



**COMSATS University Islamabad, Lahore Campus**  
**Defence Road, Off Raiwind Road, Lahore**

Tender No. CUI-LHR-TN-13-20-1367

Case # 3051

**Single Stage Two Envelop Procedure**

**Title of Tender: Lab Equipment for Establishment of Centre for Advanced Technologies in Biomedical Materials (Knowledge Economy Initiative)**

**TERMS AND CONDITIONS**

1. All pages of bidding documents are mandatory to be signed / stamped, meaning thereby bidder agrees to our terms & conditions mentioned herein, failing which the bid may be rejected.
2. Any addition, deletion or modification of any clause of the procurement terms & conditions/ BoQs of CUI Lahore Campus by any vendor will not be acceptable and may lead to rejection of the bid.
3. Only registered Suppliers, who are on Active Taxpayers List (ATL) of FBR, are eligible to participate in tender.
4. The contract will be executed and handed over in satisfactory conditions up to the entire satisfaction of COMSATS University Islamabad, Lahore Campus.
5. Documents along with Pay Order / Demand Draft amounting to **Rs. 1,000/-** as a tender document fee (Non-Refundable) shall be submitted in favor of COMSATS University Islamabad, Lahore Campus to the address given below. No bid will be accepted without tender documents' fee.
6. Part / Advance payments is not allowed.
7. **The exact completion/installation/ delivery time from the date of the purchase / work order will be 120 days. The handing over / completion time for this contract is of critical importance.**
8. Your bid proposal should be inclusive of freight and all other taxes and to be delivered at COMSATS University Islamabad (CUI), Lahore Campus's premises.
9. After opening of bids, CUI-Lahore Campus will examine the bids for completeness as per tender document.
10. Purchase order (s) will be awarded to the lowest or technically recommended bidder (s) on the basis of item wise / subtotal wise / grand total wise according to the nature of BoQs.
11. The bid should be submitted in a sealed envelope up to **May 14, 2020** on or before **1100hrs** and will be opened on the same date **at 1130hrs** in the presence of available bidders.
12. COMSATS University Islamabad, Lahore Campus, will follow the PPRA rule of **single stage two envelope procedure:**
  - i. The bid shall comprise a single package containing **two separate envelopes**. Each envelope shall contain separately the **financial proposal** and the **technical proposal**;
  - ii. The envelopes shall be marked as **“FINANCIAL PROPOSAL”** and **“TECHNICAL PROPOSAL”** in bold and legible letters to avoid confusion;

**Signature & Stamp of Bidder**

- iii. Initially, only the envelope marked **“TECHNICAL PROPOSAL”** shall be opened;
  - iv. The envelope marked as **“FINANCIAL PROPOSAL”** shall be retained in the custody of the procuring agency without being opened;
  - v. The procuring agency shall evaluate the technical proposal in a manner prescribed in advance, without reference to the price and reject any proposal which does not conform to the specified requirements;
  - vi. During the technical evaluation no **amendments** in the technical proposal shall be permitted;
  - vii. The financial proposals of bids shall be opened publicly at a time, date and venue announced and communicated to the bidders in advance;
  - viii. After the evaluation and approval of the technical proposal the procuring agency, shall at a time within the bid validity period, publicly open the financial proposals of the technically accepted bids only. The financial proposal of bids found technically nonresponsive shall be returned un-opened to the respective bidders;
  - ix. and
  - x. The bid found to be the lowest evaluated bid shall be accepted.
13. The envelope should be marked as under;
- Secretary, Purchase Committee**  
**COMSATS University Islamabad, Lahore Campus**  
 Defence Road, Off Raiwind Road, Lahore.  
 Tel: 042-111-001-007, Ext: 875
14. The envelope shall also bear the word **“CONFIDENTIAL”** and following identification quotation of **“Lab Equipment for Establishment of Centre for Advanced Technologies in Biomedical Materials (Knowledge Economy Initiative)”**.
15. The bid form (BoQs) must be duly filled in, stamped and signed by the authorized representative of the bidder.
- 16. If the vendor fails to deliver the goods / services to COMSATS University Islamabad (CUI), Lahore Campus within the given deadline, any of the following can be opted by CUI Lahore campus on the recommendation of the end user and approval of the authority;**
- a. An extension in the delivery period may be granted in case a valid reason/justification with necessary documentary evidence is provided by the vendor supporting the reason for delay.
  - b. A penalty upto 10% of the invoice value may be charged.
  - c. Purchase order may be cancelled along with confiscation of earnest money if the vendor fails to deliver the goods / services after the initial or extended delivery time, as the case may be.
17. If the delivered goods / services are not according to the required quality standards / specifications, the same shall be liable to be rejected after inspection. The vendor would be required to supply as per requirements mentioned in our BoQs, otherwise the purchase / work order will be cancelled after due date with confiscation of earnest money.
18. Deduction of Income Tax and any other tax will be deducted at source according to Government prevailing rules.

19. Payment will be made on submission of Invoice in the name of “COMSATS University Islamabad (CUI), Lahore Campus” with a copy of delivery challan (s) after the complete order has been supplied, inspected and accepted which includes delivery / installation, and COMSATS acceptance / inspection thereof.
20. All prices should be valid for at least **120 days**. Withdrawal or any modification of the original offer within the validity period shall entitle CUI-Lahore Campus to forfeit the earnest money in favor of the CUI-Lahore Campus and / or put a ban on such vendor participation in tenders / works.
21. It is the sole responsibility of the agent / supplier / manufacturer to comply with the applicable laws, be national or international.
22. In case of any dispute or grievance, the matter shall be addressed as per PPRA rules.
23. The CUI-Lahore Campus reserves the right to modify the quantities of goods / services at any time before the award of purchase / work order.
24. Warranty mentioned in BoQs shall be provided from the date of installation or standard warranty whichever is higher
25. **05% of the total value of the Invoice will be retained as security by COMSATS University Islamabad (CUI), Lahore Campus, and will be released after warranty period i.e. As Mentioned in BoQs which will be counted from the date of Installation / Completion of work / Supply.**
26. **The bidder is required to furnish in form of Bank deposit/ CDR / Pay order equivalent to 2% of the total Bid price as Earnest Money crossed in favor of “COMSATS University Islamabad, Lahore Campus”.**
27. **CUI Lahore Campus** reserves the rights to reject the bid if;
  - i. Received without earnest money
  - ii. Received later than the date and time fixed for tender submission
  - iii. The tender is unsigned/ unstamped
  - iv. The offer is ambiguous
  - v. The offer is conditional
  - vi. The offer is from a firm, which is black listed by any Govt. Office.
  - vii. The offer is received by telephone/telex/fax/telegram.
  - viii. Any unsigned / ambiguous erasing, cutting / overwriting etc. is made.
28. The bidder should furnish a certificate as worded below in token of acceptance of all the terms and conditions of the tender otherwise the tender will not be considered under any circumstances.
29. The undersigned affirm that the terms and conditions as contained in this document have been read and accepted and that in the event of selection of my/our rate the agreement in the prescribed form will be entered into:
  - **Company / Vendor Name:.....**
  - **Postal Address:.....**
  - **Tel. / Mobile:.....Email:.....**
  - **NTN#:.....GST#:.....**
  - **Signature: .....**
  - **Please also attach the Certificate supporting being Active Taxpayer as per requirement of FBR.**

**BoQs of Lab Equipment for Establishment of Centre for Advanced Technologies in Biomedical Materials (Knowledge Economy Initiative)**

**Technical Portion (Please mention the quoted model/ brand in technical portion with no mention of price otherwise the bid will be rejected)**

No change in the BoQs (Specs & Qty.) of CUI-Lahore Campus, as detailed below, is allowed. Any additional information may be mentioned in the blank columns (i.e. model / brand or Price). Any modification in CUI-Lahore Campus BoQ may lead to rejection of bid (fully or partially).				Please mention the quoted Model / Brand with meeting the all specifications mentioned in BoQs
Sr. #	Item Name	Requirement / Specifications	Qty	
1	Potentiostat	Photo-Electrochemical Workstation	A system required to control a three electrode cell and measures the voltage difference between a Working Electrode and a Reference Electrode and to be used in the area of Photo-electrochemical sensing, electrochemical sensing and supercapacitor application.	1
			It should measure: <ul style="list-style-type: none"> <li>▪ Chopped Light Voltammetry</li> <li>▪ Cyclic voltammetry</li> <li>▪ Differential pulse voltammetry</li> <li>▪ Impedance spectroscopy,</li> <li>▪ Amperometry</li> <li>▪ Chornoamperometry</li> <li>▪ Galvanostatic charge discharge</li> <li>▪ Battery cycling</li> <li>▪ Linear sweep voltammetry</li> </ul>	
		Electrochemical Impedance Spectroscopy (EIS) frequency range	10 $\mu$ Hz (or lower) to 8 MHz (or higher)	
		Maximum current	2A or better	
		Current Range	10 nA (or lower) to 1A (or higher)	
		Potential range	$\pm 10$ V	
		Slots for additional hardware	5 or more	
		Photo-Electrochemical Light Emission Source	LED Driver Kit with cover or LED Potentiostat	
			Light source setup (optical bench)	

Signature & Stamp of Bidder

		Switchable Light Source (Royal blue to UV 370 to 470 nm) or better	
		all required cable connectors, USB connector and charger adapter	
Accessories		Counter electrode (Pt) by OEM	2
		References electrode (Ag/AgCl) by OEM	2
		Reference electrode (Hg/HgCl <sub>2</sub> ) by OEM	2
		Working electrode (glassy carbon) by OEM	2
		Electrode polishing kit by OEM	1
		Basic Electrochemical Cell Setup	1
Software		Unlimited licenses and free lifetime software upgrades.	1
		Must be compatible with all provided hardware	
		Advanced custom analysis with user-defined variables and models	
Computer		Computer compatible with system and recommended by OEM with genuine windows	1
Power backup with additional Servo Stabilizer		As recommended by OEM for optimum operations	1
		12 Months from the date of installation	
Installation		Complete Installation, operation, Onsite Training (installation)	
Warranty & Others		12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers	
		Proofs of trainings of company personnel/engineers should be provided	
		List of installations in Pakistan should be provided	

1.1	Potentiostat	Electrochemical Workstation	Electrochemical Workstation for electrochemical and electrochemiluminescence measurements.	1	
			It should measure <ul style="list-style-type: none"> <li>▪ Cyclic voltammetry</li> <li>▪ Differential pulse voltammetry</li> <li>▪ Amperometry</li> <li>▪ Chornoamperometry</li> <li>▪ Pulse amperometric detection</li> <li>▪ Linear Sweep potentiometry</li> <li>▪ Potentiometric stripping analysis</li> <li>▪ Measure intensity of light emitted by electrochemiluminescent molecule</li> <li>▪ Measure intensity of light (emitted by electrochemiluminescent molecule) as a function of wavelength</li> </ul>		
		Maximum current	40 mA or better		
		Current Ranges	1 nA to 10 mA or better		
		Potential range (DC)	-4 to + 4 V or better		
		Light source	ECL Cell with detector		
			Wavelength range (215-2500 nm or better)		
			Bulb life (1,000 hours or better )		
			all required cable connector, USB connector and charger adapter		
		Accessories	Counter electrode (Pt) by OEM		1
			References electrode (Ag/AgCl) by OEM		1
			Reference electrode (Hg/HgCl <sub>2</sub> ) by OEM		1
			Screen printed carbon electrodes by OEM		150
Software	Unlimited licenses and free lifetime software upgrades.				
	Must be compatible with all provided hardware,				

			Advanced custom analysis with user-defined variables and models		
		Computer	Computer compatible with system and recommended by OEM with genuine windows	1	
		Power backup with additional Servo Stabilizer	as recommended by OEM for optimum operations	1	
		Installation	Complete Installation, operation, Onsite Training		
		Warranty & Others	12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers		
			Proofs of trainings of company personnel/engineers should be provided		
			List of installations in Pakistan should be provided		
2	Fume Cupboards	purpose	For safe working to perform chemical reactions		
		Internal Dimensions (mm)	1200x600x870 (WxDxH) or larger		
		General features	Acid and alkali resistance base with aluminum frame		
			Tempered glass window		
			Air velocity 0.3m/s or better		
			Wash basin: alkali and acid resistant		
			Gas and water valves		
			Base cabinet for storage of inflammable chemicals		
			Centrifugal blower for exhaust 900m <sup>3</sup> /h or better		
		Warranty & Others	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>		
				10	

3	Storage cabinets	Purpose	For safe storage of cylinders	03	
		Capacity	To accommodate three (03) gas cylinder (50 Liters) or more		
		Exhaust system	Automatic system to detect gas leak with alarm		
		General features	Hoop to prevent cylinder from falling		
			Movable flaps		
			Gas probe for detection of gas leak		
			90 minutes fire-resistant or better		
Double door					
Warranty & Others	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>				
4	Rheometer	Purpose	Viscosity and Rheology measurement (including cross-linking density) of low viscosity liquids, visco-elastic liquids, gel like materials, semi- solids, melts, paste like materials, and reactive systems	1	
		Operating mode	<ul style="list-style-type: none"> <li>• strain control</li> <li>• stress control,</li> <li>• Shear rate control</li> <li>• gap control</li> <li>• rheology in rotation and oscillation mode</li> </ul>		
		Motor drive system	Air bearing		
		Basic Requirements	Minimum torque Rotation ( $\mu\text{Nm}$ ): 1 (or lower)		
			Minimum torque Oscillation ( $\mu\text{Nm}$ ): 1 (or lower)		
			Maximum torque (mNm): 120 (or more)		
			Minimum speed (rotational): $10^{-3}$ rpm (or less)		
Maximum speed (rotational): 1500 rpm (or more)					



			Normal force range (N): 0.01 (or less) to 50 (or more)		
			Peltier temperature control module for cone and plate		
		Accessories	Measuring plate with diameter of any range between 20-30 mm	1	
			Measuring plate of any range between 40-60mm	1	
			Measuring cone of any range between 20-35mm angle 1°	1	
			Measuring cone of any range between 20-35mm angle 0.5°	1	
		Software	software including driver running under Microsoft windows with lifetime license		
		Computer	Compatible with system with power back up	1	
		Power backup with additional Servo Stabilizer	As recommended by OEM for optimum operations	1	
		Warranty & Others	12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers		
			Proofs of trainings of company personnel/engineers should be provided		
			List of installations in Pakistan should be provided		
5	HPLC	Purpose	Qualitative and quantitative analysis of organic compounds e.g., drugs, vitamins, proteins, enzymes etc.	01	
		General features	<ul style="list-style-type: none"> <li>• Gradient pump with degasser,</li> <li>• manual injector</li> <li>• variable wavelength detector.</li> </ul>		
		Gradient Pump	Dual pump with dual piston for binary solvents	01	
			Pressure: up to 400 bar (or higher)		
			Rate up to 5 mL/min (or higher)		
			Integrated Degassing Unit		
Manual Injector	Manual injector with sample injection valve and standard loop.	01			
Detector	Variable Wavelength Detector range: 190 nm(or less) to 600 nm (or more)	01			

		Accessories	Colum Compartment: from ambient to 60°C or better range		01	
			Column C18 (compatible with quoted machine)		01	
			Column C8 (compatible with quoted machine)		01	
			Compatible sample injections		04	
		Power backup	As recommended by OEM		01	
	Computer system	As recommended by OEM with original windows		01		
	Warranty & Others	<ul style="list-style-type: none"> <li>12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>Proofs of trainings of company personnel/engineers should be provided</li> <li>List of installations in Pakistan should be provided</li> </ul>				
6	pH electrode	Meter	Purpose of the pH meter	To perform pH measurements	02	
			pH range	0-14 pH or better		
			pH resolution	0.01 or better		
			pH accuracy	±0.05 or better		
			pH calibration	3 point calibration or better		
			Temperature resolution	0.1°C or better		
			Temperature range	Ambient to 60 °C or better		
			Temperature compensation	included		
		electrode		10		
		Temperature probe		01		
Accessories	Standard buffer solutions		Minimum 500 ml each to cover pH range 0-14			

		<b>Warranty &amp; Others</b>	<ul style="list-style-type: none"> <li>• 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>• Proofs of trainings of company personnel/engineers should be provided</li> <li>• List of installations in Pakistan should be provided</li> </ul>		
7	High Vacuum Pumps	<b>Purpose of the High Vacuum pump</b>	Vacuum pump for attaining high vacuum for different laboratory equipments	08	
		<b>Construction</b>	Rotary vane vacuum pump		
		<b>Vacuum attainable</b>	$1 \times 10^{-3}$ mbar or below		
		<b>Pumping capacity</b>	80 L/min or better		
		<b>Safety</b>	anti-suck back protection		
		<b>Accessories</b>	<b>Vacuum oil</b>	30 liters	
			<b>Cold trap</b>	5	
			<b>Fine vacuum adsorption trap</b>	5	
			<b>Oil mist filter</b>	08	
			<b>Service kit (washers, seals, gaskets etc)</b>	08	
			<b>Vacuum pipe with flanges both ends (1 meter or more)</b>	08 set	
	<b>Vacuum seal with suitable clamps</b>	08 set			
<b>Warranty &amp; Others</b>	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>				
7.1	High Vacuum Pump	<b>Purpose of the High Vacuum pump</b>	Oil-less pump for attaining high vacuum	02	
		<b>Construction</b>	Scroll vacuum pump		
		<b>Vacuum attainable</b>	$7 \times 10^{-2}$ mbar or less		
		<b>Pumping capacity</b>	100 L/min or more		

		Accessories	Service kit (washers, seals, gaskets etc)	01	
			Vacuum pipe with flanges both ends (1 meter or more)	02 set	
			Vacuum seal with suitable clamps	02 set	
		Warranty & Others	12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers Proofs of trainings of company personnel/engineers should be provided List of installations in Pakistan should be provided		
8	Dosing Pumps	General Requirements	<ul style="list-style-type: none"> <li>• Type: Diaphragm PTFE</li> <li>• All parts which come into liquid contact should be acid, alkali, solvent resistant</li> <li>• self-priming, maintenance free</li> <li>• Adjustable flow rate</li> </ul>	3	
		Flow Parameters	Variable flow rates 10 ml/min (or lower) to 100ml/min (or higher)		
		Suction height ft. water	9 ft or higher		
		Maximum Pressure	1 bar or higher		
		Tubing	10 feet or more Acid, alkali and solvent resistant tube with all requisite connectors		
		Installation and training	Installation and training at installation site		
		Warranty & Others	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>		

8.1	Dosing Pumps	General Requirements	<ul style="list-style-type: none"> <li>▪ Type: Diaphragm PTFE</li> <li>▪ All parts which come into liquid contact should be acid, alkali, solvent resistant</li> <li>▪ self-priming, maintenance free, dry running,</li> <li>▪ adjustable flow rate</li> </ul>	2	
		Flow Parameters	<ul style="list-style-type: none"> <li>▪ Variable flow rates</li> <li>▪ 0.5 ml/min (or lower) to 20ml/min (or higher)</li> </ul>		
		Suction height ft. water	6 ft (or higher)		
		Maximum Pressure	1 bar (or higher)		
		Tubing	10 feet or more Acid, alkali and solvent resistant tube and connectors which could fit with the pump		
		Installation and training	Installation and training at installation site		
		Warranty & Others	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>		
9	Filtration/ Solvent Pumps	Purpose of the Filtration/solvent pump	Pump for vacuum filtration and solvent removal	05	
		Construction	Oil free pump		
		Vacuum attainable	75 torr or above		
		Maximum flow rate	10 L/min or above		
		Accessories	Vacuum/pressure regulator with gauge		
			Filter		
			Moisture trapper	05	
Warranty & Others	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company</li> </ul>				

