



RAJKIYA ENGINEERING COLLEGE AZAMGARH

राजकीय इन्जीनियरिंग कॉलेज
देवगाँव, आजमगढ़, (उ.प्र.), भारत

AN AICTE APPROVED GOVERNMENT ENGINEERING COLLEGE, AFFILIATED TO DR. A.P.J. ABDUL KALAM TECHNICAL UNIVERSITY, LUCKNOW

<http://gecazamgarh.ac.in/>
Limited Tender Enquiry

Ref No: REC/TEQIP-III/2018-19-5

Date: 05/09/2018

To

Reference to this letter must be mentioned on the envelope containing your bid

SUB: Limited tender enquiry for ELECTRICAL Machine and Control Lab & Basic Electrical Lab under TEQIP - III

Sir,

Bids are invited in sealed envelope as per below mentioned course content of **ELECTRICAL Machine and Control Lab & Basic Electrical Lab** –under TEQIP III

Sr. No	Equipment name	Technical Specification	Qty.
1	Kirchhoff's laws Trainer.	Complete accessories with Manual, Mains supply : 230V \pm 10%, 50Hz DC Power supply : +12V Fuse : 500 mA, slow blow DC Ammeter Range : 2mA to 200mA Display :3 1/2 digit Dimensions (mm) : W 240 x D 345 x H 110. On board LCD 16*2	02
2	Thevenin Theorem Trainer System	Instrument comprises of One Fixed output DC Regulated Power Supply of 12V at 250 mA current, Two moving coil meters, Circuit diagram Printed on the front panel & connections of Supplies, meters & Resistances brought out at 4mm Sockets. Data for voltage/current must be display on LCD 16x2	02
3	Superposition Theorem Trainer System	Instrument comprises of Two Fixed output DC Regulated Power Supplies of 12V & 5V at 250 mA current, Three moving coil meter, Circuit diagram Printed on the front panel & connections of Supplies, meter & Resistances brought out at 4mm Sockets. Data for voltage/current must be display on LCD 16x2	02

4	RLC Series & parallel combinations' verification kit	Apparatus for verification for dc supply components of series and parallel combinations of R L & C parameters with inbuilt power supply and meters. Data for voltage/current must be display on LCD 16x2	02
4	Electronics and electrical trainer System	With PC Based Interfacing System for the 6 Analog and 12 Digital Channel.Onboard DPMs provided with mode/range selection.((A) DC volt: 2V/200V- 1No.(B) DC current: 2mA/200mA - 1No,(C) DC Volts/Current : 20V/200mA - 1No.,Onboard moving iron meters provided for (A) AC Current : 1 AMP - 1No. (B) AC Voltage : 15V- 1No.Onboard speaker : 8 Ohms, 0.5 Watt (1No.) Onboard POTS : 1K - 1No,1M - 1No..) Panel. Magnetism, Electromagnetism and Transformer Experiment Panel(Faraday's law of magnetic induction, Left-hand rule for north pole of coils / conductors & Corkscrew rule for flux around current carrying conductor. Fleming's left-hand rule (motor law - force on a current carrying conductor in a magnetic field), Lenz's Law, Transformer: BH curve, calculation of total Iron core loss (Hyst &Eddy loss) using CRO, DC-AC resistance, transformation ratio, loading of transformer, Auto transformer, self & mutual inductance calculations, Magnetic sensor: Reed switch, Electromagnetic Relay, Hall sensor (Analog /Digital), Mag. compass needle).	02
5	Measurement of power and power factor in a single phase ac series inductive circuit and study improvement of power factor using capacitor	Measurement Of the power, power factor using The trainer Board. Wooden Enclosure. Shrouded Connector. It should have all the accessories required to perform the Experiments.	02
6	Connection and measurement of power consumption of a fluorescent lamp (tube light).	Set Up to measure the Power and the Consumption of a fluorescent Lamp. Wooden Enclosure. With Shrouded Connectors. It should have all the accessories required to perform the Experiments.	02
7	Measurement of power in 3-phase circuit by two wattmeter method and determination of its power factor for star as well as delta	Measurement of power in 3- phase wooden Box. Shrouded Connectors. It should have all the accessories required to perform the Experiments.	02

