

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 ELECTRONIC 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: 02 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 Rastek Technologies, Karachi					
Comparative Statement Attached						

Signatures of the Members of the Committee.


Prof. Dr. Wajaha Shah
Chairperson,
Electronic 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 ELECTRONIC 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 Electronic 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. Wajiha Shah, Chairperson, Department of Electronic Engg, 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 Electronic 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 out of which (02) bidders 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 Instrument Technology Link, Karachi
3. M/s Rastek Technologies, 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 Rastek Technologies, Karachi.			

In the light of above, the Committee resolved that final item-wise recommendations be got prepared by the Departmental Experts / Professors of Electronic 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.

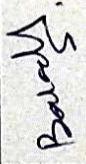


Prof. Dr. Wajiha Shah
 Chairperson,
 Electronic Engineering Department,
 MUET, Jamshoro



Nadeem Soomro
 Deputy Director (Procurement)
 MUET, Jamshoro



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


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 ELECTRONICS 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	 10/08/16	
02.	M/s Instruments Technology Link, Karachi	Absent	
03.	M/s Rastek Technologies, Karachi		


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


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


Prof. Dr. Wajih Shah,
Chairperson,
Department of Electronic
Engineering, MUET,
Jamshoro

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

COMPARATIVE STATEMENT FOR PROCUREMENT OF LAB EQUIPMENT REQUIRED FOR VARIOUS DEPARTMENTS										M/s Rastek Technologies, Karachi					Local
Item Code	Description / Specification of Items	Qty	M/s Paktech Instruments Company, Karachi				Local	Unit Rate	Exch. Rate	Cost			Local		
			Unit Rate	Exch. Rate	Cost										
					P-I	P-II				Total					
I-	FPGA/DSP BASED DESIGN AND DEVELOPMENT LABORATORY														
ES/FDDDL-01	FPGA based Embedded Design Device Affordable tool to teach and implement multiple design concepts with one device 10 analog inputs, 6 analog outputs, 40 digital I/O lines Wireless, LEDs, push button, accelerometer onboard Xilinx FPGA and dual-core ARM Cortex-A9 processor Fully programmable with LabVIEW or C, adaptable for different programming levels Onsite Training by OEM Also contains USB and Ethernet Hub, Motor Adapter and motors kit Accessories Included Driver and software evaluation DVDs USB cable Power supply with international adapters 1 MXP protoboard accessory screwdriver and MSP screw-terminal connector Sensors and Actuators Kit Barrel connector with leads Assorted capacitors Diodes 7-segment display Mechanical rotary encoder Photo interrupter (light sensor with LED) Assorted op-amps Assorted LEDs Small DC motor (1 VDC to 3 VDC, no load speed: 6600 rpm) Microphone with audio jack MXP Breadboard Accessory Potentiometer (500 kΩ) Relay Assorted resistors Piezoelectric sensor Photocell 2 Hall effect sensors (latch and switch) Buzzer Assorted switches (DIP, slide, and rotary) Thermistor (NTC, 10 kΩ, 25 degrees) Assorted transistors Force sensing resistor Wire kit Keypad Digital temperature sensor (I2C) Character LCD (I2C, SPI, and UART) Digital potentiometer (SPI) Bluetooth interface (UART) EEPROM (SPI) LED matrix Geared motor 19:1 (includes encoder for rotation and speed, 12 V) Ultrasonic range finder (accurate readings of 0 in. to 255 in. or 6.45 m) Compass Servo motor: standard (215 degrees rotation) Servo motor: continuous rotation Accelerometer (3 axis, digital - SPI and I2C) H-bridge driver (compatible with gear motor) Gyroscope (3 axis, digital - SPI and I2C) Infrared proximity sensor (10 cm to 80 cm) Ambient light sensor (SPI)	5	N/Q	--	--	--	--	--	\$ 3,500.00	104.50	1,828,750.00	-	1,828,750.00	--	

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M/s Paktech Instruments Company, Karachi										M/s Rastek Technologies, Karachi				
Item Code	Description / Specification of items	Qty	Cost				Local	Unit Rate	Exch: Rate	Cost			Total	
			Unit Rate	Exch: Rate	P-I	P-II				P-I	P-II	Total		
ES/FBDDL-02	ST Microelectronics STM32F746G-DISCO Discovery kit with STM32F746NG MCU and accompanying TFI Module Plug in the STM32F7 discovery kit allows users to develop and share applications with the STM32F7 Series microcontrollers based on ARM® Cortex®-M7 core. The discovery kit enables a wide diversity of applications taking benefit from audio, multi-sensor support, graphics, security, video and high-speed connectivity features. The Arduino connectivity support provides unlimited expansion capabilities with a large choice of specialized add-on boards. Subject Area: Embedded System Design System on a chip Interrupts Interrupt prioritization, Nesting Timers Counters Analog Comparators Digital Input/Output Serial Peripheral Interface Communication Inter-Integrated Circuit Communication Universal Serial Bus Communication RS-232 Communication IEEE-802.3-2002 Communication Graphical Output devices Image Processing Multiply Accumulate operations Floating Point Units Sampling, Quantization, Aliasing Convolution Finite Impulse Response Filtering Fourier Transforms Adaptive Filters Real Time Operating Systems Pre-emption Scheduling Threads, Tasks, Semaphores	10	N/Q	--	--	--	--	\$ 79.00	104.50	82,555.00	-	82,555.00	--	
ES/FBDDL-03	TDS: Computer Controlled Teaching Unit for the Study of Digital Signal Processing The Teaching Unit for the Study of Digital Signal Processing "TDS" allows to study the principles and more important concepts about digital signal processing, including study and practical exercises, among others, of Continuous waveforms generation. Analyze the nature of the signals. Working simultaneously with two external signals. Signals digitalization. Fast Fourier Transform visualization. Study of the effects of the digital signal processing. Study of the effects of the analog and digital filters. To analyze the time and frequency responses, before and after the digital signal processing Behaviour of the generated signal or the user's voice when noise is added to the signal. Etc. Moreover, it is possible to generate different waveforms by the software and send them to the outputs of the unit. These signals can be visualized by an external oscilloscope or be listened by the speaker. The "TDS" unit is based on a modular design structure to allow the user a better understanding of the unit. This unit includes the following modules: Two Function Generators modules. Each function generator contains a waveform selector to choose one of the three different waveform shapes (sine, triangle and square) and three potentiometers to regulate the frequency, the amplitude and the duty cycle of the signal. Noise Generator module. It includes two different noise generators, white noise and pink noise. Each noise generator includes a potentiometer to regulate the amplitude of the noise signal. Microphone and Microphone Pre-Amplifier module. It allows to record and adapt the user's voice to be analyzed with the software of the unit. PC Inputs/Outputs module. It allows to connect the unit with the data acquisition board (to be placed in the computer) and shows the acquired signals in the unit software. This module contains two BNC connectors for signal inputs and two BNC connectors for signal outputs. Power Amplifier module. It contains a potentiometer to regulate the power amplification of the signal. Speaker module. It allows to hear the generated signals of the unit and to study the effects of the noise and digital signal processing in the studied signal. All connections between modules are performed through RF coaxial cable assembly.	5	€ 7,945.00	115.85	4,602,141.25	92,042.83	4,694,184.08	--	\$ 817.00	104.50	426,882.50	-	426,882.50	--

