

Bid Evaluation Report

1. Name of Procuring Agency: Mehran University of Engineering & Technology, Jamshoro.

2. Tender Reference No: DD(Proc.)/MUET/JAM/-128, Dated: 30-06-2016

3. Tender Description/Name of work/item: PROCUREMENT OF LAB EQUIPMENT FOR VARIOUS LABORATORIES OF DEPARTMENT OF CHEMICAL ENGINEERING AT MUET, JAMSHORO.

4. Method of Procurement: Domestic/ Local.

5. Tender Published: MUET Web Site on 01-07-2016 & SPPRA Web Site on 13-07-2016.
Print & Electronic Media (SPPRA ID No.29526, Dated: 13-07-2016.

6. Total Bid documents Sold:- 03 Nos.

7. Total Bids Received: 03 Nos.

8. Technical Bid Opening date: (if applicable) Not Applicable (Provide details in separate form)

9. No. of Bid technically qualified (if applicable): Nil.

10. Bid(s) Rejected: Nil.

11. Financial Bid Opening date: 10-08-2016.


12. Bid Evaluation Report:

13. Estimated Cost:-Rs.


S No	Name of Firm or Bidder	Cost offered by the Bidder	Ranking in terms of cost	Comparison with Estimated cost	Reasons for acceptance/rejection	Remarks
0	1	2	3	4	5	6
1.	M/s Paktech Instruments Company, Karachi					
2.	M/s National Scientific Corporation, Lahore					
3.	M/s Technology Links (Pvt) Ltd, Karachi					

Comparative Statement Attached

Signatures of the Members of the Committee.


Prof. Dr. Syed Farman Ali Shah
Chairman,
Chemical Engineering Department,
MUET, Jamshoro


Nadeem Soomro
Deputy Director (Procurement)
MUET, Jamshoro


Engr. Qamar-ul-Hassan Memon
Consultant to Vice Chancellor on
Engineering Affairs,
University of Sindh

Name of Work: PROCUREMENT OF LAB EQUIPMENT FOR VARIOUS LABORATORIES OF DEPARTMENT OF CHEMICAL ENGINEERING AT MUET, JAMSHORO.

MINUTES OF MEETING:

A meeting for opening of tender for the work "Procurement of Laboratory Equipment required for various laboratories of Chemical Engineering Department at MUET, Jamshoro" was held on 10-08-2016 at 11:00 a.m. the Office of the Deputy Director (Procurement), MUET, Jamshoro. The following members of tender Opening Committee were present.

1. Prof. Dr. Syed Farman Ali Shah, Chairman, Department of Chemical Engineering, MUET, Jamshoro.	Member/ Convener
2. Engr. Qamar-ul-Hassan Memon, Consultant to Vice Chancellor on Engineering Affairs, University of Sindh, Jamshoro.	Member
3. Mr. Nadeem Soomro Deputy Director (Procurement), MUET, Jamshoro.	Member

The Deputy Director (Procurement) briefed the Committee members that the sealed percentage/ Item Rate Tenders were invited as per SPP Rules 2010 for the said work vide NIT No. DD(Proc.)/MUET/JAM/-128, dated 30-06-2016. He further briefed that the provision has been provided in the head of Equipment in the HEC approved scheme for procurement of lab equipment for various laboratories of the Chemical Engineering Department, MUET, Jamshoro. The Date of purchasing tender starting from 11-07-2016 to 09-08-2016 as per NIT and Submission Date was 10-08-2016 upto 10:00 a.m. whereas, Opening Date of the tender was 10-08-2016 @ 11:00 a.m. The Deputy Director (Procurement) further briefed that three (03) bidders had purchased the Bidding Documents and submitted the same in-time. Then all the Suppliers / Firms were called in the Office of the Deputy Director (Procurement), so that bidding documents can be opened in their presence under Rule-41 of SPP Rules 2010. Following Suppliers / Firms took part in the bidding process as under:

1. M/s Paktach Instruments Company, Karachi
2. M/s National Scientific Corporation, Lahore
3. M/s Technology Links (Pvt) Ltd, Karachi

Copy of Attendance Sheet attached.

The Committee started the proceedings of opening of tender in-front of aforementioned bidders and read aloud the names of each bidder one by one by opening their respective bids and also read aloud bid amount and other details as depicted under:


S#.	Name of Firm or Bidder	Contractor quoted bid amount in Rs.	Mathematically Corrected bid amount in Rs.	% above/ Below Estimated Cost
1.	M/s Paktech Instruments Company, Karachi	Comparative Statement Attached		
2.	M/s National Scientific Corporation, Lahore			
3.	M/s Technology Links (Pvt) Ltd, Karachi			

In the light of above, the Committee resolved that final item-wise recommendations be got prepared by the Departmental Experts / Professors Chemical Engineering Department and be approved from the competent authority and accordingly, agreed in Toto for the equipment to be selected by the Departmental Committee.

The meeting ended with the vote of thanks to all members.





Prof. Dr. Syed Farman Ali Shah
 Chairman,
 Chemical Engineering Department,
 MUEET, Jamshoro



Nadeem Soomro
 Deputy Director (Procurement)
 MUEET, Jamshoro



Engr. Qamar-ul-Hassan Memon
 Consultant to Vice Chancellor on
 Engineering Affairs,
 University of Sindh


MEHRAN UNIVERSITY OF ENGINEERING AND TECHNOLOGY,
JAMSHORO

**ATTENDANCE OF THE SUPPLIERS FOR OPENING OF THE TENDER INVITED FOR
PROCUREMENT OF LABORATORY EQUIPMENT FOR VARIOUS LABORATORIES
OF DEPARTMENT OF CHEMICAL ENGINEERING, MUET, JAMSHORO, OPENED
ON 10-08-2016 AT 11:00 HRS IN THE OFFICE OF THE DEPUTY DIRECTOR
(PROCUREMENT), MUET, JAMSHORO.**

S.#	Name of Firm	Signature	Remarks
01.	M/s Paktech Instruments Company, Karachi		
02.	M/s National Scientific Corporation, Lahore		
03.	M/s Technology Links (Pvt) Ltd, Karachi.		


Mr. Nadeem Soomro,
Deputy Director (Procurement),
MUET, Jamshoro


Engr. Qammar-ul-Hassan Memon,
Consultant to Vice Chancellor
On Engineering Affairs,
University of Sindh


Dr. Syed Farman Ali Shah,
Chairman,
Department of Chemical
Engineering, MUET,
Jamshoro

**COMPARATIVE STATEMENT FOR PROCUREMENT OF LAB EQUIPMENT REQUIRED FOR VARIOUS LABORATORIES OF
DEPARTMENT OF CHEMICAL ENGINEERING, MUET, JAMSHORO.**

