Air Oven (soil drying oven) with digital display
- max temperature 250 °C or more
- Working temperature range: + 5 °C above room temperature up to 250 °C
- Horizontal, forced air circulation for temperature uniformity better than +/- 5 °C
- Large handle to open and close the door
- Infinitely adjustable exhaust at the rear wall with operation from the front
- Low noise operation.
- Measurement 2ft X 2ft X 2ft, 3 shelves,
- Should operate at 230V and 50 Hz
- Heating element should be spread on 3 sides, wattage 2.5 KW
- temperature setting with 1 °C precession
- Exterior: MS powder coated
- Interior: Stainless steel chamber, Stainless steel SS304 grade, rust-resistant

71. UV CABINET
- Minimum space requirements through reduced footprint
- Eyes protected through UV filter in the viewing window
- Almost no influence of ambient light
- The distance between UV lamp and object should be selected optimally for homogeneous illumination and observation of the entire plate through the viewing window.
- UV Lamp dual wavelength 254/366 nm.
- Glass filter for eye protection of reflected UV light.
- Easy sliding window for quick insertion of samples.
- To work on 230 V AC
- Light transmitting screen size, mm — 126×96 or better
- With power and battery operation with rechargeable batteries

72. Light table for water mark examination.

73. High Intense LED light
Light Output	: 500+ lumens
Beam Intensity	: >25,000 candela
Adjustable Focus	: Some reflectors or optics can be adjusted for a variable spot to flood focus, but usually introduce artifacts, such as rings or holes, into the beam.

Multi-Mode	: Different brightness levels are available and typically accessed using a series of clicks.
Runtime	: 5+ hours
Warranty	3 to 5 year warranty
Water Resistance body desirable	

74. Four wheeler tool kit box (for vehicle identification numbers examination)

- Complete Screw driver set with tester: Taparia or better
- Complete set of Spanners
- Spanner pliers
- Big and small files
- Tester screw driver

75. Digital Multimeter

Automatic Terminal Blocking System
MIN/MAX Value Storage
Auto ranging / Manual Range Selection
Continuity Test
Temperature Measurement
signaling in the case of a blown fuse
Overload Warning

Specifications	
AC Voltage Accuracy	±0.5
DC Voltage Range	30mV - 1000 V
DC Voltage Accuracy	±0.35
AC Current Range	300 µA - 10 A
AC Current Accuracy	±1.0
DC Current Accuracy	±1.0
DC Current Range (Amp)	300 µA - 10 A
Sensing	True RMS
Resistance Range (Ohm)	0-30 MΩ
Resistance Accuracy	±0.6
Capacitance Range (F)	30nF - 30 µF
Capacitance Accuracy	±1.0
Frequency Range (Hz)	0-100 KHz
Frequency Accuracy	±0.5

76. Counting Machine

Specification
- Counterfeit Detecting Function (UV & MG)
- Auto & Manual Start Counting Mode
- Size Detection
- IR (Paper Thickness Notes Stuck together) Detection
- Half-Note Detection, Dual Digital Display

Counting Speed	1000 pcs/min or better
Bank Note Size	Upto 190 x 90 mm
Power Supply	AC 220V± 10%, 50Hz

77. Digital Vernier calipers

12 inches length -1no.
6 inches length - 1no.
Specifications
Resolution   : 0.01mm or .0005"/0.01mm
Repeatability   : 0.01mm / .0005"
Display   : LCD
Length standard   : ABSOLUTE
Electromagnetic induction linear Dust/Water protection level: IP67

78.Digital screw gauge

Specifications
Resolution .00005"/0.001mm, 0.001mm
Accuracy*1 ±.00005"/±1μm, ±.0001"/±2μm (3-4"/75-100mm)
Functions Origin setting (for ABS length measurements), Zero-setting
(for INC measurements), Data hold, Auto power ON/OFF,
Error reporting
Protection IP65 (IEC60529), *Anti-corrosion treatment is required

79. Digital thickness gauge

Range	Resolution	Accuracy
0-0.47in 0-12mm	0.00005in 0.001mm	0.00015in

80. Laser Measuring Scale
Specifications

Accuracy	0.04 In or better

Range	2-in. (50 mm) to 825-ft. (251 m)

Portable, unit convertible facility & battery operated.

81. Retractable Measuring tapes

Length : **3 meters**
Least count : 1 mm
Material : stainless steel

82. Illuminated Magnifiers

Magnification : 3X (2 nos)
: 5X (2 nos)
10X (2 nos)
Illumination : white LED
With maximum possible field of view

83. Forensic magnifier

84. Digital balance -1 (max.5kg)

Measuring range : 1g - 5Kg
Precision/Least count : 0.5g or available minimum
Error : < 0.1g
With stainless steel base

85. Rough Digital balance -2 (max.100kg)

Measuring range : 10g - 100Kg
Precision/Least count : 10g or available minimum
Error : around 1g
With stainless steel base