Item Code	Description / Specification of items	Qty	M/s Paktech Instruments Company, Karachi				Local	M/s Rustek Technologies, Karachi						
			Unit Rate	Exch. Rate	Cost			Unit Rate	Exch. Rate	Cum				
					P-I	P-II				Total	P-I	P-II	Total	
ES/FRDDL-04	NI ELVIS II, NI ELVIS II+ Modular Engineering Educational Laboratory Platform § Integrated suite of 12 instruments § 100 MS/s oscilloscope option (NI ELVIS II+) § Includes Basic Breadboard for Circuits and Electronics § Complete integration with NI Multisim for teaching circuits concepts Extend your lab with companion products from Quanser, Freescale, Emona, and more	5	N/Q	--	--	--	--	\$ 5,049.00	104.50	2,638,102.50	-	2,638,102.50	--	
ES/FRDDL-05	EmonaSIGEx Add-on Board For Teaching Signals and Systems with NI ELVIS § Hands-on approach to learning signals and systems § Covers signals and systems concepts from six top textbooks § Complete integration with NI ELVIS and NI LabVIEW software Includes printed lab manual of 16 experiments with software based on LabVIEW	5	N/Q	--	--	--	--	\$ 2,917.00	104.50	1,524,132.50	-	1,524,132.50	--	
2- ADVANCED INDUSTRIAL PROCESS LABORATORY														
ES/AIPL-01	SAIT : Transducers and Instrumentation Trainer Input Transducers: Resistance Transducers for applications in angular or linear position: Linearly sliding potentiometer. Rotary carbon-track potentiometer. Rotary coil potentiometer. Precision servo-potentiometer. The Wheatstone Bridge circuit. Applications of temperature: NTC (Negative Temperature Coefficient) Thermistors. RTD Sensor (Platinum Transducer with Temperature dependent Resistance). Temperature sensor IC "Integrated Circuit LM 335" Type "K" Thermocouples. Applications of light: Photovoltaic Cell. Phototransistor. Photodiode PIN. Photoconductive Cell. Linear position and force: Linear Variable Differential Transformer LVDT. Extensometric Transducer. Environmental measurements: Air flow Sensor. Air pressure Sensor. Humidity sensor. Rotational speed and position control: Slotted optoelectronic Sensor. Opto-reflective Sensor. Inductive sensor. Hall effect Sensor. Permanent D.C. magnet tachogenerator. Sound measurements: Dynamical microphone. Ultrasonic receiver. Visualization Devices: Timing device/ counter with LED display. Graphic bar visualizer. Mobile coil voltmeter. Output Transducers: Electrical Resistance. Incandescent Lamp. Applications for the sound output: Buzzing (Buzzer). Mobile coil loud speaker. Ultrasonic transmitter. Applications of linear or angular motion:	5	€ 12,960.00	115.85	7,507,080.00	150,141.60	7,657,221.60	--	\$ 5,476.19	104.50	2,861,309.28	-	2,861,309.28	--

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M/s Paktech Instruments Company, Karachi								M/s Rasiek Technologies, Karachi						
Item Code	Description / Specification of Items	Qty	Unit Rate	Exch: Rate	Cost			Local	Unit Rate	Exch: Rate	Cost			
					P-I	P-II	Total				P-I	P-II	Total	
	D.C. Solenoid. D.C. Relay. Solenoid Valve Permanent Magnet D.C. Motor Signal Conditioners. D.C. Amplifiers. A.C. Amplifier. Power Amplifier. Current Amplifier. Buffers. Inverting Amplifier. Differential amplifier. V/F and F/V Converters. V/I and I/V Converters. Full Wave Rectifier. Hysteresis convertible Comparator. Electronic switch. Oscillator 40 kHz. Filter 40 kHz. Time-constant convertible Low Pass Filter. Circuit with Mathematical Operations: Adding amplifier. Integrator with different time constants. Differentiator with different time constants. Instrumentation Amplifier. Circuit SAMPLE & HOLD. Amplifiers with gain control and offset. Furthermore it contains a linearly mounted system of a D.C. motor, tachodynamo, reflective, slotted opto-sensors to detect the absolute and incremental position. Cables.													
ES/AIPL-02	EDAS/VIS-1.25: EDIBON Data Acquisition System / Virtual Instrumentation System. (1,250,000 samples per second) Metallic box. Dimensions: 310 x 220 x 145 mm. approx. Front panel: 16 Analog inputs (1 block with 12 voltage channels and 1 block with 2 current channels (4 connections)). Sampling velocity 1,250,000 samples per second for EDAS/VIS 1.25 Version. Sampling velocity 250,000 samples per second for EDAS/VIS 0.25 Version. 2 Analog outputs. 24 Digital inputs/outputs, configurable as inputs or outputs, with 24 state led indicators. These digital inputs/outputs are grouped in three ports of eight channels (P0, P1 and P3). 4 Digital signal switches 0-5V. 2 Analog signal potentiometers 12V. Main ON/OFF switch. Inside: Internal power supply of 12 and 5 V. Potentiometer. Back panel: Power supply connector. SCSI connector (for connecting with the data acquisition board). Connecting cables.	5	€ 5,800.00	115.85	3,359,650.00	67,193.00	3,426,843.00	--	\$ 3,095.20	104.50	1,617,242.00	-	1,617,242.00	--
ES/AIPL-03	TECNEL: Computer Controlled Teaching Unit for the Study of Power Electronics (with IGBTs). (Converters: DC/AC+AC/DC+DC/DC+AC/AC) Diagram in the front panel with similar distribution that the elements in the real unit. Steel box. Front panel: Diodes module: 6 diodes. Thyristors module: 6 thyristors. IGBTs Module: 6 IGBTs. Snubber net. Sensors module. 4 Voltage sensors.	5	€ 14,940.00	115.85	8,653,995.00	173,079.90	8,827,074.90	--	\$ 1,315.47	104.50	687,333.08	-	687,333.08	--
			€ 1,940.00	115.85	1,123,745.00	22,474.90	1,146,219.90	--						

