



# राजकीय इन्जीनियरिंग कालेज

कटरिया याकूबपुर, अम्बेडकर नगर (उ०प्र०) – 224122 भारत



## Rajkiya Engineering College

Katariya Yakobpur, Ambedkar Nagar, (U.P.) – 224122 Cell Phone: 91-9454439590

AICTE APPROVED GOVERNMENT ENGINEERING COLLEGE Website: www.recabn.ac.in

VIDE APPROVAL LETTER No. F. No. Northern/1-3511948247/2018/EOA DATED: 30-Apr-2018 E-mail: director@recabn.ac.in

Affiliated to Dr. A.P.J. Abdul Kalam Technical University Lucknow, U.P., India

RECABN/TEQIP-III/2019/

Date: 18/10/2019

### INVITATION FOR QUOTATION FOR ELECTRICAL MEASUREMENT LAB

To,

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Dear Sir,

You are invited to submit your most competitive quotation for Measurement Lab for Electrical Engineering Department for the Rajkiya Engineering College. In this connection, submit your financial offers/quotation as per the product in the given format in Annexure-II for Measurement Lab. The details of specifications is given in Annexure-I

S. No.	Particular/Items	Quantity	Training & Installation
1.	As per Annexure -I	As per Annexure-I	YES

Government of India has received a credit from the International Development Association (IDA) in various towards the cost of the **Technical Education Quality Improvement Programme (TEQIP) Phase -III** Project and intends to apply part of the proceeds of this credit to eligible payments under the contract for which this invitation for quotations is issued.

*[Signature]*  
18/10/19

**Instructions:**

1. The quantity of the particular is as mentioned in Annexure-I.
2. The bidders should quote their offer/rates in package not individual items with clear terms without any ambiguity and shall be submitted individually for the above said Products.
3. The institute will select bidder who has offered the lowest aggregate cost for complete package.
4. All duties, taxes and other levies payable by the bidder shall be included in the total price.
5. The rates quoted by the bidder shall be fixed for the duration of the contract and shall not be subject to adjustment on any account.
6. The cost should be quoted in Indian Rupees only.
7. Quotation/Offer shall remain valid for a period not less than 45 days after the last date of submission.
8. For the said product warranty should be at least One Years from the satisfactory acceptance date.
9. The last date of submission of offer is **31/10/2019 by 5:00 PM.**
10. The quotation opening date will be notified later.
11. Sealed quotation to be submitted/ delivered at the address mentioned below:

Quotation (In the name of)	Delivery Address
<u>TO</u> <u>DIRECTOR</u> <u>RAJKIYA ENGINEERING COLLEGE</u> <u>AMBEDKAR NAGAR</u> <u>PIN CODE-224122, UTTAR PRADESH</u>	<u>TEQIP-III OFFICE</u> <u>RAJKIYA ENGINEERING COLLEGE</u> <u>AMBEDKAR NAGAR</u> <u>PIN CODE-224122, UTTAR PRADESH</u>

12. At the top of envelop should be mention **Quotation for Measurement Lab** in bold.
13. Quoted item make and model should be mention along with specification.
14. Submit the GSTIN registration and PAN copy of firm duly signed.
15. Submit the copy of at least one or more similar nature of works executed in Government Organizations or anywhere in India.
16. Bidder must have Turnover for last three years must be greater than Rs 15 Lac year for F.Y 2015-16, 2016-17, 2017-18 (proof to be attached).
17. Bidder must have an ISO Certificate or any similar quality certifications.
18. Bidder/Vendor should be submitting authorized Dealer proof from Original Equipment Manufacturer (OEM)/Dealership or OEM along with its SSI Registration Certificate and list of manufactured items. OEM must have their Service Center located in Uttar Pradesh.
19. All the AC/DC machines should be in accordance to IS:4722-2001.
20. Delivery of the said items should be within 3-4 weeks from the date of P.O.
21. Payment shall be made in Indian Rupees as per P.O. No advance will be paid for the said.
22. Notwithstanding the above, the Purchaser reserves the right to accept or reject any quotations and to cancel the process and reject all quotations at any time prior to the P.O.
23. Postal or courier delay will not be considered, and the bid received late will be rejected.