			<p>personnel/engineers should be provided</p> <ul style="list-style-type: none"> <li>List of installations in Pakistan should be provided</li> </ul>		
10	Minus 20 Freezer	Laboratory Freezer	Upright type	05	
		Chemical resistance	Yes		
		Door material	Steel or equivalent		
		Temperature range (programable)	Minus 20 °C (or lower) to 10 °C (or higher)		
		Effective capacity	500 L or better		
		Alarms	Power failure		
			High Temperature		
			Low Temperature		
		Temperature Display	Digital display		
		stabilizer	As recommended by OEM	05	
Warranty	1-year warranty for complete equipment				
	5 years compressor warranty				
11	Vacuum Pump	Purpose of the Vacuum pump	Vacuum pump for routine laboratory work and suitable for slightly aggressive or corrosive gases	03	
		Construction	Oil free vacuum pump		
		Vacuum attainable	75 mbar (or below)		
		Maximum flow rate	10 L/min (or above)		
		Accessories	Vacuum/pressure regulator with gauge		
			Filter		
Warranty & Others	<ul style="list-style-type: none"> <li>12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>Proofs of trainings of company personnel/engineers should be provided</li> <li>List of installations in Pakistan should be provided</li> </ul>				

12	Double Distillation unit along with water feed conversion unit (for water deionizer)	Purpose of the Double Distillation Unit	Water Distillation unit based on reverse osmosis	01	
		Distilled water output	2 L/h or above		
		Biological activity	pyrogen free		
		Safety control	visual flow		
13	CO <sub>2</sub> Incubators	Purpose	Cell and tissue culture	4	
		Capacity	170 L or higher with 4 shelves minimum		
		Design	Non-segmented inner door, with water tray		
		Chamber	Single sheet Stainless steel 304 or Cu enriched stainless steel		
		Equipment stability	Vibration and turbulence protection		
		Temperature range	Ambient to 50° C (or better) Temperature stability 37°C ± 1°C		
		CO <sub>2</sub>	CO <sub>2</sub> gas induction range of 0.2-20 % or better		
		sensor	Digital CO <sub>2</sub> sensor		
			Digital temperature sensor		
			Digital Humidity sensor		
		Disinfection	High Temperature or UV disinfection		
		Alarm	With temperature and CO <sub>2</sub> level, 72-hour data/chart logger or better		
		Necessary Accessories	CO <sub>2</sub> cylinder	04	
Gas regulator.	04				
Compatible UPS for 30-minute power backup	04				
Warranty & Others	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>				

14	Freezer (minus 80)	Scope:	Upright freezer which can be set at -80°C	1	
		Temperature range	-80°C (or lower)		
		Effective capacity	330L (or better)		
		Compressor	double compressor		
		Temperature monitoring	Alarm for temperature deviation		
			digital display		
		UPS	compatible with the power requirement for 30 min backup	1	
		installation	Complete installation with onsite training		
Warranty & Others	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>				
15	Power supply	Purpose	Power supply for Fabrication of electrospun mats and electrospaying of solutions	01	
		General Features	Power supply with all accessories like cables and clips etc.		
			Voltages Up to 50KV or more		
			Resolution 0.5 KV or better		
			Output Current 0.5 mA or better		
			Over voltage protection		
			Over current protection		
			Protection against output short circuit		
			Over temperature protection		
			Manual recovery after cutoff		
			Digital output display		
			AC insulation and reference ground connecting to the earth		



		<b>UPS with servo stabilizer</b>	<b>As recommended by OEM</b>	<b>01</b>		
		<b>Warranty &amp; Others</b>	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>			
<b>15.1</b>	<b>Power supply</b>	<b>Purpose</b>	<b>Power supply for Fabrication of electrospun matts and electro spraying of solutions</b>	<b>01</b>		
		<b>General Features</b>	<b>Power supply with all accessories like cables and clips etc.</b>			
			<b>Voltages Up to 30KV or more</b>			
			<b>Resolution 0.5 KV or better</b>			
			<b>Output Current Upto 0.5 mA or better</b>			
			<b>Over voltage protection</b>			
			<b>Over current protection</b>			
			<b>Protection against output short circuit</b>			
			<b>Over temperature protection</b>			
			<b>Manual recovery after cutoff</b>			
			<b>Digital output display</b>			
			<b>AC insulation and reference ground connecting to the earth</b>			
		<b>UPS with servo stabilizer</b>	<b>As recommended by OEM</b>			<b>01</b>
<b>Warranty &amp; Others</b>	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>					

16	Syringe pumps	<b>Purpose</b>	Syringe pump for Fabrication of electrospun matts and electro spraying of solutions	
		<b>General features</b>	Two channel syringe pump for electrospinning, able to work under high voltages (up to 50kv or more) with digital display	03
			Channels Two-channel pump: should be controlled independently for individual syringe Flow rate, volume and time of infusion Compatible to work under high voltage.	
			Pumping rate Pumping rate: 3µl/ hr (or lower) to 19 ml/min (or higher)	
			Pump rate accuracy : ±2% or better	
		<b>Accessories</b>	Needle sets 11 g to 27 g (any size in between)	05 sets
			Multi option coaxial needle set ranging from 11g to 27g (any size in between)	02 sets
			Triaxial spinneret Needle length should be 6cm with inner 22g, middle 18g and outer 14g	02 sets
			Triaxial spinneret Needle length should be 6cm with inner 22g, middle 18g and outer 15g	02 sets
			Triaxial spinneret Needle length should be 6cm with inner 22g, middle 18g and outer 16g	02 sets
			Tri-channel spinneret	02
			Multi-nozzle spinnerets	02
			Cold light source for observing the electrospinning process	01
			50ml Glass syringes (borosilicate)	05
			20ml Glass syringes (borosilicate)	05
			10ml Glass syringes (borosilicate)	10
5ml Glass syringes (borosilicate)	10			
2ml Glass syringes (borosilicate)	10			
<b>Power backup</b>	As recommended by OEM	01		

		Warranty & Others	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>			
16.1	Syringe pumps	Purpose	Syringe pump for Fabrication of electrospun mats and electrospaying of solutions	01		
		General features	Four channel syringe pump for electrospinning, able to work under high voltages (up to 50kv or higher) with digital display			
		Syringe pump	Channels Four-channel pump: can be controlled independently for individual syringe Flow rate, volume and time of infusion can be controlled precisely. Compatible to work under high voltage.			
			Pumping rate Pumping rate: 3µl/hr (or less) to 19 ml / min (or higher)			
			Pump rate accuracy : ±2% or better			
		Accessories	Needle sets 11 g to 27 g			05 set
			Multi option coaxial needle set ranging from 11g to 27g			02 set
			Triaxial spinneret Needle length should be 6cm with inner 22g, middle 18g and outer 14g			02 set
			Triaxial spinneret Needle length should be 6cm with inner 22g, middle 18g and outer 15g			02 set
			Triaxial spinneret Needle length should be 6cm with inner 22g, middle 18g and outer 16g			02 set
Tri-channel spinneret	02					
Multi-nozzle spinnerets also called islands in the sea spinneret	02					

			<b>Cold light source for observing the electrospinning process</b>	<b>01</b>	
			<b>50ml Glass syringes (borosilicate)</b>	<b>05</b>	
			<b>20ml Glass syringes (borosilicate)</b>	<b>05</b>	
			<b>10ml Glass syringes (borosilicate)</b>	<b>10</b>	
			<b>5ml Glass syringes (borosilicate)</b>	<b>10</b>	
			<b>2ml Glass syringes (borosilicate)</b>	<b>10</b>	
		<b>Power backup (optional)</b>	<b>As recommended by OEM</b>	<b>01</b>	
		<b>Warranty &amp; Others</b>	<ul style="list-style-type: none"> <li>▪ <b>12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</b></li> <li>▪ <b>Proofs of trainings of company personnel/engineers should be provided</b></li> <li>▪ <b>List of installations in Pakistan should be provided</b></li> </ul>		
<b>17</b>	<b>Flow Pumps</b>	<b>General features</b>	<ul style="list-style-type: none"> <li>▪ <b>Type: Peristaltic</b></li> <li>▪ <b>Variable-Speed</b></li> <li>▪ <b>Graphical LCD display</b></li> <li>▪ <b>Contamination-free pump system and maintenance-free high-accuracy motor</b></li> <li>▪ <b>Self-priming</b></li> <li>▪ <b>To handle high and low viscosities liquids</b></li> <li>▪ <b>Reversible motor with on/off/reverse possibility</b></li> </ul>	<b>01</b>	
		<b>Key Components</b>	<b>Complete Digital system Contain:</b> <ul style="list-style-type: none"> <li>▪ <b>Variable-Speed Pump drive</b></li> <li>▪ <b>Multiple pump heads</b></li> <li>▪ <b>Tubing</b></li> <li>▪ <b>Pump head Mounting Hardware</b></li> </ul>		
		<b>Pump drive</b>	<ul style="list-style-type: none"> <li>▪ <b>Flow rate range (ml/min): 5 (or lower) to 2800 (or higher)</b></li> <li>▪ <b>Speed control sensitivity: ±2% or better</b></li> </ul>	<b>1</b>	

		<b>Pump head</b>	<ul style="list-style-type: none"> <li>• Compatible with pump drive</li> <li>• Rotor materials- Stainless steel</li> <li>• Automatic tubing retention</li> </ul>	2	
		<b>Pump tubing</b>	Material resistance and Compatible with pump head and pump drive		
			Tubing set (20-25 feet Length) - Flow rate 1 to 450 ml/min or better	1	
			Tubing set (20-25 feet Length) - Flow rate 10 to 2000ml/min or better	1	
		<b>Pump Head Mounting Hardware</b>	Stainless steel material, Compatible with pump drive and pump head	1	
		<b>Warranty &amp; Others</b>	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>	1	
17.1	Flow Pumps	<b>General features</b>	<ul style="list-style-type: none"> <li>▪ Type: Peristaltic</li> <li>▪ Variable-Speed</li> <li>▪ Graphical LCD display</li> <li>▪ Contamination-free pump system and maintenance-free high-accuracy motor</li> <li>▪ Self-priming</li> <li>▪ To handle high and low viscosities liquids</li> <li>▪ Reversible motor with on/off/reverse possibility</li> </ul>	1	
		<b>Key Components</b>	<p>Complete Digital system Contain</p> <ul style="list-style-type: none"> <li>▪ Variable-Speed Pump drive</li> <li>▪ Multiple pump heads</li> <li>▪ Tubing</li> <li>▪ Pump head Mounting Hardware</li> </ul>		
		<b>Pump drive</b>	<ul style="list-style-type: none"> <li>▪ Flow rate range (ml/min) : 1 (or lower) to 480 (or higher)</li> </ul>	1	

			<ul style="list-style-type: none"> <li>▪ Speed control sensitivity: <math>\pm 1\%</math> or better</li> </ul>		
		Pump head	<ul style="list-style-type: none"> <li>• Compatible with pump drive</li> <li>• Rotor materials- Stainless steel</li> <li>• Automatic tubing retention</li> </ul>	2	
		Pump tubing	Material compatible with pump head and pump drive		
			Tubing set (20-25 feet Length) - Flow rate 10 to 200 ml/min or better	1	
			Tubing set (20-25 feet Length) - Flow rate 0.5 to 150 ml/min or better	1	
		Pump Head Mounting Hardware	Stainless steel material, Compatible with pump drive and pump head	1	
		Warranty & Others	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>	1	
18	Furnace	General Features	Electrically operable Programmable		
		Temperature Control	Working Temperature (Maximum): 1700 °C		01
			Continuous working temperature: 1600 °C		
			Heating Rate: 1°C/min (or lower) to 15°C/min (or higher)		
			Temperature Accuracy: $\pm 1^\circ\text{C}$		
			Step Size: 0.5 °C or better		
			length of maximum temperature zone: 60 mm or more		
			Tube Wall Thickness: not less than 2 mm		
			High quality MoSi <sub>2</sub> heating element		
Programming: Minimum 20 segment with parameters: Heating ramp Cooling ramp Dwelling steps					

			<b>Built-in over-temperature alarm and thermocouple failure alarm.</b>		
		<b>Accessories</b>	<b>An additional B-type thermocouple</b>	<b>01</b>	
			<b>Adequate ceramic protection tube/sheath/sleeve for B-type thermocouple</b>	<b>02</b>	
		<b>Gas In-flow Assembly</b>	<b>Gas in-flow assembly consisting of pressure regulating valve flow meter</b>		
		<b>Water Cooled Flange System</b>	<b>Closed loop circulating water cooling unit with at least 2 vacuum-tight water-cooled stainless-steel flanges with fittings on the outlet side</b>		
		<b>Warranty &amp; Others</b>	<ul style="list-style-type: none"> <li>▪ <b>12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</b></li> <li>▪ <b>Proofs of trainings of company personnel/engineers should be provided</b></li> <li>▪ <b>List of installations in Pakistan should be provided</b></li> </ul>		
<b>19</b>	<b>Raw materials</b>	<b>Stainless steel bar</b>	<b>ASTM Standard Material: 316L Diameter: 10 mm Cross-sectional: Round</b>	<b>1 meter each</b>	<b>10</b>
			<b>ASTM Standard Material: 316L Diameter: 20 mm Cross-sectional: Round</b>		<b>10</b>
		<b>Titanium Bars</b>	<b>Standard: ASTM Material: Ti6Al4V (biograde) Diameter: 10 mm Cross-sectional: Round</b>	<b>1 meter each</b>	<b>10</b>
			<b>Standard: ASTM Material: Ti6Al4V (biograde) Diameter: 20 mm Cross-sectional: Round</b>		<b>5</b>
		<b>Platinum Wire</b>	<b>0.4mm diameter high purity</b>	<b>50cm</b>	<b>2</b>
		<b>PTFE Sheet</b>	<b>Thickness: 10 mm</b>	<b>Length × Width: 30 X 90</b>	<b>2</b>

		<b>PTFE Sheet</b>	<b>Thickness – 30 mm</b>	<b>Length × Width: 30 X 90</b>	<b>2</b>		
		<b>PTFE Tubing</b>	<b>Inner Diameter: 3 mm Outer Diameter: 4 mm</b>	<b>Length: 50 ft</b>	<b>50 ft</b>		
		<b>FTO (Fluorine-doped tin oxide) glass slide</b>	<b>300 mm × 300 mm × 2.3 mm (13 Ω*s q-1)</b>	-	<b>25</b>		
		<b>Indium tin oxide coated glass slide, rectangular</b>	<b>75 mm × 25 mm × 1.1 mm (15-25 Ω/sq)</b>	-	<b>25</b>		
		<b>T-slot Aluminum Frames</b>	<b>40 mm with four (x4) 8 mm T-Slots – each length of 6 meters Clear anodized finish</b>	<b>6 meters</b>	<b>15</b>		
			<b>8 mm T Slots (x200)</b>	-	<b>x200</b>		
			<b>8mm T-Nuts (x200)</b>	-	<b>x200</b>		
			<b>8mm T-bolts (x200)</b>	-	<b>x200</b>		
<b>20</b>	<b>Spectrophotometer</b>	<b>Purpose</b>	<b>For biochemical analysis (chemistry and cell counting) of whole blood or blood-derived samples like plasma, serum etc (i.e. hematology)</b>			<b>01</b>	
		<b>Photo meter</b>	<b>Display</b>	<b>Touch screen</b>			
			<b>Lamp</b>	<b>Quartz halogen lamp or equivalent</b>			
			<b>Wavelengths range</b>	<b>340 (or lower)-620 nm (or higher)</b>			
			<b>absorbance</b>	<b>Absorbance 2.5 or higher</b>			
			<b>Measurement time</b>	<b>15 sec (or less)</b>			
<b>Assay type</b>	<ul style="list-style-type: none"> <li>• Absorbance,</li> <li>• Endpoint,</li> <li>• Kinetic,</li> <li>• Fixed Time,</li> <li>• Endpoint with Sample Blank,</li> </ul>						



			<ul style="list-style-type: none"> <li>Endpoint without blank,</li> <li>2 points (fixed time) with or without reagent blank</li> <li>Coagulation</li> </ul>		
		<b>Detector</b>	Photodiode detector 320 (or lower) –1100 nm (or higher)		
		<b>Sample volume</b>	35µl or less		
		<b>Working Temperature</b>	25, 30 and 37 °C		
		<b>Accessories</b>	Disposable Measuring tubes 5 mL	500	
			Disposable Measuring tubes 10 mL	500	
			Disposable Measuring tubes 15 mL	500	
	<b>Hematology analyzer</b>	<b>General features</b>	<ul style="list-style-type: none"> <li>Digital display</li> <li>Graphical user interface with compatibility to external mouse and keyboard</li> </ul>		
		<b>Mode</b>	<ul style="list-style-type: none"> <li>Whole blood</li> <li>Capillary blood</li> <li>Prediluted blood</li> </ul>		
		<b>Parameters (minimum)</b>	<ul style="list-style-type: none"> <li>WBC; along with WBC differentials</li> <li>RBC</li> <li>HGB</li> <li>HCT</li> <li>MCV</li> <li>MCH</li> <li>MCHC</li> <li>PLT</li> </ul>	01	
		<b>Sample volume</b>	50 µL (or less)		
		<b>Data storage</b>	10,000 samples or more		
		<b>Efficiency</b>	60 samples/hour or more		
		<b>Accessories</b>	<ul style="list-style-type: none"> <li>Keyboard</li> </ul>	01	

			<ul style="list-style-type: none"> <li>• mouse</li> </ul>	01	
			<ul style="list-style-type: none"> <li>• waste liquid barrel</li> </ul>	02	
			<ul style="list-style-type: none"> <li>• external barcode scanner and printer</li> </ul>	01	
		UPS	Power Backup of 30 minutes at least	01	
		Warranty	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>		
21	High Temperature Furnace	General Features	<ul style="list-style-type: none"> <li>▪ Electrically operable</li> <li>▪ Programmable</li> <li>▪ 3.5 liters or higher</li> </ul>		
		Temperature Control	Working Temperature (Maximum): 1700 °C	01	
			Continuous working temperature: 1650 °C		
			Heating Rate: 1°C/min (or lower) to 15°C/min (or higher)		
			Temperature Accuracy: ±1°C		
			Step Size: 0.5 °C or better		
			High quality MoSi <sub>2</sub> heating element		
			Programming: Minimum 20 segment with parameters: Heating ramp Cooling ramp Dwelling steps Auto restore function in case of power failure Built-in over-temperature alarm and thermocouple failure alarm.		
		Accessories	An additional B-type thermocouple	01	
Adequate ceramic protection tube/sheath/sleeve for B-type thermocouple	02				
Gas In-flow System	To create inert atmosphere				
Warranty & Others	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with</li> </ul>				

			<p>running machines and well-trained engineers</p> <ul style="list-style-type: none"> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>		
22	Microbiology Safety Cabinet	<b>Purpose</b>	CE certified total exhaust cabinets for work with infectious agents	03	
		<b>Class</b>	II		
		<b>Type</b>	B2		
		<b>Working area</b>	12 square feet or bigger		
		<b>Filter</b>	HEPA/ULPA		
		<b>control</b>	<p>Graphical LCD display containing:</p> <ul style="list-style-type: none"> <li>• on/off fan control with adjustable air velocity</li> <li>• Working window control</li> <li>• LED lamp ON/OFF</li> <li>• UV lamp ON/OFF</li> <li>• Elapsed time counter and alarm for HEPA filter replacement</li> </ul>		
		<b>Chamber Materials</b>	Stainless Steel		
		<b>Window</b>	Tempered glass		
		<b>Compatible Trolley</b>	Yes		
		<b>UV light</b>	Yes		
		<b>Total Exhaust</b>	Yes		
		<b>UPS backup</b>	As recommended by OEM	03	
		<b>installation</b>	Complete installation with onsite training		
<b>Warranty &amp; Others</b>	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>				