COMPARATIVE STATEMENT FOR PROCUREMENT OF LAB EQUIPMENT REQUIRED FOR VARIOUS LABORATORIES OF DEPARTMENT OF CHEMICAL ENGINEERING, MUET, JAMSHORO.										M/s National Scientific Corporation, Lahore					M/s Technology Links (Pvt) Ltd, Karachi				
Item Code	Description / Specification of items	Qty	M/s Paktech Instruments Company, Karachi					Local	Cost				Local	Unit Rate	Exch. Rate	Cost			Local
			Unit Rate	Exch. Rate	P-I	P-II	Total		P-I	P-II	Total	P-I				P-II	Total		
1	BIOCHEMICAL ENGINEERING LABORATORY																		
CH/BEL-01	VERTICAL GEL ELECTROPHORESIS Able to make and run two gels simultaneously. Maximum gel size 8 x 11cm, gel thickness 0.75 mm, minimum buffer volume internal 250 ml, and minimum buffer volume external 500 ml, gel tank dimensions: 30 x 13 x 16.5cm. Injection molded unit, compact design, complete unit includes Electrophoresis tank, casting module 2-set, glass plates 5-set, 0.75mm spacer 4-Nos, 0.75 mm 10 tooth combs 2-Nos, one gel plate, alignment cord. Glass plate separator and instruction manual. Optional for above if required: Electrophoresis Power Supply, compact, space saving & light weight design, touch panel, audible & visible alarm, status alarm, constant voltage or current, safety features includes: no load detection, over voltage protection, automatic recovery after power failure, dimension: 320x140x110mm, digital voltage range 10 - 500V in 1 Volt step, current 4-400 mA in 1mA steps 75 Watt max, designed parallel outputs, with timer control 0-999 minutes, operated on 220 V/50Hz.	1	\$ 1,260.00 OR \$ 3,150.00	104.50	131,670.00	2,633.40	134,303.40												
CH/BEL-02	UV/VIS SPECTROPHOTOMETER Single beam spectrophotometer with Split Beam Technology (SBT) Features: Outstanding long-term stability, excellent signal-to-noise ratio and best energy throughput Holmium oxide filter for automatic wavelength calibration Quartz cuvet optics Highly precise imaging conditions due to aspheric optics Second cell position for measuring turbid samples. Absorption, Transmission, Wavelength range: 190 - 1100 nm Spectral bandwidth: Fix 1.4 nm Scanning speed: 12000 nm/min Technical standard: Tested and designed to be compliant with the legal requirements for laboratory instrumentation and developed and produced in compliance with ISO 9001 Instruments are certified to comply with the requirements of the EMC standards and bear the CE mark. Photometric display: range of the software: 1 µg to 100 µg Photometric Range: 0.1A to 1A Spectral bandwidth: fix 1.4 nm UV-Resolution (Toluene-Hexane): > 1.8 Wavelength accuracy (Deuterium line at 656nm): ± 0.1 nm Wavelength reproducibility (with Holmium oxide filter): ± 0.02 nm Photometric accuracy: ± 0.003 A Photometric reproducibility: ± 0.0005 A Stray light: ≤ 0.01 % T Baseline stability at 500 nm: ≤ 0.0001 (RMS) Long-term stability at 500 nm: ± 0.0003 A.A Scanning speed: 12000 nm/min Complete with Software, Computer and 2 Glass & 2 Quartz Cell	1	\$ 1,810.00 OR \$ 3,250.00	104.50	189,145.00	3,782.90	192,927.90												
CH/BEL-03	TRINOCULAR MICROSCOPE WITH DIGITAL CAMERA 32" MONITOR Compound Biological Trinocular Digital Microscope with Camera and Software (5 OMP). Touch Screen LCD and Infinite Optical System are ideal instruments in biological, histological, pathological, bacteriology, immunology and pharmacy field and can be widely used in medical and sanitary establishments, laboratories, institutes, academic laboratories, colleges and universities. Infinite Optical System, Seidenmann Trinocular Viewing Head, Inclined at 30°, 360° Rotatable, Interpupillary 50-70mm, Light Distribution: 20/80, WF 10-25 Infinity E-Plan objectives (X: 10X, 40X (S), 100X (Oil) (S), (Plan DIN & Plan (OCS) are optional). Backward Quadruple Nosepiece, Backward Quintuple Nosepiece (optional), Coaxial Coarse & Fine Focusing knobs, Travel Range: 20mm, Slide Size: 75mm Stage Size: 145-140mm, Coax Travel: 30-120mm, Abbe condenser NA 1.25 with iris Diaphragm Two Slide Holder, 50/20W Halogen lamp, Brightness adjustable, LED illumination can be supplied upon request. (Green and yellow filters are optional, N.A 0.9 (Dry) Dark Field Attachment (optional), merit unit Phase contrast unit, Polarizing attach, Polarizing Attachment unit, Analyzer/Polarizer (optional), With Infinite Plan Objectives 10-100/100 (optional) 2ip. Fluorescence unit (three-hole slide) (B.G. 100W mercury lamp (optional), 420nm/220nm 45cm, Digital Camera Specifications: Dual-core 1.5GHz 9 Touch Color LCD Touch Screen (1024*768), Display range, RAM 1GB DDR2, ROM 2GB Support External SD Card (Come with AG), Maximum Capacity Up to 32GB Camera: Sensor: 1/2.3" (4.9), 10Mega Pixel Color CMOS Sensor, Aptina MT9P010 Resolution: 2592H x 1944V, Pixel Size: 2.2µm x 2.2µm, Dynamic Range: 66.5dB SNR: 40.5dB, Sensitivity: 0.33V/lux-sec(550nm), A/D Conversion: 8 bit Frame Rate: 1280 720Q/15fps, 640 480Q/30fps Shutter: Electronic Rolling Shutter (ERS) White Balance: Auto Manual Exposure: Auto Manual Network Wi-Fi, Bluetooth IO: USB/Mini-USB (OTG), Support USB Keyboard and Mouse, SD Memory Card Slot, DC 5V Power Supply, On Off 3 mode	1	\$ 2,835.00 Opt \$ 1,750.00	104.50	296,257.50	5,925.15	302,182.65												

M/s Paktech Instruments Company, Karachi										M/s National Scientific Corporation, Lahore										M/s Technology Labs (Pvt) Ltd, Karachi									
Item Code	Description / Specification of items	Qty	Unit				Unit Rate	Each Rate	Cost			Unit	Unit Rate	Each Rate	Cost			Unit	Unit Rate	Each Rate	Cost								
			P-I	P-II	Total	P-I			P-II	Total	P-I				P-II	Total	P-I				P-II	Total							
	Mechanical LCD Screen 140°@Horizontal, 90°@Vertical Operating System Android 4.3 Software Build-in Microscopy Software (Measuring and Particle Analysis) Stand Power Adapter, HDMI Cable, 8GB SD card Accessories 0.5" eyepiece adapter (Ø23mm), Ø30mm and Ø30.5mm adapter rings Optional (must be purchased separately) 0.1mm stage micrometer, 0.01mm stage micrometer																												
CHUBEL-04	DIGITAL REFRACTOMETER With a simple, intuitive touchscreen all results and user management can be operated on the device. The unit incorporates an integrated SQL database, for storing data, and allows for access via a network or standalone PC. The DR6000 has an integrated Peltier thermostat for efficient temperature control, allowing very short measuring times at maximum accuracy. Easy cleaning of the probe. Interface and software package for full GLP compliance. Four standard models are available in this series, varying according to range resolution and accuracy.	1	N/Q					N/Q											N/Q										
CHUBEL-05	COLONY COUNTER Hand held portable. Low power consumption. Light weight and compact in size and shape. Micro controller based 6 digit (999999) LCD counter. Built in buzzer, marker pen, and The instrument. Kit content: a) Adapter b) 6 digit Marker pen c) Marker pen set (9999) Warranty certificate. Instruction manual. Material: SS 304 Pen. Aluminum	1	\$ 1,350.00	104.50	141,075.00	2,821.50	143,896.50		N/Q										N/Q										
CHUBEL-06	AUTO PIPETTE	4	N/Q					N/Q											N/Q										
2. FOOD PROCESSING AND SUGAR TECHNOLOGY LABORATORY																													
CHUPSTL-01	pH METER Digital Bench Model Microprocessor Controlled With parallel Temperature indication, PH Range -0 to 14.0 pH, PH Resolution 0.001pH, MV Range ±1200 mV, Accuracy mV ±0.1mV, Automatic Temperature Compensation, Temperature Range -5 to +105.0°C. Temperature accuracy ±0.1°C with two-three Point Calibration System. Battery operated as well as operated. With 220 Volts Complete with following accessories:- a) Black Electrode stands with base b) Plastic Beaker 50 ml c) 3M KCl Solution 50 ml d) Calibration Standard solutions PH 4, 7 & 10 50ml each e) pH Electrode precision Type with Built in Temperature Sensor Complete Package	4	\$ 600.00	104.50	250,800.00	6,016.00	256,816.00		N/Q										N/Q										
CHUPSTL-02	THERMOSTAT LAB. BIOREACTOR-SINGLE WALL DISH BOTTOM VESSEL 3-LITER Features: Interchangeable impellers provide flexibility for different cell types. Colour touch screen and graphical user interface for easy operation. Real-time trend data recording ensures best fermentation performance. 2-stage DO cascade for precise DO (dissolved oxygen) level control. Ethernet remote control ability allows you to navigate and operate your fermentation process from your desktop. No additional software required. Low voltage DC brushless motor. Quick connectors for easy operation. 4 built-in assignable and programmable peristaltic pump for automatic pH, Antifoam and feeding control. Automatic process allows to setup your 15 steps programmable control. Manual process allows you to run individual parameters independently. Full accessories are offered as a standard package. Technical Specifications Vessel Working Volume (liter): 3L Total volume (liter): 3.8 Construction of Material: Borosilicate glass / 316L stainless steel for headplate and all fittings Control Unit Control Panel: 10.4" Color touch screen interface Communication Port: Remote control through Ethernet. Data export through USB port, RS-485 port for system extensions Program storage: Upto 59,994 process programs Log data storage: Upto 100 process monitoring data files Cabinet material: ABS front panel and painted iron housing Dimensions: Footprint: W x D - 15.75" x 19.69" (400 mm x 500 mm), Height: 29.14" (740 mm) Rated voltage: 220V, 50 - 60 Hz Aeration Inlet gas flow-rate: 0.1 to 10 LPM Sparger: Orifice ring Bubble: Removable 316L stainless steel baffles Temperature Control System: Thermostat System, Built-in heat exchanger (400W heater / water circulation pump, Automatic cooling water valve) Range: 5°C (41°F) above coolant upto 60°C (140°F) Resolution: 0.1°C	1	€ 28,900.00 OR \$ 52,933.00	119.85 104.50	3,116,365.00 5,531,498.50	62,327.30 110,629.97	3,178,692.30 5,642,128.47		N/Q										N/Q										