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M/s Paktech Instruments Company, Karachi													M/s Kassik Technologies, Karachi		
Item Code	Description / Specification of items	Qty	Unit Rate	Exch. Rate	Cost			Unit Rate	Exch. Rate	Cost					
					P-I	P-II	Total			P-I	P-II	Total			
	2 Current sensors. Power supply connections for Vr, Vs, Vt, Neutral and Ground. Practices schemes. Back panel: Data Acquisition Board Connector (SCSI connector). Tachodynamo connector. Main fuses (Vr, Vs, Vt) and LEDs. Circuit breaker (main switch). Single-phase driver. Three-phase driver. IGBT driver. TSI board. PIC board. SKI161 board. Four relays board. 2 Three-phase relays. Commuted power supply. Three-phase magnetothermal. Control Interface. Loads: - IND. Inductance + REV. Variable Resistance. (2 units of each one) OR - RCLJR. Resistive, Inductive and Capacitive Loads Module.														
ES/AIPL-04	Computer Controlled Process Control System with electronic valve control study of Temperature, Pressure, Level, Flow, pH, Conductivity and TDS. Bench-top unit. This unit is common for all Sets for Process Control type "UCP" and can work with one or several sets. Anodized aluminium 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. A transparent main tank and collector with an orifice in the central dividing wall (2 x 25 dm3), and drainage in both compartments. A transparent dual process tank (2 x 10 dm3), interconnected through an orifice and a ball valve and an overflow in the dividing wall; a graduate scale and a threaded drain of adjustable level with bypass. 2 Centrifugal pumps, range: 0-10 l/min. 2 Variable area flow meters (0.2-2 l/min. and 0.2-10 l/min), and with a manual valve. Line of on/off regulation valves (solenoid). Usually one is normally opened, and the other two are normally closed, and manual drainage valves of the upper tank. Proportional valve: a motorized control valve. Brass valve G 1/2". Pmax. 4 bar. 24 volts. Control 12-24 V. 200-1000 mA. Temperature: -10 to 60°C. Any Set for Process Control type "UCP" will be supplied installed in the Base Unit and ready for working. Set for Temperature Process Control: Set for Flow Process Control: Set for Pressure Process Control: Set for level Process Control Set for pH Process Control Set for TDS Process Control This unit allows that the 30 students of the classroom can visualize simultaneously all results and manipulation of the unit, during the process, by using a projector.	1	€ 28,916.00	115.85	3,349,918.60	66,998.37	3,416,916.97	--	\$ 11,926.00	104.50	1,246,267.00	-	1,246,267.00	-	

M/s Paktech Instruments Company, Karachi										M/s Rastek Technologies, Karachi				
Item Code	Description / Specification of items	Qty	Cost				Local	Unit Rate	Exch: Rate	Cost			Local	
			Unit Rate	Exch: Rate	Cost					Total	P-I	P-II		Total
					P-I	P-II								
ES/AIPL-05	Modular System for the Study of Sensor All elements are included in a metallic box. Signal Conditioning Circuits: • Amplifiers: DC amplifiers: - 3 Amplifiers. - Input range: ± 12 Vdc. - Input Impedance: 100 K Ω . - Adjustable gain: 1, 10, 100 for the "Amplifier 1" and "Amplifier 2". - Fixed gain: 100 for "x100 Amp". AC Amplifier: - Input range: 12 Vac. - Adjustable gain: 10, 100, 1000. - Bandwidth: 10 - 16000Hz. Power Amplifier: - Input range: 12 V max. - Output current: 1.5 A max. - Output power: 9W max. Current Amplifier: - Gain: 10,000. - Output current: 1A max. Buffers: - 2 Buffers. - Input voltage: 12V max. - Input impedance: 100 K Ω . Inverting Amplifier: - Input voltage: 12V max. - Input impedance: 100 K Ω . - Gain: -1. Differential Amplifier: - Input voltage: 12V max. - Inputs impedance: 100 K Ω (Input A) and 200 K Ω (Input B). - Ad (Differential gain): 1.0. - Ac (Common mode gain): 0.02 max. Instrumentation Amplifier: - Input voltage: 12V max. - Inputs impedance: 100 K Ω . - Ad (Differential gain): 1.0. - Ac (Common mode gain): 0.006 max. Summing Amplifier: - Input voltage: 12V max. - 3 Inputs. - Gain: 1. • Comparators: Schmitt trigger. Filters: 40KHz filter: Pass-Band Filter at 40KHz. Low-pass filter: Selectable cut-off frequencies at 15Hz, 1.44Hz, 0.14Hz. • Integrator: Selectable Time constants: 100ms, 1s, 10s. • Differentiator: Selectable Time constants: 10ms, 100ms, 1s. • "Sample/Hold": Time constant: 1ms. • Converters Circuits: Voltage to Current (V/I) converter: Output current: ± 10 mA max. Transfer ratio: 10mA/V.	1	€ 8,233.00 OR € 52,355.00	115.85	953,793.05	19,075.86	972,868.91	-	\$ 1,082.14	104.50	113,083.63	-	113,083.63	-
					6,065,326.75	121,306.54	6,186,633.29	-						