23	Ultrasonicator probes	Ultra sonicator	<ul style="list-style-type: none"> <li>• 400W or better</li> <li>• process time 10 hours (or more)</li> <li>• Operating frequency of 20 kHz (or more)</li> <li>• Tuneable ultrasonic time</li> <li>• Variable Amplitude (20% to 100% or better)</li> <li>• Processing volume: Minimum 10 mL (or lower) and maximum 250 mL (or higher)</li> <li>• Tunable pulse</li> </ul>	03	
		Titanium Tips	• Microtip Probe (with any size between 3-4 mm)	03	
			• Replaceable Tip Probe with any size between 6-14 mm	03	
		Accessory	• Ultrasonic oscillating system(transducer)	03	
		Warranty & Others	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>		
24	Ultrasonicator chambers	General features	<ul style="list-style-type: none"> <li>▪ Suitable for cleaning of metal, plastic, ceramic or glass parts especially for medical industry cleansing</li> <li>▪ Should include but not be limited to <ul style="list-style-type: none"> <li>- Hot air-drying system</li> <li>- Rinsing System</li> <li>- Water circulation system</li> <li>- Filtration mechanism</li> </ul> </li> </ul>	1	
			Stainless Steel Construction (304 or higher grade)		
			Digital temperature and timer display for each chamber		
			Multi-Chamber Unit (4 or more) <ul style="list-style-type: none"> <li>- 1 chamber for ultrasonic wash</li> <li>- 1 chamber for ultrasonic rinsing</li> <li>- 1 chamber for compressed air bubble cleaning</li> <li>- 1 chamber for hot air drying</li> </ul> <i>3+1 or 4 in 1 combinations acceptable</i>		
		Ultrasonicator power	Up to 2000 W or higher		

		<b>Maximum Heating Temperature</b>	<b>Up to 80 °C or higher</b>		
		<b>Maximum load on the basket</b>	<b>15 kilograms or higher</b>		
		<b>Time</b>	<ul style="list-style-type: none"> <li>▪ <b>Up to 60 minutes or higher</b></li> <li>▪ <b>Continuous mode</b></li> </ul>		
		<b>Capacity</b>	<b>20 liter per chamber (or higher)</b>		
		<b>Independent Precleaning Chamber</b>	<ul style="list-style-type: none"> <li>▪ <b>Independent (not integrated) and additional precleaning chamber</b></li> <li>▪ <b>15 Liter (or more)</b></li> <li>▪ <b>80°C or higher</b></li> <li>▪ <b>Ultrasonicator power 1000W (or higher)</b></li> </ul>	<b>1</b>	
		<b>Accessories and additional required functions</b>	<ul style="list-style-type: none"> <li>▪ <b>Baskets</b></li> <li>▪ <b>All accessories required for the aforementioned to function completely as intended</b></li> </ul>		
		<b>Warranty &amp; Others</b>	<ul style="list-style-type: none"> <li>▪ <b>12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</b></li> <li>▪ <b>Proofs of trainings of company personnel/engineers should be provided</b></li> <li>▪ <b>List of installations in Pakistan should be provided</b></li> </ul>		
<b>25</b>	<b>Blue LED Lights</b>	<b>Purpose</b>	<ul style="list-style-type: none"> <li>▪ <b>Curing of dental composites using LED UV irradiation</b></li> </ul>	<b>02</b>	
		<b>General features</b>	<ul style="list-style-type: none"> <li>▪ <b>Rechargeable</b></li> <li>▪ <b>Wireless use ability</b></li> <li>▪ <b>Base-charger with handpiece holder</b></li> </ul>		
		<b>Power</b>	<b>1250 mW/cm<sup>2</sup> or better</b>		
		<b>Battery</b>	<b>Long-life, capable of multiple runs should part of provided equipment</b>		
		<b>Accessories</b>	<ul style="list-style-type: none"> <li>▪ <b>2 extra tips</b></li> <li>▪ <b>1 extra battery</b></li> </ul>		
		<b>Warranty</b>	<b>12-months or better</b>		

25.1	Blue LED Lights	<b>Purpose</b>	<b>Curing of polymers using LED UV Light</b>		01	
		<b>General features</b>	<b>LED UV light system for curing of large surface area</b>			
		<b>Peak wave lengths (nm)</b>	<b>365 nm ± 5 nm</b>	<b>400 ± 5 nm</b>		
		<b>Irradiance (W/cm<sup>2</sup>) at 10 mm distance</b>	<b>2.6 or better</b>	<b>5.5 or better</b>		
		<b>Optical power (W)</b>	<b>65 or better</b>	<b>135 or better</b>		
		<b>Curing Area (mm)</b>	<b>75 (or higher) x 25 (or higher)</b>			
		<b>Accessories</b>	<b>Protective Gear (eye wear, face shield, gloves)</b>			
			<b>All requisite accessories for the aforementioned to function as intended</b>			
		<b>Installation &amp; Training</b>	<b>Complete installation and training on installation site</b>			
<b>Warranty &amp; Others</b>	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>					
25.2	Blue LED Lights	<b>Purpose</b>	<b>Photopolymerization of polymers</b>		01	
		<b>General features</b>	<b>LED UV light system for spot curing having four independent channels</b>			
		<b>Peak wave lengths (nm)</b>	<b>365, 385, 395 or 400 or 405</b>			
		<b>Watt/cm<sup>2</sup></b>	<b>9 or better (applicable to each of the aforementioned peak wavelengths, respectively)</b>			
		<b>Controller</b>	<ul style="list-style-type: none"> <li>▪ Simultaneous or individual control and programming of 4 (or more) UV LED curing heads</li> </ul>			

		<p><b>LED heads</b></p> <ul style="list-style-type: none"> <li>▪ 2 LED heads corresponding to each of the 4 offered wavelengths from within the aforementioned wavelength requirements</li> <li>▪ Interchangeable to any channel with individual cable for each head</li> </ul>			
		<p><b>Display</b></p> <p>Digital display for operations, programing and important information</p>			
		<p><b>Time</b></p> <p>Programable time from 0.1 to 999 seconds or better</p>			
		<p><b>Intensity</b></p> <p>Programable intensity 5% (or lower) to 100%</p>			
		<p><b>Accessories</b></p>	<p>Radiometer and calibration kit</p>		
			<p>Protective Gear (eye wear, face shield, gloves)</p>		
			<p>LED head focusing lenses</p>		
			<p>LED head mounting clamps</p>		
			<p>Extension Cable</p>		
		<p>All requisite accessories for ensuring functioning of the machine as aforementioned</p>			
		<p><b>Installation &amp; Training</b></p> <p>Complete installation and training at installation site</p>			
		<p><b>Warranty &amp; Others</b></p> <ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>			
26	High Speed mixer	<p><b>Purpose</b></p>	<p>High speed mixer is proposed to blend and grind a range of materials (ceramics, polymer etc)</p>	01	
		<p><b>Shear blender</b></p>	<p>motor</p>		<p>3 HP (or higher)</p>
			<p>Adjustable speeds</p>		<p>1,700 rpm (or lower) to 18,000 rpm (or higher)</p>
			<p>Capacity</p>		<p>1 gallon (or more)</p>
			<p>Blade</p>		<p>Industrial grade Heavy duty stainless steel or better for chopping</p>

			of both ceramics and polymer		
		Amperage	6.5 amps (or higher)		
	Shear mixer	motor	1 HP (or more)	01	
		Adjustable speeds	8000 rpm (or more)		
		Capacity	1ml (or less) to 500mL (or more)		
		other features	automatic shutoff		
		Frequency	60 hz (or higher)		
		Assemblies (stainless steel)	assembly for 1ml (or lower) to 10mL (or more)	01	
	assembly for 5ml (or lower) to 50mL (or more)		01		
	Assembly for 50ml (or lower) to 500mL (or more)		01		
	Installation	Installation and on-site (installation) training			
	Warranty and Others	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>			
27	Surgical Implants Motors	Purpose	Surgical implants motor system to be used for general oral surgery, implantology as well as for all kinds of surgical procedures.	01	
		Motors	Motor System with Handpiece 20:1		
		RPM	30 to 40,000 RPM or better Brushless Motor		
		Display	Easily Programmable Speed and Torque Keyboard Interface		
		Coolant flow	Coolant flow rate: 1 – 75 ml/min or better		
		Safety system	Intelligent safety system with acoustical and optical signal and additional blocking of the motor drive		



		<b>Torque</b>	<b>5 to 70Ncm or better Built-In Torque Controller and Safety Overload Protection</b>		
		<b>Warranty</b>	<b>12 months or more from the date of installation</b>		
<b>28</b>	<b>Dental Hand piece contra angle</b>	<b>Purpose</b>	<b>A dental drill or handpiece is a hand- held, mechanical instrument used to perform a variety of common dental procedures, including removing decay, polishing fillings, and altering prostheses</b>	<b>01</b>	
		<b>Contra angle</b>	<b>20:1</b>		
		<b>Rotation</b>	<b>200,000 rpm (or more)</b>		
		<b>Properties</b>	<b>quadruple external spray, with microfilter</b>		
			<b>Titanium Comfort Grip</b>		
		<b>Water spray</b>	<b>Single Water Spray</b>		
			<b>Internal and External Irrigation</b>		
			<b>Cellular Glass Optics</b>		
		<b>chuck</b>	<b>Ultra push Chuck</b>		
		<b>Body</b>	<b>Solid Titanium Body</b>		
<b>Ceramic Bearings</b>					
<b>Sterilizatio n temp stability</b>	<b>Autoclave Or Chemiclave Up To 275° F (135° C) (or higher)</b>				
<b>Warranty</b>	<b>12 months or more from the date of installation</b>				
<b>29</b>	<b>Drying Oven</b>	<b>Purpose</b>	<b>For drying of samples under heat and for studies of samples at different temperatures</b>	<b>01</b>	
		<b>Max temp</b>	<b>250 °C or more</b>		
		<b>Min temp</b>	<b>Ambient</b>		
		<b>Control Resolution</b>	<b>±0.1 °C or better</b>		
		<b>Shelf loading</b>	<b>2 or more</b>		
		<b>Ventilation</b>	<b>Ventilation hole with Stainless steel Cap</b>		
		<b>Volume</b>	<b>50 Liter or more</b>		
		<b>Circulation</b>	<b>Forced Air Type</b>		
		<b>Controller</b>	<b>Digital controller</b>		

		<b>Display</b>	<b>Digital LCD</b>		
		<b>Timer</b>	<b>99 hr 59 min or more (Delay &amp; Continuous Function)</b>		
		<b>Auto restart</b>	<b>Auto restart at the same program after power resumption</b>		
		<b>Material Internal</b>	<b>Stainless Steel -304</b>		
		<b>Safety</b>	<b>Over Temp alarm over Current Protector Sensor Error Detector</b>		
		<b>Others</b>	<b>UL/CUL Certified CE Certified</b>		
		<b>Warranty &amp; Others</b>	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>		
29.1	Drying Oven	<b>Purpose</b>	<b>For drying of samples under heat and for studies of samples at different temperatures</b>	01	
		<b>Max temp</b>	<b>250 °C or more</b>		
		<b>Min temp</b>	<b>Ambient</b>		
		<b>Control Resolution</b>	<b>±0.1 °C or better</b>		
		<b>Shelf loading</b>	<b>2 or more</b>		
		<b>Ventilation</b>	<b>Ventilation hole with Stainless steel Cap</b>		
		<b>Volume</b>	<b>Minimum 100 Liter or more</b>		
		<b>Circulation</b>	<b>Forced Air Type</b>		
		<b>Controller</b>	<b>Digital controller</b>		
		<b>Display</b>	<b>Digital LCD</b>		
		<b>Timer</b>	<b>99 hr 59 min or more (Delay &amp; Continuous Function)</b>		
		<b>Auto restart</b>	<b>Auto restart at the same program after power resumption</b>		
		<b>Material Internal</b>	<b>Stainless Steel -304</b>		
		<b>Safety</b>	<b>Over Temp alarm over Current Protector Sensor Error Detector</b>		

		<b>Others</b>	<b>UL/CUL Certified CE Certified</b>		
		<b>Warranty &amp; Others</b>	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>		
<b>29.2</b>	<b>Drying Oven</b>	<b>Purpose</b>	<b>For drying of samples under heat and for studies of samples at different temperatures</b>	<b>01</b>	
		<b>Max temp</b>	<b>250 °C or more</b>		
		<b>Min temp</b>	<b>Ambient</b>		
		<b>Control Resolution</b>	<b>±0.1 °C or better</b>		
		<b>Shelf loading</b>	<b>2 or more</b>		
		<b>Ventilation</b>	<b>Ventilation hole with Stainless steel Cap</b>		
		<b>Volume</b>	<b>Minimum 150 Liter or more</b>		
		<b>Circulation</b>	<b>Forced Air Type</b>		
		<b>Controller</b>	<b>Digital controller</b>		
		<b>Display</b>	<b>Digital LCD</b>		
		<b>Timer</b>	<b>99 hr 59 min or more (Delay &amp; Continuous Function)</b>		
		<b>Auto restart</b>	<b>Auto restart at the same program after power resumption</b>		
		<b>Material Internal</b>	<b>Stainless Steel -304</b>		
		<b>Safety</b>	<b>Over Temp alarm over Current Protector Sensor Error Detector</b>		
<b>Others</b>	<b>UL/CUL Certified CE Certified</b>				
	<b>Warranty &amp; Others</b>	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>			

30	Centrifuge	Max Capacity	12 or more x 2 mL	03	
		Max speed	14,000 rpm or more (100 rpm increments)		
		Rotor capacity and adaptor	1.5/2 ml tubes along with suitable rotor and adopter capable of holding at least 12 samples at a time		
			0.5 ml tubes along with suitable rotor and adopter capable of holding at least 12 samples at a time		
			0.2 ml tubes along with suitable rotor and adopter capable of holding at least 12 samples at a time		
		Timer	15 sec (or less) to 99 minutes (or more)		
		Features	LED with control panel		
Warranty & Others	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>				
31	Viscometer	Purpose	To measure the viscosity of a small volume of samples. Digital display for the results at various temperatures controlled by the temperature sensing system	01	
		Viscosity range	1.5 mPa (or less) to 1300 mPa s (or higher)		
		mode	Rotational viscometer		
		Temperature Sensor	150 °C or higher		
		Display	digital		
		Rotational speed (RPM)	0.1 (or lower) to 6 (or higher)		
		Accuracy	±1% or better		
		Measuring System	spindles or cylinder systems		
		Sensor	Temperature sensor		

		<b>Repeatability</b>	$\pm 0.2\%$ or better				
		<b>Warranty &amp; Others</b>	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>				
32	Platinum Crucible	Crucible 1	Purity Level: Pt $\geq$ 99.95% Volumetric Capacity: 10mL		1		
		Crucible 2	Purity Level: Pt $\geq$ 99.95% Volumetric Capacity: 30mL		1		
33	Portable X-Ray	X-Ray system	X-Ray Generator	DC High Frequency	02		
			X-ray Tube	Tube Voltage: 60 kV (or more)			
				Tube Current :2 mA (or more)			
				Anode Type: Stationary			
				Anode Angle: 15-25°			
				Focal Spot: 0.6 mm (or less)			
				Heat Capacity: 8.5 KHU (or more)			
		Exposure Time Setting	0.01-1.60 Sec. (0.01 Sec step) or better				
		Total Filtration:	1.6 mmAl or better				
		Dental digital X-ray Sensor	Active areas	35 mm x 25 mm or better			
30 mm x 22 mm or better							
Resolution	>20 lp/mm or better						
Total Cable Length	2.80 more						
Image Pixels	1600 x 1200 or better						
Warranty	12 months or more from the date of installation						

34	Storage cabinet	General feature	Fire resistant cabinet for storage of flammable chemicals with digital lock	07	
		Capacity	220 litre (or more)		
		Fire resistant time	90 min or more		
		Shelves	2 or more		
		Main body features	Two layer anti fire steel plates with at least 1mm thickness of plates		
			Liquid tank for leakage		
			Air vent		
Warranty & Others	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>				
35	Liquid nitrogen tank	Liquid nitrogen supply tank	Tank made of stainless steel For safe supply and storage of liquid nitrogen	01	
		Capacity	100 Litre or more		
		Tanks rating	22 psi or better		
		accessories	Cylindrical roller base		
			Cylinder hand truck with wheels		
			4 ft. flexible braided stainless-steel transfer hose or better		
			LN2 fill phase separator		
			Temperature Sensor		
			Pressure gauge		
			Liquid nitrogen level indicator		
			First Safety valve		
			Second Safety valve		
			Fill and withdraw valve		

			Transfer hoses		
			Solenoid valve		
			Pressure building valve		
		Warranty & Others	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>		
35.1	Liquid nitrogen tank	Liquid nitrogen tank for cell storage	CE certified Tank made of stainless steel For safe storage of cells	01	
		Capacity	30 litres (or more)		
		Vial capacity (1.2-2 mL)	600 (or more)		
		Evaporation rate	0.2 litres/ day (or lower)		
		Accessories	vial rack	06	
			1ml cryo-vial box	10	
			2ml cryo-vial box	10	
0.5 ml cryo-vial box	5				
Warranty & Others	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>				
36	Autoclave	Purpose	Sterilization of Glassware, Surgical instruments, Media and biological waste	01	
		Type	Horizontal fully automatic Stainless Steel chamber		
		Capacity	Effective Chamber Capacity 50 L (or more)		

		<b>Programs</b>	<b>With programs: for Solids, Waste destruction bags, Liquid waste, Liquid Media and Cleaning.</b>		
		<b>Heating Type</b>	<b>Integrated separate steam generator (no heating elements in sterilization chamber).</b>		
		<b>Steam Parameters</b>	<b>Up to 135°C (or higher)</b>		
			<b>Pressure 4 bar (or higher)</b>		
		<b>Safety Lock</b>	<b>Specialized Safety door lock during operation and till cooling according to international Pressure Vessel Regulations</b>		
		<b>Pressure control</b>	<b>Electronic pressure transducer for pressure and temperature control</b>		
		<b>Sterilization program</b>	<b>Multiple built in programs for waste destruction with ventilation of waste bags</b>		
		<b>Water inlet</b>	<b>Autofill function</b>		
		<b>Integrated Vacuum System</b>	<b>For improved air release and quicker drying</b>		
		<b>Rapid Cooling</b>	<b>Using cold water and sterile compressed air</b>		
		<b>Warranty</b>	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>		
36.1	<b>Autoclave Sterilizer</b>	<b>Purpose</b>	<b>Sterilization of Glassware, Surgical instruments, Media and biological waste</b>	02	
		<b>Type</b>	<b>Vertical Laboratory Sterilizer, Fully automatic, Interior Chamber Stainless steel. Digital microprocessor controlled</b>		
		<b>Sterilization Temperature</b>	<b>Up to 135°C or higher</b>		
		<b>Programs</b>	<b>Multi-mode selection</b>		
		<b>Effective Capacity</b>	<b>50 Litre or higher</b>		
		<b>Safety</b>	<b>Over pressure power cut off Over temperature power cut off Current leak detection</b>		



		<b>Rated working pressure</b>	<b>2.5 bar or higher</b>		
		<b>Controls</b>	<b>Digital Control Programmable or Built in Multiple Programs</b>		
		<b>Accessories</b>	<b>Drainage hose, Stainless steel baskets And all other requisite accessories for operation as aforementioned</b>		
		<b>Warranty &amp; Others</b>	<ul style="list-style-type: none"> <li>▪ <b>12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</b></li> <li>▪ <b>Proofs of trainings of company personnel/engineers should be provided</b></li> <li>▪ <b>List of installations in Pakistan should be provided</b></li> </ul>		
37	<b>Shaker (Rocking platform)</b>	<b>Purpose</b>	<b>Used for a broad range of mixing and agitation applications in the laboratory. Brushless dc motor</b>	02	
		<b>Speed range</b>	<b>5–50 rpm or better</b>		
		<b>Power restoration</b>	<b>Auto function restoration in case of power failure</b>		
		<b>Motion</b>	<b>Tilting/Rocking</b>		
		<b>Control</b>	<b>LCD Display</b>		
			<b>Knob or touch or pressing button</b>		
		<b>UPS</b>	<b>As recommended by OEM</b>		
<b>Warranty &amp; Others</b>	<ul style="list-style-type: none"> <li>▪ <b>12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</b></li> <li>▪ <b>Proofs of trainings of company personnel/engineers should be provided</b></li> <li>▪ <b>List of installations in Pakistan should be provided</b></li> </ul>				

