

**Department of Forensic Medicine & Toxicology,
Khyber Medical College, Peshawar**

**Specifications of Equipments
For up-gradation of Toxicology Laboratory**

S.No	Name of Equipment	Specifications
01	LC-MS QTOF	<p>MS-QTOF Specifications: Robust, High performance, high resolution MS/MS system designed for forensic routine use. Should be capable of simultaneous identification and quantitation, Automatic unknown identification, Target identification and quantitation, unknown screening. Simple software workflows that deliver reliable results, preferably single software platform for MS controls Data processing and reporting. Sensitivity, TOF/MS: Using the Sprayer probe in TOF-MS mode, reserpine 1pg on column, S/N >750:1 RMS. Sensitivity, MS/MS Quant: Using the Sprayer probe in TOF-MS Mode, reserpine 1pg on column, S/N >750:1 RMS. Resolution, MS: Equal to or greater than 42000 (FWHM) Mass Accuracy Internal: Less than or equal to 0.4 ppm. Mass Accuracy Over Time, External: less than 2 ppm RMS. Polarity Switching: Fully Computer controlled Linear Dynamic Range: Equal to or greater than 4 orders of magnitude inter-scan linear dynamic range without signal reduction Mass Range: TOP. Up to 40 kDa Precursor ion selection: 5-2250 mhz. Standard ionization Source: ESI and APCI as an option. Flow Rate: 5µL /min to 3 mL/min</p> <p>UHPLC Specifications: Component Based higher pressure UHPLC system includes the following components: Quaternary LC Controller, Degasser, LC Tray, AC Pumps, LC AC Auto sampler with 100 samples capacity tray. Including 5 solvent bottles, 5 vented caps and solvent lines. Auxiliary I/O synch cable as well as 100L binary mixing module. Pressure 12000psi for high performance). Column Oven: with auto column changer with minimum two columns with cooling. Temperature range from 10C below ambient to 85C. Sample Rack Tubing and fittings kit. Data System: Latest data system with compatible operating system Software: Latest software to control LCMS/MS Library: Latest & updated Forensic Library. Branded latest computer with laser printer.</p> <p>Gas Generator Standalone N₂ gas generator, containing a back- up compressor. To ensure continuous operation in the event of compressor failure. Produces source and exhaust gases in the required flow rates, purities and pressures to meet or exceed the requirements of LCMSMS Systems. LN2 Generator should be suitable for quoted system. UPS: Pure Sine wave Online UPS 7.5KVA. System Warranty and Technical Support</p> <p>Sample Preparation system:</p> <ol style="list-style-type: none"> 1. Solid Phase extraction completer system with chamber, vacuum pump and C18, C8 and normal phase extraction cartridges, vacuum manifold along with complete accessories.

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		<ol style="list-style-type: none"> 2. Vortex 2 channel 3. Flask Shaker 4. Micropipettes full set 1 µl to 5 ml 5. Tissue homogenizer 6. Nitrogen cylinder with block Heating (10-20 sample) for evaporating of solvent) 7. pH-meter <p>On-site Installation, commissioning, training and IQ/OQ by factory-trained Engineer is required. The Supplier must provide assurance to have a facility in a local city and dedicated team, consist of sales and service engineers/ chemist to provide efficient and effective support of the equipment during equipment breakdown.</p> <p>Make:UK / Japan / USA/Germany.</p> <p>Note: During installation any deficiency occurs, the supplier will be responsible to arrange at their own cost. The system should be complete in all respect to cover the forensic & toxicology applications. The successful bidder will also responsible for the renovation of the room and required fixtures. The above specifications are the minimum criteria for the selection of the instrument, with the same or better specifications within the approved budget.</p>
02	Atomic Absorption Spectrophotometer	<p>Specifications:</p> <p>Wavelength Range: 190-800 nm Diffraction grating: 1800 lines/mm Blazing Wavelength: Dual blazed, at UV and Visible, to get good intensity in entire wavelength region. Beam geometry: True double beam system with innovative high throughput optical design. Monochromator: best design with motorized drive for automatic wavelength selection. Detector: Solid-state detector or latest technology. Lamp: Number of Lamp position:6- 8-lamp position, fully-automatic lamp selection and alignment. Lamp power supply: Supply for high intensity lamp for higher sensitivity inbuilt. Flame & Furnace: Auto aligned Flame & Graphite furnace. Flame Type: Air – C₂H₂ & N₂O-C₂H₂ Burner: Burner with 10 cm slot for Air–C₂H₂& 5 cm slot for N₂O-C₂H₂ Gas control: Fully computer-controlled with oxidant and fuel monitoring. Keyboard-activated remote ignition. Automatic switching between Air–C₂H₂& N₂O-C₂H₂ flame. Burner position: Auto-optimization Background Correction: Double-beam background correction. Graphite Furnace: Heating technique: Computer-controlled Transversely Heated Graphite Tube. Background Correction: Entire wavelength correction preferably Longitudinal AC Zeeman-effect background correction. Furnace Camera: Color furnace camera. Mercury Hydride System: with High Intensity Lamps for Hg, Se & As.</p>