86. Digital Spring balance

Maximum Capacity : upto 10 Kg
Error : 1g or less
Readability : minimum possible 20 gm or less.
Display : Big easy readable LED
Type Load Cell : Heavy Duty "S"/"C"
Powder Coated Metal or S.S. Body

87. Density gradient glass tubes including stand

1. Tube length   30cm at least
2. Colour   transparent
3. Diameter (inner)   3mm
4. Material   glass.
5. Number of tubes   200

Stand should hold minimum 10 tubes

V. Audio-Video Forensic Labs
Details of Software / Hardware required

88.

  a. Computerized Speech lab/equally good software-cum-hardware with best quality noise reduction software (latest version)
  b. Speaker Identification software (best quality international speaker identification software) with audio authentication software (latest version)
  c. Automatic speaker identification software (latest version)
    (all the above software should be supplied with suitable hardware and required general software with license)

89.

    a. Video/CCTV footage authentication and enhancement software (including poor CCTV footage enhancement) complete version with required hardware of standard company

    b. Advanced digital image authentication software with required hardware of standard company
(all the above software should be supplied with suitable hardware and required general software with license)

90.

    a. DVR examiner including deleted data retrieval software including all required cables

    b. UFED for PC or equally better software cum hardware for analysis of all models of mobile phones including china mobiles and all types of memory cards including all required cables.

    c. Forensic Face comparison software (including face 3D reconstruction with facial features and measurements extraction)

91.

    a. Meta data extractor for all audio and video files

    b. File format converter for all formats

    c. Adobe Photoshop or better for image enhancement

    d. Any video player software

    e. LaserJet Printer (Black & White)

    f. Colour LaserJet printer (600 x 600 dpi or better & two sided printing) with scanner

    g. Laptop with i7 Pentium processor, 1 TB hard disk, 8 GB RAM, Graphic card with licensed Windows 10, MS Office and reputed antivirus for three years

    h. Good quality Scientific external Speakers with zero noise and
Two sets of Head phones (SCNNHEISER HD 215 or better)

    i. UPS 5KVA for complete lab with minimum 2 hours backup including cable connections

Note:
1. All software should meet international standards and certification.
2. All software should be supplied with minimum 3 years license and updates.
3. Demo on all software & hardware should be conducted on end user (Forensic) samples before technical bid finalization.

Detailed specifications of audio-video enhancement and authentication system

88 a. Computerized Speech lab/equally good software-cum-hardware with the best quality noise reduction software (latest version)

Analog Input: 2 XLR /Phone –Type & 2 phono Channels

Coupling: AC or DC (Channels 3 & 4 switchable)

Sampling Rate: 8000 to 200,000 Hz

Dynamic Range: > 90 dB

Frequency Response: Channel 1 & 2: 20 to 88 KHz

Channel 3 & 4: AC Mode: 18 to 88 KHz

Channel 3 & 4: DC Mode: low pass roll of at 88 KHz

Digital Interface: AES /EBU or SPDIF format; transformer coupled

Software Interface: ASIO & MME

Computer Interface: Half size PCI card

Analog output: 4 channels: line & speaker, head phone

Systems should be supplied with Main program & Hardware

Systems must be supplied with required accessories to take care of Forensic Application.

Speech Analyser should be supplied with suitable Latest Computer work station with color Printer

System must be supplied with Gold wave software complete & Format Factory software

System should supply with Main program having following software features Speech Analysis software should be comprehensive speech recording, analysis, feedback and measurement program.

Software should be able to use for voice measurements and forensic work.

Software must be delivered with many pre-written macros, and users should have facility to create their own as well..Software should include a macro that loads a speech file, filters the signal to sound like a phone connection which illustrates the spectrum changes typical of a phone connection.

Should have the facility to adjust every function to suit even advanced research requirements. For example, the spectrographic analysis should have adjustments for as many possible filter bandwidths, four window weightings, full scaling, color, pre - emphasis, and dynamic range.

Speech Analysis Software should have following Features:

*   Capture and play with any sampling rate
*   Up to eight channels of data,
*   Read and write to wav file format and native file format,
*   Complete IPA symbols,
*   Editing viz. cutting, pasting, digital filtering, and appending,
*   Complete on-line Help and tutorial,
*   Analysis including multiple pitch extraction methods, Pitch -synchronous LPC, Glottal event markers, FFT, Formant history, Spectrogram, Energy, etc.

- Logging of cursor values,
- Macros to repeat operational steps,
- Learn mode to memorize steps,
- Tags, storable with signal,
- Complete suite of features for each analysis and editing command,
- All 32-bit, MDI-compliant for fast operation.
  Signal Enhancement software and noise reduction software should be Included
    - All varieties of filters for noise reduction such as broad band noise filter,
    - tone suppressor filter
    - click suppressor filter
    - dynamic range control
    - reverb suppressor
    - restoration of clipped wave fragments and reconstruction of lost signal information
    - reference noise canceller
    - high definition spectrum analyzer
    - speech segmentation automatic
    - Speech detector automatic (marking speech fragments suitable for identification)
    - automatic background noise scan