	connected load.		
8	Determination of parameters of ac single phase series RLC circuit	Determination Of the Parameters of the ac Single Phase RLC Circuit. Aluminum Framing. In the form Of the Replaceable Panels. It should have all the accessories required to perform the Experiments.	02
9	D.C. Machine with Cut Sections	D.C. Machine:: Commutator ,Bearing., End Shield., Carbon with scissor., Armature., Interpole with winding., Frame (Yoke)., Shaft. Field coil. Connection box. Rocker arm. Main poles.	01
10	Three Phase Squirrel Cage Induction Motor with Cut Sections	Three Phase Squirrel Cage Induction Motor:: Stator core.,Stator winding. Frame, Shaft., Terminal Plate, End shield,Bearing Squirrel Cage rotor.	01
11	Synchronous Machine Rotating Field Type with Cut Sections	Slip ring. Bearing., End Shield. Carbon with Scissor. Frame (Yoke) Shaft. Rotating Field pole. Field coil. Connection box. Damper winding	01
12	Two study running and speed reversal of a 3 phase induction motor and record speed in both direction	MACHINE REQUIRED It will comprise of 3-phase induction motor, 1HP complete with control panel comprising of metering and voltage and frequency inverter variable with frequency variation from 5 cycles to 50 cycles.	01

13	To obtain speed-torque characteristics and efficiency of a dc shunt motor by direct loading.	<p>MACHINE REQUIRED D.C. Motor 2 HP, 220 V, 1500 RPM with Pronney Brake Loading arrangement, consisting of C.I. Drum Pulley, suitable for water cooling, longitudinal spring balances, Canvas belt with hooks, threaded studs with wheel for tightening the belt, Frame and base complete. D.C Shunt Motor 2 HP with loading arrangement & Starter 3Point faceplate type CONTROL PANEL :: It consist of nicely powder coated M.S. fabricated box with engraved will be fitted on the Bakelite sheet panel with duly marked termination and also back door of the panel will have lock facility for safety of panel. Control Panel consist of following accessories:- (i) MC Ammeter 96x96mm panel type 0-10A-1 No. MECO/RISHAB MAKE (ii) DPST Switch 16A, 240V. HAVELL'S MAKE (iii) MC Voltmeter 96x96mm panel type 0-300V (iv) Indicating light. (v) Tubular Rheostat 290ohms, 1.2A. -1 No. (vi) DC Starter face plate type suitable for above motor. (vii) Educational type insulated terminals. Complete illustrated manual covering brief theory of equipments along with technical details and experimental procedures, Connection diagrams will be supplied with above experimental set up.</p>	01
14	To obtain efficiency of a dc shunt machine by no load test.	<p>DC shunt Motor 3HP, 220V, 1500RPM The motor will confirm to ISS 4722 with DC 3point starter with not volt and over load Protection. CONTROL PANEL(It consist of nicely powder coated M.S. fabricated box with engraved will be fitted on the Bakelite sheet panel with duly marked termination and also back door of the panel will have lock facility for safety of panel.) Control Panel consist of following accessories:- 1 D.P.S.T Switches HAVELL'S MAKE. 2 3point DC Starters 3 Rheostat 290ohms, 1.2A 4 Analog meters Ammeter (0-15A) MC type AE Make 5 Analog meters Ammeter (0-1A) MC type AE Make 6 Analog meters Voltmeter (0-300V) MC type AE Make 7 Analog meters Voltmeter (0-30V) MC type AE Make 8 Lamp Bank Load (for calculation of armature resistance). 9 Educational type insulated colored terminals. Complete illustrated manual covering brief theory of equipments along with technical details and experimental procedures, Connection diagrams will be supplied with above experimental set up</p>	01
15	To obtain speed control of dc shunt motor using (a) armature	<p>MACHINE REQUIRED DC shunt motor 3HP, 220V, 1500rpm shunt wound, self excited, screen protected, horizontal foot mounted, fan cooled. CONTROL PANEL :: It consist of nicely powder coated M.S. fabricated box with engraved will be fitted on the Bakelite sheet panel with</p>	01