  
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(TEQIP-III Coordinator)



## Annexure-I

### Detailed Specification

#### ITEM NO. 1

#### CALIBRATION OF AC VOLTMETER AND AC AMMETER

##### Apparatus required: -

	Quantity
1. Portable M.I. Voltmeter (for calibration) 0-250 V	- 1 No.
2. Portable M.I. Voltmeter (Standard) 0-300 V	- 1 No.
3. Single Phase Variac 0-6 A	- 1 No.
4. M.I. Ammeter (for calibration) 0-2.5 A	- 1 No.
5. Portable M.I. Ammeter (Standard) 0-10 A	- 1 No.
6. Lamp Bank Load	

#### ITEM NO. 2

Quantity-01

#### MEASUREMENT OF SELF INDUCTANCE BY MAXWELL'S BRIDGE

##### FEATURES

- Circuit is engraved and components are mounted on the top of the Bakelite Sunmica panel for better and clear understanding.
- 1 KHz sine wave oscillator of variable amplitude.
- One Decade Resistance Dial is provided on the board for measurement.
- One Variable Resistance (Ten Round Pot of Resistance of  $1000\Omega$ ).
- One Decade Inductance Dial is provided on the board for measurement.
- Few Unknown Inductances are provided on the board for study.
- Digital Meter for null detector find the null point.
- A complete working manual containing theory, circuit details and operating procedure is supplied with the experimental board.
- For assembling the circuit, stackable type connecting leads are supplied with the experimental board for easy and perfect interconnections.

#### ITEM NO. 3

Quantity-01

#### MEASUREMENT OF SELF INDUCTANCE BY HAY'S BRIDGE

##### FEATURES

- Circuit is engraved and components are mounted on the top of the Bakelite Sunmica panel for better and clear understanding.
- 1 KHz sine wave oscillator of variable amplitude.
- One Decade Resistances Dial is provided on the board for measurement.
- One Variable Resistance (Ten Round Pot of Resistance of  $1000\Omega$ ).
- One Decade Capacitors Dial is provided on the board for measurement.
- Few Unknown Inductances are provided on the board for study.
- Digital Meter for null detector find the null point.
- A complete working manual containing theory, circuit details and operating procedure is supplied with the experimental board.
- For assembling the circuit, stackable type connecting leads are supplied with the experimental board for easy and perfect interconnections.

  
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**ITEM NO. 4**

Quantity-01

**MEASUREMENT OF SELF INDUCTANCE BY ANDERSON'S BRIDGE****FEATURES**

- Circuit is engraved and components are mounted on the top of the Bakelite Sunmica panel for better and clear understanding.
- 1 KHz sine wave oscillator of variable amplitude.
- DC Fixed supply provided on the board.
- Two Decade Resistances Dials are provided on the board for measurement.
- One Variable Resistance (Ten Round Pot of Resistance of  $1000\Omega$ ).
- One Decade Capacitors Dial is provided on the board for measurement.
- Few unknown inductances are provided on the board for study.
- Digital Meter for null detector find the null point.
- A complete working manual containing theory, circuit details and operating procedure is supplied with the experimental board.
- For assembling the circuit, stackable type connecting leads are supplied with the experimental board for easy and perfect interconnections.

**ITEM NO. 5**

Quantity-01

**MEASUREMENT OF SELF INDUCTANCE BY OWEN'S BRIDGE****FEATURES**

- Circuit is engraved and components are mounted on the top of the Bakelite Sunmica panel for better and clear understanding.
- 1 KHz sine wave oscillator of variable amplitude.
- One Variable Resistance (Ten Round Pot of Resistance of  $1000\Omega$ ).
- One Decade Capacitors Dial is provided on the board for measurement.
- Few Unknown Inductances are provided on the board for study.
- Digital Meter for null detector find the null point.
- A complete working manual containing theory, circuit details and operating procedure is supplied with the experimental board.
- For assembling the circuit, stackable type connecting leads are supplied with the experimental board for easy and perfect interconnections.