M/s Paktech Instruments Company, Karachi										M/s Rastek Technologies, Karachi				
Item Code	Description / Specification of items	Qty	Unit Rate	Exch. Rate	Cost			Local	Unit Rate	Exch. Rate	Cost			Local
					P-I	P-II	Total				P-I	P-II	Total	
	Current to Voltage (I/V) converter: - Output voltage: ± 2 V (6 V max.) - Transfer ratio: 0.1V/mA Frequency to Voltage (f/V) converter: - Transfer ratio: 1 V/kHz - Maximum input frequency: 10 kHz - No linearity: 0.024% Voltage to Frequency (V/f) converter: - Transfer ratio: 1 kHz/V - Maximum input frequency: 10 kHz - No linearity: 0.024% • Other circuits: Full-Wave Rectifier: 40kHz Oscillator: - Output frequency: 41093 Hz. - Output amplitude: 5 Vpp. Alarm Oscillator: - Oscillator frequency: 700Hz - Switch turn off voltage: 2.3V. Electronic Switch: - Input voltage: 12 V max. - Switch voltage: 2.1V. - Output current: 500mA max. Control Circuits: • PID: Process control applications. Independent PID parameters adjustment (Proportional, Integrative and Derivative). • Industrial Controller: Input: DC voltage, RTD sensor or Thermocouple. Output 1: Relay. Alarm output: Relay. • Relay: Double relay. NO and NC terminal. 12Vdc coil excitation. • DC Dimmer: Light dimmer or DC motor speed controller applications. PWM generator. Frequency and duty cycle adjustable. Power Elements: • Power Supply: AC voltage range: 0 to 30 Vac. DC voltage range: 0 to ± 15 Vdc. Output current: 4A max. • DC Source: 2 Output for each voltage. DC voltages: +5 Vdc, -5 Vdc, -12 Vdc, 0 to 12 Vdc. Output current: 500mA max. • Wave Generator: Sine, square, triangular and sawtooth waveforms. Frequency range: 100 to 10000 Hz. Amplitude range: Adjustable ± 10 V • Potentiometers: 4 Potentiometers. Impedance values: 0-1 K Ω , 0-5 K Ω , 0-10 K Ω and 0-20 K Ω . Power dissipation: 1 W max. Measuring Elements:													

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M/s Paktech Instruments Company, Karachi										M/s Rastek Technologies, Karachi				
Item Code	Description / Specification of items	Qty	Unit Rate	Exch: Rate	Cost			Local	Unit Rate	Exch: Rate	Cost			Total
					P-I	P-II	Total				P-I	P-II	Total	
	Current to Voltage (I/V) converter: - Output voltage: ± 2 V (6 V max.) - Transfer ratio: 0.1 V/mA. Frequency to Voltage (F/V) converter - Transfer ratio: 1 V/kHz. - Maximum input frequency: 50 kHz. - No linearity: 0.024%. Voltage to Frequency (V/F) converter - Transfer ratio: 1 kHz/V. - Maximum input frequency: 10 kHz. - No linearity: 0.024%. 1 Phase oscillator Full-Wave Rectifier 40kHz Oscillator. - Output frequency: 40kHz Hz. - Output amplitude: 5 Vpp. Alarm Oscillator - Oscillator frequency: 700Hz. - Switch turn off voltage: 2.5V. Electronic Switch. - Input voltage: 12 V max. - Switch voltage: 2 V. - Output current: 500mA max. Control Circuits: • PID: Process control applications. Independent PID parameters adjustment (Proportional Integrative and Derivative) • Industrial Controller Input: DC voltage, RTD sensor or Thermocouple Output 1: Relay Alarm output: Relay. • Relay: Double relay. NO and NC terminal. 12Vdc coil excitation. • DC Dimmer: Light dimmer or DC motor speed controller applications. PWM generator. Frequency and duty cycle adjustable Power Elements: • Power Supply: AC voltage range: 0 to 30 Vac. DC voltage range: 0 to +15 Vdc Output current: 4A max. • DC Source: 2 Output for each voltage. DC voltages: +5 Vdc, -5 Vdc, +12 Vdc, -12 Vdc, 0 to 12 Vdc Output current: 500mA max. • Wave Generator: Sine, square, triangular and sawtooth waveforms Frequency range: 100 to 10000 Hz. Amplitude range: Adjustable ± 10 V • Potentiometers: 4 Potentiometers. Impedance values: 0-1 K Ω , 0-5 K Ω , 0-10 K Ω and 0-20 K Ω . Power dissipation: 1 W max. Measuring Elements:													

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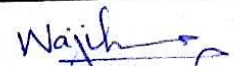
M/s Paktech Instruments Company, Karachi										M/s Hasek Technologies, Karachi						
Item Code	Description / Specification of Item	Qty	Unit Rate	Exch. Rate	Cost			Local	Unit Rate	Exch. Rate	Cost			Total		
					P-I	P-II	Total				P-I	P-II	Total			
	<ul style="list-style-type: none">• 1 L.D. bar graph displayInput range: 0-5V.• Counter/TimerTemporization applicationsCounting applications• Moving coil meter Module: Vibration and Deformation Module Temperature Test Module Pressure Test Module Flow Test Module Oven Test Module Liquid Test Module Tachometer Test Module Proximity Test Module Pneumatic Test Module Light Test Module															
3-	AUTOMATION TECHNOLOGIES & PROCESS CONTROL LABORATORY															
ES/ATPCL-01	SERIN/CC: Computer Controlled Advanced Industrial Servo system Trainer (for DC Motors) It is formed by a Control Interface Box and a Direct Current Motor and Encoder Module. The Control Interface Box has a 4-quadrants servo amplifier for DC motors that controls the motor speed, position and current of the motor. In order to do this control the feedback is done thanks to an encoder. The RS232 communication between the Control Interface Box and the computer (PC) provides the possibility of commanding the motor from the PC and to visualize the most important signals of the motor. The 4-quadrant servo amplifier controls the motor operation and the braking operation in both rotation directions clockwise and counter clockwise Velocity, Position and Torque Control. It allows predefined moves and programming. Control Interface Box: Front panel: Diagram in the front panel with similar distribution that the elements in the real unit. 7 Digital outputs: They have led's that indicate if the outputs are active or not. Output 1: this output indicates when the system has been referenced already. Output 2: this output indicates when a target position is reached. Output 3: this output indicates when the motor is running. Output 4: this output indicates when a command cannot be executed. Output 5: this output indicates when an error occurs. Output 6: this output is a user definable PWM-output (5V, 0-100% duty cycle, 50kHz). Output 7: this output is the common cathode of the freewheeling diode of the low side drivers. 13 Digital inputs: 7 User definable digital inputs for process control. 1 Digital input (trigger signal). 3 Digital inputs: reference, left limit and right limit. DI reference: digital input for reference switch. DI left limit: digital input for left limit switch of a linear unit. DI right limit: digital input for right limit switch of a linear unit. 2 Digital inputs power stage and stop. DI power stage: digital input for enabling the power stage. DI stop: digital input for switching the regulation off if the signal is removed. 2 Analog inputs with voltages in the range of 0-5V. 2 Potentiometers to select the value of the analog inputs (0-5 V DC), these potentiometers are enabled by a commutating switch placed next to them.	5	£	7,656.00	115.85	4,434,738.00	88,694.76	4,523,432.76	-	\$	6,383.30	104.50	3,335,274.25	-	3,335,274.25	-