	voltage control (b) field control	<p>duly marked termination and also back door of the panel will have lock facility for safety of panel.</p> <p>Control Panel consist of following accessories:-</p> <ol style="list-style-type: none"> 1. D.P.S.T Switches. HAVELL'S MAKE 2. 3point DC Starters 3. Rheostat 290ohms, 1.2A. and 50ohms, 5A 4. Analogue Ammeter (0-1A) MC type AE Make 5. Analogue Ammeter (0-15A) MC type AE Make 6. Analogue Voltmeter (0-300V) MC type AE Make 7. Educational type insulated coloured terminals. <p>Price for complete experiment set up with conventional panel specified above:</p> <ul style="list-style-type: none"> • With DC motor 3hp 220V1500rpm 12A <p>Complete illustrated manual covering brief theory of equipments along with technical details and experimental procedures, Connection diagrams will be supplied with above experimental set up.</p>	
16	Transformer Trainer System	<p>Electrical trainers may need a set of associated panels which are mounted in a light weight sturdy aluminum flat demo panel system, With PC interfacing facility to read data on PC. Facilitates easy and safe wiring by students due to 4mm sturdy shrouded banana patch cords and shrouded socket arrangement for high voltage circuits, On Board Graphical Lcd 128*64 Display. Each panel has ABS molded plastic sturdy enclosure, and colorful screwless overlays showing circuit diagram & its connection tag numbers for easy understanding and connections, Set of Instructor Guide & Student Workbook, List of Panels: Input 3 phase DOL starter panel, Digital multifunction measurement panel 3 phase, Digital multifunction measurement panel 1 phase, FWD - OFF-Rev switch panel, Single phase input MCB panel, Secondary side AC Voltmeter Panel, Dual range Secondary side AC ammeter panel, Mili ohmmeter (V-I method), Resistive load panel, Lamp Load, 3 PHASE Dimmer-1 No, Rack/Panels: 4x3 / 12 Nos, Mechanical Dimensions/Wt. : 960(L)X300(W)X720 (H) mm Net Wt.=42 Kg, Gross Weight=50 Kg, 1 Phase Transformer (1. VA rating : 300 VA</p> <ol style="list-style-type: none"> 2. X'merType:1 phase (2 No.) 3. Construction: Double wound iron core EI step down Transformer / Star secondary design.4. Primary: 0-115-200-230VAC/1.3A, 50 Hz brought out on 2x2 sockets 5. Secondary: 200 Vac / 1.5 Amp. Brought out on 2x2 sockets), 3 Phase Transformer (1. VA rating : 300 VA, 2. X'mer Type: 3 phase (1 No.), 3. Construction: Iron core strip lamination type step down Delta primary 4. Primary: 3 Nos. Isolated prime series 0-415 /0.24 A at 50 Hz brought out on 3x3 sockets, 5. Secondary: 3 Nos. Isolated winding groups main 110V/0.5A, zigzag 110V/0.5A, Tertiary 220V / 0.25 A brought out 6. 3 Phases 0-270V AC /3 Amp. Variac. 	02