38	Shaker (Horizontal, Orbital)	Purpose of the Orbital Shaker	Used for a broad range of mixing and agitation applications in the laboratory.	02	
		Speed range	50-300 rpm or better		
		Motion	Orbital		
		Temperatu re range	Up to 60°C or better		
		Control	LCD Display to control temperature, speed and time		
		UPS	As recommended by OEM		
		Warranty & Others	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>		
39	Centrifuge	Max Capacity	12 or more x 2 mL	03	
		Max speed	14,000 rpm or more (100 rpm increments)		
		Rotor capacity and adaptor	1.5/2 ml tubes along with suitable rotor and adopter capable of holding at least 12 samples at a time		
			0.5 ml tubes along with suitable rotor and adopter capable of holding at least 12 samples at a time		
		Timer	15 sec or less to 99 minutes or more		
		Features	LED with control panel		
		Warranty & Others	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>		

40	Microplate Reader (Florescence, Multi Mode)	Purpose:	<ul style="list-style-type: none"> <li>▪ Must be able to detect absorbance, luminescence, fluorescence, time-resolved fluorescence (TRF) in plate format</li> <li>▪ real time kinetic monitoring.</li> <li>▪ software controlled.</li> </ul>	01	
		Plate Type	96 well plate or more types of plate		
		Detection module	UV-Vis Fluorescence intensity Luminescence (Or more)		
		Light source	Xenon flash or Halogen lamp or better		
		Software	Protocol and full data analysis and reporting		
		Spectral range	250 nm (or lower) - 900 nm (or higher)		
		Temperature Control	65°C or more		
		Atmospheric control unit	Regulate CO <sub>2</sub> and O <sub>2</sub>		
		UPS backup	As recommended by OEM	01	
		Installation	Complete installation with onsite training		
Warranty & Others	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>				
41	Safety Cabinet	Purpose	CE certified Total exhaust cabinets for work with toxic chemicals and infectious agents	02	
		Class	II		
		Type	B2		
		Working area	12 square feet (or bigger)		
		Filter	HEPA/ULPA		

		<b>control</b> Graphical LCD display containing: on/off fan control with adjustable air velocity Working window control LED lamp ON/OFF UV lamp ON/OFF Elapsed time counter and alarm for HEPA filter replacement		
		<b>Chamber Materials</b>	Stainless Steel	
		<b>Window</b>	Tempered glass	
		<b>Other features</b>	<ul style="list-style-type: none"> <li>▪ Compatible trolley</li> <li>▪ UV light</li> <li>▪ Total Exhaust</li> </ul>	
		<b>UPS backup</b>	As recommended by OEM	
		<b>Installation</b>	Complete installation with onsite training	
		<b>Warranty &amp; Others</b>	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>	
41.1	Safety Cabinet	<b>Purpose</b>	CE certified exhaust cabinets for work with toxic chemicals and infectious agents	
		<b>Class</b>	II	
		<b>Type</b>	A2	
		<b>Working area</b>	12 square feet (or bigger)	
		<b>Filter</b>	HEPA/ULPA	
		<b>control</b>	Graphical LCD display containing: on/off fan control with adjustable air velocity Working window control LED lamp ON/OFF UV lamp ON/OFF Elapsed time counter and alarm for HEPA filter replacement	6
		<b>Chamber Materials</b>	Stainless Steel	
		<b>Window</b>	Tempered glass	
		<b>Other features</b>	<ul style="list-style-type: none"> <li>▪ Compatible trolley</li> <li>▪ UV light</li> <li>▪ Total exhaust</li> </ul>	

		<b>UPS backup</b>	As recommended by OEM		
		<b>Installation</b>	Complete installation with onsite (installation) training		
		<b>Warranty &amp; Others</b>	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>		
42	Drill Machine	<b>General Features</b>	<ul style="list-style-type: none"> <li>• Benchtop Drill machine with digital system to read drilling speed and depth</li> <li>• Keyless precision chuck</li> <li>• Adjustable speed (RPM)</li> <li>• Adjustable drilling height</li> <li>• Multi gear</li> <li>• Laser pointing system for precision drilling</li> </ul>	01	
		<b>Drilling capacity in mild steel</b>	13 mm (or higher)		
		<b>Drill stoke</b>	90 mm or better		
		<b>Chuck jaw width range</b>	1.5 300 mm or better		
		<b>Power in put</b>	700 Watt (or higher)		
		<b>Warranty &amp; Others</b>	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>		
43	Centrifugal Grinder	<b>Bench Grinder</b>	<b>General Features</b> <ul style="list-style-type: none"> <li>• Torque 1400 in-lb or higher</li> <li>• eye shields, spark deflectors, tool rests, adjusting wrench</li> <li>• Overload Protection</li> <li>• Tool-Free Adjustable Guard</li> <li>• 3/4 hp induction motor or higher power</li> <li>• 3,600 rpm or higher</li> </ul>	01	

			<ul style="list-style-type: none"> <li>wheel guards;</li> <li>12-1/2-inch or more distance between wheels for larger and longer grinding applications</li> </ul>		
			<ul style="list-style-type: none"> <li>Accessories</li> <li>Grinding wheel coarse (60 grit or finer)</li> </ul>	01	
			Accessories Grinding wheel fine (100 grit or finer)	01	
		Warranty and others	12 months from the date of installation with onsite training and installation		
		Angle grinder	<b>General features</b> <ul style="list-style-type: none"> <li>Power: 800 watts (or above)</li> <li>Cutting Wheel Size: 100 mm or equivalent</li> <li>Speed: 10,000 rpm (or higher)</li> <li>Spindle Size: M10 or equivalent</li> <li>Cable length : 2 meter (or more)</li> <li>Body Grip tool for firm hold</li> <li>Lock on switch for continuous use</li> </ul>	01	
		Warranty and others	12 months from the date of installation with onsite training and installation		
44	Arc welder	General Features	<b>Multi-purpose</b> <ul style="list-style-type: none"> <li>Manual/Stick</li> <li>TIG</li> <li>Should be able to weld Stainless Steel, Steel, Aluminum</li> <li>Display screen</li> </ul>	01	
		Output	240 A (or higher)		
		Stick Welding Output	180 A (230 V) @ 25% duty cycle or better		
		TIG Welding Output	180 A (230 V) @ 30% duty cycle or better		
		Accessories	All requisite accessories to perform aforementioned tasks as highlighted in General Features should be provided (which includes but may not be limited to torches, regulators, gas cylinder)		
		Class of Protection	IP23S or better		
		Warranty & Others	<ul style="list-style-type: none"> <li>12 Months from the date of installation (parts and service)</li> </ul>		

			<p>with vendor having good local reputation with running machines and well-trained engineers</p> <ul style="list-style-type: none"> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>		
45	Compressor	Purpose	oil free single stage compressor with air storage tank suitable for high quality air demand for biomedical and pharmaceutical applications	01	
		Power	4kW (or higher)		
		Pressure	10 bar (or higher)		
		Receiver/airtank (litre)	270 (or higher)		
		pumping Capacity (litre)	350 (or higher)		
		Warranty & Others	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>		
46	Manual & Power Tool and Consumables	Workstations	6 ft or more length of Workstation for tool storage and tabletop for day to day work	1	
			30,000 cu. inch or more capacity load		
			24" or more professional working depth		
			Workstation should be equipped with 15 or more, ball-bearing drawers that hold up to 100 lbs. or above with 200 lbs. or above capacity in the deeper drawers.		
			Thick 18 Gauge or better Steel Body (powder coated)		
			Auto Return Drawers		
		Mixed Tool SET	<ul style="list-style-type: none"> <li>▪ 400 or more pieces</li> <li>▪ Blow molded durable carry case</li> <li>▪ Black chrome or better finish for anti-corrosion protection</li> </ul>	1 complete set	

		<ul style="list-style-type: none"> <li>▪ Laser-etched markings for size visibility</li> <li>▪ Quick release switch and reversible mechanism for easy operation</li> <li>▪ Meets or exceeds ANSI specifications</li> <li>▪ Chrome-molybdenum steel according to SAE and MM standards</li> </ul>		
		<p>Should include but not necessarily be limited to;</p> <ul style="list-style-type: none"> <li>▪ Utility Knife,</li> <li>▪ 5m/16ft Tape Measure</li> <li>▪ Screw drivers (different types)</li> <li>▪ Adjustable Wrenches</li> <li>▪ Hex. Key wrenches</li> <li>▪ Pipe Wrench</li> <li>▪ Pliers</li> <li>▪ Dr. Specialty bits, sockets</li> <li>▪ Hammers</li> <li>▪ Extension Bar</li> </ul>		
		<p><b>22V Brushless Cordless Drill &amp; Impact Driver Kit</b></p>	<ul style="list-style-type: none"> <li>▪ 22V Brushless 3/8 in. drill and impact driver</li> <li>▪ Brushless motor for maximum runtime and durability</li> <li>▪ Must have vibration reduction mechanism</li> <li>▪ Torque control mechanism and Quick-change chucks – changing bits must be a fast and tool-free function</li> <li>▪ Associated tools and drill bits</li> <li>▪ High speed transmission with 2 or more speed settings</li> <li>▪ With LED lights to illuminate the work surface</li> <li>▪ Compact, lightweight design for tight spaces</li> <li>▪ 2 extra batteries for drill as well as impact driver &amp; charger</li> <li>▪ Wide range of drill bits (hard coated &amp; wear resistant)</li> <li>▪ 1-year warranty (or more)</li> </ul>	<p><b>01</b></p>
		<p><b>36V Brushless Hammer drill</b></p>	<p>Integrated lithium ion Battery</p> <hr/> <p>Chuck Size 1/2" Cordless System</p> <hr/> <p>RPM 0-2000 or more</p> <hr/> <p>Multiple speed settings</p> <hr/> <p>Must have vibration reduction mechanism</p> <hr/> <p>Torque control mechanism and Quick-change chucks – changing</p>	<p><b>01</b></p>



		<p><b>bits must be fast and a tool-free function</b></p> <p><b>Drilling through wood, metal, and plastic</b></p> <p><b>2 extra Lithium Ion Batteries</b></p> <p><b>Charger</b></p> <p><b>Brad Point Drill &amp; Masonry Bits (tungsten carbide tips)</b></p> <p><b>Screws / Fasteners</b></p> <p><b>HSS Drill Bits</b></p> <p><b>Magnetic Bit Tip Holder</b></p> <p><b>1" Bits, 2" Bits, 3-1/2" Bits</b></p> <p><b>Nutdrivers</b></p> <p><b>Ratcheting Screwdriver</b></p> <p><b>Gauge</b></p> <p><b>Sockets</b></p> <p><b>Socket Adaptor</b></p> <p><b>Storage box</b></p> <p><b>1-year warranty (or more)</b></p>		
	<b>Hammer Drill (Corded)</b>	<p><b>2-position switch to select standard or hammer drill functions</b></p> <p><b>6.5 Amp or more power</b></p> <p><b>Quick-change chucks – changing bits must be fast and tool-free</b></p> <p><b>Working mode: Hammer drilling, Drilling, Chiseling</b></p> <p><b>Active vibration reduction mechanism</b></p> <p><b>Single-sleeved chuck for easy bit changes</b></p> <p><b>Multi-position side handle for ease of use</b></p> <p><b>1/2 in. chuck to accommodate larger bits along with associated bits</b></p> <p><b>1-year warranty (or more)</b></p>	<b>01</b>	
	<b>Chop Saw</b>	<ul style="list-style-type: none"> <li>▪ <b>To cut through metal</b></li> <li>▪ <b>15 Amperes or more</b></li> <li>▪ <b>14 in. (or more) Chop Saw to cut</b></li> <li>▪ <b>1-year warranty (or more)</b></li> </ul>	<b>01</b>	

		<b>Multipurpose Bench Vise</b>	<b>Jaw width 5-6-inch Jaw with Swivel Base</b>	<b>01</b>	
			<b>Opening capacity 5 inch or more</b>		
			<b>Throat depth 2 inches or more</b>		
			<b>Captured safety jaw to prevent slide from falling out</b>		
			<b>Fused steel handle</b>		
			<b>Anvil incorporated</b>		
			<b>Integrated pipe jaws</b>		
<b>47</b>	<b>Contact Angle measurement</b>	<b>Purpose</b>	<b>Drop shape analyzer for static and dynamic contact angle measurement, surface and interfacial tension measurements, and surface free energy calculation</b>	<b>1</b>	
		<b>Measuring angle Range</b>	<b>Range: 0-180° or better</b>		
			<b>Hardware accuracy: 0.3° Or better</b>		
		<b>Measuring range of interface tension</b>	<b>Range: 0.01 to 2000 mN/m or better</b>		
			<b>Accuracy: 0.3 mN/m or better</b>		
		<b>Camera</b>	<b>Measuring speed: 2000 fps or better</b>		
			<b>Camera view angle (°): ±2.5 or better</b>		
			<b>IR cut filters</b>		
			<b>Resolution: 1200 x 1200 px</b>		
		<b>Optics</b>	<b>Field of view 3.2 to 18.5 mm or better</b>		
		<b>Illumination</b>	<b>Adjustable LED</b>		
		<b>Stage</b>	<b>X, Y, Z axis movement</b>		
			<b>Tilting/ rotation for roll-off/ receding contact angle measurement</b>		
		<b>Dosing system</b>	<b>Software control Automatic, with glass and disposable syringes</b>		
			<b>Accuracy 0.1µL or better</b>		
<b>dosing speed 10-1000µL/minute or better</b>					
<b>sample holder for manual dosing</b>					
<b>Accessories</b>	<b>Disposable syringe of any volume between 200 uL to 1000 uL with needle (In addition to all standard syringes and needles)</b>	<b>1</b>			
	<b>Calibration standards for drop size analysis</b>	<b>1 Kit</b>			

		<b>Environmental Chamber</b>	<b>For air controlled measurement</b>	<b>1</b>	
		<b>Software</b>	<b>Software to determine static and dynamic contact angle measurement</b>	<b>1</b>	
			<b>Software to measure surface free energy of solids</b>	<b>1</b>	
			<b>software to determine surface and interfacial tension of liquids</b>	<b>1</b>	
			<b>Software to control camera, illumination, temperature, dosing module, table movement, cuvette for pendant drop</b>	<b>1</b>	
		<b>Computer</b>	<b>Compatible with system with power back up</b>	<b>1</b>	
		<b>Power backup</b>	<b>As recommended by OEM</b>	<b>1</b>	
		<b>Warranty &amp; Others</b>	<ul style="list-style-type: none"> <li>• <b>12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</b></li> <li>• <b>Proofs of trainings of company personnel/engineers should be provided</b></li> <li>• <b>List of installations in Pakistan should be provided</b></li> </ul>		
<b>48</b>	<b>Cryostat</b>	<b>Purpose</b>	<b>Thin sectioning of biological tissues at cryogenic temperature. The instrument should be complete with all accessories including blades, sample holders, knives etc necessary for smooth running.</b>	<b>01</b>	
		<b>General Features</b>	<b>Temperature setting -35°C (or below)</b>		
			<b>Section thickness setting 5µm (or below) to 100µm (or above)</b>		
			<b>Specimen feed 15 mm or better</b>		
			<b>Vertical specimen stroke 48 mm or better</b>		
			<b>Freezing shelf temperature -35°C (or below)</b>		
			<b>Accessories</b>		
		<b>Knife case large 01</b>			

			<b>Cryostat oil 250ml</b>		
			<b>Knives 16 cm TC 03</b>		
			<b>Knives 16 cm long steel 03</b>		
			<b>Blades TC disposable 50</b>		
			<b>Blade high profile disposable 10</b>		
			<b>Blade low profile disposable 10</b>		
		<b>UPS backup</b>	As recommended by OEM	<b>01</b>	
		<b>installation</b>	Complete installation with onsite training		
		<b>Warranty &amp; Others</b>	<ul style="list-style-type: none"> <li>• 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>• Proofs of trainings of company personnel/engineers should be provided</li> <li>• List of installations in Pakistan should be provided</li> </ul>		
49	CAD licensed software	<b>Purpose</b>	software suite for computer-aided design (CAD), computer-aided manufacturing (CAM), computer-aided engineering (CAE),	01	
		<b>License</b>	<ul style="list-style-type: none"> <li>• Multiuser (minimum 3 or higher) - lifetime</li> <li>• Educational/startup/incubator</li> </ul>		
		<b>Scope of Applications</b>	3D and 2D drawings for CNC operations		
			Suitable file formats for use in commercial CAD/CAM equipment e.g. CNC machines, 3D printers		
			3D visualization		
			Parts modeling		
		<b>Others</b>	Biomedical device designs		
<b>Others</b>	Must be from world renowned company having a track record of providing CAD/CAM solutions to industries				
50	Surgical light for OT	<b>Purpose</b>	Surgical light source to illuminate the Operating area. Facilitation in surgical procedures for animal trials. Compact exam light for surgical procedures on experimental animals.	02	

		<b>Light source</b>	LED		
		<b>Installation type</b>	Floor standing Six-dimensional joint; 360°,		
		<b>Luminance</b>	Multiple luminescence		
			Illumination depth: ≥600(mm) ≥2°C,		
			Higher than 100000 Lux.Color		
			Spot Diameter:150 mm (or higher)		
		<b>Light-adjusting mode</b>	four grade dimmer system or better		
		<b>Lamp automatic switching time</b>	0.2S, Color indication index: ≥97%,		
		<b>Warranty</b>	12 Months from the date of installation		
51	Operating Table	<b>Purpose</b>	Operating Table for surgical procedures on small and medium sized animals. Made of Stainless steel 304.	02	
		<b>Tabletop dimensions</b>	Equal to 60 x 22 in (or higher)		
		<b>Adjustable Height</b>	Table height electronically adjustable ranging 28 to 40 inch or better		
		<b>Heated Top</b>	Durable stainless steel tabletop with electronic heating system		
		<b>Drain hole</b>	Built-in drain hole at the table top		
		<b>Load capacity</b>	Higher 120 Kg (or higher)		
		<b>Warranty</b>	12 Months from the date of installation		
52	Trolley with in built rabbit cages	Rabbit Cages	Cages size(internal dimensions): ~ 600mm x ~ 450mm x ~ 450 mm (LXBXH)	48	
			Made of S.S 304 material with duly spot welded and finished joints		
			Each cage should be Independent and movable		
			AISI 304 quality stainless steel material		
			Fitted with tag holder		
			Gap between S.S rods used in cage walls: ~7mm		
			Cage door with fixed label holder and arrangement for food hopper and fixing water bottle.		
			The door must be made of wire mesh of ~2.5mm and ~5mm SS rod		

			welded on a frame of ~5mm SS rod and covered with 22 swg Sheet.		
			Floor grill Bottom floor net of ~ 12 x 26 mm must be made of ~2.5mm and ~5mm SS wire welded on a frame of ~5mm SS rod. Floor net must be fixed and non-removable type.		
			Tray Excreta tray made of 22swg S.S sheet with turned and smoothed edges, and removable for cleaning		
		Bottles	Polypropylene water bottle of capacity ~650ml fitted S.S bent type nozzle	48	
		Trolley	Three rack moveable trolleys with wheels must be made up of ~20mm x 20mm x 16swg S.S to accommodate aforementioned 6 rabbit cages each	8	
53	Low-Flow Anesthesia System	Purpose	Anesthesia system for ethical precise delivery of anesthetic to prepare small animals for surgical procedures. Safe for surgical personnel.	02	
		Range	Flow rates from 25 ml/hour (or lower) to 1 L/hour (or higher)		
		Number of animals	Anesthetize multiple animals at once (minimum 2)		
		Air compressor	Built-in		
		Monitoring	Built-in display for real-time monitoring		
		Accessories	All the required hardware and connections included in the system		
		Warranty	12 Months from the date of installation		
54	Anesthesia Mask/ Breathing Circuit	Purpose	Rodent face masks made from clear acrylic to anesthetize or resuscitate the rodents.	04	
		features	Large anesthesia mask with co-axial non-rebreathing system diameter: ~44mm , depth: ~33mm,		
		Diaphragm	Includes diaphragm material (200g or more).		
55	Freeze Dryer	Purpose	Benchtop model for removing water from numerous small sample loads	02	
		Exterior	Cubic or rectangular (Corrosion resistant)		
		Temperature	-80 °C (or lower)		
		Water capture capacity	1.5 litres/24 hours (or higher)		