Item Code	Description / Specification of items	Qty	M/s Paktech Instruments Company, Karachi						M/s National Scientific Corporation, Lahore						M/s Technology Links (Pvt) Ltd, Karachi						
			Unit Rate	Exch. Rate	Cost			Local	Unit Rate	Exch. Rate	Cost			Local	Unit Rate	Exch. Rate	Cost			Local	
					P-I	P-II	Total				P-I	P-II	Total				P-I	P-II	Total		
	Probe: Platinum RTD probe (PT-100) Control mode: Manual or Programmable 15 steps PID control Agitation Drive: Removable imp brushless motor Speed range: For fermentation and cell culture a. For 3 to 7L: 30 - 1200 rpm b. For 10L: 30 - 700 rpm Resolution: 1rpm Impeller: Two impeller types a. For fermentation: 2 psi of height adjustable Rushton - type impeller (standard) Control mode: Manual or Programmable 15 steps PID control pH Range: 2 to 14 pH, Resolution: 0.01 pH Probe: Gel-filled electrode, autoclavable Control mode: Manual / Acid start / programmable 15 steps PID control with adjustable deadband DO Range: 0 to 200% Resolution: 0.1% Probe: Polarographic DO sensor; autoclavable Control mode: 2-stage DO cascade response: (operate under manual or process mode) a. Increase or decrease agitation speed Substrate feeding strategy Foam Probe: 316L, stainless steel protector with insulated teflon tube, on/off control Peristaltic Pump Motor type: Precise stepping motor; minimum speed is 1 rpm Speed range: 0 to 60 rpm Resolution: 1 rpm Control mode: Manual or Programmable 15 steps feeding control; pump can be assigned for Acid, Base, Antifoam and Substrate Exhaust Device type: 316L, stainless steel condenser Utility requirement Power Source: 230 - 230 V, 50-60 Hz with electrical safety cutoff switch Water Source: 2 bar maximum (29 psi), water supplied to fermenter must be at least 15 °C below its operating temperature Air Source 1 bar maximum, must be dry, oil-free and filtered For 3-5L, minimum pressure 0.1499 kg/cm ² and air flow rate 60L/min For 7-10L, minimum pressure 7.0 kg/cm ² and air flow rate 120L/min Sterilization: Autoclave; size of the autoclave inner chamber must be able to accommodate vessel with condenser attached																				
CH/FPSTL-03	MAGNETIC STIRRER WITH HOT PLATE Temp 550 - 1500 rpm	1	\$ 598.00	104.50	62,491.00	1,249.82	63,740.82	-	N/Q	-	-	-	-	-	N/Q	-	-	-	-	-	-
CH/FPSTL-04	DEEP FREEZER -8 Temp Ranges	1	\$ 13,600.00	104.50	1,421,200.00	28,424.00	1,449,624.00	-	N/Q	-	-	-	-	-	N/Q	-	-	-	-	-	-
CH/FPSTL-05	UNIVERSAL OVEN PRECISE DRYING	1	\$ 2,500.00	104.50	261,250.00	5,225.00	266,475.00	-	N/Q	-	-	-	-	-	N/Q	-	-	-	-	-	-
CH/FPSTL-06	ADAPTIVE MULTIFUNCTIONAL DIGITAL PID- MICROPROCESSOR CONTROLLER WITH HIGH-DEFINITION TFT-COLOR DISPLAYS Temperature range 5°C above ambient up to +300°C Single DISPLAY natural convection adjustment of pre-heated fresh air admixture by air flap control in 10% steps for each segment individually self-diagnostics for fault analysis digital timer adjustable from 1 minute to 99 days, 23 hours Multiple Over temperature Protection with audible and visual alarm Interior Stainless Steel & Textured Stainless Steel Casing Operated on 220volts, 1N Series	1	N/Q	-	-	-	-	-	N/Q	-	-	-	-	-	N/Q	-	-	-	-	-	-
CH/FPSTL-07	DIGESTION UNIT Traditional Kjeldahl Digestion Units for nitrogen analysis and protein determination, with an aluminum heating block that offers an excellent thermal homogeneity, with a maximum working temperature of 450 °C	1	N/Q	-	-	-	-	-	N/Q	-	-	-	-	-	N/Q	-	-	-	-	-	-