17	To study speed control of a 3-phase induction motor using (a) Voltage Control (b) Constant (Voltage/ frequency) control.	<p>MACHINE REQUIRED It will comprise of 3-phase induction motor, 1HP with pronney brake load system complete with control panel comprising of metering and voltage and frequency inverter variable with frequency variation from 5 cycles to 50 cycles. AC Drive will be of Crompton Greaves Make</p>	01
18	To perform load test on a 3-phase induction motor and determine (a) speed- torque characteristics (b) power factor v/s line current characteristics.	<p>MACHINE REQUIRED AC squirrel cage induction motor 3phase, 2HP, 415V,1440 RPM TEFC horizontal foot mounted. Class 'B' insulation with star/Delta starter. The motor will be supplied with pony brake mechanical loading arrangement which consists of water cooled C.I. drum pulley. Longitudinal spring balances. Canvass belt with hooks, CP threaded studs with CP wheel for tightening the belt, MS frame and channel base . CONTROL PANEL It consist of nicely powder coated M.S. fabricated box with properly engraved circuit will be fitted on the Bakelite sheet panel with duly marked termination and also back door of the panel will have lock facility for safety of panel. Control Panel consist of following accessories:- 1. Analogue Volt meter 0-500V AE Make 2. Ammeters 0-10A AE Make 3. D.O.L. starter (1Pcs.) 4. Switch gear 5. Indicating light 6. MCB etc. 7. Educational type insulated coloured terminals. 8. Wattmeter. UPF 5/10A, 150/300/600V – 2 NO</p>	01
19	To Perform Open Circuit And Short Circuit Test On A 3phase synchronous machine and determine voltage regulation at full load and unity, 0.8 lagging and 0.8 leading	<p>MACHINES REQUIRED DC shunt motor 2HP 220V directly coupled to synchronous generator 1KVA separately excited CONTROL PANEL It consist of nicely powder coated M.S. fabricated box with screen printed circuit will be fitted on the Bakelite sheet panel with duly marked termination and also back door of the panel will have lock facility for safety of panel. Control Panel consist of following accessories:- 1. D.P.S.T., T.P.S.T Switches Havell's Make For D.C. Motor: 2. Analogue ammeter (0-25A) MC Type. AE Make 3. Analogue Voltmeter (0-300V) M.C. Type . AE Make 4. Analogue ammeter (0-1A) M.C. Type AE Make 5. Rheostat 290ohms, 1.2A For Synchronous Alternators:</p>	01

	power factor using synchronous impedance method.	<ol style="list-style-type: none"> 5. Analogue Ammeter (0-10A) M.I. Type AE Make 6. Analogue Voltmeter (0-500V) M.I. Type AE Make 7. M.C.B. 8. Indicating Light. 9. Rheostate 500Ohm, 1A. <p>For Excitation</p> <ol style="list-style-type: none"> 10. Analogue Voltmeter (0-300V) M.C. AE Make 11. Analogue Ammeter (0-2A) M.C. AE Make 	
20	To determine V-curve of a 3-phase synchronous motor at no load, half load and full load.	<p>MACHINE REQUIRED</p> <p>Self synchronizing auto synchronous induction start motor 3hp with mechanical loading arrangement which consists of water cooled C.I. drum pulley. Dial type spring balances canvass belt with hooks, CP threaded studs with CP wheels for tightening the belt. MS frame and channel base, 440 volts with built in separate DC exciter</p> <p>Control panel</p> <p>It consist of nicely powder coated M.S. fabricated box with 4 feet x 2 feet x 6 inches with screen printed circuit will be fitted on the panel with duly marked termination and also back door of the panel will have lock facility for safety of panel. All the necessary accessories such as:-</p> <ol style="list-style-type: none"> 1. D.P.S.T, T.P.S.T. switches for motor and alternator. <p>For Synchronous Motor</p> <ol style="list-style-type: none"> 2. Analog meters Ammeter (0-10A) MI type AE Make 3. Analog meters Voltmeter (0-500V) MI type AE Make 4. M.C.B (1pc) 5. Indicating lights (3pcs) 6. D.O.L. Starter. <p>For Excitor</p> <ol style="list-style-type: none"> 11. Analog meter Ammeter (0-2A) MC type AE Make 12. Rheostate. 	01
21	PID Based Oven Temperature Control System	<p>Features and Specifications:-Based on advance ARM microcontroller, Graph between Time and Temperature on PC side</p> <p>Store the Data in a file excel format</p> <ul style="list-style-type: none"> • Study of Proportional Controller (P) • Study of Proportional & Integral Controller (PI) • Open loop closed loop operations • Study of Proportional Integral and Derivative Controller (PID) • Separate controls for P, I, D channel gains • Digital display of set and measured temperature on a 16x2 LCD • Digital display of P,I,D gain factor on a 16x2 LCD • Operating temperature: Ambient to 90°C • In built power supply 	01