		<b>Solvents</b>	<b>Water</b>		
		<b>Drying Chamber</b>	<b>Stainless steel drying chamber</b>		
			<b>Transparent door</b>		
			<b>Stainless steel trays</b>		
		<b>Condenser</b>	<b>stainless-steel collector coil condenser</b>		
		<b>Refrigeration system</b>	<b>CFC-free</b>		
		<b>Vacuum system</b>	<b>Rotary vane vacuum pump</b>		
			<b>Ultimate vacuum: 0.002 mbar or below</b>		
		<b>Control panel</b>	<b>Touch screen display panel shows operating parameters, set-up parameters and alarm messages</b>		
		<b>Safety controls</b>	<b>Alarm system.</b>		
			<b>Vacuum control option to maintain set point</b>		
			<b>Auto restore functions in case of power failure</b>		
		<b>Accessories</b>	<b>Freeze drying flasks (100ml) 4 Nos</b>		
			<b>Power stabilizer</b>		
		<b>Warranty</b>	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>		
56	Automated Microtome	<b>Purpose</b>	<b>Histology of preserved soft and hard tissue</b>	02	
		<b>Nature</b>	<b>Fully-Motorized/ automated Microtome with foot pedal</b>		
		<b>Automatic unlock handwheel</b>	<b>To instantly switch from manual to automatic mode</b>		
		<b>Sectioning Speed</b>	<b>up to 400 mm/s (or higher)</b>		
		<b>Vertical stroke</b>	<b>Vertical stroke 70 mm or better</b>		
		<b>Clamp</b>	<b>universal cassette clamp large</b>		
		<b>Specimen orientation</b>	<b>Horizontal: ± 8° or better Vertical: ± 8° or better</b>		

		<b>Section thickness range (<math>\mu\text{m}</math>)</b>	<b>0.5 (or lower) - 100 (or higher)</b>		
		<b>Trimming Section thickness range (<math>\mu\text{m}</math>)</b>	<b>5 (or lower) - 500 (or higher)</b>		
		<b>Control panel</b>	<b>LCD display</b>		
		<b>Holder for blade</b>	<b>Blade holder base with cutting protection for safety Should be able to hold high- and low-profile blades</b>		
		<b>Waste tray</b>	<b>Should be included</b>		
		<b>Specimen Retraction</b>	<b>Should be included</b>		
		<b>Accessories</b>	<b>Compatible blades &amp; all requisite accessories needed to perform the aforementioned functions</b>		
		<b>Warranty &amp; Others</b>	<ul style="list-style-type: none"> <li>• 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>• Proofs of trainings of company personnel/engineers should be provided</li> <li>• List of installations in Pakistan should be provided</li> </ul>		
57	Microplate Reader	<b>Purpose of Microplate Spectrophotometer</b>	<b>Microplate Spectrophotometer is used for DNA and RNA quantitation, cytotoxicity assays, Reporter gene assay, Enzyme assays</b>	01	
		<b>Applications</b>	<b>RNA, DNA and Protein quantification and kinetic assays</b>		
		<b>Light Source</b>	<b>Xenon Flash lamp</b>		
		<b>Wavelength Range</b>	<b>300 nm (or lower) to 950 nm (or higher)</b>		
		<b>Measurement Speed</b>	<b>15 seconds or less</b>		
		<b>Plate Type</b>	<b>96 well plates or more</b>		
		<b>UPS</b>	<b>As recommended by OEM</b>		
		<b>computer</b>	<b>As recommended by OEM</b>		



		Warranty & Others	<ul style="list-style-type: none"> <li>• 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>• Proofs of trainings of company personnel/engineers should be provided</li> <li>• List of installations in Pakistan should be provided</li> </ul>		
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### **Bid Evaluation Criteria**

All bids shall be evaluated in accordance with the following evaluation criteria and other terms & conditions set forth in this bidding document.

- a. The bids shall be evaluated to strictly ensure that the quoted brand/ model meet all the BoQ/ specification requirements given in the tender document for each item.
- b. In addition to the BoQ requirements, vendors must meet the vendor qualification criteria /company profile requirements (if any), as set forth in this tender document.
- c. Supporting literature of the quoted model must be attached for verification & technical evaluation of the required specification by the technical committee. In case of any clash is found between the quoted model and the supported literature may lead to rejection of bid.
- d. The vendor must have an **authorized dealer certificate against all items except Sr. # 50, 51, 52, 53 & 54 of the quoted product/Item (Certificate with current year's validity) of Original Manufacturer for all Equipment which shall be also verifiable from the Principal / Manufacture Website or through email. It must be attached with bid otherwise such item/bid may be rejected.**

**Financial Portion (Price and Brand/Model to be mention only in Financial Proposal in a separate sealed envelope) Strictly on our BoOs Form.**

Vendors are required to provide both unit and total price of each item and calculations must be made carefully to avoid mistakes. However, in case, total price does not match with the unit price and quantity due to calculation error or typo error, any of the following can be opted

1. The bid may be rejected on the reason of ambiguity (OR)
2. Unit price will be considered as final and total price of the respective item will be calculated by multiplying it with the quantity required. Sub-totals and grand total will also be corrected accordingly.

No change in the BoQs (Specs & Qty.) of CUI-Lahore Campus, as detailed below, is allowed. Any additional information may be mentioned in the blank columns (i.e. model / brand or Price). Any modification in CUI-Lahore Campus BoQ may lead to rejection of bid (fully or partially).

Prices should be quoted inclusive of all applicable taxes

Sr. #	Item Name	Requirement / Specifications	Qty	Quoted Model / Brand / Make	Unit Price (Rs)	Total Price (Rs)
1	Potentiostat	<p>Photo-Electrochemical Workstation</p> <p>A system required to control a three electrode cell and measures the voltage difference between a Working Electrode and a Reference Electrode and to be used in the area of Photo-electrochemical sensing, electrochemical sensing and supercapacitor application.</p> <p>It should measure:</p> <ul style="list-style-type: none"> <li>▪ Chopped Light Voltammetry</li> <li>▪ Cyclic voltammetry</li> <li>▪ Differential pulse voltammetry</li> <li>▪ Impedance spectroscopy,</li> <li>▪ Amperometry</li> <li>▪ Chronoamperometry</li> <li>▪ Galvanostatic charge discharge</li> <li>▪ Battery cycling</li> <li>▪ Linear sweep voltammetry</li> </ul> <p>Electrochemical</p>	1			
		10 $\mu$ Hz (or lower) to 8 MHz (or higher)				

Signature & Stamp of Bidder

<b>Impedance Spectroscopy (EIS) frequency range</b>		
<b>Maximum current</b>	2A or better	
<b>Current Range</b>	10 nA (or lower) to 1A (or higher)	
<b>Potential range</b>	±10 V	
<b>Slots for additional hardware</b>	5 or more	
<b>Photo-Electrochemical Light Emission Source</b>	<b>LED Driver Kit with cover or LED Potentiostat</b>	
	<b>Light source setup (optical bench)</b>	
	<b>Switchable Light Source (Royal blue to UV 370 to 470 nm) or better</b>	
	<b>all required cable connectors, USB connector and charger adapter</b>	
<b>Accessories</b>	<b>Counter electrode (Pt) by OEM</b>	2
	<b>References electrode (Ag/AgCl) by OEM</b>	2
	<b>Reference electrode (Hg/HgCl<sub>2</sub>) by OEM</b>	2
	<b>Working electrode (glassy carbon) by OEM</b>	2
	<b>Electrode polishing kit by OEM</b>	1
	<b>Basic Electrochemical Cell Setup</b>	1
<b>Software</b>	<b>Unlimited licenses and free lifetime software upgrades.</b>	1
	<b>Must be compatible with all provided hardware</b>	
	<b>Advanced custom analysis with user-defined variables and models</b>	

		Computer	Computer compatible with system and recommended by OEM with genuine windows	1		
		Power backup with additional Servo Stabilizer	As recommended by OEM for optimum operations 12 Months from the date of installation	1		
		Installation	Complete Installation, operation, Onsite Training (installation)			
		Warranty & Others	12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers			
			Proofs of trainings of company personnel/engineers should be provided			
			List of installations in Pakistan should be provided			
1.1	Potentiostat	Electrochemical Workstation	<p>Electrochemical Workstation for electrochemical and electrochemiluminescence measurements.</p> <p>It should measure</p> <ul style="list-style-type: none"> <li>▪ Cyclic voltammetry</li> <li>▪ Differential pulse voltammetry</li> <li>▪ Amperometry</li> <li>▪ Chronoamperometry</li> <li>▪ Pulse amperometric detection</li> <li>▪ Linear Sweep potentiometry</li> <li>▪ Potentiometric stripping analysis</li> <li>▪ Measure intensity of light emitted by electrochemiluminescent molecule</li> <li>▪ Measure intensity of light (emitted by electrochemiluminescence)</li> </ul>	1		

	escent molecule) as a function of wavelength			
<b>Maximum current</b>	<b>40 mA or better</b>			
<b>Current Ranges</b>	<b>1 nA to 10 mA or better</b>			
<b>Potential range (DC)</b>	<b>-4 to + 4 V or better</b>			
<b>Light source</b>	<b>ECL Cell with detector</b>			
	<b>Wavelength range (215-2500 nm or better)</b>			
	<b>Bulb life (1,000 hours or better )</b>			
	<b>all required cable connector, USB connector and charger adapter</b>			
<b>Accessories</b>	<b>Counter electrode (Pt) by OEM</b>	<b>1</b>		
	<b>References electrode (Ag/AgCl) by OEM</b>	<b>1</b>		
	<b>Reference electrode (Hg/HgCl<sub>2</sub>) by OEM</b>	<b>1</b>		
	<b>Screen printed carbon electrodes by OEM</b>	<b>150</b>		
<b>Software</b>	<b>Unlimited licenses and free lifetime software upgrades.</b>			
	<b>Must be compatible with all provided hardware,</b>			
	<b>Advanced custom analysis with user-defined variables and models</b>			
<b>Computer</b>	<b>Computer compatible with system and recommended by OEM with genuine windows</b>	<b>1</b>		
<b>Power backup with additional Servo Stabilizer</b>	<b>as recommended by OEM for optimum operations</b>	<b>1</b>		
<b>Installation</b>	<b>Complete Installation, operation, Onsite Training</b>			
<b>Warranty &amp; Others</b>	<b>12 Months from the date of installation (parts and service)</b>			

			<p>with vendor having good local reputation with running machines and well-trained engineers</p> <p>Proofs of trainings of company personnel/engineers should be provided</p> <p>List of installations in Pakistan should be provided</p>			
2	Fume Cupboards	purpose	For safe working to perform chemical reactions	10		
		Internal Dimensions (mm)	1200x600x870 (WxDxH) or larger			
		General features	Acid and alkali resistance base with aluminum frame			
			Tempered glass window			
			Air velocity 0.3m/s or better			
			Wash basin: alkali and acid resistant			
			Gas and water valves			
			Base cabinet for storage of inflammable chemicals			
			Centrifugal blower for exhaust 900m <sup>3</sup> /h or better			
		Warranty & Others	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>			

3	Storage cabinets	Purpose	For safe storage of cylinders	03			
		Capacity	To accommodate three (03) gas cylinder (50 Liters) or more				
		Exhaust system	Automatic system to detect gas leak with alarm				
		General features	Hoop to prevent cylinder from falling				
			Movable flaps				
			Gas probe for detection of gas leak				
			90 minutes fire-resistant or better				
Double door							
Warranty & Others	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>						
4	Rheometer	Purpose	Viscosity and Rheology measurement (including cross-linking density) of low viscosity liquids, visco-elastic liquids, gel like materials, semi- solids, melts, paste like materials, and reactive systems	1			
		Operating mode	<ul style="list-style-type: none"> <li>• strain control</li> <li>• stress control,</li> <li>• Shear rate control</li> <li>• gap control</li> <li>• rheology in rotation and oscillation mode</li> </ul>				
		Motor drive system	Air bearing				

	<b>Basic Requirements</b>	<b>Minimum torque Rotation (<math>\mu\text{Nm}</math>): 1 (or lower)</b>	
		<b>Minimum torque Oscillation (<math>\mu\text{Nm}</math>): 1 (or lower)</b>	
		<b>Maximum torque (mNm): 120 (or more)</b>	
		<b>Minimum speed (rotational): <math>10^{-3}</math> rpm (or less)</b>	
		<b>Maximum speed (rotational): 1500 rpm (or more)</b>	
		<b>Normal force range (N): 0.01 (or less) to 50 (or more)</b>	
		<b>Peltier temperature control module for cone and plate</b>	
	<b>Accessories</b>	<b>Measuring plate with diameter of any range between 20-30 mm</b>	<b>1</b>
		<b>Measuring plate of any range between 40-60mm</b>	<b>1</b>
		<b>Measuring cone of any range between 20-35mm angle <math>1^\circ</math></b>	<b>1</b>
		<b>Measuring cone of any range between 20-35mm angle <math>0.5^\circ</math></b>	<b>1</b>
	<b>Software</b>	<b>software including driver running under Microsoft windows with lifetime license</b>	
	<b>Computer</b>	<b>Compatible with system with power back up</b>	<b>1</b>
<b>Power backup with additional Servo Stabilizer</b>	<b>As recommended by OEM for optimum operations</b>	<b>1</b>	
<b>Warranty &amp; Others</b>	<b>12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines</b>		



			and well-trained engineers				
			Proofs of trainings of company personnel/engineers should be provided				
			List of installations in Pakistan should be provided				
5	HPLC	Purpose	Qualitative and quantitative analysis of organic compounds e.g., drugs, vitamins, proteins, enzymes etc.	01			
		General features	<ul style="list-style-type: none"> <li>• Gradient pump with degasser,</li> <li>• manual injector</li> <li>• variable wavelength detector.</li> </ul>				
		Gradient Pump	Dual pump with dual piston for binary solvents	01			
			Pressure: up to 400 bar (or higher)				
			Rate up to 5 mL/min (or higher)				
			Integrated Degassing Unit				
		Manual Injector	Manual injector with sample injection valve and standard loop.	01			
		Detector	Variable Wavelength Detector range: 190 nm(or less) to 600 nm (or more)	01			
		Accessories	Colum Compartment: from ambient to 60°C or better range	01			
			Column C18 (compatible with quoted machine)	01			
			Column C8 (compatible with quoted machine)	01			
Compatible sample injections	04						
Power backup	As recommended by OEM	01					
Computer system	As recommended by OEM with original windows	01					

		Warranty & Others	<ul style="list-style-type: none"> <li>• 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>• Proofs of trainings of company personnel/engineers should be provided</li> <li>• List of installations in Pakistan should be provided</li> </ul>				
6	pH electrode	Meter	Purpose of the pH meter	To perform pH measurements	02		
			pH range	0-14 pH or better			
			pH resolution	0.01 or better			
			pH accuracy	±0.05 or better			
			pH calibration	3 point calibration or better			
			Temperature resolution	0.1°C or better			
			Temperature range	Ambient to 60 °C or better			
			Temperature compensation	included			
		Accessories	electrode	10			
			Temperature probe	01			
Standard buffer solutions	Minimum 500 ml each to cover pH rang						

				e 0-14			
		Warranty & Others	<ul style="list-style-type: none"> <li>• 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>• Proofs of trainings of company personnel/engineers should be provided</li> <li>• List of installations in Pakistan should be provided</li> </ul>				
7	High Vacuum Pumps	Purpose of the High Vacuum pump	Vacuum pump for attaining high vacuum for different laboratory equipments	08			
		Construction	Rotary vane vacuum pump				
		Vacuum attainable	$1 \times 10^{-3}$ mbar or below				
		Pumping capacity	80 L/min or better				
		Safety	anti-suck back protection				
		Accessories	Vacuum oil	30 liters			
			Cold trap	5			
			Fine vacuum adsorption trap	5			
			Oil mist filter	08			
			Service kit (washers, seals, gaskets etc)	08			
			Vacuum pipe with flanges both ends (1 meter or more)	08 set			
	Vacuum seal with suitable clamps	08 set					
Warranty & Others	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with</li> </ul>						

			<p>running machines and well-trained engineers</p> <ul style="list-style-type: none"> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>				
7.1	High Vacuum Pump	Purpose of the High Vacuum pump	Oil-less pump for attaining high vacuum pump	02			
		Construction	Scroll vacuum pump				
		Vacuum attainable	$7 \times 10^{-2}$ mbar or less				
		Pumping capacity	100 L/min or more				
		Accessories	Service kit (washers, seals, gaskets etc)	01			
			Vacuum pipe with flanges both ends (1 meter or more)	02 set			
			Vacuum seal with suitable clamps	02 set			
Warranty & Others	12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers Proofs of trainings of company personnel/engineers should be provided List of installations in Pakistan should be provided						
8	Dosing Pumps	General Requirements	<ul style="list-style-type: none"> <li>• Type: Diaphragm PTFE</li> <li>• All parts which come into liquid contact should be acid, alkali, solvent resistant</li> <li>• self-priming, maintenance free</li> <li>• Adjustable flow rate</li> </ul>	3			
		Flow Parameters	Variable flow rates				

			10 ml/min (or lower) to 100ml/min (or higher)			
		Suction height ft. water	9 ft or higher			
		Maximum Pressure	1 bar or higher			
		Tubing	10 feet or more Acid, alkali and solvent resistant tube with all requisite connectors			
		Installation and training	Installation and training at installation site			
		Warranty & Others	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>			
8.1	Dosing Pumps	General Requirements	<ul style="list-style-type: none"> <li>▪ Type: Diaphragm PTFE</li> <li>▪ All parts which come into liquid contact should be acid, alkali, solvent resistant</li> <li>▪ self-priming, maintenance free, dry running, adjustable flow rate</li> </ul>	2		
		Flow Parameters	<ul style="list-style-type: none"> <li>▪ Variable flow rates</li> <li>▪ 0.5 ml/min (or lower) to 20ml/min (or higher)</li> </ul>			
		Suction height ft. water	6 ft (or higher)			
		Maximum Pressure	1 bar (or higher)			

		<b>Tubing</b>	<b>10 feet or more Acid, alkali and solvent resistant tube and connectors which could fit with the pump</b>			
		<b>Installation and training</b>	<b>Installation and training at installation site</b>			
		<b>Warranty &amp; Others</b>	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>			
9	Filtration/ Solvent Pumps	<b>Purpose of the Filtration/solvent pump</b>	<b>Pump for vacuum filtration and solvent removal</b>	05		
		<b>Construction</b>	<b>Oil free pump</b>			
		<b>Vacuum attainable</b>	<b>75 torr or above</b>			
		<b>Maximum flow rate</b>	<b>10 L/min or above</b>			
		<b>Accessories</b>	<b>Vacuum/pressure regulator with gauge</b>			
			<b>Filter</b>			
		<b>Moisture trapper</b>	05			
		<b>Warranty &amp; Others</b>	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> </ul>			

			<ul style="list-style-type: none"> <li>List of installations in Pakistan should be provided</li> </ul>				
10	Minus 20 Freezer	Laboratory Freezer	Upright type	05			
		Chemical resistance	Yes				
		Door material	Steel or equivalent				
		Temperature range (programmable)	Minus 20 °C (or lower) to 10 °C (or higher)				
		Effective capacity	500 L or better				
		Alarms	Power failure				
			High Temperature				
			Low Temperature				
		Temperature Display	Digital display				
		stabilizer	As recommended by OEM	05			
Warranty	1 year warranty for complete equipment						
	5 years compressor warranty						
11	Vacuum Pump	Purpose of the Vacuum pump	Vacuum pump for routine laboratory work and suitable for slightly aggressive or corrosive gases	03			
		Construction	Oil free vacuum pump				
		Vacuum attainable	75 mbar (or below)				
		Maximum flow rate	10 L/min (or above)				
		Accessories	Vacuum/pressure regulator with gauge				
			Filter				
		Warranty & Others	<ul style="list-style-type: none"> <li>12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>Proofs of trainings of company personnel/engineers should be provided</li> </ul>				