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02A	Microwave Digestion System for sample prep.	<p>Accessories supplied with instrument as standard: Air Compressor with Filters. Cooling water circulator. Regulators for C₂H₂ & N₂O (including Pre-heater) Fume hood with blower. Coded HCL Lamps with standards: Manganese, Magnesium, Strontium, Sodium, Iron , Silicon Copper, Tin, Cadmium, Lead, Potassium, Nickel, Zinc, Calcium, Titanium, Phosphorous, Chromium, Cesium. Data handling Software: Complete PC control system. Provides complete control of the instrument and its accessories. Computer: Branded Computer with 18.“ LED Monitor Printer: LaserJet Printer UPS: True on line, to support the complete system. Make: UK / Japan / USA/Germany</p> <p>Specifications: The system enables rapid digestion of any organic and inorganic sample Magnetron Frequency 2450 MHz Power Output 1800 watts - Continuous power available at all power levels to provide more control for reactions. Magnetron Protection Solid-state isolator, to protect magnetron from reflected energy, ensuring constant power output. Vessels: 8-12 with 75ml capacity. Method: Built-In or available with system. Turntable Design: Turntable operates in alternating or continuous mode. Sensors All sensors including pressure and temperature sensing devices located within the microwave cavity are microwave-transparent or shielded to ensure accurate readings and to eliminate arcing (ignition) hazards. Make: UK / Japan / USA/Germany</p> <p>Note: During installation any deficiency occur, the supplier will be responsible to arrange at their own cost. The system should be complete in all respect to cover the forensic & toxicology applications. The successful bidder will also responsible for the renovation of the room and required fixtures. The above specifications are minimum criteria for the selection of the instrument, with the same or better specifications within the approved budget.</p>
03	Gas Chromatograph with Head Space	<p>Specifications:</p> <ul style="list-style-type: none"> * Gas Chromatograph have all accessories. * The gas chromatograph has Time Saver, Enhanced Solvent Purge, Isolation and Enhanced Large Volume modes. * The twin-walled oven with concentric air intake to save time between chromatographic runs. * The gas has programmable pneumatic control. * The gas chromatograph has the ability for an auto sampler pre-rinse to perform a time-consuming syringe rinse with sample before the gas chromatograph is ready. * The gas chromatograph oven is capable of a maximum heating rate of 140 °C/minute.

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		<p>* The gas chromatograph oven is capable of fast cool-down from 450 °C to 50 °C within 2.0 minutes.</p> <p>* Injectors</p> <p>* Packed-column Injector: Removable glass liner for trapping nonvolatile residues 50°C to 450°C in 1°C increments, pneumatics—Programmed Flow</p> <p>* Programmable On-column Capillary Injector: Temperature-programmable inlet Oven Tracking mode for simple operation 50°C to 500°C in 1°C increments.</p> <p>* Detectors</p> <p>*Flame Ionization Detector (FID)>0.015 /pg. Makeup gas: Not required GC Columns: For Forensic & Toxicology applications. Qty.05</p> <p>* Nitrogen Generator with air supply: Flow: 100 mL/min. Purity: more than 99.995%. 230 VAC, 50 Hz.</p> <p>* Hydrogen Generator: Flow: 100 mL/min. Purity: more than 99.995%. 230 C, 50 Hz</p> <p>Headspace:</p> <p>*Forty vials with thermostating of up to twelve vials. * Solid aluminum thermostating oven *Sample temperature is settable from 35 °C to 210 °C in 1 °C increments. * Static leak checking to control that all pneumatics are leak tight. *Compatible with all capillary column diameters in split and split less (direct coupled) mode. On-column sampling. *Computer: Branded Computer with 18.5“LED Monitor * Printer: LaserJet Printer. * UPS: 10KVA True online. Make: UK / USA / Japan/Germany</p> <p>Note: During installation any deficiency occurs, the supplier will be responsible to arrange at their own cost. The system should be complete in all respect to cover the forensic & toxicology applications. The successful bidder will also responsible for the renovation of the room and required fixtures. The above specifications are the minimum criteria for the selection of the instrument, with the same or better specifications within the approved budget.</p>
04	FT-IR	<p>Specifications:</p> <p>FT-IR system platform: Robust, portable and Sealed Sampling accessories and application packages ensure the best solution. Wavelength Range: 7000 - 350 cm⁻¹ with KBr Resolution: 0.5 cm⁻¹ Precision: 0.01 cm⁻¹ Interferometer: Self-compensating for dynamic alignment, High stability. Source: Stabilized Long-life source. Detector: High linearity room temperature detector. Beam splitter: KBr. Can work under high range of humidity Diamond Universal ATR for solid and liquid direct sampling. The ATR</p>

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		<p>system detachable not built-in. Software: A single software platform incorporates all of the functions required for infrared analyses; instrument control, data manipulation and analysis, and flexible report utilities. <u>Latest & updated Forensic library.</u> UPS: 3KV True Online to support complete system. Computer: Branded Computer with 18.5" LED Monitor with laser Printer. Make: UK/Japan/USA/Germany.</p> <p>Note: During installation any deficiency occurs, the supplier will be responsible to arrange at their own cost. The system should be complete in all respect to cover the forensic & toxicology applications. The successful bidder will also be responsible for the renovation of the room and required fixtures. The above specifications are the minimum criteria for the selection of the instrument, with the same or better specifications within the approved budget.</p>
05	Centrifuge	<p>Specifications: Speed: 20000 - 22,000rpm Rotors: Swing Variable Rotor with adaptor and buckets holders. Sample Size: 5, 10 & 20ml. Frequency: 50/60Hz Phase: Single Voltage: 208 to 240V Temperature compensation controlled. Digital System. Make: UK/Japan/USA/Germany.</p> <p>Note: During installation any deficiency occurs, the supplier will be responsible to arrange at their own cost. The system should be complete in all respect to cover the forensic & toxicology applications. The successful bidder will also be responsible for the renovation of the room and required fixtures. The above specifications are the minimum criteria for the selection of the instrument, with the same or better specifications within the approved budget.</p>

Head of Department

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In charge Biochemist

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