88 b Speaker Identification software (best quality international software) with audio authentication software(latest version)
- auditory and acoustic analysis
- Complete Latest audio examination software useful for speaker identification, Semi automatic comparison software including spectrogram & formants comparison, pitch analysis & range calculation, Oscillogram/energy, spectrogram/LPC-spectrogram, cepstrogram signal representation;
- Fast calculation parameters adjustment, easy spectral view attenuation;
- Signals synchronization;
- Full export options with user presets (images, transcripted text, pitch and formant tracks, voiceprints.. etc)
- cepstrograms with automatic extraction of coefficients, LPC .. etc.,
- Speaker text linked to the audio segments for audio decoding and text transcription;
- Speech enhancement and distortion compensation techniques;
- facility to draw metadata of file;
- Recording device identification tool.
- All audio files formats and majority of video files formats should support and convert: 3gp, aac, ac3, amr, ape, asf, au, avi, avm, avs, cda, dat, divx, dts, flac,

flv, m4a, mkv, mka, mov, mp2, mp3, mp4, mpa, mpc, mpeg, mpg, mts, nsv, ofr, ogg, ogm, ppk, ra, rm, rmvb, tp, ts, tta, vdr, vob, voc, wav, wma, wmv, wsd ... and more

Text decoding:
- Speech signal segmentation, manual audio decoding and text transcription;
- Search for matching text (words/sounds).

Speech enhancement:
- Band filtering, inverse and spectrum saving filtering;
- Broadband filtering, filtering by noise sample;
- Filtering to target frequency response;
- Advanced filtering (customized by user): equalization and harmonic filter;
- Amplification
- Stereo filtration

Forensic manual speaker voice identification:
- Speech quality assessment;
- Speech range comparison
- Pitch extractor and pitch distributions comparison;
- Prosodic patterns comparison;
- Formant tracks extractor, tracks represented over spectrogram;
- Matching articulations automated search;
- Speaker phonetic profile creation and phoneme statistics comparison;

Audio authentication software
- Finding the traces of previous digital processing
- Establishing of the recording device
- finding the traces of harmonics phase shift
- DC offset analysis
- sample order analysis
- traces of MP3 coding
- Automatic scanning regarding the integrity of back ground noises marking the abrupt changes of noise levels.
- calculation of recorder's parameters
- Automatic search for matching fragments of a signal with more advanced parameters which are useful for audio authentication.

- **Audio evidence verification:**
- Detailed file structure parsing and file format check;
- HEX and ASCII data representation;
- Automatic search and interpretation options;
- Frame allocation map;
- Histogram of samples, asymmetry, smoothing calculation;
- Histogram of samples autocorrelation analysis;
- Levelogram signal representation;
- Repeating samples automatic search;

- Identical signal fragments automatic detection ("copy-paste" search)
- Matching energy patterns detector;
- Precise resampling;
- MP3 coder auto detector: Number of zeros in spectrum graph and Frame shift graph;
- WMA coder auto detector: Number of zeros in spectrum graph and Frame shift graph;
- AAC coder auto detector: Number of zeros in spectrum graph and Frame shift graph;
- OGG coder auto detector: Number of zeros in spectrum graph and Frame shift graph;
- Automatic detection of resampling by codec

88 c. Automatic speaker identification software (latest version)
- with more than 95% accuracy which should have capability to compare not only clear voice samples but also slightly distorted and noised samples with as minimum as possible sample input along with suitable hardware which includes
  - Language independent
  - text independent
  - channel independent
  - Gender Identification
  - Speaker Segmentation
  - Able to export the complete results of the calculations into a file to generate a forensic report.
  - The minimum length of the audio file to perform identification task is seven seconds or better
  - The system should work with audio files with a signal to noise ratio (SNR) of at least 10dB or better
  - The system has to remove noises and non-voice events

  Hardware(in place of hardware if computer system is supplied it should meet the following specifications) and General Software specifications
- Suitable advanced desktop computer Pentium i7 or better, 8GB RAM, 2 TB hard disk, 2GB Graphic card, suitable audio card for the above software, 24 bit A/D converter with about dynamic range, 16 channel input and output, compatible PCI card and drivers, micro phone, connection cables, 22 inch monitor with licensed Windows 10, MS Office and reputed antivirus with three years license
- Good quality & reputed company external lab quality speakers
- Sennheiser HD 215 or better head phones
- Technical support and free updates during warranty period.

89 a. Video/CCTV footage authentication and enhancement software (including poor CCTV footage enhancement) complete version with required hardware of standard company

Frame by frame study, automatic identification of defected frames and signal breaks including blank frames.