			<ul style="list-style-type: none"> <li>▪ List of installations in Pakistan should be provided</li> </ul>					
12	Double Distillation unit along with water feed conversion unit (for water deionizer)	Purpose of the Double Distillation Unit	Water Distillation unit based on reverse osmosis	01				
		Distilled water output	2 L/h or above					
		Biological activity	pyrogen free					
		Safety control	visual flow					
13	CO <sub>2</sub> Incubators	Purpose	Cell and tissue culture	4				
		Capacity	170 L or higher with 4 shelves minimum					
		Design	Non-segmented inner door, with water tray					
		Chamber	Single sheet Stainless steel 304 or Cu enriched stainless steel					
		Equipment stability	Vibration and turbulence protection					
		Temperature range	Ambient to 50° C (or better) Temperature stability 37° C ± 1° C					
		CO <sub>2</sub>	CO <sub>2</sub> gas induction range of 0.2-20 % or better					
		sensor	Digital CO <sub>2</sub> sensor					
			Digital temperature sensor					
			Digital Humidity sensor					
		Disinfection	High Temperature or UV disinfection					
		Alarm	With temperature and CO <sub>2</sub> level, 72-hour data/chart logger or better					
Necessary Accessories	CO <sub>2</sub> cylinder	04						
	Gas regulator.	04						
	Compatible UPS for 30 minute power backup	04						



		Warranty & Others	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>				
14	Freezer (minus 80)	Scope:	Upright freezer which can be set at -80°C	1			
		Temperature range	-80°C (or lower)				
		Effective capacity	330L (or better)				
		Compressor	double compressor				
		Temperature monitoring	Alarm for temperature deviation digital display				
		UPS	compatible with the power requirement for 30 min backup	1			
		installation	Complete installation with onsite training				
Warranty & Others	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>						

15	Power supply	Purpose	Power supply for Fabrication of electrospun matts and electro spraying of solutions	01			
		General Features	Power supply with all accessories like cables and clips etc.				
			Voltages Up to 50KV or more				
			Resolution 0.5 KV or better				
			Output Current 0.5 mA or better				
			Over voltage protection				
			Over current protection				
			Protection against output short circuit				
			Over temperature protection				
			Manual recovery after cutoff				
Digital output display							
AC insulation and reference ground connecting to the earth							
UPS with servo stabilizer	As recommended by OEM	01					
Warranty & Others	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>						
15.1	Power supply	Purpose	Power supply for Fabrication of electrospun matts and	01			

			electrospraying of solutions					
		General Features	Power supply with all accessories like cables and clips etc.					
			Voltages Up to 30KV or more					
			Resolution 0.5 KV or better					
			Output Current Upto 0.5 mA or better					
			Over voltage protection					
			Over current protection					
			Protection against output short circuit					
			Over temperature protection					
			Manual recovery after cutoff					
			Digital output display					
			AC insulation and reference ground connecting to the earth					
		UPS with servo stabilizer	As recommended by OEM	01				
		Warranty & Others	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>					
16	Syringe pumps	Purpose	Syringe pump for Fabrication of electrospun matts and electrospaying of solutions	03				

			Two channel syringe pump for electrospinning, able to work under high voltages (up to 50kv or more) with digital display			
		<b>General features</b>	Channels Two-channel pump: should be controlled independently for individual syringe Flow rate, volume and time of infusion Compatible to work under high voltage.			
			Pumping rate Pumping rate: 3µl/ hr (or lower) to 19 ml/min (or higher)			
			Pump rate accuracy : ±2% or better			
		<b>Accessories</b>	Needle sets 11 g to 27 g (any size in between)	05 sets		
			Multi option coaxial needle set ranging from 11g to 27g (any size in between)	02 sets		
			Triaxial spinneret Needle length should be 6cm with inner 22g, middle 18g and outer 14g	02 sets		
			Triaxial spinneret Needle length should be 6cm with inner 22g, middle 18g and outer 15g	02 sets		
			Triaxial spinneret Needle length should be 6cm with inner 22g, middle 18g and outer 16g	02 sets		
			Tri-channel spinneret	02		
			Multi-nozzle spinnerets	02		
			Cold light source for observing the electrospinning process	01		
			50ml Glass syringes (borosilicate)	05		

			20ml Glass syringes (borosilicate)	05			
			10ml Glass syringes (borosilicate)	10			
			5ml Glass syringes (borosilicate)	10			
			2ml Glass syringes (borosilicate)	10			
		<b>Power backup</b>	As recommended by OEM	01			
		<b>Warranty &amp; Others</b>	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>				
16.1	Syringe pumps	<b>Purpose</b>	Syringe pump for Fabrication of electrospun matts and electro spraying of solutions	01			
		<b>General features</b>	Four channel syringe pump for electrospinning, able to work under high voltages (up to 50kv or higher) with digital display				
		<b>Syringe pump</b>	Channels Four-channel pump: can be controlled independently for individual syringe Flow rate, volume and time of infusion can be controlled precisely. Compatible to work under high voltage.				

			<b>Pumping rate</b> <b>Pumping rate: 3<math>\mu</math>l/hr</b> <b>(or less) to 19 ml / min</b> <b>(or higher)</b>			
			<b>Pump rate accuracy :</b> <b><math>\pm</math>2% or better</b>			
		<b>Accessories</b>	<b>Needle sets</b> <b>11 g to 27 g</b>	<b>05</b> <b>set</b>		
			<b>Multi option coaxial</b> <b>needle set</b> <b>ranging from 11g to</b> <b>27g</b>	<b>02</b> <b>set</b>		
			<b>Triaxial spinneret</b> <b>Needle length should</b> <b>be 6cm with inner</b> <b>22g, middle 18g and</b> <b>outer 14g</b>	<b>02</b> <b>set</b>		
			<b>Triaxial spinneret</b> <b>Needle length should</b> <b>be 6cm with inner</b> <b>22g, middle 18g and</b> <b>outer 15g</b>	<b>02</b> <b>set</b>		
			<b>Triaxial spinneret</b> <b>Needle length should</b> <b>be 6cm with inner</b> <b>22g, middle 18g and</b> <b>outer 16g</b>	<b>02</b> <b>set</b>		
			<b>Tri-channel spinneret</b>	<b>02</b>		
			<b>Multi-nozzle</b> <b>spinnerets also called</b> <b>islands in the sea</b> <b>spinneret</b>	<b>02</b>		
			<b>Cold light source for</b> <b>observing the</b> <b>electrospinning</b> <b>process</b>	<b>01</b>		
			<b>50ml Glass syringes</b> <b>(borosilicate)</b>	<b>05</b>		
			<b>20ml Glass syringes</b> <b>(borosilicate)</b>	<b>05</b>		
			<b>10ml Glass syringes</b> <b>(borosilicate)</b>	<b>10</b>		
			<b>5ml Glass syringes</b> <b>(borosilicate)</b>	<b>10</b>		
			<b>2ml Glass syringes</b> <b>(borosilicate)</b>	<b>10</b>		
		<b>Power backup</b> <b>(optional)</b>	<b>As recommended by</b> <b>OEM</b>	<b>01</b>		

		Warranty & Others	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>				
17	Flow Pumps	General features	<ul style="list-style-type: none"> <li>▪ Type: Peristaltic</li> <li>▪ Variable-Speed</li> <li>▪ Graphical LCD display</li> <li>▪ Contamination-free pump system and maintenance-free high-accuracy motor</li> <li>▪ Self-priming</li> <li>▪ To handle high and low viscosities liquids</li> <li>▪ Reversible motor with on/off/reverse possibility</li> </ul>	01			
		Key Components	<p>Complete Digital system Contain:</p> <ul style="list-style-type: none"> <li>▪ Variable-Speed Pump drive</li> <li>▪ Multiple pump heads</li> <li>▪ Tubing</li> <li>▪ Pump head Mounting Hardware</li> </ul>				
		Pump drive	<ul style="list-style-type: none"> <li>▪ Flow rate range (ml/min): 5 (or lower) to 2800 (or higher)</li> </ul>	1			

			<ul style="list-style-type: none"> <li>▪ Speed control sensitivity: <math>\pm 2\%</math> or better</li> </ul>			
		<b>Pump head</b>	<ul style="list-style-type: none"> <li>• Compatible with pump drive</li> <li>• Rotor materials- Stainless steel</li> <li>• Automatic tubing retention</li> </ul>	2		
		<b>Pump tubing</b>	Material resistance and Compatible with pump head and pump drive			
			Tubing set (20-25 feet Length) - Flow rate 1 to 450 ml/min or better	1		
			Tubing set (20-25 feet Length) - Flow rate 10 to 2000ml/min or better	1		
		<b>Pump Head Mounting Hardware</b>	Stainless steel material, Compatible with pump drive and pump head	1		
		<b>Warranty &amp; Others</b>	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>	1		
17.1	<b>Flow Pumps</b>	<b>General features</b>	<ul style="list-style-type: none"> <li>▪ Type: Peristaltic</li> <li>▪ Variable-Speed</li> <li>▪ Graphical LCD display</li> <li>▪ Contamination-free pump system and</li> </ul>	1		



			<p>maintenance-free high-accuracy motor</p> <ul style="list-style-type: none"> <li>▪ Self-priming</li> <li>▪ To handle high and low viscosities liquids</li> <li>▪ Reversible motor with on/off/reverse possibility</li> </ul>			
		Key Components	<p>Complete Digital system Contain</p> <ul style="list-style-type: none"> <li>▪ Variable-Speed Pump drive</li> <li>▪ Multiple pump heads</li> <li>▪ Tubing</li> <li>▪ Pump head Mounting Hardware</li> </ul>			
		Pump drive	<ul style="list-style-type: none"> <li>▪ Flow rate range (ml/min) : 1 (or lower) to 480 (or higher)</li> <li>▪ Speed control sensitivity: <math>\pm 1\%</math> or better</li> </ul>	1		
		Pump head	<ul style="list-style-type: none"> <li>• Compatible with pump drive</li> <li>• Rotor materials- Stainless steel</li> <li>• Automatic tubing retention</li> </ul>	2		
		Pump tubing	Material compatible with pump head and pump drive			
			Tubing set (20-25 feet Length) - Flow rate 10 to 200 ml/min or better	1		
			Tubing set (20-25 feet Length) - Flow rate 0.5 to 150 ml/min or better	1		
		Pump Head Mounting Hardware	Stainless steel material, Compatible with pump drive and pump head	1		
		Warranty & Others	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts</li> </ul>	1		

			<p>and service) with vendor having good local reputation with running machines and well-trained engineers</p> <ul style="list-style-type: none"> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>					
18	Furnace	General Features	Electrically operable Programmable	01				
		Temperature Control	Working Temperature (Maximum): 1700 °C					01
			Continuous working temperature: 1600 °C					
			Heating Rate: 1°C/min (or lower) to 15°C/min (or higher)					
			Temperature Accuracy: ±1°C					
			Step Size: 0.5 °C or better					
			length of maximum temperature zone: 60 mm or more					
			Tube Wall Thickness: not less than 2 mm					
			High quality MoSi <sub>2</sub> heating element					
			Programming: Minimum 20 segment with parameters: Heating ramp Cooling ramp Dwelling steps					
Built-in over-temperature alarm and thermocouple failure alarm.								
Accessories	An additional B-type thermocouple	01						
	Adequate ceramic protection tube/sheath/sleeve for B-type thermocouple	02						

		<b>Gas In-flow Assembly</b>	<b>Gas in-flow assembly consisting of pressure regulating valve flow meter</b>				
		<b>Water Cooled Flange System</b>	<b>Closed loop circulating water cooling unit with at least 2 vacuum-tight water-cooled stainless-steel flanges with fittings on the outlet side</b>				
		<b>Warranty &amp; Others</b>	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>				
19	Raw materials	Stainless steel bar	ASTM Standard Material: 316L Diameter: 10	1 meter each	10		
			ASTM Standard Material: 316L Diameter: 20 mm		10		
		Titanium Bars	Standard: ASTM Material: Ti6Al4V (biograde) Diameter: 10 mm	1 meter each	10		
			Standard: ASTM Material: Ti6Al4V (biograde) Diameter: 20 mm	1 meter each	5		

		<b>Platinum Wire</b>	<b>0.4mm diameter high purity</b>	<b>50cm</b>	<b>2</b>		
		<b>PTFE Sheet</b>	<b>Thickness: 10 mm</b>	<b>Length × Width: 30 X 90</b>	<b>2</b>		
		<b>PTFE Sheet</b>	<b>Thickness – 30 mm</b>	<b>Length × Width: 30 X 90</b>	<b>2</b>		
		<b>PTFE Tubing</b>	<b>Inner Diameter: 3 mm Outer Diameter: 4 mm</b>	<b>Length: 50 ft</b>	<b>50 ft</b>		
		<b>FTO (Fluorine-doped tin oxide) glass slide</b>	<b>300 mm × 300 mm × 2.3 mm (13 Ω•s q-1)</b>	-	<b>25</b>		
		<b>Indium tin oxide coated glass slide, rectangular</b>	<b>75 mm × 25 mm × 1.1 mm (15-25 Ω/sq)</b>	-	<b>25</b>		
		<b>T-slot Aluminum Frames</b>	<b>40 mm with four (x4) 8 mm T-Slots – each length of 6 meters Clear anodized finish</b>	<b>6 meters</b>	<b>15</b>		
			<b>8 mm T Slots (x200)</b>	-	<b>x200</b>		
			<b>8mm T-Nuts (x200)</b>	-	<b>x200</b>		
			<b>8mm T-bolts (x200)</b>	-	<b>x200</b>		
<b>20</b>	<b>Spectrophotometer</b>	<b>Purpose</b>	<b>For biochemical analysis (chemistry and cell counting) of whole blood or blood-derived samples like plasma, serum etc (i.e. hematology)</b>		<b>01</b>		

			<b>Display</b>	<b>Touch screen</b>			
			<b>Lamp</b>	<b>Quartz halogen lamp or equivalent</b>			
			<b>Wavelengths range</b>	<b>340 (or lower)-620 nm (or higher)</b>			
			<b>absorbance</b>	<b>Absorbance 2.5 or higher</b>			
			<b>Measurement time</b>	<b>15 sec (or less)</b>			
		<b>Photo meter</b>	<b>Assay type</b>	<ul style="list-style-type: none"> <li>• Absorbance,</li> <li>• Endpoint,</li> <li>• Kinetic,</li> <li>• Fixed Time,</li> <li>• Endpoint with Sample Blank,</li> <li>• Endpoint without blank,</li> <li>• 2 points (fixed time) with or without reagent blank</li> <li>• Coagulation</li> </ul>			
			<b>Detector</b>	<b>Photodiode detector 320 (or lower) – 1100 nm (or higher)</b>			
			<b>Sample volume</b>	<b>35µl or less</b>			
			<b>Working Temperature</b>	<b>25, 30 and 37 °C</b>			
			<b>Accessories</b>	<b>Disposable Measuring tubes 5 mL</b>	<b>500</b>		
				<b>Disposable Measuring tubes 10 mL</b>	<b>500</b>		

				Disposable Measuring tubes 15 mL	500			
		Hematology analyzer	General features	<ul style="list-style-type: none"> <li>Digital display</li> <li>Graphic al user interface with compati bility to external mouse and keyboar d</li> </ul>	01			
			Mode	<ul style="list-style-type: none"> <li>Whole blood</li> <li>Capillar y blood</li> <li>Predilut ed blood</li> </ul>				
			Parameter s (minimum )	<ul style="list-style-type: none"> <li>WBC; along with WBC different ials</li> <li>RBC</li> <li>HGB</li> <li>HCT</li> <li>MCV</li> <li>MCH</li> <li>MCHC</li> <li>PLT</li> </ul>				
			Sample volume	50 µL (or less)				
			Data storage	10,000 samples or more				
			Efficiency	60 samples/hour or more				
			Accessorie s	• Keyboard		01		
				• mouse		01		
				• waste liquid barrel	02			
				• external barcode scanner and printer	01			

		UPS	Power Backup of 30 minutes at least	01			
		Warranty	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>				
21	High Temperature Furnace	General Features	<ul style="list-style-type: none"> <li>▪ Electrically operable</li> <li>▪ Programmable</li> <li>▪ 3.5 liters or higher</li> </ul>	01			
		Temperature Control	Working Temperature (Maximum): 1700 °C				
			Continuous working temperature: 1650 °C				
			Heating Rate: 1°C/min (or lower) to 15°C/min (or higher)				
			Temperature Accuracy: ±1°C				
			Step Size: 0.5 °C or better				
			High quality MoSi <sub>2</sub> heating element				
			Programming: Minimum 20 segment with parameters: Heating ramp Cooling ramp Dwelling steps Auto restore function in case of power failure Built-in over-temperature alarm and thermocouple failure alarm.				
Accessories	An additional B-type thermocouple	01					
	Adequate ceramic protection tube/sheath/sleeve for B-type thermocouple	02					
Gas In-flow System	To create inert atmosphere						
Warranty & Others	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service)</li> </ul>						

			<p>with vendor having good local reputation with running machines and well-trained engineers</p> <ul style="list-style-type: none"> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>			
22	Microbiology Safety Cabinet	Purpose	CE certified total exhaust cabinets for work with infectious agents	03		
		Class	II			
		Type	B2			
		Working area	12 square feet or bigger			
		Filter	HEPA/ULPA			
		control	<p>Graphical LCD display containing:</p> <ul style="list-style-type: none"> <li>• on/off fan control with adjustable air velocity</li> <li>• Working window control</li> <li>• LED lamp ON/OFF</li> <li>• UV lamp ON/OFF</li> <li>• Elapsed time counter and alarm for HEPA filter replacement</li> </ul>			
		Chamber Materials	Stainless Steel			
		Window	Tempered glass			
		Compatible Trolley	Yes			
		UV light	Yes			
		Total Exhaust	Yes			
		UPS backup	As recommended by OEM			
		installation	Complete installation with onsite training			
Warranty & Others	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service)</li> </ul>					



			<p>with vendor having good local reputation with running machines and well-trained engineers</p> <ul style="list-style-type: none"> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>				
23	Ultrasonicator probes	Ultrasonicator	<ul style="list-style-type: none"> <li>• 400W or better</li> <li>• process time 10 hours (or more)</li> <li>• Operating frequency of 20 kHz (or more)</li> <li>• Tuneable ultrasonic time</li> <li>• Variable Amplitude (20% to 100% or better)</li> <li>• Processing volume: Minimum 10 mL (or lower) and maximum 250 mL (or higher)</li> <li>• Tunable pulse</li> </ul>	03			
		Titanium Tips	<ul style="list-style-type: none"> <li>• Microtip Probe (with any size between 3-4 mm)</li> </ul>	03			
			<ul style="list-style-type: none"> <li>• Replaceable Tip Probe with any size between 6-14 mm</li> </ul>	03			
		Accessory	<ul style="list-style-type: none"> <li>• Ultrasonic oscillating system(transducer)</li> </ul>	03			
		Warranty & Others	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>				

24	Ultrasonicator chambers	General features	<ul style="list-style-type: none"> <li>▪ Suitable for cleaning of metal, plastic, ceramic or glass parts especially for medical industry cleansing</li> <li>▪ Should include but not be limited to                             <ul style="list-style-type: none"> <li>- Hot air-drying system</li> <li>- Rinsing System</li> <li>- Water circulation system</li> <li>- Filtration mechanism</li> </ul> </li> </ul>	1		
			Stainless Steel Construction (304 or higher grade)			
			Digital temperature and timer display for each chamber			
			Multi-Chamber Unit (4 or more) <ul style="list-style-type: none"> <li>- 1 chamber for ultrasonic wash</li> <li>- 1 chamber for ultrasonic rinsing</li> <li>- 1 chamber for compressed air bubble cleaning</li> <li>- 1 chamber for hot air drying</li> </ul> <i>3+1 or 4 in 1 combinations acceptable</i>			
		Ultrasonicator power	Up to 2000 W or higher			
		Maximum Heating Temperature	Up to 80 °C or higher			
		Maximum load on the basket	15 kilograms or higher			
		Time	<ul style="list-style-type: none"> <li>▪ Up to 60 minutes or higher</li> <li>▪ Continuous mode</li> </ul>			
		Capacity	20 liter per chamber (or higher)			
Independent Precleaning Chamber	<ul style="list-style-type: none"> <li>▪ Independent (not integrated) and additional precleaning chamber</li> <li>▪ 15 Liter (or more)</li> </ul>	1				

