Engineering College, Ajmer,
N.H.8 , Barliya Circle, Near Nareli Temple, Ajmer

PURCHASE ORDER

Package Code: TEQIP-III/2019/RJ/GECA/106 **Current Date:** 25/2/20

Package Name: GECA/TEQIP-III /2018-19/EIC- Transducer and Measurement Lab **Method: Shopping Goods**

PO Reference No : TEQIP-III/2019/RJ/geca/106
Date of Issue: 19-Feb.-2020
Subject : GECA/TEQIP-III /2018-19/EIC- Transducer and Measurement Lab

Purchaser : Engineering College, Ajmer,N.H.8 , Barliya Circle, Near Nareli Temple, Ajmer

Supplier Name: M/s TECHNOZON Solutions
Level-4, Tower-A, Plot No 70,
Industrial Area-1, Chandigarh

With reference to our correspondence, Engineering College, Ajmer,N.H.8 , BARLIYA CIRCLE, NEAR NARELI TEMPLE, AJMER, is pleased to award this detailed Purchase Order to for supply of items as per the details given below at a total cost (Contract Value) of **Rs. 799450(In Words:Seven Lakh Ninety Nine Thousands Four Hundred Fifty Only)**

S. N.	Item Name	Qty.	Place of Delivery	Installation Requirement
1	Current Transformer & Potential Transformer kit (To measure the phase angle and ratio error of CT)	1	Engg. College, Ajmer N.H. 8,Barliya Circle, Near Nareli Temple, Ajmer	
2	Two wattmeter Kit for star connected 3-Phase Load (To measure the power in 3-Phase star connected load by two wattmeter method at different values of load power factor)	1		
3	Single Phase Energy Meter	1		
4	Sensor Trainer Kit	2		
5	Ultrasonic Depth Meter	1		
6	Earth Resistance meter	1		
7	Slide wire potentiometer	1		
8	Crompton Potentiometer	1		
9	Kelvin's Bridge	1		
10	Torque Measurement Kit	1		
11	De-sauty Bridge	1		
12	Anderson Bridge	1		
13	Wien Bridge trainer	1		
14	Water Level Measurement Kit	1		
15	50 MHz Digital storage oscilloscope	1		
16	Two Channel Arbitrary Function Generator	1		

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Total price (without taxes) :	Rs. 677500
Total applicable taxes :	Rs. 121950
Total price (with taxes) :	Rs. 799450
Total Octroi& Other Charges :	Rs. 0
Delivery :	Engineering College, Ajmer, N.H.8 , Barliya Circle, Near Nareli Temple, Ajmer
Testing/Installation Clause (if any):	On site installation and testing & commissioning required. Price must be included in quotation.
Training Clause (if any) :	Yes
Technical Specifications :	As per Annexure - 1
Delivery Period :	45 days or as early possible
Warranty (In Months):	36 Months from the date of successful acceptance of items.
Liquidated Damages :	Liquidated Damages will be charged at the rate of 0.66% per day, L.D. Max. 10% on pre tax billing amount if delivery period exceeds 45 days. Purchase Order shall be understood cancelled automatically without any prior notification if delivery period exceeds 60 days
Performance Security :	Performance security amount Rs 33875/- at the rate of (5 %) of the Total contract value to be submitted in form of Bank guarantee of any Nationalized. Bank only within 21 day from the date of issue of PO Bank only within 21 day from the date of issue of PO including acceptance of P.O.
Payment Terms :	Below are the payment terms- **Satisfactory Delivery & Installation - 90% of total cost** **Satisfactory Acceptance - 10% of total cost**
Invoice Generation:	The invoice has to be generated against GST No. **08AABAP0959P1ZZ** of Govt. Engineering College, Ajmer

Dr. U. S. Modani
Principal
Principal
Govt. Engineering College,
AJMER

Accepted by Signature:

Date:

Address:

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Annexure I

S. N.	Item Name	Specifications
1	Current Transformer & Potential Transformer kit (To measure the phase angle and ratio error of CT)	"To measure high value of AC Current by a low range AC Ammeter and Current Transformer To measure high value of AC Voltage by a low range AC Voltmeter & Potential Transformer To measure Power using CT & PT To study the effect of CT turns ratio in Current measurement To study PT & CT connection in an electric Circuit for Measurement Mains Supply : 230V ±10%, 50Hz Variac Input : 230V AC, Output : 0-270V AC Current Rating : 5A, Ammeter (2 nos.) Display Resolution : 0.01A AC Range Min/Max : 0.1/5A Voltmeter Display Resolution : 1V AC, Range Min/Max : 10V/300V Wattmeter Display Resolution : 1W, Range Min/Max : 15/1500W Current Transformer CT Ratio : 1:10 Secondary Current Rating : 2A, Potential Transformer PT1 : Primary : 230V Secondary : 115 PT Ratio : 1:2 PT2 : Primary : 230VSecondary : 57.5VPT Ratio : 1:4 Rheostat : 220Ω, 2.8A, MCB : 2A (SPN)"
2	Two wattmeter Kit for star connected 3-Phase Load (To measure the power in 3-Phase star connected load by two wattmeter method at different values of load power factor)	"The unit consists of various meters, resistive and Inductive load, etc all housed in an elegant powder coated metal cabinet with a well spread intelligently designed layout on front panel. The unit is accompanied with a comprehensive Instruction manual complete with theory, operating details, connection drawings and observation tables. • Inbuilt Inductive Load • Facility to configure Star and Delta Load • Control board consist of high grade FRP material to provide utmost safety to the users • Provided with bulb holder to use load externally • Equipped with supply indication lamps • Designed by considering all the safety standards • Diagrammatic representation for the ease of connections Mains Supply : Three Phase, 415V ±10%, 50Hz Load : Resistive Load (R) and Resistive-Inductive Load Digital Meters Used Wattmeter : 1500W (2 nos.) AC Voltmeter : 450V, AC Ammeter : 5A MCB (TPN) : 10A, Three Phase Variac, 10A"
3	Single Phase Energy Meter	"Technical Specifications Single phase kWh Energy meter Inbuilt Voltmeter, Ammeter, Watt meter as Standard meter for calibration of Energy meter Big font LCD (16 x 2) for use as Standard meter/Energy meter calibration

		Separate Seven Segment Display as Energy meter Digital Calibration/ Operation using Keypad Sockets are provided to Connect External Voltmeter, Ammeter and Watt meter for Calibration Default and User Calibration modes are provided to avoid errors during Operation 5 LED Operation Indicators Auxiliary Power Supply : 90 - 270V ±10%, 50Hz Standard meter Voltmeter Minimum/Maximum : 10/300V Ammeter Minimum /Maximum : 0.1/5A Watt meter Minimum/Maximum : 10/1500W Energy meter Display Resolution : 0.001kWh Frequency : 50HzFuse : 250mA (2 Nos.) 5A (4 Nos.) and should have external (Watt Meter, Voltmeter and Ammeter Module) and (AC/DC Load Load Range : 0-1.2kW, (in steps of 100W) Load Type : Resistive (Lamp load)"
4	**Sensor Trainer Kit**	**"7``capacitive touch screen LCD with in built processor for viewing** the output waveforms, reading the operating manual, tutorial videos etc.; In built DAQ; User can design any circuit on bread board and test; Every Sensor can be interfaced with proper signal conditioning; Characteristic plot of Sensors; USB Port for Keyboard and Pen drive interface; Ethernet Port to connect with real world; On board Graph capture and store; Office tools are inbuilt to view PDF and doc files; Inverting Amplifier ;Non–Inverting Amplifier; Power Amplifier; Current Amplifier; Instrumentation Amplifier; Differential Amplifier; F to V converter : 1KHz –1V 10 KHz –10V V to F Converter : 1V – 1KHz 10V – 10 KHz ;C to V and V to C Converter; A/D Converter : 4 Channel , D/A Converter : 2 Channel High Pass & Low Pass Filter; Unity Gain Buffer; LED, LED Bar Graph & Buzzer Interface; Scientific calculator& HDMI Port A. Temperature sensor: RTD100Ω at 0°C (Temp.Coefficient0.385 Ω /°C), NTC: 4.7KΩ, LM35 10mV/ °C, Thermocouple; K Type Thermocouple : 0°C to 400°C B. Optical Sensor: Photo Diode BPX65: 500nm – 1100nm Photo TransistorL14G1 : 500nm-1100nm Photovoltaic Cell : 500mV – 580mv, Light Dependent Resistor, C. Pressure Sensor (SX100DN) Pressure Transducer : 0 – 60 psi, Differential Input Supply Voltage : +5V DC count : 0.01 mm D. Displacement Sensor (LVDT)Measurement range : 20 mm (±10 mm) Excitation Frequency : 4 KHz Excitation Voltage: 4 V (approximately) PP Sensitivity: 10 mV DC/ mm; Micrometer Least E. Force Sensor Strain Gauge Strain Gauge (350Ω) : 4 Nos.,Gauge Factor : 2:1,Maximum bearable weight : 500 Gms,Cantilever Material : Stainless Steel, Cantilever Width : 2.5 cms, Cantilever Thickness : 0.16 cms, Cantilever length : 20 cms, Bridge Configuration : Full Bridge, F. Hall Effect Sensor, Hall Effect Sensor : WSH315, Sensitivity : 1.5 mV/Gauss