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Item Code	Description / Specification of items	Qty	M/s Paktech Instruments Company, Karachi					Local	M/s Rastek Technologies, Karachi					Local
			Unit Rate	Exch. Rate	Cost				Unit Rate	Exch. Rate	Cost			
					P-I	P-II	Total				P-I	P-II	Total	
	Ignition Switch. When the unit is on, the red LED is active and lighting Back panel) Voltage supply. There is a voltage supply that feeds the unit with 220 V of alternating current. Motor power supply. It is a 24 V DC motor power supply (it is a three wires connection motor +, motor - and one taking to earth) Connection port in series. It is a connection plug to connect the Control Interface with the PC by the RS-232 port, in order to allow the software to manage the motor. Connection with the Feedback. It is a connection with the motor Feedback. It allows the encoder to manage the motor. Direct Current Motor and Encoder Module: DC Motor, 90W. Position, speed and current are controlled by the Control Interface. Digital encoder, 500 pulses per revolution, with RS232 communication port 2 Power supply wires (one for the motor and other for the Control Interface). 2 Communication RS232 wires (one from the Control Interface to the computer (PC) and other from the Control Interface to the encoder).													
ES/ATPCL-02	NI ELVIS II, NI ELVIS II+ Modular Engineering Educational Laboratory Platform • Integrated suite of 12 instruments • 100 MS/s oscilloscope option (NI ELVIS II+) • Includes Basic Breadboard for Circuits and Electronics • Complete integration with NI Multisim for teaching circuits concepts Extend your lab with companion products from Quanser, Free scale, Emona, and more	5	N/Q	--	--	--	--	--	\$ 5,049.00	104.50	2,638,192.50	--	2,638,192.50	--
ES/ATPCL-03	Quanser QNET VTOL 2.0 Add-On Board For Teaching Flight Dynamics and Control With NI ELVIS • Illustrate the basic principles of flight dynamics with a 1 DOF helicopter • Teach flight dynamics, modeling, model validation, PID control, and more • Simulate models and implement controllers in one software platform Save time with a comprehensive curriculum that enables deep understanding of engineering principles	3	N/Q	--	--	--	--	--	\$ 3,464.20	104.50	1,086,026.70	--	1,086,026.70	--
ES/ATPCL-04	Quanser QNET Rotary Inverted Pendulum 2.0 Add-On Board For Teaching Controls With NI ELVIS • Illustrate pendulum control using a rotating arm with a DC servo motor and optical encoders • Build intuition by taking models from simulation to implementation using one software platform Save time with comprehensive curriculum that enables a deep understanding of engineering principles	3	N/Q	--	--	--	--	--	\$ 3,464.28	104.50	1,086,051.78	--	1,086,051.78	--
ES/ATPCL-05	NI My DAQ with Project Guides 8 analog inputs (14-bit, 48 kS/s) 2 static analog outputs (12-bit); 12 digital I/O; 32-bit counter Bus-powered for high mobility; built-in signal connectivity Contains Project Guides on Circuits, Signals & Systems and hands on experiments Subject Area: 1. Signal Conditioning 2. Analog to Digital Conversion Process 3. Digital to Analog Conversion Process 4. Sensitivity, Resolution 5. Intelligent Instrumentation 6. Data Acquisition Systems Graphical User Interfaces	5	N/Q	--	--	--	--	--	\$ 751.19	104.50	392,496.78	--	392,496.78	--


Prof. Dr. Waqar Shah,
 Chairperson, Department of Electronic Engineering
 MUET, Jamshoro.


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


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

BIDDERS QUALIFICATION REPORT

TENDER NAMELY


Name of work: Procurement of Lab Equipment for various laboratories of Department of Electronic Engineering 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. Waqha Shah
Chairperson

Department of Electronic Engineering
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

BIDDERS QUALIFICATION REPORT

TENDER NAMELY


Name of work: Procurement of Lab Equipment for various laboratories of Department of Electronic Engineering 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 Rastek Technologies, 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. Waqar Shah
Chairperson