**ITEM NO. 6**

Quantity-01

**MEASUREMENT OF CAPACITANCE BY DESAUTY'S BRIDGE****FEATURES**

- Circuit is engraved and components are mounted on the top of the Bakelite Sunmica panel for better and clear understanding.
- 1 KHz sine wave oscillator of variable amplitude.
- One Decade Resistance Dial is provided on the board for measurement.
- One Variable Resistance (Ten Round Pot of Resistance of  $1000\Omega$ ).
- One Decade Capacitors Dial is provided on the board for measurement.
- Few Unknown Capacitor are provided on the board for study.
- Digital Meter for null detector find the null point.



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- A complete working manual containing theory, circuit details and operating procedure is supplied with the experimental board.
- For assembling the circuit, stackable type connecting leads are supplied with the experimental board for easy and perfect interconnections.

#### **ITEM NO. 7**

Quantity-01

### **MEASUREMENT OF CAPACITANCE BY SCHERING BRIDGE**

#### **FEATURES**

- Circuit is engraved and components are mounted on the top of the Bakelite Sunmica panel for better and clear understanding.
- 1 KHz sine wave oscillator of variable amplitude.
- One Decade Resistance Dial is provided on the board for measurement.
- One Variable Resistance (Ten Round Pot of Resistance of  $1000\Omega$ ).
- Two Decade Capacitors Dials are provided on the board for measurement.
- Few Unknown Capacitor are provided on the board for study.
- Digital Meter for null detector find the null point.
- A complete working manual containing theory, circuit details and operating procedure is supplied with the experimental board.
- For assembling the circuit, stackable type connecting leads are supplied with the experimental board for easy and perfect interconnections.

#### **ITEM NO. 8**

Quantity-01

### **MEASUREMENT OF LOW RESISTANCE BY KELVIN'S DOUBLE BRIDGE**

#### **FEATURES**

- Regulated and short circuit proof power supply suitable to experimental board is built in.
- Two Decade Resistance Dials are provided on the board for measurement.
- Few Unknown Resistances are provided on the board for the study.
- One Variable Resistance (Ten Round Pot of Resistance of  $1000\Omega$ ).
- Circuit is engraved and components are mounted on the top of the Bakelite Sunmica panel for better and clear understanding.
- Digital Meter for null detector find the null point.
- For assembling the circuit, stackable type connecting leads are supplied with the experimental board for easy and perfect interconnections.
- A complete working manual containing theory, circuit details and operating procedure is supplied with the experimental board.

#### **ITEM NO. 9**

Quantity-01

### **MEASUREMENT OF VOLTAGE AND FREQUENCY OF A SINUSOIDAL SIGNAL USING CRO AND DRAW WAVE SHAPE OF SIGNAL**

Specification:-

- On board circuit to Study Lassajous Pattern
- On board signal generator with variable amplitude
- On board circuit for phase shift( $0, 45, 90, 135, 180$  degree)
- ON/OFF switch and LED for power indication.
- Bare board Tested Glass Epoxy SMOBC PCB is used.

  
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- Block Description Screen printed on glassy epoxy PCB
- All interconnections are made using 2mm banana Patch cords
- Supplied with User manual and patch cords
- With built-in power supply
- Enclosed in a wooden/plastic box

#### **ITEM NO. 10**

Quantity-01

#### **POWER MEASUREMENT USING CT, PT & WATTMETER**

Control Board :- Rust free powder coated control board made up of high grade Fibre molded body (FRP) of minimum thickness 4 mm. The Enclosure is open from front side for fitting of Engraved diagram Bakelite plate. Back side door is with hinges & lock for open the door from back side suitable for table mounting.

Complete experimental setup consisting of CT, PT, Suitable Electrical Loading arrangement, Variable Voltage & Current Source and Clamp-on Meter.