		G. Capacitive Proximity Sensor, Operating input voltage : +12V DC, Sensor Type : PNP Output voltage : 12V DC, Sensing Range : 0-10 mm, Switch Type : NO Body : Cubical H. Inductive Proximity Sensor, Operating input voltage : 12V DC • Sensor Type : PNP, • Output voltage : 12V DC • Sensing Range : 0-10 mm, • Switch Type : NO Types of Temperature Sensor (K Type Thermocouple) • Temperature Range :–260°C to +1370°C •Sensitivity : 41μV/°C, Acceleration Sensor Supply Voltage : +5VDC ADC channel (X, Y, Z) : 3 Operating Current : 1ma Zero G output voltage (X,Y,Z) : Idle output is VDD/2 So 3.3V/2=1.65V, Flow Sensor • Working Voltage : 5V • Max current draw : 5mA at 5V • Working Flow Rate : 1 to 30 Ltr/Minute • Maximum water pressure : 2.0 MPa • Output duty cycle : 50% +-10% Slotted Opto Sensor + Tacho generator • DC Motor : +12V DC • Speed Range : 2400 RPM"
5	Ultrasonic Depth Meter	"Ultrasonic Transducer as a distance meter study Ultrasonic Transducer as a proximity switch study Long distances can be measured Buzzer indicator Ultrasonic Transducer : 27 cm to 1.5 meter (approximately) Clock Generator : 40 KHz Amplifier : 60 db Display : Seven segment Threshold detector : 0 to 9 V DC Buzzer Indicator : 5 V DC"
6	Earth Resistance meter	"3-pole Fall-of-Potential earth testing for basic measurements 2-pole resistance measurements for added versatility Easily capture values with single-button operation Ensure accurate measurements with automatic 'noise' voltage detection Hazardous voltage warning offers increased user protection Clearly read and record data with a large, backlit display Rugged holster and design for tough work environments Portable size allows for easy transportation Instantly be alerted to measurements outside of your set limit, when you use the adjustable limit setting Measuring functions 3-pole earth ground resistance, 2 pole ac resistance of a conductor, Interference voltage Intrinsic error Refers to the reference temperature range and is guaranteed for one

		year Measuring rate 2 measurements/second, Battery One 9 volt alkaline (LR61) Battery condition, LO-BAT is displayed if voltage drops below 6.5 V Voltages Between jacks H/C2 and E/C1: 250 Veff maximum (effective voltage) Between jacks S/P2 and E/C1: 250 Veff maximum Climatic class VDE/VDI 3540 RZ (conforming to KWG as per DIN 40040, 4/87) Temperature performance Working: -10 °C to +50 °C (+14 °F to +122 °F) Operating: 0 °C to +35 °C (+32 °F to +95 °F) Storage: -20 °C to +60 °C (+68 °F to +140 °F) Reference: +23 °C ± 2 °C (+73 °F ± 4 °F) Note: If the tester is not going to be used, or is being stored for a long period, remove the battery and store separately from the tester to avoid damage from battery leakage."
7	Slide wire potentiometer	"Analog Voltmeter : 0-10V Analog Ammeter : 0-1A Potentiometer Wire : Constantan Length : 10m DC Supply (Standard) : 1.016V Variable Resistance : 3-Decade : x0.1Ω, x1Ω, x10Ω Voltage Ratio Factor : 0, 1.5, 15, 30, 150, 300 Total Resistance : 15 kΩ Variable Supply : 0-12 V Mains Supply : 230V ±10%, 50 Hz Fuse : 0.5A, Should perform below experiments Study of Standardization of the DC Potentiometer Calibration of Voltmeter using DC potentiometer Calibration of Ammeter using DC potentiometer"
8	Crompton Potentiometer	"Analog Voltmeter : 0-10V Analog Ammeter : 0-1A Potentiometer Wire : Constantan Length : 10m DC Supply (Standard) : 1.016V Variable Resistance : 3-Decade : x0.1Ω, x1Ω, x10Ω Voltage Ratio Factor : 0, 1.5, 15, 30, 150, 300 Total Resistance : 15 kΩ Variable Supply : 0-12 V Mains Supply : 230V ±10%, 50 Hz Fuse : 0.5A Should perform below experiments Study of Standardization of the DC Potentiometer Calibration of Voltmeter using DC potentiometer Calibration of Ammeter using DC potentiometer"
9	Kelvin's Bridge	"KELVIN'S BRIDGE