- Automatic identification of video editing regarding superimposition of disputed audio over another video Frame by frame
- Video enhancement software including all Filters and Photogrammetric tool with the following parameters/filters
    1. Denoise (deblock, frame average)
    2. Deblur (optical and motion blur, blur caused by air turbulence)
    3. Histogram-Based Enhancement
    4. Reconstruction
    5. Interlacing/De-interlacing
    6. Transform Velocity
    7. Segmentation (edge detection)
    8. Edge enhancer
    9. Detail sharpener
    10. Colour safe levels adjustment
    11. Colour safe curves adjustment
    12. Universal noise remover of digital image (includes average blur, Gaussianblur, non edge blur, conditional smoothing, vertical filters) and more
    13. Demultiflexing of CCTV footage (preferably manual and auto)
    14. Should create a report with embedded images.
    15. Load video files from almost any digital format, sourced from NTSC, PAL and almost any other system such as mobile phones and internet content;
    16. Loss less screen capture and also video capture from external source.
    17. conversion facility for proprietary DVR formats;
    18. Multiple video frames may be selected in either a consecutive or random sequence.
    19. Correct the perspective in order to see the picture of the scene from a different angle.
    20. Automatic and manual image enhancement algorithms
    21. Resize the image without losing quality, clarity
    22. should Improve shaking video with local or global image stabilization
    23. Should correct and modify the camera viewpoint in different frames with perspective alignment.
    24. Should improve the resolution of the frames with a super resolution algorithm.

25. Should improve a video with bad weather conditions (fog, rain, flat light, sandstorm, etc.) and improve backlight images.
26. Should View 360° dome camera images as panorama view.
27. Lens correction facility.
28. Image sequence compilation.
29. Hash Code calculation for input files and to check integrity loading the project.
30. should export all frames as a PDF in one easy step

89b. Advanced digital image authentication software with required hardware of standard company

Image authentication with re-compression, any modification of the original color array distribution, re-sizing and consequent re- compression as well as format transfer, JPEG Quantization, pixel correlation differences within and image to detect traces of copy/paste objects from the same image or from different images, traces of copy/paste operations from images with different JPEG block structures, locate traces of copy/paste, luminance levels within an image to help detect traces of copy/paste operations, Clone Detection which Automatically detects duplicated objects in an image For RAW, BMP or uncompressed TIF files, 2D Discrete Fourier Transform of an image, Photo Response Non-Uniformity of an Image. The software should capable to detect utmost image morphing.

Software cum hardware to link the camera with video /image

• Image Ballistics tools to verify the camera used to shoot the image.
• Should support any standard image format like Jpeg, tiff, bmp, png and raw format from digital camera
• Image Display :Embedded viewer with multiple image comparison and synchronization
• Output image export must support standard image format like jpeg , tiff , bmp , png… etc.,
• Output Data export analysis output as plain text, HTML or TSV
• Google images integration , Flickr integration ,Tin Eye integration, Extraction of Embedded JPEGs

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Suitable advanced desktop computer Pentium i7 or better , 32 GB   RAM, 2 TB hard disk, 2 GB or better Graphic card, 32 inch monitor with licensed Windows 10 professional 64 bit operating system or suitable, MS Office and antivirus for three years with good quality external lab quality speakers, Sennheiser HD 215 or better head phones

90 a. DVR examiner including deleted data retrieval software including all required cables

DVR examiner (including DVR Format converter without compression effects and deleted data retrieval) should perform forensically sound method of recovering video from various types of CCTV DVRs having proprietary File systems. Should be able to identify proprietary file systems in the CCTV DVRs. Should be able to recover data, including "deleted" data, in a completely forensically sound manner.

Should be able to access the data on the DVR hard disk drive in a write-protected environment. Should be able to recover data from hard disk drive even if the DVR device is damaged or locked by a password.

Should be able to preview all CCTV video footage clips recorded in the DVR hard disk drive in write-protected manner.

Should be able to forensically recover data from the hard disk drive of a DVR in native format and also export relevant clips in generic file format (such as .AVI). Should generate a comprehensive report for data export and should generate HASH values for the exported clips.

Should be able to forensically recover data from a DVR, sometimes that is not accessible using the DVR itself.

90b. UFED for PC or better software cum hardware for analysis of all models of mobile phones and all types of memory cards including all required cables. Warranty-3 years (should include free maintenance, upgradation and new cable released included in the price).

90c. Forensic Face comparison software (including face 3D reconstruction with facial features and measurements extraction)

Face comparison software/ tool to identify individuals including from low-resolution photos or video (including face 3D reconstruction with facial   features and measurements extraction) (forensica GPS or other better software)

91a. Meta data extractor for all audio and video files

91b.File format converter for all formats

91c. Adobe photoshop or better for image enhancement

91d.Any video player software and Quick view plus software latest version

91e.LaserJet Printer (Black & White)

91f.Colour LaserJet printer (600 x 600 dpi or better & two sided printing) with scanner

Laser color printer (high quality)
- Technology   laser
- Built-in Devices   status LCD
- Connectivity Technology   wired

- Interface   USB, Gigabit LAN
- PostScript Support   standard
- Media Type   cards, envelopes, glossy paper, plain paper, transparencies

PRINTING

- Max Resolution   1200 x 600 dpi
- Max Printing Speed   30 ppm
- Media Sizes

Letter A Size (8.5 in x 11 in), Legal (8.5 in x 14 in), Executive (7.25 in x 10.5 in), Executive (7.25 in x 10.5 in), A4 (8.25 in x 11.7 in), A5 (5.83 in x 8.25 in), B5 (6.93 in x 9.83 in), C5 (6.38 in x 9 in), JIS B5 (7.17 in x 10.12 in)

Scanner

Type:	Full-color scanner
Scan method:	Flatbed scanning
Image sensor type:	CCD Image Sensor
Scan type:	Sheet, book
Original sizes that can be scanned:	
Length	10–297 mm (0.4–11 inches) or better
Width	10–432 mm (0.4–17 inches) or better
Tone:	Black and white: 2 tones
	Full color / Gray scale: 256 tones or better.