		M/s Pakorch Instruments Company, Karachi						M/s National Scientific Corporation, Lahore						M/s Technology Link (Pvt) Ltd, Karachi						
Item Code	Description / Specification of item	Qty	Unit Rate	Exch. Rate	Cost			Unit Rate	Exch. Rate	Cost			Unit Rate	Exch. Rate	Cost			Unit		
					P-I	P-II	Total			P-I	P-II	Total			P-I	P-II	Total			
CH/PS/TL-08	CONTROL UNIT FOR ACID DIGESTION Specification for Microwave Digestion System: The microwave digestion system should enable rapid digestion of samples such as natural/synthetic polymers, rubbers, ceramics, organo/inorganic compounds, soluble metals (Pb, Ni), etc. The digestion system should include suitable color system that can carry out reactions at extreme conditions of temperature and pressure and meet the international safety standards Microwave Digestion Unit. The microwave output power should be 400 watts or more. System should have built-in control and real-time graphic display for all routine operations. The system should have suitable exhaust system to minimize worker exposure to toxic and hazardous fumes as well as to cool the vessels. Cooling should be fast and the instrument door should not open before the vessels are cooled down to safe temperature for safety of users. External cooling devices via water bath, oil bath, etc are not acceptable due to safety reasons. System should withstand to corrosive chemicals and spills. Corrosion resistant material like 316L SS or 304 SS in accordance with various water/water. The system should be able to continuously work at the typical operating parameters of temperature and pressure upto at least more than 3 hours to ensure complete digestion of difficult to digest samples. Note: The system should have appropriate safety for acid digestion, drying, evaporation. System must be capable of processing digestion in at least 8 vessels capable of holding: maximum temperature and pressure conditions simultaneously. Vessel: No. of vessels: 18 or more. Volume: 100 ml or more. Maximum pressure: 100 bar or more. Maximum temperature: 300 °C or more. Maximum operating temperature/pressure: 250 °C or more at 100 bar or more. The maximum temperature and pressure parameters should be simultaneously available. Feature: There should be provision of simultaneous measurement of pressure and temperature in the individual digestion vessels. The pressure and temperature values should be displayed simultaneously. Pressure control should be for each vessel and should be user programmable, including the measurement of pressure increase to ensure complete user safety and precise reaction control. The pressure should be monitored, displayed and documented for each run.	1	N/Q						N/Q						N/Q					
CH/PS/TL-09	SCRUBBER	1	CHF 30,200.00	106.31	3,210,502.00	64,211.24	3,274,713.24	—	N/Q	—	—	—	—	—	N/Q	—	—	—	—	
CH/PS/TL-10	TEMPERATURE CONTROLLED POLYMER REACTOR	1	CHF 48,100.00 Opt 9,940.00	106.31	5,113,511.00 1,050,721.40	102,270.22 21,134.43	5,215,781.22 1,077,855.83	—	N/Q	—	—	—	—	—	N/Q	—	—	—	—	
CH/PS/TL-11	COMPUTERIZED CONTROL AEROBIC DIGESTER SCADA AND PID CONTROL Bench-top Unit Bench-top unit Anodized aluminum structure and panels in painted steel. Main metallic elements in stainless steel. Diagram in the front panel with similar distribution to the elements in the real unit. 2 Paired reactors (aerobic digesters) that may be operated in series or parallel flow arrangement. Each reactor has 5 liter capacity. Reactor packing: 25mm diameter Bio-balls. For each reactor: heating jacket with PID Control from a temperature sensor. 2 Feed peristaltic pumps, computer controlled. (50 cc/min.) 2 Volumetric tanks for collecting and measurement of the volume of gas produced. Temperature control: 3 Temperature sensors, "E" type, ranges: -60° C to 200° C. 2 pH sensors. 2 Water flow meters (0-50 cc/min.). Thermostatic bath (heating resistance, computer controlled), up to 90° C. Water circulation pump, computer controlled, for the thermostatic bath. Buffer vessel (1 liter capacity). The complete unit includes as well: Advanced Real-Time SCADA and PID Control. Open Control + Multicontrol + Real Time Control. Specialized EDIBON Control Software based on Labview. National Instruments Data Acquisition board (250 KHz/silo samples per second). Data Acquisition Board. The Data Acquisition board is part of the SCADA system. PCI Express Data acquisition board (National Instruments) to be placed in a computer slot. Analog input: Channels: 16 single-ended or 8 differential. Resolution: 16 bits, 1 in 65536. Sampling rate up to 250 KHz (Kilo samples per second). Analog output: Channels: 2. Resolution: 16 bits, 1 in 65536. Digital Input/Output: Channels: 24 inputs/outputs. PID Computer Control + Data Acquisition + Data Management Software.	1	€ 19,200.00	115.85	2,224,320.00	44,486.40	2,268,806.40	—	N/Q	—	—	—	—	—	N/Q	—	—	—	—	
CH/PS/TL-12	ANAEROBIC DIGESTER Lab scale fully automatic computer controlled with applications software.	1	€ 22,700.00	115.85	2,628,795.00	52,595.90	2,682,390.90	—	N/Q	—	—	—	—	—	N/Q	—	—	—	—	
CH/PS/TL-13	SHAKING INCUBATOR Dual hydraulic thermostats 55 to 100°C shaking speed: Temp variation from 0 to 10°C.	1	N/Q	—	—	—	—	—	N/Q	—	—	—	—	—	N/Q	—	—	—	—	
CH/PS/TL-14	MICRO-FUGE (MICRO CENTRIFUGE) 40-60 SAMPLES, 500-14,000 RPM, DIGITAL 800-14,000 rpm (10 rpm increments). Stainless steel lid with knurled nut. Eppendorf Mini Spin.	1	N/Q	—	—	—	—	—	N/Q	—	—	—	—	—	N/Q	—	—	—	—	
CH/PS/TL-15	ROTARY VACUUM EVAPORATOR 1200W heating power, 20-270 rpm rotation speed range, 20-180°C bath temperature range, 240mm bath diameter.	1	N/Q	—	—	—	—	—	N/Q	—	—	—	—	—	N/Q	—	—	—	—	
CH/PS/TL-16	GAS CHROMATOGRAPH, MS ECD Detector, Auto Injector, with a DC power Supply Module.	1	N/Q	—	—	—	—	—	N/Q	—	—	—	—	—	GBP 85,700.00	104.80	8,955,650.00	—	8,955,650.00	

			M/s Paktech Instruments Company, Karachi					M/s National Scientific Corporation, Lahore					M/s Technology Links (Pvt) Ltd, Karachi							
Item Code	Description / Specification of Items	Qty	Unit Rate	Exch. Rate	Cost			Local	Unit Rate	Exch. Rate	Cost			Local	Unit Rate	Exch. Rate	Cost			Local
					P-I	P-II	Total				P-I	P-II	Total				P-I	P-II	Total	
1	FLUID MECHANICS LABORATORY																			
CH/FML-01	BASIC HYDRAULIC BENCH The basic hydraulic bench should be designed as a portable and self-contained device and the bench should be constructed from light weight corrosion resistant plastic material. The hydraulic bench must have side chamber (LOW FLOW VOLUMETRIC TANK) to support the necessary on test and perform the following practicals: The hydraulic bench should be single mounted, to avoid any possible leakage for a long time. ABB Power Protection against all Electric hazards. <u>Technical Specification:-</u> Pump: Centrifugal Type, max head 2m (1250) Max flow: 1.35L/s Note: Submersive Pumps are not recommended as in high flow discharge rate, the pump can become dry and may damage its shaft. There may be requirement of experiments incorporating different accessories at the same time, therefore Centrifugal pump is highly recommended. Motor rating: 0.1kW at least Sump tank capacity: 250liters High flow volumetric tank: 40liters Low flow volumetric tank: 6liters Height of working surface: 1 Meter above floor level. The Hydraulic Bench should be equipped with U-Tube Manometer for High flow volumetric tank to continuous measurement of flow discharge. (Optional) Experimental accessories for Hydraulic bench. All (Optional) Experiments Conducted on Hydraulic bench enter by mounting the equipments on Low Flow Volumetric Tank or larger equipments standalone type requiring the services of Hydraulic bench for measurement of flow discharge.	1	€ 1,866.00 OR € 3,226.00	115.85	216,176.10	4,323.52	220,499.62	-	GBP 2,509.58	135.82	340,851.16	25,563.84	366,414.99	-	GBP 2,667.00	135.82	362,231.94	-	362,231.94	-
CH/FML-02	BERNOULLI'S THEOREM DEMONSTRATION * Demonstrate Bernoulli's Theorem and its limitations * Directly measure the static and total head distribution along a venturi tube * Determine the minor coefficient at various flow rates. <u>Technical Specification:-</u> Manometer range: 0 to 300mm Number of manometer tubes: 8 Throat diameter: 10 mm, Upstream diameter: 25 mm Discharge tube: 1/4" Diameter, length: 75" <u>Impact of Jet</u> * Measuring the force exerted on different targets and comparison with the forces predicted by momentum theory. <u>Technical Specification:-</u> Nozzle diameter: 8mm Distance between nozzle & target plate: 200mm Diameter of target plate: 30mm Target plate: 1/8" thickness, 100mm target (center) of target: 200mm Target	1	€ 1,698.00	115.85	196,713.30	3,934.27	200,647.57	-	GBP 2,104.14	135.82	285,784.29	21,433.82	307,218.12	-	GBP 3,359.00	135.82	456,219.38	-	456,219.38	-
CH/FML-03	FLUID PROPERTIES AND HYDROSTATICS BENCH This equipment should be self-contained and mobile unit for demonstration of the properties of fluids & hydrostatics and mounted on a steel-framed bench fixed with casters. This equipment should be bench top, incorporate a normal plastic tank & a variety of measuring devices should be incorporated to the unit including a universal hydrometer, range 0.70 to 2.00, falling sphere viscometer, hook and point gauge, hydrostatic pressure apparatus, Pascal's apparatus, double scale level balance with displacement vessel, bucket and cylinder metacentric height apparatus, direct reading barometer range 185 to 760mm, dial pressure gauge range 0 to 200 kN/m ² (kPa), dead weight pressure gauge calibrator with weights, thermometer range -5°C to +50°C. These devices should be able to allow a full range of 18 experiments carried out, demonstrating the properties of fluids, the effects of static pressure, the operation and application of pressure gauges and manometers and the investigation of the stability of floating bodies. A comprehensive manual should be included describing how the experiments are performed as well as how to commission the equipment. <u>Technical Specification:-</u> Universal hydrometer: range 0.70 to 2.00 sub-divided in 0.01 intervals Falling sphere viscometer: 40mm tube diameter Hydrostatic pressure: comprises counter-balanced precision quadrant apparatus pivoted on knife edges in its centre of gravity Direct reading barometer: (With) compensated silvered metal scale range 185 to 760mm sub-divided in 1mm intervals includes thermometer 100mm dial pressure: range 0 to 200 kN/m ² (kPa) & equivalent head gauge of water in metres Dead weight pressure: (with) 2 x 10 kg, 1kg and 200 g weights gauge calibrator Lever balance: 170mm diameter pan, hook for use in buoyancy experiments, anti-parallel cursor, double scale 0 to 0.25kg and 0 to 1.00kg Thermometer: range -5°C to +50°C The provision of practical instruction exercises demonstrating the principles of fluid mechanics, in particular: Understanding the properties of fluids: ➤ Determine the density, specific gravity & viscosity of different liquids ➤ Observe the effects of capillarity Understanding the effects of static pressure: ➤ Demonstrating that the free surface of a static liquid is horizontal ➤ Studying the effect of flow on a free surface ➤ Measuring changes in liquid level ➤ Studying the relationship between intensity of liquid pressure & depth ➤ Determining the position of the centre of pressure on a plane surface	1	€ 12,950.00	115.85	1,500,257.50	30,005.15	1,530,262.65	-	GBP 8,354.61	135.82	1,134,723.13	85,104.23	1,219,827.36	-	GBP 13,843.00	135.82	1,880,156.26	-	1,880,156.26	-