#### **ITEM NO. 11**

Quantity-01

#### **MEASUREMENT OF IRON LOSS IN A RING BY USING MAXWELL'S BRIDGE**

#### **FEATURES**

- Circuit is engraved and components are mounted on the top of the Bakelite Sunmica panel for better and clear understanding.
- 1 KHz sine wave oscillator of variable amplitude.
- One Decade Resistance Dial is provided on the board for measurement.
- One Variable Resistance (Ten Round Pot of Resistance of 1000 $\Omega$ ).
- One Decade Inductance Dial is provided on the board for measurement.
- Few Unknown Inductances are provided on the board for study.
- Digital Meter for null detector find the null point.
- A complete working manual containing theory, circuit details and operating procedure is supplied with the experimental board.
- For assembling the circuit, stackable type connecting leads are supplied with the experimental board for easy and perfect interconnections.
- Ring specimen of iron.

#### **ITEM NO. 12**

Quantity-01

#### **MEASUREMENT OF DISPLACEMENT USING LVDT**

#### **Features and Specifications**

- |                      |   |  |
|----------------------|---|--|
| ➤ Excitation source  | : | Built in AC source 2.5 KHz sine approx.                                |
| ➤ L.V.D.T.           | : | in non metallic structure  |
| ➤ Micrometer         | : | One (for displacement)   |
| ➤ Displacement range | : | $\pm 15$ mm  |
| ➤ Test points        | : | Sockets at different places for signals.                               |
| ➤ User controls      | : | Two potentiometers one to adjust zero other to calibrate (span adjust) |
| ➤ Display            | : | 3.5 digit digital  |

  
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- Power supply : IC Regulated
- Phase detection : Balanced demodulator
- Power supply : Short circuit & overload Protected
- Mains : 230V/50Hz AC

#### **ITEM NO. 13**

**Quantity-01**

#### **MEASURING TEMPERATURE USING THERMOCOUPLE**

##### **Features and Specifications**

- Thermocouple :
- Heating arrangement : Electrically heated oven +90° C
- Circuit : in built cold temperature junction compensation
- Amplifier : Differential with feedback
- Thermometer : Glass (110°) for reference
- Test points : Sockets at different places for signals.
- Potentiometer : Two (ambient & span adjust)
- Display : 3.5 digit digital
- Power supply : Short circuit & overload Protected
- Mains : 230V/50Hz AC

#### **ITEM NO. 14**

**Quantity-01**

#### **MEASUREMENT OF VIBRATION (PRESSURE) USING PIEZOELECTRIC PICKUP**

##### **Features and Specifications**

- Shock arrangement : Spring type
- Circuit : Peak detector & hold
- Amplifier : Op-amp based
- Test points : Sockets at different places for signals
- Display : 3.5 digit digital
- Power supply : Short circuit & overload Protected
- Mains : 230V/50Hz AC

#### **ITEM NO. 15**

**Quantity-01**

#### **MEASUREMENT OF SPEED OF DC MOTOR BY PHOTOELECTRIC PICK UP**

##### **Features and Specifications**

- Transducer : Non-Contact type
- Motor : 12V, 3000 RPM permanent magnet DC motor
- Speed Control : variable with {on/off switch}
- Sensor : Photo diode
- Tachogenerator : Electronic
- Light Source : H.G. LED
- Interrupt : Opto interrupt disc
- Signal Conditioner : Based on op amps
- Test points : Sockets provided at each signal processing block i/p o/p
- Display : 4 digit digital counter for speed(RPM)
- Power supply : Short circuit & overload Protected
- Mains : 230V/50Hz AC

#### **ITEM NO. 16**

**Quantity-01**

*Handwritten signature and date:*  
18/10/17

**CALIBRATION OF SINGLE PHASE ENERGY METER BY PHANTOM LOADING WITH AND WITHOUT PHASE SHIFTING TRANSFORMER**

Control Board :- Rust free powder coated control board made up of high grade Fibre molded body (FRP) of minimum thickness 4 mm. The Enclosure is open from front side for fitting of Engraved diagram Bakelite plate. Back side door is with hinges & lock for open the door from back side suitable for table mounting.

Completer Experimental Setup with digital ammeter & voltmeter, phantom loading arrangement, phase shifting arrangement (static type), auto transformer, wattmeter, energy meter, etc.