Basic scanning resolution: 200 dpi
Selectable scanning resolutions when using the E-mail function:
100 dpi, 200 dpi, 300 dpi, 400 dpi, 600 dpi or more.
Interface: USB 2.0 (Type A) port (on the control panel)

91g. Laptop with i7 Pentium processor, 1 TB hard disk, 8 GB RAM, Graphic card with licensed Windows 10, MS Office and reputed antivirus for three years

91h. Good quality Scientific external Speakers with zero noise such as BOSH and Two sets of Head phones (SCNNHEISER HD 215 or better)

91i. Suitable UPS 5KVA for complete lab with minimum 2 hours backup.
SPECIFICATIONS
1. Should be 5KVA on-line UPS with 2 hours full load battery support.
2. Should work with input 200 to 240v ac 50Hz supply.
3. Should be with output voltage and current monitoring with digital display.
4. Should have long life lead acid sealed battery pack in movable cabinet.
5 . Complete wiring to be covered and installation
6. Input DC in for the inverter: 120V DC or more.
7. Battery should be from standard and renowned brands.

Note: 1) Vendors can individually quote item wise i.e. 88 a, 88b…….91i separately.
    2) Complete version of all software should be supplied
    3) Before technical bid, forensic samples should be analyzed with the software / hardware and basing on the satisfactory result of the end user only the software / hardware has to be finalized.

VI.   Documents Analysis Lab

92. Specifications for Visual Spectral Comparator for Questioned Documents

CAMERA:

- 5MP or more CMOS digital camera with IR sensitivity spectral range 350nm-1100nm.
- **Digital zoom upto 8x** or more.
- **optical zom upto 20x or more** motorized continued optical zoom.
- Automatic and manual control of image integration from 1 milli-second to 180 seconds.
- Automatic and manual control of camera contrast,white balance, brightness, and gamma
- **magnification:**2x 8x digital magnification on screen magnification range from 1.7xupto 213x on 32" UHD monitor.
- **Field of view:** 263 x 212mm (± 10%) using X-Y stage to standard A4/letter size.

Connection interface: USB 3.0

LIGHT SOURCES:

INFRARED / VISIBLE illumination(LED /HALOGEN LAMP):

- Incident IR and visible light source,
- Transmitted IRand visible light source,
- Twin side light source,
- Incident IR and visible background light,
- High intensity transmitted Spot Light Source.
- Coaxial LED light source to view retro-reflective security printing.

ULTRAVIOLET:

- Incident UV Light- with range from 254nm to 365nm or better, transmitted 365nm.
- *(safety interlocked panels protect the operator during use)

Antistokes IR LIGHT SOURCES: 800nm-1100nm.

REQUIRED SPECIAL FEATURES   :
- Polarised light sources with effective lighting for viewing birefringent security features plus a linearly polarised light source (with effective lighting) crossed with the polarizing filter
- Pulsed 365nm UV LEDs/ light sources for differentiating fluorescent and phosphorescent security ink

SYSTEM HARDWARE :

COMPUTER AND MONITOR:
- Intel Core i7 processor or equivalent with 16GB RAM and 1TB SATA HDD
- Graphics card with a minimum of 1GB Ram
- 32-inch 4K UHD Flat Panel Monitor

SYSTEM SOFTWARE:

- Software that maximises the effectiveness of document examinations by providing the user with control of all VSC functions via a fluent
- Quick-access toolbar or programmable 'hot-keys'/macros.

DOCUMENT-SPECIFIC WORKSPACES:

- A range of application focussed workspaces providing tools and functions specific to the document being examined.
- facility to examine all security features present in security documents such as Passports, ID Cards, banknotes, ink analysis etc.,

IMAGE STORAGE, RETRIEVAL & VIDEO RECORDING:

- Images may be saved as Bitmap, Jpeg, Jpeg 2000, TIF, PNG, RAW or PDF files or copied into Microsoft Word with details of illumination,
- camera filter, integration time, magnification, contrast setting, etc
- Video capture of DOVD images with playback synchronized to scanning of live image

CASEWORK MANAGEMENT:

- Facility to store case information, images, spectra, chromaticity charts and full VSC examination settings
- Casework database facility

IMAGE ANNOTATION:

- Measurement of length, angle, area, and radius of a circular feature
- Image annotation with text and various shapes including arrows, lines, boxes and circles

IMAGE ENHANCEMENT

- Image enhancement functions including Contrast, HSL, RGB, Filters, Equalization, FFT, Gamma correction, sharpen and a library of user-coded
- image processing functions

IMAGE COMPARISON:

- Facilities to compare live and stored images side-by-side, superimposed or subtracted, strobed, rotated and mirror inverted

OPTICAL CHARACTER READER (OCR):

- OCR module to read and verify ICAO codes on Passports, ID cards and visas

- Facility to examine **BARCODE** and analysis of 1D and 2D barcodes

CALIBRATION AND DIAGNOSTICS

- Facility for calibration of filters and light sources using NIST traceable standards
- Facility for Automated diagnostics of the system and display of diagnostic reports.