Department of Electronic Engineering
MUET, Jamshoro


Deputy Director (Procurement)
MUET, Jamshoro


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

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

**STATEMENT SHOWING SELECTED LAB EQUIPMENT REQUEST
DEPARTMENT OF ELECTRONIC ENGINEERING, MUET, JAMSHORO.**

Item Code	Description / Specification of items	Qty	Unit Rate	Each Rate	Cost			Unit	Name of Vendor	Remarks	
					P-I	P-II	Total				
1-	FPGA/ DSP BASED DESIGN AND DEVELOPMENT LABORATORY										
ES/FBDDL-03	TDS: Computer Controlled Teaching Unit for the Study of Digital Signal Processing The Teaching Unit for the Study of Digital Signal Processing "TDS" allows to study the principles and more important concepts about digital signal processing, including study and practical exercises, among others, of: Continuous waveforms generation; Analyze the nature of the signals; Working simultaneously with two external signals; Signals digitalization; Fast Fourier Transform visualization; Study of the effects of the digital signal processing; Study of the effects of the analog and digital filters; To analyze the time and frequency responses, before and after the digital signal processing; Behaviour of the generated signal of the user's voice when noise is added to the signal; Etc. Moreover, it is possible to generate different waveforms by the software and send them to the outputs of the unit. These signals can be visualized by an external oscilloscope or be listened by the speaker. The "TDS" unit is based on a modular design structure to allow the user a better understanding of the unit. This unit includes the following modules: Two Function Generators modules: Each function generator contains a waveform selector to choose one of the three different waveform shapes (sine, triangle and square) and three potentiometers to regulate the frequency, the amplitude and the duty cycle of the signal. Noise Generator module: It includes two different noise generators: white noise and pink noise. Each noise generator includes a potentiometer to regulate the amplitude of the noise signal. Microphone and Microphone Pre-Amplifier module: It allows to record and adapt the user's voice to be analyzed with the software of the unit. PC Inputs/Outputs module: It allows to connect the unit with the data acquisition board (to be placed in the computer) and shows the acquired signals in the unit software. This module contains two BNC connectors for signal inputs and two BNC connectors for signal outputs. Power Amplifier module: It contains a potentiometer to regulate the power amplification of the signal. Speaker module: It allows to hear the generated signals of the unit and to study the effects of the noise and digital signal processing in the studied signal. All connections between modules are performed through RF coaxial cable assembly.	5	E	7,045.00	115.85	4,602,141.25	92,042.81	4,694,184.06	—	M/s Paktech Instruments Company, Karachi	Selected as per recommendations of the Departmental Experts and approved by the Departmental Personnel/ May refer: Statistical Final Procurement Committee in its meeting held on 27-09-2015
2-	ADVANCED INDUSTRIAL PROCESS LABORATORY										
ES/AIPL-01	SAIT : Transducers and Instrumentation Trainer Input Transducers: Resistance Transducers for applications in angular or linear position: Linearly sliding potentiometer. Rotary carbon-track potentiometer. Rotary coil potentiometer. Precision servo-potentiometer. The Wheatstone Bridge circuit. Applications of temperature: NTC (Negative Temperature Coefficient) Thermistors. RTD Sensor (Platinum Transducer with Temperature dependent Resistance). Temperature sensor IC "Integrated Circuit LM 135". Type "K" Thermocouples. Applications of light: Photo-voltaic Cell. Photo-transistor. Photodiode PIN. Photoconductive Cell. Linear position and force.	5	E	12,960.00	115.85	7,507,080.00	150,141.60	7,657,221.60	—	M/s Paktech Instruments Company, Karachi	Selected as per recommendations of the Departmental Experts and approved by the Departmental Personnel/ May refer: Statistical Final Procurement Committee in its meeting held on 27-09-2015

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Item Code	Description / Specification of Items	Qty	Unit Rate	Each Rate	Cost			H.C.T	Name of Vendor	Remarks
					P-I	P-II	Total			
	Linear Variable Differential Transformer LVDT Potentiometric Transducers Potentiometric measurements Air flow Sensor Air pressure Sensor Humidity sensor Rotational speed and position sensor Slotted optoelectronic Sensor Opto-reflective Sensor Inductive sensor Hall effect Sensor Permanent D.C. magnet tachogenerator Sound measurements Dynamical microphones Ultrasonic sensor Visualization Devices Timing device/ counter with LED display Graphic bar visualizer Mobile coil voltmeter Output Transducers Electrical Resistance Incandescent Lamp Applications for the sound output Buzzing (Buzzer) Mobile coil loud speaker Ultrasonic transmitter Applications of linear or angular motion D.C. Solenoid D.C. Relay Solenoid Valve Permanent Magnet D.C. Motor Signal Conditioners D.C. Amplifiers A.C. Amplifier Power Amplifier Current Amplifier Buffers Inverting Amplifier Differential amplifier V/F and F/V Converters V/I and I/V Converters Full Wave Rectifier Hysteresis convertible Comparator Electronic switch Oscillator 40 kHz Filter 40 kHz Time-constant convertible Low Pass Filter Circuit with Mathematical Operation Adding amplifier Integrator with different time constants Differentiator with different time constants Instrumentation Amplifier Circuit SAMPLE & HOLD Amplifiers with gain control and offset Furthermore it contains a linearly mounted system of a D.C. motor, tachodynamo, reflective, slotted opto-sensors to detect the absolute and incremental position Cables									


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Item Code	Description / Specification of items	Qty	Unit Rate	Exch. Rate	Cost			Landed	Name of Vendor	Remarks
					P-I	P-II	Total			
ES/AIPL-01	EDAS/VIS-1.25: EDIBON Data Acquisition System / Virtual Instrumentation System, (1,250,000 samples per second) Metallic box. Dimensions: 310 x 220 x 145 mm approx. Front panel: 14 Analog inputs (1 block with 12 voltage channels and 1 block with 2 current channels (4 connections)) Sampling velocity: 1,250,000 samples per second for EDAS/VIS 1.25 Version Sampling velocity: 250,000 samples per second for EDAS/VIS 0.25 Version 2 Analog outputs 24 Digital inputs/outputs, configurable as inputs or outputs, with 24 state led indicators These digital inputs/outputs are grouped in three pairs of eight channels (P0, P1 and P2) 6 Digital signal pushers 0-5V 2 Analog signal potentiometers 0-12V Main ON/OFF switch Slider: internal power supply of 12 and 5 V Potentiometer Back panel: Power supply connector: SCSI connector (for connecting with the data acquisition board) Connecting cables	5	€ 5,800.00	115.85	3,159,650.00	67,193.00	3,426,843.00	--	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.
ES/AIPL-02	TECH22: Computer Controlled Teaching Unit for the Study of Power Electronics (with IGBTs) (Converters: DC/AC + AC/DC + DC/DC + AC/AC) Diagram in the front panel with similar distribution that the elements in the real unit. Steel box. Front panel: Diodes module: 6 diodes Thyristors module: 6 thyristors IGBTs Module: 6 IGBTs Snubber net Sensors module: 4 Voltage sensors 2 Current sensors Power supply connections for V _t , V _s , V _L Neutral and Ground. Practices schemes Back panel: Data Acquisition Board Connector (SCSI connector). Tachodynamo connector Main fuses (V _t , V _s , V _L) and LEDs Circuit breaker (main switch) Single-phase driver. Three-phase driver. IGBT driver TSI board PIC board SKH161 board Four relays board 2 Three-phase relays Commutated power supply Three-phase magnetothermal Control Interface Loads: - IND. Inductance + REV. Variable Resistance. (2 units of each one) OR - RCLJR. Resistive, Inductive and Capacitive Loads Module.	5	€ 14,940.00	115.85	3,653,995.00	773,979.90	3,827,974.90	--	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.