		SALIENT FEATURES: • Dedicated trainer board for each bridge. • Completely self - contained stand - alone unit. • Demonstrates the principle and working of AC bridges for measurement of resistance. • Supply required 230V, 50 Hz AC. • Built - in IC based DC regulated power supply with short circuit protection and LED indication for supply • "ON". • Built - in 1KHz oscillator. • Built - in imbalance amplifier. • Head - phone set for sensitive detection. • Built - in variable arms and multiplier. • Multi - coloured test points at various stages in the circuit to observe waveforms and voltages. • Set of patch cords. • Housed in an elegant cabinet with a well spread intelligently designed circuit layout on the front panel. • Strongly supported by a comprehensive manual complete with theory and operating details."
10	Torque Measurement Kit	"Mains Supply : Three Phase, 415V ±10%, 50Hz Three Phase Induction Motor Type : Squirrel Cage Rating : 1HP (Also available with 2 HP and 3 HP) Voltage Rating : 415V Speed : 1440 RPM ±5% Insulation : Class 'B' Loading arrangement : Mechanical Brake Drum/Pulley : Aluminum Casted Digital Meters used Wattmeter : 1500W (2 nos.) AC Voltmeter : 450V AC Ammeter : 5A MCB (TPN) : 10A Digital Tachometer : 20,000 RPM Three Phase Variac, 10A"
11	De-sauty Bridge	"Sine Wave Generator Frequency range : 1kHz ±10% Amplitude control output : Up to 15Vpp Null detector with audio amplifier and speaker Fuse : 500MA, S/B, DPM : 200MV Unknown Capacitor : 0.1μF, 0.22μF, 0.47μF Mains Supply : 90-275V, 50Hz Dimension (mm) : W 345 x D 240 x H 110"
12	Anderson Bridge	"Size of Breadboard : 172.5mm x 128.5mm Tie Points on Breadboard : 1685 nos (solderless) DC Power Supplies : +5V, 1A (fixed) +12V, 500 mA (fixed), -12V, 500 mA (fixed) +12V, 500 mA (variable), -12V, 500 mA (variable)

		AC Supply : 9V-0V-9V, 500 mA Function Generator : Sine, Square, and Triangular functions Frequency range:1Hz to 100KHz In 5 steps (variable in between the steps) Modulation Generator : Sine, Square, and Triangular functions Frequency range:1Hz to 10KHz In 4 steps (variable in between the steps) Continuity Tester : For testing the continuity (provided with beeper sound), Mains Supply : 110-220V ±10%, 50/60Hz Anderson Bridge application module"
13	Wien Bridge trainer	It should have following features : Exclusive and compact design Straight forward representation of Wein Bridge Oscillator +12V, -12V inbuilt SMPS provided with the trainer for power supply Designed with considering all the safety standards Low cost trainer including illustration of Oscillator design usingpassive elements It should have following Technical Specifications : Biasing Voltage : +12V, -12V DC **Design of Oscillators : Passive** Experiment that can be performed: Study of design and functioning of Wein Bridge Oscillator
14	Water Level Measurement Kit	"Water Level Controller This has Built-In DC +12V/500mA regulated fixed Power supply, Microcontroller based with timer IC 555 and its associate circuitry of RC network, relay control, input sensors, complete setup with small size water pump motor wired as to control the water level in two steps (minimum & maximum level), Fully automatic, water level indication by LEDs. Complete setup. Features: □ A Schematic diagram printed in multicolor on the front panel of the white acrylic board. □ Complete enclosed in High Quality poly coated imported pine Wooden Box. □ Built-in Fixed / Variable DC Regulated Power Supply. □ Maximum Test Points to study all the corners of the Experiment. □ Equipped with maximum objectives. □ Test Points by 2 mm high quality banana sockets. □ Interconnections by 2 mm high quality banana pins. □ Very Easy for operation. □ Detailed Instruction manual on the line of curriculum. □ Water Level Indicator by LED. □ Fully automatic water controller. □ Water flow Indicator Objectives : □ To Study operation of IC 555 as water level controller circuit. □ To Observe & Note Turn ON & OFF of water Motor & signals w.r.t. change in water level. Instruments Required : Digital Multimeter (DMM). Accessories Included : Water storage tank (2No), Water sensors,