OTHER SOFTWARE FEATURES:

- False colour image display
- Colour isolation RGB channel separation
- Software control of external [microscope] camera
- Interactive tutorial and on screen operation manual

SOFTWARE UPDATES:

- VSC software suitable updates for 5 years

- **Desirable Additional technical features: to read the special security features present in the documents.**

REQUIRED ACCESSORIES :

1.Laser color printer (high quality)

- Technology   : laser
- Built-in Devices   : status LCD
- Connectivity Technology   : wired
- Interface   : USB, Gigabit LAN
- PostScript Support   : standard
- Media Type   : cards, envelopes, glossy paper, plain paper, transparencies

PRINTING

- Max Resolution   : 1200 x 600 dpi
- Max Printing Speed   : 30 ppm
- Media Sizes

Letter A Size (8.5 in x 11 in), Legal (8.5 in x 14 in), Executive (7.25 in x 10.5 in), Executive (7.25 in x 10.5 in), A4 (8.25 in x 11.7 in), A5 (5.83 in x 8.25 in), B5 (6.93 in x 9.83 in), C5 (6.38 in x 9 in), JIS B5 (7.17 in x 10.12 in)

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3 KVA UPS SYSTEMS -
TECHNICAL SPECIFICATIONS
1. Should be 3KVA on-line UPS with 2 hours full load battery support.
2. Should work with input 200 to 240v ac 50Hz supply.
3. Should have zero delay changeovers.
4. Should be with output voltage and current monitoring.
5. Should have lead acid sealed battery based support.
6. Power outlet terminated in sockets with isolator protection.
7 . Complete wiring and installation inside the laboratory to be covered under the scope of this work.
8. Input DC in for the inverter: 120V DC or more.
9. Battery should be from standard and approved brands.
10. Should be with zero maintenance.

93. STEREO ZOOM MICROSCOPE with digital camera attachment
With measurement software
(With the following specifications or better)

1. Zoom Ratio : 1 : 8 or more
2. Magnification : 10 to 80 X or more
3. Objective : 1 X or better
4. Working distance : 75 mm or more
5. Eyepiece : 10 X, with diapter correction for spectacle viewers
6. Resolution   1 X objective should be 300lp/mm
7. Optical system : Apochromatic with Greenough design
8. Binocular tube : should have comfortable Inter-pupillary distance adjustment
9. Objective field : 23 to 29 mm or more
10. Focus : should remain constant throughout the zoom range
11. Illumination : integrated LED illumination for both Transmitted and incident lights with built in power supply and LED
    ring   illumination, ARC illumination desirable.
12. Least Measurement : 1 micrometer or better

Color Digital camera for microscope

➢ Resolution : 2048 X 1536 pixel or more, 16 M Pixels or more

- ➢ Sensor : CMOS or better
- ➢ Pixel size : 3.2 µm X 3.2 µm or better
- ➢ Gain : 1X to 20X with shading correction
- ➢ Adapter : C mount video adapter
- ➢ Live Image : Full size live image
- ➢ Connector : USB cable (data cum power)
- ➢ Exposure time : 0.1 milli sec to 2.0 sec or better

Computer : I-7 or better Multi core processor, 16 GB RAM, 2TB hard disc, 32" LED Monitor, with colour Laser printer of reputed brand and UPS

Software : Windows 10, Latest software for image transfer, analysis and measurement

Warranty : company warranty and additional three years
extended warranty.