		<ul style="list-style-type: none"> Data plot facility on lab view and Matlab 	
22	Temperature Calibration System of RTD.	<p>This unit has been designed to study temperature measuring Techniques and the modes of calibration of the relevant sensors by means of fixed points and of a thermometer provided with calibration certificate. It consists of a hot water bath and of an ice bath to determine Precise reference points (boiling point and melting point of Water) and variable temperatures. A set of thermometers of different types is fixed onto a support that can be moved from the hot bath to the ice bath. The available thermometers are:</p> <p>Reference Pt100 thermo resistance with calibration certificate Industrial Pt100 thermo resistance, Two K-type thermocouples Gas Thermometer Water Bath Tube Temp. Controlling Knob Calibrator Unit Glass Thermometer RTD Sensor Thermocouple Sensor</p> <p>Dewar Flask PTC thermistor Inert gas thermometer Liquid thermometer Thermal bath of stainless steel equipped with stirrer shielded heating element safety level switch Dewar flask of stainless steel with high vacuum insulation, capacity of 1 liter. Support for thermometers .Reference Pt100 thermo resistance with 3 points calibration certificate. Different Type Of Temperature Sensor Industrial Pt100 thermo resistance of class A</p> <p>K-type thermocouple. Thermistor (PTC) Liquid thermometer Gas thermometer Electric console with 20*4 LCD displays and controls. PC interface facility for calibration</p>	01
23	Linear System Simulator	<p>With Facility of Interfacing Data with Matlab or labview or any Software using PC Based Data Acquisitions System Study of Simulator on PID Controller. PID Controller Configurable as P, PI, PD & PID. Proportional Band : 1% - 50% (Gain 0-20). Integral Time : -10mS - 100mS. Derivative Time : -2 - 20mS. Signal Sources : Square Wave : -0 - 2Vpp at 10 -40 Hz (Typical) Variable. TraingularWave : -0 - 2Vpp at 10 -40 Hz (Typical) Variable. Built in IC Regulated Power Supplies, 3.5 Digit Digital Volt Meter complete with Patchchords, Working Manual, 220V Mains Operated.</p>	01
24	DC separately Excited Motor Control Training System	<p>The trainer system comes in the aluminum framing system. Instrumentation Power supply cum Multi- channel DPM panel (+/-12 V, 500 mA, +5V, 300mA , Unregulated 17V dc/750 mA , line synchronizing signal., Multi channel DPM for digital display of speed, etc). SCR Actuator (variable DC) cum sensor signal conditioning panel x 2 Nos. (Full bridge SCR based 0V-195V / 12 Amp cosine firing with linear charateristics. Supports signal conditioning circuit for speed to give output 0-2.5Vdc (FS).</p> <p>2 Nos. of these supplies required for DC Armature & DC motor field.) DC voltmeter and DC ammeter panel (DC voltmeter (0-300V), DC Ammeter (0-5A) with polarity protection diode, Field failure relay to control Armature supply. Both 6A/6B needed simultaneously) DC Integrated Motor Specifications:(180V/300W/1500RPM with series shunt and compound windings, Chasis mounted table top with spring balance loading arrangement [10kg] and Electronic Tacho:1V/1000RPM).</p>	01
25	DSO-100MHz,2 Channel	<p>1GSa/s maximum sampling rate, 10M maximum memory depth for each channel, 7" 800 x 480 WXGA LCD display, 256 color gradient display function to strengthen waveform performance, 1Mpts FFT frequency domain signal display, Zero Key function for horizontal time, vertical voltage and triggering, Compact and innovative exterior design,</p>	3