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Item Code	Description / Specification of Items	Qty	Unit Rate	Exch. Rate	Cost			Local	Name of Vender	Remarks	
					P-I	P-II	Total				
3-	AUTOMATION TECHNOLOGIES & PROCESS CONTROL LABORATORY										
ES/ATPCL-01	SERIN/CC: Computer Controlled Advanced Industrial Servo system Trainer (for DC Motors) It is formed by a Control Interface Box and a Direct Current Motor and Encoder Module. The Control Interface Box has a 4-quadrants servo amplifier for DC motors that controls the motor speed, position and current of the motor. In order to do this control the feedback is done thanks to an encoder. The RS232 communication between the Control Interface Box and the computer (PC) provides the possibility of commanding the motor from the PC and to visualize the most important signals of the motor. The 4-quadrant servo amplifier controls the motor operation and the braking operation in both rotation directions clockwise and counter clockwise. Velocity, Position and Torque Control It allows predefined moves and programming. Control Interface Box: Front panel: Diagram in the front panel with similar distribution that the elements in the real unit. 7 Digital outputs: They have led's that indicate if the outputs are active or not. Output 1: this output indicates when the system has been referenced already. Output 2: this output indicates when a target position is reached. Output 3: this output indicates when the motor is running. Output 4: this output indicates when a command cannot be executed. Output 5: this output indicates when an error occurs. Output 6: this output is a user definable PWM output (5V, 0-100% duty cycle, 50kHz). Output 7: this output is the common cathode of the freewheeling diode of the low side drivers. 13 Digital inputs: 7 User definable digital inputs for process control. 1 Digital input (trigger signal). 3 Digital inputs: reference, left limit and right limit. DI reference: digital input for reference switch. DI left limit: digital input for left limit switch of a linear unit. DI right limit: digital input for right limit switch of a linear unit. 2 Digital inputs power stage and stop. DI power stage: digital input for enabling the power stage. DI stop: digital input for switching the regulator off if the signal is removed. 2 Analog inputs with voltages in the range of 0-5V. 2 Potentiometers to select the value of the analog inputs (0-5 V DC), these potentiometers are enabled by a controlling switch placed next to them. Signal: Feedback. When the unit is on, the red LED is active and lighting. Back panel: Voltage supply: There is a voltage supply that feeds the unit with 220 V of alternating current. Motor power supply: It is a 24 V DC motor power supply (it is a three wires connection motor +, motor - and one taking to earth). Communication port in series: It is a connection plug to connect the Control Interface with the PC by the RS-232 port, in order to allow the software to manage the motor. Connection with the Feedback: It is a connection with the motor Feedback. It allows the encoder to manage the motor. Direct Current Motor and Encoder Module: DC Motor: 90W. Position, speed and current are controlled by the Control Interface. Digital encoder: 500 pulses per revolution, with RS232 communication port. 2 Power supply wires (one for the motor and other for the Control Interface). 2 Communication RS232 wires (one from the Control Interface to the computer (PC) and other from the Control Interface to the encoder).	5	C	7,656.00	115.85	4,434,738.00	88,694.76	4,523,432.76	-	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.			29,128,756.34			


Prof. Dr. Waqar Shah,
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Engr. Qamar-ul-Hassan Memon,
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University of Sindh, Jamshoro


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

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

DEPARTMENT OF ELECTRONIC 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- FPGA/ DSP BASED DESIGN AND DEVELOPMENT LABORATORY										
ES/FDDDL-01	<p>FPGA based Embedded Design Device</p> <p>Affordable tool to teach and implement multiple design concepts with one device</p> <p>10 analog inputs, 6 analog outputs, 40 digital I/O lines</p> <p>Wireless, LEDs, push button, accelerometer onboard</p> <p>Xilinx FPGA and dual-core ARM Cortex-A9 processor</p> <p>Fully programmable with LabVIEW or C, adaptable for different programming levels</p> <p>Onsite Training by OEM</p> <p>Also contains USB and Ethernet Hub, Motor Adapter and motors kit</p> <p>Accessories included</p> <p>Driver and software evaluation DVDs</p> <p>USB cable</p> <p>Power supply with international adapters</p> <p>1 MXP protoboard accessory</p> <p>screwdriver and MSP screw-terminal connector</p> <p>Sensors and Actuators Kit</p> <p>Barrel connector with leads</p> <p>Assorted capacitors</p> <p>Diodes</p> <p>7-segment display</p> <p>Mechanical rotary encoder</p> <p>Photo interrupter (light sensor with LED)</p> <p>Assorted on-amms</p> <p>Assorted LEDs</p> <p>Small DC motor (1 VDC to 3 VDC, no load speed: 6600 rpm)</p> <p>Microphone with audio jack</p> <p>MXP Breadboard Accessory</p> <p>Potentiometer (500 kΩ)</p> <p>Relay</p> <p>Assorted resistors</p> <p>Piezoelectric sensor</p> <p>Photocell</p> <p>2 Hall effect sensors (latch and switch)</p> <p>Buzzer</p> <p>Assorted switches (DIP, slide, and rotary)</p> <p>Thermistor (NTC: 10 kΩ, 25 degrees)</p> <p>Assorted transistors</p> <p>Force sensing resistor</p> <p>Wire kit</p> <p>Keypad</p> <p>Digital temperature sensor (I2C)</p> <p>Character LCD (I2C, SPI, and UART)</p> <p>Digital potentiometer (SPI)</p> <p>Bluetooth interface (UART)</p> <p>EEPROM (SPI)</p>	5	\$ 3,500.00	104.50	1,828,750.00	-	1,828,750.00	--	M/s Rastek Technologies, 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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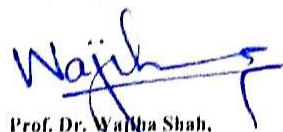
Item Code	Description / Specification of items	Qty	Unit Rate	Exch. Rate	Cost			Local	Name of Vendor	Remarks
					P-I	P-II	Total			
	LED matrix Geared motor 19:1 (includes encoder for rotation and speed, 12 V) Ultrasonic range finder (accurate readings of 0 in. to 255 in. or 6.45 m) Compass Servo motor: standard (215 degrees rotation) Servo motor: continuous rotation Accelerometer (3 axis, digital - SPI and I2C) H-bridge driver (compatible with gear motor) Gyroscope (3 axis, digital - SPI and I2C) Infrared proximity sensor (10 cm to 80 cm) Ambient light sensor (SPI)									
ES/FBDD1-02	ST Microelectronics STM32F746G-DISCO Discovery kit with STM32F746NG MCU and accompanying TFT Module Plug in the STM32F7 discovery kit allows users to develop and share applications with the STM32F7 Series microcontrollers based on ARM® Cortex®-M7 core. The discovery kit enables a wide diversity of applications taking benefit from audio, multi-sensor support, graphics, security, video and high-speed connectivity features. The Arduino connectivity support provides unlimited expansion capabilities with a large choice of specialized add-on boards. Subject Area: Embedded System Design System on a chip Interrupts Interrupt prioritization, Nesting Timers Counters Analog Comparators Digital Input/Output Serial Peripheral Interface Communication Inter-Integrated Circuit Communication Universal Serial Bus Communication RS-232 Communication IEEE-802.3-2002 Communication Graphical Output devices Image Processing Multiply Accumulate operations Floating Point Units Sampling, Quantization, Aliasing Convolution Finite Impulse Response Filtering Fourier Transforms Adaptive Filters Real Time Operating Systems Pre-emption Scheduling Threads, Tasks, Semaphores	10	5	79.00	104.50	82,555.00	-	82,555.00	--	M/s Rastek Technologies, 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 29-09-2016.