Item Code	Description (Specification of items)	Qty	M/s Paktech Instruments Company, Karachi					M/s National Scientific Corporation, Lahore					M/s Technology Links (Pvt) Ltd, Karachi					Local
			Unit Rate	Exch. Rate	Cost			Unit Rate	Exch. Rate	Cost			Unit Rate	Exch. Rate	Cost			
					P-I	P-II	Total			P-I	P-II	Total			P-I	P-II	Total	
	Studying the operation and application of pressure gauges and manometers. ➤ Using a direct reading Mercury barometer. ➤ Measuring air and water pressure using manometers. ➤ Comparing results obtained from various devices. ➤ Calibrating a Bourdon-tube pressure gauge using a dead Weight pressure vessel calibrator. ➤ Investigating the behaviour force and stability of fluid bodies. ➤ Verifying Archimedes' principle. ➤ Determining manometric height. These devices should be able to allow a full range of 18 experiments on, demonstrating the properties of fluids, the effects of static pressure, the operation and application of pressure gauges and manometers the investigation of the stability of floating bodies.																	
4	HEAT TRANSFER LABORATORY																	
CHHTL-01	RIISING FILM EVAPORATOR A floor standing, single tube, rising film evaporator capable of a throughput of approximately 10 litres/hr. Hygienic construction in stainless steel/borosilicate glass allows small scale production of concentrated food products, particularly evaporated milk. The evaporator tube is 1.5m long giving a total heat transfer area of 0.6m ² . Steam at variable pressures up to 1.7 bar is the heat transfer medium employed. A glass elbow at the top of the evaporator tube allows the vapour/liquid phase to be seen entering a stainless steel 45mm diameter cyclone separator. The vapours enter a vertical shell and tube condenser and condensate is collected in a 5 litre glass collecting tank. The liquid phase from the separator is also collected in a 5 litre tank. A diaphragm type vacuum pump allows operation at pressures down to 200 mbar and below if the connections are re-orientated. Clean-in-place is facilitated by a positive displacement pump, the selected vessels being cleaned by multi-directional spray nozzles. Feed to the evaporator is by gravity from the 30 litre stainless steel feed tank through a variable area flow meter. Temperature sensors allow digital display of six relevant temperatures which can also be monitored on an optional data logger. Waterproof to IP65 A user instruction manual provides installation, commissioning and maintenance details together with associated safety aspects.	1	€ 26,600.00 Opt € 5,000.00 OR € 34,398.00	115.85	3,081,610.00 579,250.00 3,965,008.30	61,632.20 11,585.00 79,700.17	3,143,242.20 590,835.00 4,064,708.47	N/Q								GBP 44,720.00	135.82	6,073,870.40
CHHTL-02	HEAT EXCHANGER PROCESS CONTROL SYSTEM (1) Laboratory test stand for control engineering experiments based on the example of heat transfer. (2) Pump 0.15kW, 2700rpm, head max. 4 m, flow rate 2m ³ /h (3) Circulating pump 60W, 4m, 4.2m ³ /h (4) Fan 250W, 0.217m ³ /s, max. 4100/h (5) Heater 2kW (6) Plate heat exchanger, max. 6.5kW (7) Industrial universal controller, P, PI, PD, PID configurable. (8) Pneumatically operated actuator valve (9) Supply tank, 28L/h, mains-independent (10) Steel tube support can be moved on castors (11) 1x each: 1800x750x1800mm, approx. 215kg	1	€ 9,700.00 OR € 28,214.00	115.85	1,123,745.00 3,268,591.00	22,474.90 65,371.84	1,146,219.90 3,333,963.74	N/Q								GBP 4,417.00	135.82	599,916.94
CHHTL-03	COMPUTER CONTROLLED THERMAL CONDUCTIVITY OF LIQUIDS AND GASES UNIT WITH SCADA AND PID CONTROL TCLCC Bench-top unit. Anodized aluminum structure and panel in painted steel. Main metallic elements in stainless steel. Diagram in the front panel with similar distribution to the elements in the real unit. Aluminum body (cylinder) with brass jacket that contains the test fluid and the refrigeration water. Variable heating element (in the cylinder), computer controlled, with PID Control, (150 W, temperature max. 150°C). The power is measured by a sensor. 6 Temperature sensors, type "T" (high precision). Water flow sensor, range: 0.25 - 6.5 l/min. Water flow regulation valve. Syringe. The complete unit includes as well: Advanced Real-Time SCADA and PID Control. Open Control - Multicontrol - Real-Time Control. Specialized Control Software based on Labview. National Instruments Data Acquisition board (250 KS/s, kilo samples per second).	1	€ 11,652.00	115.85	1,349,884.20	26,997.68	1,376,881.88	N/Q								N/Q		
CHHTL-04	HEAT EXCHANGERS TRAINING SYSTEM, COMPUTER CONTROLLED, TIC C Base Unit: This unit is common for Heat Exchangers type "TT" and can work with one or several exchangers. Anodized aluminum structure. Panel and main metallic elements in stainless steel. Diagram in the front panel with similar distribution to the elements in the real unit. Stainless steel tank equipped with: Electric resistance. Temperature sensor type "T" to measure the water temperature. Level switch to control the water level of the tank. Stainless steel cover to avoid the contact with the hot water. In this cover exists an hole to allow us to visualize the water level and even to stuff the tank. Draining water valve. Centrifugal pump with velocity adapter. 2 Flow sensors, one for hot water and the other for cold water. 2 Control valves, one to control cold water and another one to control hot water. 4 Ball valves that, depending on how we manipulate them, they give us parallel or crosscurrent flow in the exchanger. Control interface box. This control interface is common for Heat Exchangers type "TT" and can work with one or several exchangers. Control interface box with process diagram in the front panel and with the same distribution that the different elements located in the unit, for an easy understanding by the student. All sensors, with their respective signals, are properly manipulated for -10V to +10V computer output.	1	€ 8,753.00	115.85	1,014,035.05	20,280.70	1,034,315.75	GBP 12,986.46	135.82	1,763,821.00	132,286.57	1,896,107.57	GBP 9,210.00	135.82	1,250,902.20			1,250,902.20