**ITEM NO. 17**

**Quantity-01**

**CALIBRATION OF THREE PHASE ENERGY METER A) PHANTOM LOADING B) USING PHASE SHIFTING TRANSFORMER**

Control Board :- Rust free powder coated control board made up of high grade Fibre moulded body (FRP) of minimum thickness 4 mm. The Enclosure is open from front side for fitting of Engraved diagram Bakelite plate. Back side door is with hinges & lock for open the door from back side suitable for table mounting.

Completer Experimental Setup with digital ammeter & voltmeter, phantom loading arrangement, three phase phase shifting arrangement (rotary type), wattmeter, energy meter, etc.

**ITEM NO. 18**

**Quantity-01**

**CALIBRATION OF L.P.F. WATTMETER BY PHANTOM LOADING**

Control Board :- Rust free powder coated control board made up of high grade Fibre moulded body (FRP) of minimum thickness 4 mm. The Enclosure is open from front side for fitting of Engraved diagram Bakelite plate. Back side door is with hinges & lock for open the door from back side suitable for table mounting.

Complete experimental setup consisting of LPF Wattmeter, Electrical Load Measuring Instruments, DC source, Variac etc. Complete with necessary connecting leads.

**ITEM NO. 19**

**Quantity-01**

**C.T. TESTING BY SILSBEE'S METHOD – MEASUREMENT OF % RATIO ERROR & PHASE ANGLE OF GIVEN C.T. BY COMPARISON**

Control Board :- Rust free powder coated control board made up of high grade Fibre moulded body (FRP) of minimum thickness 4 mm. The Enclosure is open from front side for fitting of Engraved diagram Bakelite plate. Back side door is with hinges & lock for open the door from back side suitable for table mounting.

**APPARATUS REQUIRED**

Completer Experimental Setup with digital ammeter, voltmeter & wattmeter, phase shifting arrangement, CTs and loading arrangement etc.

*2*  
*19/10/17*

**ITEM NO. 20**

**Quantity-01**



## TO MEASURE THE EARTH RESISTANCE USING EARTH TESTER

Complete experimental setup consisting of Earth Tester with four spikes with accessories.

### ITEM NO. 21

Quantity-01

#### CRO

##### Features


- Dual Channel, DC to 30 MHz, Invert facility in both Channels
- Vertical Deflection coefficients : 5 mV to 20 V/div.
- Time Base: 20 ns -0.2 s/ div; Variable Hold- Off; X10 Magnification
- Triggering: DC-60 MHz; Active TV Sync Sep.; Alternate triggering
- LED indication for stable triggering
- XY mode
- Z Modulation
- Saw tooth output (5 Vpp approx)
- Component Tester; 2 Level Calibrator

### ITEM NO. 22

Quantity-01

#### DIGITAL MULTIMETER

- 3½ Digit
- DC-AC Volts & Currents
- Resistance/Diodes/Continuity Testing
- Capacitance/Frequency Measurement
- Transistor  $H_{FE}$  Measurement
- 10A Range Fuse Protected
- Auto Polarity
- Over Range Indication
- 2.5 Measurement/Sec.
- Palm size with built-in tilt stand.

  
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## Annexure-II

**FORMAT FOR QUOTATION SUBMISSION**  
(In letterhead of the supplier with seal)

Date: \_\_\_\_\_

To: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Sl. No.	Description of goods \ (with full Specifications)	Qty.	Unit	Quoted Unit rate in Rs.  (Including Ex-Factory price, excise duty, packing and forwarding, transportation, insurance, other local costs incidental to delivery and warranty/ guaranty commitments)	Total Price  (A)	Sales tax and other taxes payable	
						In %	In figures (B)
<b>Total Cost</b>							

Gross Total Cost (A+B): Rs. \_\_\_\_\_

We agree to supply the above goods in accordance with the technical specifications for a total contract price of Rs. \_\_\_\_\_ (Amount in figures) (Rupees \_\_\_\_\_ amount in words) within the period specified in the Invitation for Quotations.

We confirm that the normal commercial warranty/ guarantee of \_\_\_\_\_ months shall apply to the offered items and we also confirm to agree with terms and conditions as mentioned in the Invitation Letter.

We hereby certify that we have taken steps to ensure that no person acting for us or on our behalf will engage in bribery.

Signature of Supplier

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Contact No. \_\_\_\_\_