			<ul style="list-style-type: none"> <li>▪ 80°C or higher</li> <li>▪ Ultrasonicator power 1000W (or higher)</li> </ul>			
		Accessories and additional required functions	<ul style="list-style-type: none"> <li>▪ Baskets</li> <li>▪ All accessories required for the aforementioned to function completely as intended</li> </ul>			
		Warranty & Others	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>			
25	Blue LED Lights	Purpose	<ul style="list-style-type: none"> <li>▪ Curing of dental composites using LED UV irradiation</li> </ul>	02		
		General features	<ul style="list-style-type: none"> <li>▪ Rechargeable</li> <li>▪ Wireless use ability</li> <li>▪ Base-charger with handpiece holder</li> </ul>			
		Power	1250 mW/cm <sup>2</sup> or better			
		Battery	Long-life, capable of multiple runs should part of provided equipment			
		Accessories	<ul style="list-style-type: none"> <li>▪ 2 extra tips</li> <li>▪ 1 extra battery</li> </ul>			
		Warranty	12-months or better			
25.1	Blue LED Lights	Purpose	Curing of polymers using LED UV Light		01	
		General features	LED UV light system for curing of large surface area			
		Peak wave lengths (nm)	365 nm ± 5 nm	400 ± 5 nm		

		<b>Irradiance (W/cm<sup>2</sup>) at 10 mm distance</b>	2.6 or better	5.5 or better			
		<b>Optical power (W)</b>	65 or better	135 or better			
		<b>Curing Area (mm)</b>	75 (or higher) x 25 (or higher)				
		<b>Accessories</b>	<b>Protective Gear (eye wear, face shield, gloves)</b>				
			All requisite accessories for the aforementioned to function as intended				
		<b>Installation &amp; Training</b>	Complete installation and training on installation site				
		<b>Warranty &amp; Others</b>	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>				
25.2	Blue LED Lights	<b>Purpose</b>	Photopolymerization of polymers		01		
		<b>General features</b>	LED UV light system for spot curing having four independent channels				
		<b>Peak wave lengths (nm)</b>	365, 385, 395 or 400 or 405				
		<b>Watt/cm<sup>2</sup></b>	9 or better (applicable to each of the aforementioned peak wavelengths, respectively)				
		<b>Controller</b>	<ul style="list-style-type: none"> <li>▪ Simultaneous or individual control and programming of 4 (or more) UV LED curing heads</li> </ul>				

		<p><b>LED heads</b></p> <ul style="list-style-type: none"> <li>▪ 2 LED heads corresponding to each of the 4 offered wavelengths from within the aforementioned wavelength requirements</li> <li>▪ Interchangeable to any channel with individual cable for each head</li> </ul>				
		<b>Display</b>	Digital display for operations, programing and important information			
		<b>Time</b>	Programable time from 0.1 to 999 seconds or better			
		<b>Intensity</b>	Programable intensity 5% (or lower) to 100%			
		<b>Accessories</b>	Radiometer and calibration kit			
			Protective Gear (eye wear, face shield, gloves)			
			LED head focusing lenses			
			LED head mounting clamps			
			Extension Cable			
			All requisite accessories for ensuring functioning of the machine as aforementioned			
		<b>Installation &amp; Training</b>	Complete installation and training at installation site			
		<b>Warranty &amp; Others</b>	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>			
26	High Speed mixer	Purpose	High speed mixer is proposed to blend and grind a range of materials	01		

			(ceramics, polymer etc)			
	<b>Shear blender</b>	<b>motor</b>	<b>3 HP (or higher)</b>	<b>01</b>		
		<b>Adjustable speeds</b>	<b>1,700 rpm (or lower) to 18,000 rpm (or higher)</b>			
		<b>Capacity</b>	<b>1 gallon (or more)</b>			
		<b>Blade</b>	<b>Industrial grade Heavy duty stainless steel or better for chopping of both ceramics and polymer</b>			
		<b>Amperage</b>	<b>6.5 amps (or higher)</b>			
	<b>Shear mixer</b>	<b>motor</b>	<b>1 HP (or more)</b>	<b>01</b>		
		<b>Adjustable speeds</b>	<b>8000 rpm (or more)</b>			
		<b>Capacity</b>	<b>1ml (or less) to 500mL (or more)</b>			
		<b>other features</b>	<b>automatic shutoff</b>			
		<b>Frequency</b>	<b>60 hz (or higher)</b>			
		<b>Assemblies (stainless steel)</b>	<b>assembly for 1ml (or lower) to 10mL (or more)</b>	<b>01</b>		
	<b>assembly for 5ml (or lower) to 50mL (or more)</b>		<b>01</b>			
	<b>Assembly for 50ml (or lower) to 500mL (or more)</b>		<b>01</b>			
	<b>Installation</b>	<b>Installation and on-site (installation) training</b>				
	<b>Warranty and Others</b>	<ul style="list-style-type: none"> <li>▪ <b>12 Months from the date of installation</b></li> </ul>				

			<p>(parts and service) with vendor having good local reputation with running machines and well-trained engineers</p> <ul style="list-style-type: none"> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>				
27	Surgical Implants Motors	Purpose	Surgical implants motor system to be used for general oral surgery, implantology as well as for all kinds of surgical procedures.	01			
		Motors	Motor System with Handpiece 20:1				
		RPM	30 to 40,000 RPM or better Brushless Motor				
		Display	Easily Programmable Speed and Torque Keyboard Interface				
		Coolant flow	Coolant flow rate: 1 – 75 ml/min or better				
		Safety system	Intelligent safety system with acoustical and optical signal and additional blocking of the motor drive				
		Torque	5 to 70Ncm or better Built-In Torque Controller and Safety Overload Protection				
		Warranty	12 months or more from the date of installation				
28	Dental Hand piece contra angle	Purpose	A dental drill or handpiece is a hand-held, mechanical instrument used to perform a variety of common dental procedures, including removing decay, polishing fillings, and altering prostheses	01			
		Contra angle	20:1				
		Rotation	200,000 rpm (or more)				

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29.1	Drying Oven	Purpose	For drying of samples under heat and for studies of samples at different temperatures	01			
		Max temp	250 °C or more				
		Min temp	Ambient				
		Control Resolution	±0.1 °C or better				
		Shelf loading	2 or more				
		Ventilation	Ventilation hole with Stainless steel Cap				
		Volume	Minimum 100 Liter or more				
		Circulation	Forced Air Type				
		Controller	Digital controller				
		Display	Digital LCD				
		Timer	99 hr 59 min or more (Delay & Continuous Function)				
		Auto restart	Auto restart at the same program after power resumption				
		Material Internal	Stainless Steel -304				
		Safety	Over Temp alarm over Current Protector Sensor Error Detector				
Others	UL/CUL Certified CE Certified						
Warranty & Others	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines</li> </ul>						

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29.2	Drying Oven	Purpose	For drying of samples under heat and for studies of samples at different temperatures	01			
		Max temp	250 °C or more				
		Min temp	Ambient				
		Control Resolution	±0.1 °C or better				
		Shelf loading	2 or more				
		Ventilation	Ventilation hole with Stainless steel Cap				
		Volume	Minimum 150 Liter or more				
		Circulation	Forced Air Type				
		Controller	Digital controller				
		Display	Digital LCD				
		Timer	99 hr 59 min or more (Delay & Continuous Function)				
		Auto restart	Auto restart at the same program after power resumption				
		Material Internal	Stainless Steel -304				
		Safety	Over Temp alarm over Current Protector Sensor Error Detector				
Others	UL/CUL Certified CE Certified						
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30	Centrifuge	Max Capacity	12 or more x 2 mL	03			
		Max speed	14,000 rpm or more (100 rpm increments)				
		Rotor capacity and adaptor	1.5/2 ml tubes along with suitable rotor and adopter capable of holding at least 12 samples at a time				
			0.5 ml tubes along with suitable rotor and adopter capable of holding at least 12 samples at a time				
			0.2 ml tubes along with suitable rotor and adopter capable of holding at least 12 samples at a time				
		Timer	15 sec (or less) to 99 minutes (or more)				
		Features	LED with control panel				
Warranty & Others	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>						
31	Viscometer	Purpose	To measure the viscosity of a small volume of samples. Digital display for the results at various temperatures controlled by the temperature sensing system	01			

		Viscosity range	1.5 mPa (or less) to 1300 mPa s (or higher)					
		mode	Rotational viscometer					
		Temperature Sensor	150 °C or higher					
		Display	digital					
		Rotational speed (RPM)	0.1 (or lower) to 6 (or higher)					
		Accuracy	±1% or better					
		Measuring System	spindles or cylinder systems					
		Sensor	Temperature sensor					
		Repeatability	±0.2% or better					
		Warranty & Others	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>					
32	Platinum Crucible	Crucible 1	Purity Level: Pt ≥ 99.95% Volumetric Capacity: 10mL		1			
		Crucible 2	Purity Level: Pt ≥ 99.95% Volumetric Capacity: 30mL		1			
33	Portable X-Ray	X-Ray system	X-Ray Generator	DC High Frequency	02			
			X-ray Tube	Tube Voltage: 60 kV (or more)				

				<b>Tube Current :2 mA (or more)</b> <b>Anode Type: Stationary</b> <b>Anode Angle: 15-25°</b> <b>Focal Spot: 0.6 mm (or less)</b> <b>Heat Capacity: 8.5 KHU (or more)</b>				
			<b>Exposure Time Setting</b>	<b>0.01-1.60 Sec. (0.01 Sec step) or better</b>				
			<b>Total Filtration:</b>	<b>1.6 mmAl or better</b>				
		<b>Dental digital X-ray Sensor</b>	<b>Active areas</b>	<b>35 mm x 25 mm or better</b>				
				<b>30 mm x 22 mm or better</b>				
			<b>Resolution</b>	<b>&gt;20 lp/mm or better</b>				
			<b>Total Cable Length</b>	<b>2.80 more</b>				
			<b>Image Pixels</b>	<b>1600 x 1200 or better</b>				
		<b>Warranty</b>	<b>12 months or more from the date of installation</b>					
34	Storage cabinet	<b>General feature</b>	<b>Fire resistant cabinet for storage of flammable chemicals with digital lock</b>		07			
		<b>Capacity</b>	<b>220 litre (or more)</b>					
		<b>Fire resistant time</b>	<b>90 min or more</b>					

		<b>Shelves</b>	<b>2 or more</b>				
		<b>Main body features</b>	<b>Two layer anti fire steel plates with at least 1mm thickness of plates</b>				
			<b>Liquid tank for leakage</b>				
			<b>Air vent</b>				
		<b>Warranty &amp; Others</b>	<ul style="list-style-type: none"> <li>▪ <b>12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</b></li> <li>▪ <b>Proofs of trainings of company personnel/engineers should be provided</b></li> <li>▪ <b>List of installations in Pakistan should be provided</b></li> </ul>				
<b>35</b>	<b>Liquid nitrogen tank</b>	<b>Liquid nitrogen supply tank</b>	<b>Tank made of stainless steel For safe supply and storage of liquid nitrogen</b>	<b>01</b>			
		<b>Capacity</b>	<b>100 Litre or more</b>				
		<b>Tanks rating</b>	<b>22 psi or better</b>				
		<b>accessories</b>	<b>Cylindrical roller base</b>				
			<b>Cylinder hand truck with wheels</b>				
			<b>4 ft. flexible braided stainless-steel transfer hose or better</b>				
			<b>LN2 fill phase separator</b>				
			<b>Temperature Sensor</b>				
			<b>Pressure gauge</b>				
			<b>Liquid nitrogen level indicator</b>				
			<b>First Safety valve</b>				
			<b>Second Safety valve</b>				
			<b>Fill and withdraw valve</b>				
			<b>Transfer hoses</b>				
<b>Solenoid valve</b>							
<b>Pressure building valve</b>							

		<b>Warranty &amp; Others</b>	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>				
35.1	Liquid nitrogen tank	<b>Liquid nitrogen tank for cell storage</b>	CE certified Tank made of stainless steel For safe storage of cells	01			
		<b>Capacity</b>	30 litres (or more)				
		<b>Vial capacity (1.2-2 mL)</b>	600 (or more)				
		<b>Evaporation rate</b>	0.2 litres/ day (or lower)				
		<b>Accessories</b>	vial rack	06			
			1ml cryo-vial box	10			
			2ml cryo-vial box	10			
0.5 ml cryo-vial box	5						
<b>Warranty &amp; Others</b>	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>						
36	Autoclave	<b>Purpose</b>	Sterilization of Glassware, Surgical instruments, Media and biological waste	01			
		<b>Type</b>	Horizontal fully automatic Stainless Steel				

			<b>chamber</b>			
		<b>Capacity</b>	<b>Effective Chamber Capacity 50 L (or more)</b>			
		<b>Programs</b>	<b>With programs: for Solids, Waste destruction bags, Liquid waste, Liquid Media and Cleaning.</b>			
		<b>Heating Type</b>	<b>Integrated separate steam generator (no heating elements in sterilization chamber).</b>			
		<b>Steam Parameters</b>	<b>Up to 135°C (or higher)</b>			
			<b>Pressure 4 bar (or higher)</b>			
		<b>Safety Lock</b>	<b>Specialized Safety door lock during operation and till cooling according to international Pressure Vessel Regulations</b>			
		<b>Pressure control</b>	<b>Electronic pressure transducer for pressure and temperature control</b>			
		<b>Sterilization program</b>	<b>Multiple built in programs for waste destruction with ventilation of waste bags</b>			
		<b>Water inlet</b>	<b>Autofill function</b>			
		<b>Integrated Vacuum System</b>	<b>For improved air release and quicker drying</b>			
		<b>Rapid Cooling</b>	<b>Using cold water and sterile compressed air</b>			
		<b>Warranty</b>	<ul style="list-style-type: none"> <li>▪ <b>12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</b></li> <li>▪ <b>Proofs of trainings of company personnel/engineers should be provided</b></li> <li>▪ <b>List of installations in Pakistan should be provided</b></li> </ul>			



36.1	Autoclave Sterilizer	Purpose	Sterilization of Glassware, Surgical instruments, Media and biological waste	02			
		Type	Vertical Laboratory Sterilizer, Fully automatic, Interior Chamber Stainless steel. Digital microprocessor controlled				
		Sterilization Temperature	Up to 135°C or higher				
		Programs	Multi-mode selection				
		Effective Capacity	50 Litre or higher				
		Safety	Over pressure power cut off Over temperature power cut off Current leak detection				
		Rated working pressure	2.5 bar or higher				
		Controls	Digital Control Programmable or Built in Multiple Programs				
		Accessories	Drainage hose, Stainless steel baskets And all other requisite accessories for operation as aforementioned				
		Warranty & Others	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>				
37	Shaker (Rocking platform)	Purpose	Used for a broad range of mixing and agitation applications in the	02			

			laboratory. Brushless dc motor				
		Speed range	5-50 rpm or better				
		Power restoration	Auto function restoration in case of power failure				
		Motion	Tilting/Rocking				
		Control	LCD Display				
			Knob or touch or pressing button				
		UPS	As recommended by OEM				
		Warranty & Others	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>				
38	Shaker (Horizontal, Orbital)	Purpose of the Orbital Shaker	Used for a broad range of mixing and agitation applications in the laboratory.	02			
		Speed range	50-300 rpm or better				
		Motion	Orbital				
		Temperature range	Up to 60°C or better				
		Control	LCD Display to control temperature, speed and time				
		UPS	As recommended by OEM				
		Warranty & Others	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local</li> </ul>				

			<p>reputation with running machines and well-trained engineers</p> <ul style="list-style-type: none"> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>				
39	Centrifuge	Max Capacity	12 or more x 2 mL	03			
		Max speed	14,000 rpm or more (100 rpm increments)				
		Rotor capacity and adaptor	1.5/2 ml tubes along with suitable rotor and adopter capable of holding at least 12 samples at a time				
			0.5 ml tubes along with suitable rotor and adopter capable of holding at least 12 samples at a time				
		Timer	15 sec or less to 99 minutes or more				
		Features	LED with control panel				
Warranty & Others	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>						
40	Microplate Reader (Florescence, Multi Mode)	Purpose:	<ul style="list-style-type: none"> <li>▪ Must be able to detect absorbance, luminescence, fluorescence, time-resolved fluorescence (TRF) in plate format</li> <li>▪ real time kinetic monitoring.</li> <li>▪ software controlled.</li> </ul>	01			

		<b>Plate Type</b>	<b>96 well plate or more types of plate</b>				
		<b>Detection module</b>	<b>UV-Vis Fluorescence intensity Luminescence (Or more)</b>				
		<b>Light source</b>	<b>Xenon flash or Halogen lamp or better</b>				
		<b>Software</b>	<b>Protocol and full data analysis and reporting</b>				
		<b>Spectral range</b>	<b>250 nm (or lower) - 900 nm (or higher)</b>				
		<b>Temperature Control</b>	<b>65°C or more</b>				
		<b>Atmospheric control unit</b>	<b>Regulate CO<sub>2</sub> and O<sub>2</sub></b>				
		<b>UPS backup</b>	<b>As recommended by OEM</b>	<b>01</b>			
		<b>Installation</b>	<b>Complete installation with onsite training</b>				
		<b>Warranty &amp; Others</b>	<ul style="list-style-type: none"> <li>▪ <b>12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</b></li> <li>▪ <b>Proofs of trainings of company personnel/engineers should be provided</b></li> <li>▪ <b>List of installations in Pakistan should be provided</b></li> </ul>				
<b>41</b>	<b>Safety Cabinet</b>	<b>Purpose</b>	<b>CE certified Total exhaust cabinets for work with toxic chemicals and infectious agents</b>				
		<b>Class</b>	<b>II</b>	<b>02</b>			
		<b>Type</b>	<b>B2</b>				
		<b>Working area</b>	<b>12 square feet (or bigger)</b>				
		<b>Filter</b>	<b>HEPA/ULPA</b>				

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		<b>control</b>	Graphical LCD display containing: on/off fan control with adjustable air velocity Working window control LED lamp ON/OFF UV lamp ON/OFF Elapsed time counter and alarm for HEPA filter replacement				
		<b>Chamber Materials</b>	Stainless Steel				
		<b>Window</b>	Tempered glass				
		<b>Other features</b>	<ul style="list-style-type: none"> <li>▪ Compatible trolley</li> <li>▪ UV light</li> <li>▪ Total Exhaust</li> </ul>				
		<b>UPS backup</b>	As recommended by OEM				
		<b>Installation</b>	Complete installation with onsite training				
		<b>Warranty &amp; Others</b>	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>				
41.1	Safety Cabinet	<b>Purpose</b>	CE certified exhaust cabinets for work with toxic chemicals and infectious agents	6			
		<b>Class</b>	II				
		<b>Type</b>	A2				
		<b>Working area</b>	12 square feet (or bigger)				
		<b>Filter</b>	HEPA/ULPA				
		<b>control</b>	Graphical LCD display containing:				

			<p>on/off fan control with adjustable air velocity</p> <p>Working window control</p> <p>LED lamp ON/OFF</p> <p>UV lamp ON/OFF</p> <p>Elapsed time counter and alarm for HEPA filter replacement</p>				
		<b>Chamber Materials</b>	Stainless Steel				
		<b>Window</b>	Tempered glass				
		<b>Other features</b>	<ul style="list-style-type: none"> <li>▪ Compatible trolley</li> <li>▪ UV light</li> <li>▪ Total exhaust</li> </ul>				
		<b>UPS backup</b>	As recommended by OEM				
		<b>Installation</b>	Complete installation with onsite (installation) training				
		<b>Warranty &amp; Others</b>	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>				
42	<b>Drill Machine</b>	<b>General Features</b>	<ul style="list-style-type: none"> <li>• Benchtop Drill machine with digital system to read drilling speed and depth</li> <li>• Keyless precision chuck</li> <li>• Adjustable speed (RPM)</li> <li>• Adjustable drilling height</li> <li>• Multi gear</li> <li>• Laser pointing system for precision drilling</li> </ul>	01			
		<b>Drilling capacity in mild steel</b>	13 mm (or higher)				