VII. **Misc Forensic Equipment for retender**

S. NO	NAME OF THE EQUIPMENT	TECHNICAL SPECIFICATIONS	QUANTITY
94.	*8-Capillary genetic analyzer with all essential accessories or equivalent or better*	Automated Genetic Analyzer with array of 8-capillary, upgradable to array of 24- capillary *and supported by Genemapper/Genemaker or equivalent software* for Autosomal STRs, X-STRs, Y-STRs and mitochondrial sequencing data collection for Forensic DNA Profiling work. The system and all major accessories validated as per the SWGDAM guidelines for forensic DNA testing. Capillaries should be lined internally with new generation of polymer optimized for its performance for medium to high throughput DNA sequencing and fragment analysis requirements. System should operate by using virtual filters and peltier cooled charged coupled device (CCD) camera. Vendor should supply windows operating system with branded Desktop Computer (2-5 terabyte capacity, 25"TFT LCD monitor) for Data collection and analysis software. All essential accessories and consumables should be supplied along with the equipment.	*1*
95.	*Flourimeter*	Quantification of DNA in low volumes (1-2 µl) for quick accurate and sensitiveness with storage capacity of 500 or more readings. Wavelength range should be between 200 to 300 nm.	*1*
96.	*Shaking water bath - Big*	Shaking water bath of 30 liters with +5°C to 99°C temperature variability along with digital PID controller supported by universal racks of 50 ml to 2 Liters and over temperature, current protection capability.	*2*
97.	*Shaking incubator*	Shaking incubator with digital PID control for +7°C to 80°C temp. 0 to 300 rpm electronically controlled shaking mechanism. Should accommodate 50ml tubes and flasks up to 2 liters along with universal racks for various flasks and tubes with suitable stabilizer.	*1*
98.	*Mini Gel Submarine Gel System*	Mini Gel system (small 12.5 x6 cm)with gel tank, direct connect power supply, standard gel casting set and long gel casting set, 120v, micro casting set for four gels, including casting stands, four 6 x 6 cm gel trays and 4 combs.	*2*
99.	*Shaking rotators / mixer*	To rotate/ shake the sample vials of different sizes (2 ml / 50 ml tubes) for a given time period.	*2*

100.	PCR work station	For preparing PCR reaction mix under sterilized conditions with proper lighting. Built in 254 nm UV light programmability option for decontamination and auto UV light switch off function will be preferable. The system should be antimicrobial coated stainless steel having large work area. The size of the cabinet should be 4 ft.	1
101.	Cold room (4°c)	The chamber with 10 x 15 x 10 ft. dimensions, with 220 V with adjustable racks with maintaining 4°c continuously, to preserve the biological samples for longer periods	1
102.	Kits / Cartridges for DNA Sequencing equipment Portable model	Capillary System having 1-8 sample loading capacity with NDIS – approved STR based chemistry to generate DNA Profile from a fresh/forensic sample in a fully automated manner in a short span of 100 min +/- 10 min. Extraction to profile generation in a cartridge/chip with self contained reagents having shelf life of about 6 months or above. To be compatible for any commercially available cotton swab/collection device with or without RFID. Should be capable of utilizing in a Forensic Science Laboratory or in non-laboratory conditions in a mobile mode at the incident site to generate a DNA profile. User access should be restricted by PIN code/fingerprint/ password/facial recognition or any biometric ID system. To be supplied with appropriate Software allowing administrative users to control the instrument remotely and securely to review the result. Software should allow multiple systems at different locations to be monitored and managed by user(s) at a central terminal. The system should be rugged, robust, tested for vibrations/shockproof for mobile operations. Minimally trained persons should be capable of operating the instrument and free catridges/chips should be provided for 250 sample analysis for training. *The vendor should supply essential accessories and consumables such as cartridges/chip and kits along with the equipment.* **The Kits / Cartridges (Autosomal STR kits) for staggered delivery @ 1000 samples for every 6 months upto 3 years (total 6000 samples) along with other accessories and consumables.**	*Set of Kits & Catridges only*
103.	HPTLC with Scanner and Photo Recording Unit	**HPTLC SYSTEM MANAGER:** Software to control, document and manage all the instrumental steps of HPTLC analysis incl. application, development, scanning and photorecording. Communicates in both directions with all connected instruments. 32 bit analysis. Upgradable periodically. Methods can be created	*05 Nos*

and stored. Single report per analysis. Enables analysis report to include all related data such as time, date, name of the analyst / sample / place etc. Random report no. - to be prevent mix-up of two prints of same analysis. GLP compliant. 3rd generation.

SEMI AUTOMATIC SPOT / BAND APPLICATOR:

5th Generation. Sprays sample to layer. Stand alone or System Manager Control. 4 mode applicator   1) Quantitative analysis 2) Micro-preparative chromatography (190mm band length & 500µl sample in one go)   3) Superimpose – int. std.orderivatization reagent in same method 4) in – situ clean-up (sample application at 110mm on y axis). Sample syringe – 100µl (for analytical work) 500µl (for micropreparative work). Sample position on X & Y axis freely selectable.   Automatic rate of sample dispensing. Method storage – 10 built-in or infinite through system manager. Method entry – Manual or download from System Manager. Can auto – test instruments (self-diagnosis).

CHROMATOGRAM DEVELOPMENT CHAMBERS:

All glass, moulded, one piece, bubble free chamber for TLC/ HPTLC. Bottom divided into two equal halves with a sloping divider. Chamber top and bottoms (both outside the chamber and inside the two troughs) should be perfectly parallel to each other.

Chamber ground finish on top for good seal and at bottom for perfect level. Heavy chamber to minimise effects of vibration. One piece joint less moulded chambers prevent leakage and tough to handle while cleaning. Stainless steel rust proof lid with overhang to completely seal the chamber. Appropriate sizes for 20x20 cm, 20x10 cm and 10x10 cm plates.

PHOTO RECORDING UV CABINET:

UV Cabinet with a digital camera mount.