Item Code	Description / Specification of items	Qty	M/S Paktech Instruments Company, Karachi					Local	M/S National Scientific Corporation, Lahore					Local	M/S Technology Links (Pvt) Ltd, Karachi					Local
			Unit Rate	Exch. Rate	Cost				Unit Rate	Exch. Rate	Cost				Unit Rate	Exch. Rate	Cost			
					P-I	P-II	Total				P-I	P-II	Total				P-I	P-II	Total	
CH/HTL-05	CONCENTRIC TUBE HEAT EXCHANGER: Anodized aluminum structure. Panel and main metallic elements in stainless steel. Diagram in the front panel with similar distribution that the elements in the real unit. Formed by two concentric copper tubes with hot water circulating through the internal tube and cold water circulating in the ring space. Exchange length L = 2 X 0.54 m. Internal tube: Internal diameter: D int = 16 x 10.3m. External diameter: D ext = 18 x 10.3 m. Thickness = 10.3m. Heat transfer internal area: A int = 0.025 m ² . Heat transfer external area: A ext = 0.046 m ² . External tube: Internal diameter: D int = 20 x 10.3m. External diameter: D ext = 28 x 10.3 m. Thickness = 8 x 10.3m. 4 Temperature sensors. 4 Flexible tubes to connect the exchanger with the Base Service Unit. Plate Heat Exchanger: Anodized aluminum structure. Panel and main metallic elements in stainless steel. Diagram in the front panel with similar distribution that the elements in the real unit. Formed by corrugated stainless steel plates. 4 Ports re connections of input and output of hot and cold water. 4 Temperature sensors. 4 Flexible tubes to connect the exchanger with the Base.	1	€ 3,560.00	115.85	412,426.00	8,248.52	420,674.52	—	GBP 1,383.90	135.82	187,961.30	14,097.10	202,058.40	—	GBP 3,698.00	135.82	502,262.36	—	502,262.36	—
CH/HTL-06	SHELL & TUBE HEAT EXCHANGER: Anodized aluminum structure. Panel and main metallic elements in stainless steel. Diagram in the front panel with similar distribution that the elements in the real unit. Formed by tubes of stainless steel with hot water circulating for the interior. 4 segmented baffles located transversal in the shell. Exchange length of the shell and each tube L = 0.54m. Interior tube: Internal diameter: D int = 8 x 10.3m. External diameter: D ext = 10 x 10.3 m. Thickness = 10.3m. Internal heat transfer area: A int = 0.0126 m ² . External heat transfer area for each tube: A ext = 0.0157 m ² . Shell: Internal diameter: D int = 0.148 m. External diameter: D ext = 0.180 m. Thickness = 6 x 10.3m. 4 Temperature sensors. 4 Flexible tubes to connect the exchanger with the Base Service Unit.	1	€ 2,321.00	115.85	268,887.85	5,377.76	274,265.61	—	GBP 1,383.90	135.82	187,961.30	14,097.10	202,058.40	—	GBP 2,325.00	135.82	315,781.50	—	315,781.50	—
CH/HTL-07	COMPUTER CONTROLLED HEAT EXCHANGER SERIES MODULES: Linear Heat Conduction Module: Anodized aluminum structure. Panel and main metallic elements in stainless steel. Diagram in the front panel with similar distribution that the elements in the real unit. Linear conduction module consists of: Input heat section: Electric heater with controller circuit. 4 Temperature sensors distributed 10cm. Radiation section with a surface cooled by water and 4 Temperature sensors distributed 10cm. Central section: With brass of 25 mm of diameter. With brass of 10 mm of diameter. With stainless steel of 25 mm of diameter. 3 Temperature sensors distributed 10cm. Digital waveform of 0 to 150 Hz.	1	€ 16,228.00	115.85	1,763,932.10	35,278.64	1,799,210.74	—	GBP 2,578.94	135.82	350,271.63	26,270.37	376,542.00	—	GBP 10,424.00	135.82	1,415,787.68	—	1,415,787.68	—
CH/HTL-08	RADIATION HEAT TRANSFER MODULE: Anodized aluminum structure. Panel and main metallic elements in stainless steel. Diagram in the front panel with similar distribution that the elements in the real unit. This unit consists on a metal plate with a resistance at one side and a lamp in another side. Lengthwise of the metal plate you can place the elements supplied with the unit. Resistance that allows to heat and to study the radiation. The unit is provided with accessories for light experiments and radiation experiments. Light accessories: Luxo meter that allows to measure the intensity of the light in Lux or Candie. Filters. They allow to filtrate the light in the experiments. There are 3 Grey Neutral Density filters, 1 Grey Neutral Density filter and 1 Grey Neutral Density filter.	1	€ 5,945.00	115.85	688,728.25	13,774.57	702,502.82	—	GBP 18,697.04 Add: GBP 3,703.56	135.82	2,539,431.97 503,017.52	190,457.40 37,726.31	2,729,889.37 540,743.83	—	GBP 8,956.00	135.82	1,216,403.92	—	1,216,403.92	—

Prof. Dr. Syed Farman Shah,
Chairman, Department of Chemical Engineering
MUET, Jamshoro

Engr. Qamar-ul-Hassan Meemon,
Consultant to Vice Chancellor on Engineering Affairs
University of Sindh, Jamshoro

Mr. Saleem Saamro
Deputy Director (Procurement)
MUET, Jamshoro

BIDDERS QUALIFICATION REPORT

TENDER NAMELY

Name of work: Procurement of Laboratory Equipment required for various laboratories of Chemical Engineering Department at MUET, Jamshoro.

1	Name of Procuring Agency	Deputy Director (Procurement)
2	Tender Reference Number	No. DD(Proc.)/MUET/JAM/128, Dated: 30-06-2016.
3	Method of Procurement	Single Stage- One Envelope Procedure
4	Name of Firm / Bidder	M/s Paktech Instruments Company, Karachi.
5	Registration with Income Tax Department	Yes
6	Registration with PEC	Yes
7	Bank Statement showing cash balance of 40% of Bid amount.	Yes
8	Tender Fee / Cost of Bidding Document.	Submitted
9	5% Earnest money	Submitted
10	Firm has not been Blacklisted previously by any executing agency.	Not Blacklisted.
11	All documents / information furnished are true & correct.	Yes
12	Compliant / non-compliant.	Compliant



Prof. Dr. Syed Farman Ali Shah

Chairman
Chemical Engineering Department,
MUET, Jamshoro



Nadeem Soomro

Deputy Director (Procurement)
MUET, Jamshoro



Engr. Qamar-ul-Hassan Memon

Consultant to Vice Chancellor on Engineering Affairs,
University of Sindh, Jamshoro

**STATEMENT SHOWING SELECTED LAB EQUIPMENT REQUIRED FOR VARIOUS LABORATORIES OF
DEPARTMENT OF CHEMICAL ENGINEERING, MUET, JAMSHORO.**

Item Code	Description / Specification of items	Qty	Unit Rate	Exch: Rate	Cost			Local	Name of Vender	Remarks
					P-I	P-II	Total			
1-	BIOCHEMICAL ENGINEERING LABORATORY									
CH/BEL-01	VERTICAL GEL ELECTROPHORESIS Able to make and runs two gels simultaneously. Maximum gel size 8 x 11cm, gel thickness 0.75 mm, minimum buffer volume internal 250 ml, and minimum buffer volume external 500 ml, gel tank dimension: 20 x 13 x 16.5cm. Injection molded unit, compact design, complete unit includes Electrophoresis tank, casting module 2-set, glass plates 5-sets, 0.75mm spacer 4-Nos., 0.75 mm 10 teeth combs 2-Nos., one gel plate, alignment cord, Glass plate separator and instruction manual. <u>Optional for above if required:-</u> Electrophoresis Power Supply, compact, space saving & light weight design, touch panel, audible & visible alarm, status alarm, constant voltage or current, safety features includes, no load detection, over voltage protection, automatic recovery after power failure, dimension 320x240x73mm, digital voltage range 10 - 300V in 1 Volt step, current 4-400 mA in 1mA steps 75 Watt max, design4 parallel outputs, with timer control 0-999 minute, operated on 220 Volts.	1	\$ 1,260.00	104.50	131,670.00	2,633.40	134,303.40	-	M/s Paktech Instruments Company, Karachi	Selected as per recommendations of the Departmental Experts and approved by the Equipment/ Furniture/ Any other Material Final Procurement Committee in its meeting held on 27-09-2016
CH/BEL-02	UV/VIS SPECTROPHOTOMETER Single beam spectrophotometer with Split Beam Technology (SBT) Features Outstanding long-term stability, excellent signal-to-noise ratio and best energy Holmium oxide filter for automatic wavelength calibration Quartz coated optics Highly precise imaging conditions due to aspheric optics Second cell position for measuring turbid samples Absorption, Transmission, Wavelength range: 190—1100 nm Spectral bandwidth: Fix 1.4 nm Scanning speed: 12000 nm/min Technical standard: Tested and designed to be complaint with the legal requirements for laboratory instrumentation and developed and produced in compliance with ISO 9001 Instruments are certified to comply with the requirements of the EMC standards and bear the CE mark Photometric display: Range of the software: Upto 8A Photometric Range: -3A to 3A Spectral bandwidth: fix 1.4 nm UV- Resolution (Toluene-Hexane): ≥ 1.6 Wavelength accuracy (Deuterium line at 656nm): ± 0.1 nm Wavelength reproducibility (with Holmium oxide filter): ≤ 0.02 nm Photometric accuracy: ± 0.003 A	1	\$ 1,810.00	104.50	189,145.00	3,782.90	192,927.90	-	M/s Paktech Instruments Company, Karachi	Selected as per recommendations of the Departmental Experts and approved by the Equipment/ Furniture/ Any other Material Final Procurement Committee in its meeting held on 27-09-2016