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Item Code	Description / Specification of items	Qty	Unit Rate	Exch: Rate	Cost			Local	Name of Vender	Remarks
					P-I	P-II	Total			
ES/FBDDL-04	NI ELVIS II, NI ELVIS II+ Modular Engineering Educational Laboratory Platform \$ Integrated suite of 12 instruments \$ 100 MS/s oscilloscope option (NI ELVIS II+) \$ Includes Basic Breadboard for Circuits and Electronics \$ Complete integration with NI Multisim for teaching circuits concepts Extend your lab with companion products from Quanser, Freescale, Emona, and more	5	\$ 5,049.00	104.50	2,638,102.50	-	2,638,102.50	--	M/s Rastek Technologies, 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
ES/FBDDL-05	EmonaSIGEx Add-on Board For Teaching Signals and Systems with NI ELVIS \$ Hands-on approach to learning signals and systems \$ Covers signals and systems concepts from six top textbooks \$ Complete integration with NI ELVIS and NI LabVIEW software Includes printed lab manual of 16 experiments with software based on LabVIEW	5	\$ 2,917.00	104.50	1,524,132.50	-	1,524,132.50	--	M/s Rastek Technologies, 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
2- ADVANCED INDUSTRIAL PROCESS LABORATORY										
ES/AIPL-04	Computer Controlled Process Control System with electronic valve control study of Temperature, Pressure, Level, Flow, pH, Conductivity and TDS. Bench-top unit This unit is common for all Sets for Process Control type "UCP" and can work with one or several sets 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. A transparent main tank and collector with an orifice in the central dividing wall (2 x 25 dm ³), and drainage in both compartments	1	\$ 11,926.00	104.50	1,246,267.00	-	1,246,267.00	--	M/s Rastek Technologies, 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
	A transparent dual process tank (2 x 10 dm ³), interconnected through an orifice and a ball valve and an overflow in the dividing wall, a graduate scale and a threaded drain of adjustable level with bypass 2 Centrifugal pumps, range: 0-10 l/min. 2 Variable area flow meters (0.2-2 l/min, and 0.2-10 l/min), and with a manual valve Line of on/off regulation valves (solenoid). Usually one is normally opened, and the other two are normally closed, and manual drainage valves of the upper tank Proportional valve: a motorized control valve Brass valve G 1/2" Pmax: 4 bar 24 volts Control 12-24 V 200-1000 mA Temperature: -10 to 60°C Any Set for Process Control type "UCP" will be supplied installed in the Base Unit and ready for working Set for Temperature Process Control: Set for Flow Process Control: Set for Pressure Process Control: Set for level Process Control Set for pH Process Control Set for TDS Process Control This unit allows that the 30 students of the classroom can visualize simultaneously all results and manipulation of the unit, during the process, by using a projector									

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Item Code	Description / Specification of items	Qty	Unit Rate	Exch. Rate	Cost			Local	Name of Vender	Remarks
					P-I	P-II	Total			
3- AUTOMATION TECHNOLOGIES & PROCESS CONTROL LABORATORY										
ES/ATPCL-02	NI ELVIS II, NI ELVIS II+ Modular Engineering Educational Laboratory Platform • Integrated suite of 12 instruments • 100 MS/s oscilloscope option (NI ELVIS II+) • Includes Basic Breadboard for Circuits and Electronics • Complete integration with NI Multisim for teaching circuits concepts Extend your lab with companion products from Quanser, Free scale, Emona, and more	5	\$ 5,049.00	104.50	2,638,102.50	-	2,638,102.50	--	M/s Rastek Technologies, 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.
ES/ATPCL-03	Quanser QNET VTOL 2.0 Add-On Board For Teaching Flight Dynamics and Control With NI ELVIS • Illustrate the basic principles of flight dynamics with a 1 DOF helicopter • Teach flight dynamics, modeling, model validation, PID control, and more • Simulate models and implement controllers in one software platform Save time with a comprehensive curriculum that enables deep understanding of engineering principles	3	\$ 3,464.20	104.50	1,086,026.70	-	1,086,026.70	--	M/s Rastek Technologies, 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.
ES/ATPCL-04	Quanser QNET Rotary Inverted Pendulum 2.0 Add-On Board For Teaching Controls With NI ELVIS • Illustrate pendulum control using a rotating arm with a DC servo motor and optical encoders • Build intuition by taking models from simulation to implementation using one software platform Save time with comprehensive curriculum that enables a deep understanding of engineering principles	3	\$ 3,464.28	104.50	1,086,051.78	-	1,086,051.78	--	M/s Rastek Technologies, 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.
ES/ATPCL-05	NI MyDAQ with Project Guides 8 analog inputs (14-bit, 48 kS/s) 2 static analog outputs (12-bit), 12 digital I/O, 32-bit counter Bus-powered for high mobility, built-in signal connectivity Contains Project Guides on Circuits, Signals & Systems and hands on experiments Subject Areas: 1. Signal Conditioning 2. Analog to Digital Conversion Process 3. Digital to Analog Conversion Process 4. Sensitivity, Resolution 5. Intelligent Instrumentation 6. Data Acquisition Systems Graphical User Interfaces	5	\$ 751.19	104.50	392,496.78	-	392,496.78	--	M/s Rastek Technologies, 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.					12,622,484.76					



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