		Digital Voltage Meter Function, Data Log Function, 36 Measurement Parameter Selections Digital Filter Function, Zoom In/Play and Pause Function, Diversified Trigger Functions	
26	Function Generator-5MHz	. Frequency range : 0.1Hz - 5MHz Display : 6 digit LED display Output waveforms : Sine, Triangle, Square, \pm Pulse, \pm Ramp Voltage Control Frequency (VCF) capability,TTL/CMOS and OUTPUT, Output Impedance : 50E Output Amplitude : 20Vp-p(open circuit) ,10Vp-p(with 50 E load) DC Offset : 0 to \pm 10V continuously adjustable Symmetry Range : 90:10 - 10:90 Distortion : <1% (at 10Hz-100KHz) 1 Hz - 30MHz frequency counter	2
27	Multimeter	<ul style="list-style-type: none"> • Count: 6000 • AVG responding • Voltage: DC: 600 volts; AC: 600 volts; DC Accuracy: \pm 0.5% + 3 digit; AC Accuracy: \pm 1% + 3 digit • Resistance: 40 M ohm; Resistance Accuracy: \pm 1.5% + 3 digit • Capacitance: 100 μF • CAT III 600 volts safety rated. Current Measurement also <ul style="list-style-type: none"> • AC/DC voltage, resistance, capacitance, frequency measurement • Diode and continuity test with buzzer • Small light weight design - easy to carry in pocket • Rugged, reliable accurate readings • Long battery life with auto power Off 	10
28	DC Regulated Power Supply	30-0-30 V, 2 Amps DC Output : 2 , 0 - 30 V, 2 A continuously variable by means of coarse and fine controls Current limit: 100 mA - 2 A continuously adjustable Display : 3 digit for voltage & 3 digit for current LED indication for Voltage & Current	2
29	CRO-30 Mhz, 2-Channel	CRO 30mhz, dual channel, display 8*10cm, ac,dc.two channel	1
		Total	

Terms and conditions.

1. Should attach EMD of the mentioned cost with each package. The applying bidder must attach the EMD.
2. The quotation should reach to the Coordinator, TEQIP-III office, RAJKIYA ENGINEERING COLLEGE AZAMGARH, Uttar Pradesh at given timing by speed post/courier.
3. Should attach GST proof.
4. Should be govt. Registered company. Proof should be attached
5. Should attach last 3-year balance sheet copy with the proof of the ITR copy
6. Should attach earlier PO copies.
7. Should not be blacklisted from the govt. Sectors/PSU/institutes.
8. Supplier(s)/Bidder(s) should be manufacturer/distributor/dealer/authorized firm of the mentioned product(s)/goods and should submit the copies of ST No., company/firm registration or equivalent registration with the Central/State Government of India if any. Copies of OEM / Latest authorized dealership certificate for respective items should be enclosed.
9. For the suppliers quoting for more than one package, the quotations should be submitted separately in separate envelope along with separate EMD of appropriate amount.
10. If required, we can call for the predemo before finalizing the order to check the technical specification and the quality.
11. The whole items of packages must be quoted.
12. Information brochures/ Product catalogue, if any must be accompanied with the quotation clearly indicating the model quoted for.
13. Conditional Bid(s)/Quotation(s) will not be accepted. Any breach of term(s) of contract at any stage and/or non-execution of firm Purchase Order by the supplier(s)/Bidder(s) shall be lead to forfeiture of Earnest money deposit(s).
14. Right to accept or reject any bid or all bids without assigning any reason is reserved with the Institute (or Purchaser).
15. The Bids should reach the institute's Training & Placement office on or before 19.09.2018 up to 4pm. The institute will not be responsible for any postal delay. Bids Received after due date and time will not be considered.
16. It is essential to indicate service condition of the course material being quoted by you. If service condition is/are not indicated, it will be assumed that it is as per the tender enquiry.

17. All bids will be opened on 20.09.2018 at 11 a.m. in the presence of representative of the vender of if present.
18. All prices quoted are to be recorded as per the format given in Annexure -I .
19. The prices quoted are to be handwritten/typed on the letter head of the firm/company.

Regards

TEQIP Office
REC Azamgarh

Copy to:

1. Director Office, Rajkiya Engineering College Azamgarh,
2. TEQIP, Coordinator, Rajkiya Engineering College Azamgarh,
3. Asst. Registrar, Rajkiya Engineering College Azamgarh,
4. Website In-charge ,REC Azamgarh

Annexure -I

PRICE QUOTE FORMAT

Sr. No	Equipment name	Technical Specification	Qty	Unit Cost	GST	Total price with GST

Terms and Conditions:

Validity of Bid

(If not specified then the terms and conditions as mentioned in bid will be applicable.)

Date

Signature

Place

Name of Firm/ Company
(with stamp)