		<b>Drill stoke</b>	<b>90 mm or better</b>					
		<b>Chuck jaw width range</b>	<b>1.5 300 mm or better</b>					
		<b>Power in put</b>	<b>700 Watt (or higher)</b>					
		<b>Warranty &amp; Others</b>	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>					
43	Centrifugal Grinder	<b>Bench Grinder</b>	<b>General Features</b>	01				
			<ul style="list-style-type: none"> <li>• Torque 1400 in-lb or higher</li> <li>• eye shields, spark deflectors, tool rests, adjusting wrench</li> <li>• Overload Protection</li> <li>• Tool-Free Adjustable Guard</li> <li>• 3/4 hp induction motor or higher power</li> <li>• 3,600 rpm or higher</li> <li>• wheel guards;</li> <li>• 12-1/2-inch or more distance between wheels for larger and longer grinding applications</li> </ul>					
			<ul style="list-style-type: none"> <li>• Accessories</li> <li>• Grinding wheel coarse (60 grit or finer)</li> </ul>					01
			Accessories Grinding wheel fine (100 grit or finer)	01				
		<b>Warranty and others</b>	12 months from the date of installation with onsite training and installation					
		<b>Angle grinder</b>	<b>General features</b>	01				

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			<ul style="list-style-type: none"> <li>• Power: 800 watts (or above)</li> <li>• Cutting Wheel Size: 100 mm or equivalent</li> <li>• Speed: 10,000 rpm (or higher)</li> <li>• Spindle Size: M10 or equivalent</li> <li>• Cable length : 2 meter (or more)</li> <li>• Body Grip tool for firm hold</li> <li>• Lock on switch for continuous use</li> </ul>			
		Warranty and others	12 months from the date of installation with onsite training and installation			
44	Arc welder	General Features	<b>Multi-purpose</b> <ul style="list-style-type: none"> <li>• Manual/Stick</li> <li>• TIG</li> <li>• Should be able to weld Stainless Steel, Steel, Aluminum</li> <li>• Display screen</li> </ul>	01		
		Output	240 A (or higher)			
		Stick Welding Output	180 A (230 V) @ 25% duty cycle or better			
		TIG Welding Output	180 A (230 V) @ 30% duty cycle or better			
		Accessories	All requisite accessories to perform aforementioned tasks as highlighted in General Features should be provided (which includes but may not be limited to torches, regulators, gas cylinder)			
		Class of Protection	IP23S or better			
Warranty & Others	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with</li> </ul>					



			<p>running machines and well-trained engineers</p> <ul style="list-style-type: none"> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>				
45	Compressor	Purpose	oil free single stage compressor with air storage tank	01			
			suitable for high quality air demand for biomedical and pharmaceutical applications				
		Power	4kW (or higher)				
		Pressure	10 bar (or higher)				
		Receiver/air tank (litre)	270 (or higher)				
		pumping Capacity (litre)	350 (or higher)				
Warranty & Others	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>						
46	Manual & Power Tool and Consumables	Workstations	6 ft or more length of Workstation for tool storage and tabletop for day to day work	1			
			30,000 cu. inch or more capacity load				
			24" or more professional working depth				
			Workstation should be equipped with 15 or more, ball-bearing				

		<p>drawers that hold up to 100 lbs. or above with 200 lbs. or above capacity in the deeper drawers.</p> <p>Thick 18 Gauge or better Steel Body (powder coated)</p> <p>Auto Return Drawers</p>				
	Mixed Tool SET	<ul style="list-style-type: none"> <li>▪ 400 or more pieces</li> <li>▪ Blow molded durable carry case</li> <li>▪ Black chrome or better finish for anti-corrosion protection</li> <li>▪ Laser-etched markings for size visibility</li> <li>▪ Quick release switch and reversible mechanism for easy operation</li> <li>▪ Meets or exceeds ANSI specifications</li> <li>▪ Chrome-molybdenum steel according to SAE and MM standards</li> </ul> <p>Should include but not necessarily be limited to;</p> <ul style="list-style-type: none"> <li>▪ Utility Knife,</li> <li>▪ 5m/16ft Tape Measure</li> <li>▪ Screw drivers (different types)</li> <li>▪ Adjustable Wrenches</li> <li>▪ Hex. Key wrenches</li> <li>▪ Pipe Wrench</li> <li>▪ Pliers</li> <li>▪ Dr. Specialty bits, sockets</li> <li>▪ Hammers</li> <li>▪ Extension Bar</li> </ul>	1 complete set			
	22V Brushless Cordless Drill & Impact Driver Kit	<ul style="list-style-type: none"> <li>▪ 22V Brushless 3/8 in. drill and impact driver</li> <li>▪ Brushless motor for maximum runtime and durability</li> <li>▪ Must have vibration reduction mechanism</li> </ul>	01			

			<ul style="list-style-type: none"> <li>▪ Torque control mechanism and Quick-change chucks – changing bits must be a fast and tool-free function</li> <li>▪ Associated tools and drill bits</li> </ul>			
			<ul style="list-style-type: none"> <li>▪ High speed transmission with 2 or more speed settings</li> <li>▪ With LED lights to illuminate the work surface</li> <li>▪ Compact, lightweight design for tight spaces</li> <li>▪ 2 extra batteries for drill as well as impact driver &amp; charger</li> <li>▪ Wide range of drill bits (hard coated &amp; wear resistant)</li> <li>▪ 1-year warranty (or more)</li> </ul>			
		<b>36V Brushless Hammer drill</b>	<b>Integrated lithium ion Battery</b>	<b>01</b>		
			<b>Chuck Size 1/2"</b>			
			<b>Cordless System</b>			
			<b>RPM 0-2000 or more</b>			
			<b>Multiple speed settings</b>			
			<b>Must have vibration reduction mechanism</b>			
			<b>Torque control mechanism and Quick-change chucks – changing bits must be fast and a tool-free function</b>			
			<b>Drilling through wood, metal, and plastic</b>			
			<b>2 extra Lithium Ion Batteries</b>			
			<b>Charger</b>			
			<b>Brad Point Drill &amp; Masonry Bits (tungsten carbide tips)</b>			
			<b>Screws / Fasteners</b>			
		<b>HSS Drill Bits</b>				

			<b>Magnetic Bit Tip Holder</b> <b>1" Bits, 2" Bits, 3-1/2" Bits</b> <b>Nutdrivers</b> <b>Ratcheting Screwdriver</b> <b>Gauge</b> <b>Sockets</b> <b>Socket Adaptor</b> <b>Storage box</b> <b>1 year warranty (or more)</b>			
		<b>Hammer Drill (Corded)</b>	<b>2-position switch to select standard or hammer drill functions</b> <b>6.5 Amp or more power</b> <b>Quick-change chucks – changing bits must be fast and tool-free</b> <b>Working mode: Hammer drilling, Drilling, Chiseling</b> <b>Active vibration reduction mechanism</b> <b>Single-sleeved chuck for easy bit changes</b> <b>Multi-position side handle for ease of use</b> <b>1/2 in. chuck to accommodate larger bits along with associated bits</b> <b>1-year warranty (or more)</b>	01		
		<b>Chop Saw</b>	<ul style="list-style-type: none"> <li>▪ <b>To cut through metal</b></li> <li>▪ <b>15 Amperes or more</b></li> <li>▪ <b>14 in. (or more) Chop Saw to cut</b></li> <li>▪ <b>1-year warranty (or more)</b></li> </ul>	01		
		<b>Multipurpose Bench Vise</b>	<b>Jaw width 5-6-inch Jaw with Swivel Base</b> <b>Opening capacity 5 inch or more</b> <b>Throat depth 2 inches or more</b>	01		

			<p><b>Captured safety jaw to prevent slide from falling out</b></p> <p><b>Fused steel handle</b></p> <p><b>Anvil incorporated</b></p> <p><b>Integrated pipe jaws</b></p>			
47	Contact Angle measurement	Purpose	Drop shape analyzer for static and dynamic contact angle measurement, surface and interfacial tension measurements, and surface free energy calculation	1		
		Measuring angle Range	Range: 0-180° or better			
			Hardware accuracy: 0.3° Or better			
		Measuring range of interface tension	Range: 0.01 to 2000 mN/m or better			
			Accuracy: 0.3 mN/m or better			
		Camera	Measuring speed: 2000 fps or better			
			Camera view angle (°): ±2.5 or better			
			IR cut filters			
			Resolution: 1200 x 1200 px			
		Optics	Field of view 3.2 to 18.5 mm or better			
		Illumination	Adjustable LED			
		Stage	X, Y, Z axis movement			
			Tilting/ rotation for roll-off/ receding contact angle measurement			
Dosing system	Software control Automatic, with glass and disposable syringes					
	Accuracy 0.1µL or better					
	dosing speed 10-1000µL/minute or better					
	sample holder for manual dosing					

		Accessories	Disposable syringe of any volume between 200 uL to 1000 uL with needle (In addition to all standard syringes and needles)	1			
			Calibration standards for drop size analysis	1 Kit			
		Environmental Chamber	For air controlled measurement	1			
		Software	Software to determine static and dynamic contact angle measurement	1			
			Software to measure surface free energy of solids	1			
			software to determine surface and interfacial tension of liquids	1			
			Software to control camera, illumination, temperature, dosing module, table movement, cuvette for pendant drop	1			
		Computer	Compatible with system with power back up	1			
		Power backup	As recommended by OEM	1			
		Warranty & Others	<ul style="list-style-type: none"> <li>12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>Proofs of trainings of company personnel/engineers should be provided</li> <li>List of installations in Pakistan should be provided</li> </ul>				
48	Cryostat	Purpose	Thin sectioning of biological tissues at cryogenic temperature. The instrument should be complete with all accessories including	01			

			<b>blades, sample holders, knives etc necessary for smooth running.</b>			
		<b>General Features</b>	<b>Temperature setting -35°C (or below)</b>			
			<b>Section thickness setting 5µm (or below) to 100µm (or above)</b>			
			<b>Specimen feed 15 mm or better</b>			
			<b>Vertical specimen stroke 48 mm or better</b>			
			<b>Freezing shelf temperature -35°C (or below)</b>			
		<b>Accessories</b>	<b>Tissue freezing medium 125ml</b>			
			<b>Knife case large 01</b>			
			<b>Cryostat oil 250ml</b>			
			<b>Knives 16 cm TC 03</b>			
			<b>Knives 16 cm long steel 03</b>			
			<b>Blades TC disposable 50</b>			
			<b>Blade high profile disposable 10</b>			
		<b>Blade low profile disposable 10</b>				
		<b>UPS backup</b>	<b>As recommended by OEM</b>	<b>01</b>		
		<b>installation</b>	<b>Complete installation with onsite training</b>			
		<b>Warranty &amp; Others</b>	<ul style="list-style-type: none"> <li>• <b>12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</b></li> <li>• <b>Proofs of trainings of company personnel/engineers should be provided</b></li> <li>• <b>List of installations in Pakistan should be provided</b></li> </ul>			

49	CAD licensed software	Purpose	software suite for computer-aided design (CAD), computer-aided manufacturing (CAM), computer-aided engineering (CAE),	01			
		License	<ul style="list-style-type: none"> <li>• Multiuser (minimum 3 or higher) - lifetime</li> <li>• Educational/startup/incubator</li> </ul>				
		Scope of Applications	3D and 2D drawings for CNC operations				
			Suitable file formats for use in commercial CAD/CAM equipment e.g. CNC machines, 3D printers				
			3D visualization				
			Parts modeling Biomedical device designs				
		Others	Must be from world renowned company having a track record of providing CAD/CAM solutions to industries				
50	Surgical light for OT	Purpose	Surgical light source to illuminate the Operating area. Facilitation in surgical procedures for animal trials. Compact exam light for surgical procedures on experimental animals.	02			
		Light source	LED				
		Installation type	Floor standing Six-dimensional joint; 360°,				
		Luminance	Multiple luminescence				
			Illumination depth: ≥600(mm) ≥2°C,				
			Higher than 100000 Lux.Color Spot Diameter:150 mm (or higher)				
		Light-adjusting mode	four grade dimmer system or better				
		Lamp automatic	0.2S, Color indication index: ≥97%,				



		switching time					
		Warranty	12 Months from the date of installation				
51	Operating Table	Purpose	Operating Table for surgical procedures on small and medium sized animals. Made of Stainless steel 304.	02			
		Tabletop dimensions	Equal to 60 x 22 in (or higher)				
		Adjustable Height	Table height electronically adjustable ranging 28 to 40 inch or better				
		Heated Top	Durable stainless steel tabletop with electronic heating system				
		Drain hole	Built-in drain hole at the table top				
		Load capacity	Higher 120 Kg (or higher)				
		Warranty	12 Months from the date of installation				
52	Trolley with in built rabbit cages	Rabbit Cages	Cages size(internal dimensions): ~ 600mm x ~ 450mm x ~ 450 mm (LXBXH)	48			
			Made of S.S 304 material with duly spot welded and finished joints				
			Each cage should be Independent and movable				
			AISI 304 quality stainless steel material				
			Fitted with tag holder				
			Gap between S.S rods used in cage walls: ~7mm				
			Cage door with fixed label holder and arrangement for food hopper and fixing water bottle.				
			The door must be made of wire mesh of ~2.5mm and ~5mm SS rod welded on a frame of ~5mm SS rod and covered with 22 swg Sheet.				

			<p><b>Floor grill</b> Bottom floor net of ~ 12 x 26 mm must be made of ~2.5mm and ~5mm SS wire welded on a frame of ~5mm SS rod. Floor net must be fixed and non-removable type.</p> <p><b>Tray</b> Excreta tray made of 22swg S.S sheet with turned and smoothed edges, and removable for cleaning</p>				
		<b>Bottles</b>	Polypropylene water bottle of capacity ~650ml fitted S.S bent type nozzle	48			
		<b>Trolley</b>	Three rack moveable trolleys with wheels must be made up of ~20mm x 20mm x 16swg S.S to accommodate aforementioned 6 rabbit cages each	8			
53	Low-Flow Anesthesia System	<b>Purpose</b>	Anesthesia system for ethical precise delivery of anesthetic to prepare small animals for surgical procedures. Safe for surgical personnel.	02			
		<b>Range</b>	Flow rates from 25 ml/hour (or lower) to 1 L/hour (or higher)				
		<b>Number of animals</b>	Anesthetize multiple animals at once (minimum 2)				
		<b>Air compressor</b>	Built-in				
		<b>Monitoring</b>	Built-in display for real-time monitoring				
		<b>Accessories</b>	All the required hardware and connections included in the system				
		<b>Warranty</b>	12 Months from the date of installation				
54	Anesthesia Mask/ Breathing Circuit	<b>Purpose</b>	Rodent face masks made from clear acrylic to anesthetize or resuscitate the rodents.	04			
		<b>features</b>	Large anesthesia mask with co-axial non-				

			rebreathing system diameter: ~44mm , depth: ~33mm, <b>Diaphragm</b> Includes diaphragm material (200g or more).				
55	Freeze Dryer	<b>Purpose</b>	Benchtop model for removing water from numerous small sample loads	02			
		<b>Exterior</b>	Cubic or rectangular (Corrosion resistant)				
		<b>Temperature</b>	-80 °C (or lower)				
		<b>Water capture capacity</b>	1.5 litres/24 hours (or higher)				
		<b>Solvents</b>	Water				
		<b>Drying Chamber</b>	Stainless steel drying chamber				
			Transparent door				
			Stainless steel trays				
		<b>Condenser</b>	stainless-steel collector coil condenser				
		<b>Refrigeration system</b>	CFC-free				
		<b>Vacuum system</b>	Rotary vane vacuum pump				
			Ultimate vacuum: 0.002 mbar or below				
		<b>Control panel</b>	Touch screen display panel shows operating parameters, set-up parameters and alarm messages				
		<b>Safety controls</b>	Alarm system.				
Vacuum control option to maintain set point							
Auto restore functions in case of power failure							
<b>Accessories</b>	Freeze drying flasks (100ml) 4 Nos						
	Power stabilizer						
<b>Warranty</b>	<ul style="list-style-type: none"> <li>▪ 12 Months from the date of installation (parts and service) with</li> </ul>						

			<p>vendor having good local reputation with running machines and well-trained engineers</p> <ul style="list-style-type: none"> <li>▪ Proofs of trainings of company personnel/engineers should be provided</li> <li>▪ List of installations in Pakistan should be provided</li> </ul>				
56	Automated Microtome	Purpose	Histology of preserved soft and hard tissue	02			
		Nature	Fully-Motorized/ automated Microtome with foot pedal				
		Automatic unlock handwheel	To instantly switch from manual to automatic mode				
		Sectioning Speed	up to 400 mm/s (or higher)				
		Vertical stroke	Vertical stroke 70 mm or better				
		Clamp	universal cassette clamp large				
		Specimen orientation	Horizontal: $\pm 8^\circ$ or better Vertical: $\pm 8^\circ$ or better				
		Section thickness range ( $\mu\text{m}$ )	0.5 (or lower) - 100 (or higher)				
		Trimming Section thickness range ( $\mu\text{m}$ )	5 (or lower) - 500 (or higher)				
		Control panel	LCD display				
		Holder for blade	Blade holder base with cutting protection for safety Should be able to hold high- and low-profile blades				

		<b>Waste tray</b>	<b>Should be included</b>				
		<b>Specimen Retraction</b>	<b>Should be included</b>				
		<b>Accessories</b>	<b>Compatible blades &amp; all requisite accessories needed to perform the aforementioned functions</b>				
		<b>Warranty &amp; Others</b>	<ul style="list-style-type: none"> <li>• 12 Months from the date of installation (parts and service) with vendor having good local reputation with running machines and well-trained engineers</li> <li>• Proofs of trainings of company personnel/engineers should be provided</li> <li>• List of installations in Pakistan should be provided</li> </ul>				
57	Microplate Reader	<b>Purpose of Microplate Spectrophotometer</b>	<b>Microplate Spectrophotometer is used for DNA and RNA quantitation, cytotoxicity assays, Reporter gene assay, Enzyme assays</b>	01			
		<b>Applications</b>	<b>RNA, DNA and Protein quantification and kinetic assays</b>				
		<b>Light Source</b>	<b>Xenon Flash lamp</b>				
		<b>Wavelength Range</b>	<b>300 nm (or lower) to 950 nm (or higher)</b>				
		<b>Measurement Speed</b>	<b>15 seconds or less</b>				
		<b>Plate Type</b>	<b>96 well plates or more</b>				
		<b>UPS</b>	<b>As recommended by OEM</b>				
		<b>computer</b>	<b>As recommended by OEM</b>				
		<b>Warranty &amp; Others</b>	<ul style="list-style-type: none"> <li>• 12 Months from the date of installation (parts and</li> </ul>				

			<p>service) with vendor having good local reputation with running machines and well-trained engineers</p> <ul style="list-style-type: none"> <li>• Proofs of trainings of company personnel/engineers should be provided</li> <li>• List of installations in Pakistan should be provided</li> </ul>				
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**Special Terms and conditions:**

- i. Please submit the technical and financial bid (rates) on our prescribed BoQs Form and clearly mention the quoted model / brands, with complete terms and conditions signed, stamped with both bids, otherwise your bid (s) may be rejected.
- ii. Lowest Vendor are required to provide the samples against the Sr. # 52 i.e. (Trolley within built rabbit cages) before the bulk supply.
- iii. Vendor will be responsible for Installation & Commissioning of the delivered equipment's.
- iv. Purchase / work order (s) will be awarded on **Item wise Basis.**
- v. Kindly attach the **Tender fee with Technical Bid and Bid money / CDR with Financial Bid.**
- vi. **Multiple rates of an item may also lead to the rejection of bid / item.**