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		Single phase AC Motor 1/2Hp, Water suction pipes, set of patch cords (10 Nos.), Operating / Instruction Manual."
15	50 MHz Digital storage oscilloscope	"Bandwidth 50MHz, with 4 Analog channels 1G Sa/s Real-time Sample Rate on single channel and 500MSa/s(Dual-channel) Vertical Scale 1 mV/div to 10 V/div Time Base Scale 5 ns/div to 50 s/div, Memory Depth : 20Mpts Innovative ""UltraVision"" technology and Multi- Levels intensity grading waveform display Waveform Capture Rate : 30,000wfms/s Low noise floor, Dynamic Range: 1mV/div to 10V/div Channel to Channel Isolation : DC to maximum bandwidth: >40 dB Complete Connectivity: USB Host, USB Device, LAN, Aux Output (TrigOut/PassFail), USB Host & Device Compact size, light weight, easy to use Display : 7 Inch TFT WVGA (800x480), multiple intensity levels waveform , PVP2150 150 MHz Passive HighZ Probe: 4 sets; Important safety standards and Electromagnetic Compatibility The instrument must comply with International EMC and Safety standards"
16	Two Channel Arbitrary Function Generator	"Frequency Frequency - Sine wave 1μHz to 25MHz. Square Wave 1 μHz to 10 MHz Pulse Waveform 1 μHz to 10 MHz Sampling Rate 125 MSa/s Vertical Resolution -16 bits Output channels- Two channel Harmonics Distortion DC to 10 MHz (included): <-55 dBc 10 MHz to 20 MHz (included): <-50 dBc 20 MHz to 35 MHz (included): <-40 dBcAmplitude(50 Ω) ≤10 MHz: 1.0 mVpp to 10 Vpp ≤30 MHz: 1.0 mVpp to 5.0 Vpp Resolution:-1μHz Wave form:-Sine, Square, Triangle, Ramp, Pulse, Noise PRBS, RS232, Sequence and Arbitrary AM/FM/PM/ASK/FSK PSK/PWM/Sweep/Burst and Built-in high-order harmonic generator (at most 8-order harmonics) Dual channel function – Phase (-180o to +180o) , Tracking, Coupling Duty Cycle control :-0.01% to 99.99% Display:- 4.3 inch TFT LCD Touch Screen Arbitrary Function : Sample Rate 200MSa/sec and Memory 2Mpts Interface : USB Host , USB Device"

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Annexure 2 (Purchase Order)

PERFORMANCE SECURITY FORM

To: _____ (Name of Purchaser)

WHEREAS ..... (Name of Supplier) hereinafter called "the Supplier" has undertaken , in pursuance of Contract (Notification of Award) No..... dated,..... 2019 to supply..... .....(Description of Goods and Services) hereinafter called "the Contract".

AND WHEREAS it has been stipulated by you in the said Contract that the Supplier shall furnish you with a Bank Guarantee by a Nationalized bank for the sum specified therein as **security for compliance with the Supplier's performance obligations in accordance with the Contract.**

AND WHEREAS we have agreed to give the Supplier a Guarantee:

THEREFORE WE hereby affirm that we are Guarantors and responsible to you, on behalf of the Supplier, up to a total of ..... **(Amount of the Guarantee in Words and Figures) and we undertake to pay you, upon your first written demand declaring the Supplier to be in default under the Contract and without cavil or** argument, any sum or sums within the limit of ..... (Amount of Guarantee) as aforesaid, without your needing to prove or to show grounds or reasons for your demand or the sum specified therein.

This guarantee is valid until the .....day of.....2019.

Signature and Seal of Guarantors

Date.....2019.
Address:.....
.....
.....

Note: *The Bank Guarantee to be issued by nationalized bank only and is to be submitted on a non-judicial stamp paper of Rs. 100/- (One Hundred only). The non-judicial stamp paper should be purchased in the name of issuing bankers. The Issuing bank must provide its Head Office/Regional office addresses of communication*

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