Item Code	Description / Specification of items	Qty	Unit Rate	Exch: Rate	Cost			Local	Name of Vender	Remarks
					P-I	P-II	Total			
	Photometric reproducibility: ≤ 0.0005 A Stray light $\leq 0.03\%$ T Baseline stability at 500 nm: ≤ 0.0001 (RMS) Longterm stability at 500 nm: ± 0.0005 A/h Scanning speed: 12000 nm/min Complete with Software, Computer and 2 Glass & 2 Quartz Cell									
CH/BEL-03	TRINOCULAR MICROSCOPE WITH DIGITAL CAMERA 32" MONITOR Compound Biological Trinocular Digital Microscope with Camera and Software (5.0MP). Touch Screen LCD and Infinite Optical System are ideal instruments in biological, histological, pathological, bacteriology, immunizations and pharmacy field and can be widely used in medical and sanitary establishments, laboratories, institutes, academic laboratories, colleges and universities. Infinite Optical System Seidentopf Trinocular Viewing Head, Inclined at 30° , 360° Rotatable, Interpupillary 50-75mm, Light Distribution 20:80. WF10x/20. Infinity E-Plan objectives 4X, 10X, 40X (S), 100X (Oil) (S), (Plan 20X & Plan 60X(S) are optional). Backward Quadruple Nosepiece, Backward Quintuple Nosepiece (optional), Coaxial Coarse & Fine Focusing knobs, Travel Range: 26mm, Scale: 2um. Stage Size: 145x140mm, Cross Travel 76x52mm, Abbe condenser NA 1.25 with Iris Diaphragm Two Slide Holder, 6V/20W Halogen lamp, Brightness adjustable. LED Illumination can be supplied upon request blue (Green and yellow filters are optional), N.A.0.9 (Dry) Dark Field Attachment (optional), merit unit Phase contrast unit. Polarizing attach. Polarizing Attachment unit, Analyzer/Polarizer (optional), With Infinite Plan Objectives 10x/20x/40x/100x (optional). For Fluorescence unit (three-hole slide) (B.G., 100W mercury lamp). Digital Camera Specification: Dual-core 1.5GHz, 9.7inch Color LCD Touch Screen (1024*768) Display range, RAM 1GB DDR3, ROM 2GB Support External SD Card (Come with 8G), Maximum Capacity Up to 32GB Camera Sensor: 1/2.5" (4.3), 5Mega Pixel Color CMOS Sensor, Aptina MT9P001 Resolution: 2592H x 1944V, Pixel Size: 2.2um x 2.2um, Dynamic Range: 66.5dB SNR: 40.5Db, Sensitivity: 0.53V/lux-Sec(550nm), A/D Conversion: 8 bit Frame Rate: 1280 x 720@15fps, 640 x 480@30fps Shutter: Electronic Rolling Shutter (ERS) White Balance: Auto/Manual Exposure: Auto/Manual Network WI-FI, Bluetooth I/O USB/Mini-USB (OTG), Support USB Keyboard and Mouse, SD Memory Card Slot, DC5V Power Supply On/Off Button Mechanical LCD Screen 360° @Horizontal/ 90° @Vertical Operating System Android 4.2 Software Build-in Microscopy Software (Measuring and Particle Analysis) Stand Power Adapter, HDMI Cable, 8GB SD card	1	\$ 2,835.00	104.50	296,257.50	5,925.15	302,182.65	--	M/s Paktech Instruments Company, Karachi	'Selected as per recommendations of the Departmental Experts and approved by the Equipment/ Furniture/ Any other Material Final Procurement Committee in its meeting held on 27-09-2016

Item Code	Description / Specification of Items	Qty	Unit Rate	Exch: Rate	Cost			Local	Name of Vender	Remarks
					P-I	P-II	Total			
	Accessories: 0.5x eyepiece adapter(Φ23mm), Φ30mm and Φ30.5mm adapter rings Optional (must be purchased separately) 0.1mm stage micrometer, 0.01mm stage micrometer									
CH/BEL-04	DIGITAL REFRACTOMETER With a simple, intuitive touchscreen all results and user management can be operated on the device. The unit incorporates an integrated SQL database, for storing data, and allows for access via a network or standalone PC. The DR6000 has an integrated Peltier thermostat for efficient temperature control, allowing very short measuring times at maximum accuracy. Easy cleaning of the probe. Interface and software package for full GLP compliance. Four standard models are available in this series, varying according to range resolution and accuracy.	1	N/Q	--	--	--	--	--		To be re-tendered
CH/BEL-05	COLONY COUNTER Hand held portable - Low power consumption - Light weight and compact in size and shape - Micro controller based 6 digit (999999) LCD counter - Built in buzzer, marker The instrument Kit content: a) Adaptor b) 6 digit Marker pen c) Marker pen set (900us) Warranty certificate instruction manual Material: 55 304 Pen - Aluminium	1	\$ 1,350.00	104.50	141,075.00	2,821.50	143,896.50	--	M/s Paktech Instruments Company, Karachi	Selected as per recommendations of the Departmental Experts and approved by the Equipment/ Furniture/ Any other Material Final Procurement Committee in its meeting held on 27-09-2016
CH/BEL-06	AUTO PIPETTE	4	N/Q	--	--	--	--	--		To be re-tendered
2- FOOD PROCESSING AND SUGAR TECHNOLOGY LABORATORY										
CH/FPSTL-01	pH METER Digital Bench Model Microprocessor Controlled With parallel Temperature indication, PH Range -0 to 20.0 ±0.005pH, PH Resolution 0.005pH, MV Range ±1200.0mV, Accuracy mV ±0.3mv, Automatic Temperature Compensation, Temperature Range -5 to +105.0°C, Temperature accuracy ±0.1°C with two/three Point Calibration System, Battery operated as well as operated With 220 Volts Complete with following accessories:- a) Black Electrode stands with base. b) Plastic Beaker 50 ml. c) 3MKCL Solution 50 ml. d) Calibration Standard solutions PH 4, 7 & 10 50ml each. e) pH Electrode precision Type with Built in Temperature Sensor Complete Package	4	\$ 800.00	104.50	250,800.00	5,018.00	255,818.00	--	M/s Paktech Instruments Company, Karachi	Selected as per recommendations of the Departmental Experts and approved by the Equipment/ Furniture/ Any other Material Final Procurement Committee in its meeting held on 27-09-2016

Item Code	Description / Specification of items	Qty	Unit Rate	Exch: Rate	Cost			Local	Name of Vendor	Remarks
					P-I	P-II	Total			
CH/FPSTL 02	THERMOSTAT LAB. BIOREACTOR-SINGLE WALL DISH BOTTOM VESSEL 3- LITER Features: Interchangeable impellers provide flexibility for different cell types Colour touch screen and graphical user interface for easy operation Real-time trend data recording ensures best fermentation performance 2-stage DO cascade for precise DO (dissolved oxygen) level control Ethernet remote control ability allows you navigate and operate your fermentation process from your desktop. No additional software required Low voltage DC brushless motor Quick connectors for easy operation 4 built-in assignable and programmable peristaltic pump for automatic pH, Antifoam and feeding control Automatic process allows to setup your 15 steps programmable control Manual process allows you to run individual parameters independently Full accessories are offered as a standard package. Technical Specifications Vessel Working Volume (liter): 3L Total volume (liter): 3.8 Construction of Material: Borosilicate glass / 316L stainless steel for headplate and all fittings Control Unit Control Panel: 10.4" Color touch screen interface Communication Port: Remote control through Ethernet, Data export through USB port, RS-485 port for system extensions Program storage: Upto 59,994 process programs Log data storage: Upto 100 process monitoring data files Cabinet material: ABS front panel and painted item housing Dimension: Footprint: W x D - 15.75" x 19.69" (400 mm x 500 mm), Height: 29.14" (740 mm) Rated voltage: 220V 50 - 60 Hz Aeration Inlet gas flow-meter: 0.1 to 10 LPM Sparger: Orifice ring Baffle: Removable 316L stainless steel baffles Temperature Control System Thermostat System, Built-in heat exchanger (400W heater / water circulation pump, Automatic cooling water valve" Range: 5°C (41°F) above coolant upto 60°C (140°F) Resolution: 0.1°C Probe: Platinum RTD probe (PT-100) Control mode: Manual or Programmable 15 steps PID control Agitation Drive: Removable top brushless motor Speed range: For fermentation and cell culture	1	€ 26,900.00	115.85	3,116,365.00	62,327.30	3,178,692.30	--	M/s Paktech Instruments Company, Karachi	Selected as per recommendations of the Departmental Experts and approved by the Equipment/ Furniture/ Any other Material Final Procurement Committee in its meeting held on 27-09-2016