Enables to inspect the plate as well as keep a record by photodocumentation. Images transferrable to PC. Digital camera required. Image can be attached to System Manager report. Image annotation software included.

Dual wavelength 254 nm + 366 nm with guaranteed minimum intensity, as follows : UV lamp at 17 cm distance. Short wave UV (254 nm) 1600, long wave (366 nm) 1000,. Visible light (<400nm) 0.4. 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 10 min. Thermal sensor and tilt sensor built in.

FOR DERIVATIZATION

20 X 10 cm one piece, moulded Dip Tank with lid

MULTIPURPOSE CHAMBER FOR METHOD DEVELOPMENT

Multipurpose Chamber for a) Method development b) Rapid screening of samples c) Horizontal development. Chamber comprises layer scraping module and development module. Uses 10 x 10 cm glass plates. Can run six mobile phases on one plate, side by side at the same time, with or without saturation. New method developed in 3 – 4 runs. With mobile phase creation guide. For screening, run same sample with 6 different mobile phases.

TLC SCANNER WITH DATA EVALUTION :

Computer controlled Scanner / Densitometer for automatic spectrum scanning for identity check as well as purity check; Automatic quantitative measurement by absorbance & fluorescence; All TLC / HPTLC plate sizes acceptable; Scan speed 100mm/sec @ 25µm resolution; Wavelength range 190-900 nm; Monochromator flushing by nitrogen; Data sampling rate – 4000 / sec; Special optics Macro / Maicro for HPTLC measurements; Spectrum scan speed 100 nm / sec; Max 999 spectra / plate; Visible pilot slit image / scan compartment illumination with UV to check sample alignment with scan beam; D2, Hg, W lamps + self diagnostic + Service dialog + Universal filter for fluorescence all built-in; scan slit size variable; bandwidth selectable 5 or 20 nm.

Data evaluation 32 bit software (latest version), Excellent S/N ratio. High reproducibility; Controlled by System Manager, Automatic / Manual data integration, Auto baseline correction. Spot check facility. 3D display with data

storage. Calibration - single level, multilevel, linear / non-linear. Statistics CV / CI. Reproducibility check facility. Auto calculation of data from wts and dil. factors , Computer generated random no. for each report (GLP compliance). Lamp use tracking. 2 level digital user manual. Service Dialog + self Diagnostics + Tutorial all built – in. Meets GLP. Optional IQ-OQ and 21 CFR Rule 11 certification.

Software should be latest version and future upgradable

General conditions: -

Specifications of high cost instruments: should be preferably confirmed using the website of the manufacturer or directly by the manufacturer.
Good support from Indian base is essential.

Maintenance: A good team of service engineers, trained by the manufacturer is essential. Detailed information of service engineers and their product training to be provided. AMC or CMC rates should be offered reasonably.

Live product demo where applicable, with our samples is necessary. The same may be arranged at supplier's cost.

Training: In view of the long life of the instrument, training should be offered wherever requested by us. It can be arranged preferably at our lab or supplier's application lab.

Analysis support: Since we deal with complex samples, support for analysis should be given by the supplier by sending their application.

Equipment should be future proof and manufacturer is expected to offer upgrade whenever available rather than change models.

A live demo nearby and analysis of our samples will have to be done by bidders at their cost.
Please provide complete details of your customer support lab. in India and training charges, if any in the next three years after the installation.

4. **Price Bid**

ON THE LETTER HEAD OF THE COMPANY

Tender No. & Date : ……………………………………..
Name of the Item quoted : ……………………………………..
S.No. of Item in Tender Document : ……………………………………
HS Code of the equipment : …....................................
Rate of import custom duty and IGST : …....................................

Price Format for Imported Equipment

Details	Total Amount (Amount to be provided in words as well)
FOB Price (….......currency)	
Insurance Charges up to Port/ Airport (….......currency)	
Freight Charges up to Port/ Airport (….......currency)	
Total CIP Price (….......currency)	
Custom Clearing & Handling Charges (INR)	
Ex Works price (for items/ accessories supplied locally) (if any) (INR)	
Applicable GST for equipment supplied locally (if any) (INR)	
Inland Transport & Transit Insurance Charges from Hyderabad/Vijayawada Airport/Visakhapatnam Port to end-user premises (INR)	
Cost of Comprehensive Maintenance Contract for 4th & 5th Year	
Cost of Annual Maintenance Contract for 6th,7th & 8th Year	

Price Format for Indigenous Supplies

Details	Price (INR)
Ex Works price	
GST	
Inland Transportation & Transit Insurance Charges up to end-user premises in Vijayawada	
Total FOR Vijayawada Price	
Cost of Comprehensive Maintenance Contract for 4th & 5th Year	
Cost of Annual Maintenance Contract for 6th,7th & 8th Year	

We have carefully gone through the Terms and Conditions of the Tender Documents and hereby agree to abide by the same for the fulfillment of the contract. This is to also confirm that I am fully authorized by company for signing and submitting this price bid.

Place: SIGNATURE OF THE TENDERER
Date: NAME & DESIGNATION OF TENDERER
                                                            COMPANY SEAL