[illegible]

Item Code	Description / Specification of Items	Qty	Unit Rate	Exch: Rate	Cost			Local	Name of Vender	Remarks
					P-I	P-II	Total			
CH/FPSTL 08	CONTROL UNIT FOR ACID DIGESTION Specification for Microwave Digestion System The microwave digestion system should enable rapid digestion of samples such as, natural/synthetic polymers, rubbers, ceramics, organo/inorganic compounds, noble metals (PGM), etc. The digestion system should include suitable rotor system that can carry out reactions at extreme conditions of temperature and pressure and meet the international safety standards. Microwave Digestion Unit. The microwave output power should be 400 watts or more. System should have built-in control and real-time graphic display for all routine operations. The system should have inbuilt exhaust system to eliminate worker exposure to toxic and hazardous fumes as well as to cool the vessels. Cooling should be fast and the instrument door should not open before the vessels are cooled down to safe temperature for safety of users. External cooling devices viz. water bath, chiller, etc. are not acceptable due to safety reasons. System should withstand to corrosive chemicals and spills. Cavity volume must be at least 60 Liters to accommodate various accessories. The system should be able to continuously work at the highest operating parameters of temperatures and pressure upto at least more than 2 hours to ensure complete digestion of difficult to digest samples. Rotor. The system should have appropriate rotors for acid digestion, drying/evaporation. System must be capable of processing digestion in at least 18 vessels capable of handling: extreme temperature and pressure conditions simultaneously. Vessel: No. of vessels 08 or more. Volume 100 mL or more. Maximum pressure 100 bar or more. Maximum temperature 300 °C or more. Maximum operating temperature/pressure 250 °C or more at 60 bar or more. The maximum temperature and pressure parameters should be simultaneously available. Sensor. There should be provision of simultaneous measurement of pressure and temperature in the individual digestion vessels. The pressure and temperature values should be displayed simultaneously. Pressure control should be for each vessel and should be user programmable, including the maximum rate of pressure increase, to ensure complete user safety and precise reaction control. The pressure should be monitored, displayed and documented for each run.	1	N/Q	--	--	--	--	--	--	To be re-tendered
CH/FPSTL 09	SCRUBBER	1	CHF 30,200.00	106.31	3,210,562.00	64,211.24	3,274,773.24	--	M/s Paktech Instruments Company, Karachi	Selected as per recommendations of the Departmental Experts and approved by the Equipment/Furniture/ Any other Material Final Procurement Committee in its meeting held on 27-09-2016
CH/FPSTL 10	TEMPERATURE CONTROLLED POLYMER REACTOR	1	CHF 48,100.00 Opt CHF 9,940.00	106.31 106.31	5,113,511.00 1,056,721.40	102,270.22 21,134.43	5,215,781.22 1,077,855.83	-- --	M/s Paktech Instruments Company, Karachi	Selected as per recommendations of the Departmental Experts and approved by the Equipment/Furniture/ Any other Material Final Procurement Committee in its meeting held on 27-09-2016

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	2 Flow sensors, one for hot water and the other for cold water. 2 Control valves, one to control cold water and another one to control hot water. 4 Ball valves that, depending on how do we manipulate them, they give us parallel or crosscurrent flux in the exchanger Control Interface Box This control interface is common for Heat Exchangers type "TI" and can work with one or several exchangers. Control interface box with process diagram in the front panel and with the same distribution that the different elements located in the unit, for an easy understanding by the student. All sensors, with their respective signals, are properly manipulated for -10V to +10V computer output									
CH/ITL-05	CONCENTRIC TUBE HEAT EXCHANGER: Anodized aluminum structure. Panel and main metallic elements in stainless steel. Diagram in the front panel with similar distribution that the elements in the real unit. Formed by two concentric copper tubes with hot water circulating through the interior tube and cold water circulating in the ring space. Exchange length $L = 2 \times 0.5 = 1\text{m}$. Internal tube: Internal diameter: $D_{int} = 16 \cdot 10^{-3}\text{m}$. External diameter: $D_{ext} = 18 \cdot 10^{-3}\text{m}$. Thickness $= 10 \cdot 10^{-3}\text{m}$. Heat transfer internal area: $A_h = 0.0503\text{m}^2$. Heat transfer external area: $A_c = 0.0565\text{m}^2$. External tube: Internal diameter: $D_{ext} = 26 \cdot 10^{-3}\text{m}$. External diameter: $D_{ext} = 28 \cdot 10^{-3}\text{m}$. Thickness $= 6 \cdot 10^{-3}\text{m}$. 6 Temperature sensors. 4 Flexible tubes to connect the exchanger with the Base Service Unit. Plate Heat Exchanger: Anodized aluminum structure. Panel and main metallic elements in stainless steel. Diagram in the front panel with similar distribution that the elements in the real unit. Formed by corrugated stainless steel plates. 4 Ports or connections of input and output of hot and cold water. 4 Temperature sensors. 4 Flexible tubes to connect the exchanger with the Base	1	-	-	-	-	-	-	-	To be re-tendered
CH/ITL-06	SHELL & TUBE HEAT EXCHANGER: Anodized aluminum structure. Panel and main metallic elements in stainless steel. Diagram in the front panel with similar distribution that the elements in the real unit. Formed by tubes of stainless steel with hot water circulating for the interior. 4 segmented baffles located transversal in the shell. Exchange length of the shell and each tube: $L = 0.5\text{m}$. Interior tube: Internal diameter: $D_{int} = 8 \cdot 10^{-3}\text{m}$. External diameter: $D_{ext} = 10 \cdot 10^{-3}\text{m}$. Thickness $= 10 \cdot 10^{-3}\text{m}$. Internal heat transfer area: $A_h = 0.0126\text{m}^2$. External heat transfer area for each tube: $A_c = 0.0157\text{m}^2$. Shell: Internal diameter: $D_{int,c} = 0.148\text{m}$. External diameter: $D_{ext,c} = 0.160\text{m}$. Thickness $= 6 \cdot 10^{-3}\text{m}$. 7 Temperature sensors. 4 Flexible tubes to connect the exchanger with the Base Service Unit.	1	€ 2,321.00	115.85	288,887.85	5,377.76	274,265.61	--	M/s Paktech Instruments Company, Karachi	"Selected as per recommendations of the Departmental Experts and approved by the Equipment/ Furniture/ Any other Material Final Procurement Committee in its meeting held on 27-09-2016

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CH/ITL-07	COMPUTER CONTROLLED HEAT EXCHANGER SERIES MODULES: Linear Heat Conduction Module: Anodized aluminum structure. Panel and main metallic elements in stainless steel Diagram in the front panel with similar distribution that the elements in the real unit Linear conduction module consist on: Input heat section Electric heater with controller circuit 4 Temperature sensors distanced 10mm Refrigeration section with a surface cooled by water and 4 Temperature sensors distanced 10mm Central section With brass of 25 mm of diameter With brass of 10 mm of diameter With stainless steel of 25 mm of diameter 3 Temperature sensors distanced 10mm Digital wattmeter of 0 to 120 W	1	--	--	--	--	--	--	--	Dropped
CH/ITL-08	RADIATION HEAT TRANSFER MODULE: Anodized aluminum structure. Panel and main metallic elements in stainless steel. Diagram in the front panel with similar distribution that the elements in the real unit. This unit consists on a metal plate with a resistance at one side and a lamp in another side. Lengthwise of the metal plate you can place the elements supplied with the unit. Resistance that allows to heat and to study the radiation. The unit is provided with accessories for light experiments and radiation experiments. Light accessories: Luxo meter that allows to measure the intensity of the light in Lux or Candle. Filters. They allow to filtrate the light in the experiments. There are 3 Grey Neutral Density filters, 1 Grey Neutral Density filter and 1 Grey Neutral Density filter.	1	€ 5,945.00	115.85	688,728.25	13,774.57	702,502.82	--	M/s Paktech Instruments Company, Karachi	Selected as per recommendations of the Departmental Experts and approved by the Equipment/Furniture/ Any other Material Final Procurement Committee in its meeting held on 27-09-2016
Total Amount Rs.							18,801,643.68			


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