



OFFICE OF THE REGISTRAR MANIPUR TECHNICAL UNIVERSITY, IMPHAL

(A University established under the Manipur Technical University Act, 2016)
Recognised by UGC under Section 2(f) and Section 22 of UGC Act, 1956

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INVITATION LETTER

Package Code: TEQIP-III/2019/MN/mtui/70

Package Name: Physics Lab Equipments

Current Date: 05-Dec-2019

Method: Shopping Goods

To,

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Sub: INVITATION LETTER FOR Physics Lab Equipments

Dear Sir,

1. You are invited to submit your most competitive quotation for the following goods with item wise detailed specifications given at Annexure I,

Sr. No	Item Name	Quantity	Place of Delivery	Installation Requirement (if any)
1	Malu's law apparatus	2	Manipur Technical University, Takyelpat	
2	Planck's Constant apparatus using photocell	1	Manipur Technical University, Takyelpat	
3	Planck's constant by LED'S	2	Manipur Technical University, Takyelpat	
4	Newton's Ring	2	Manipur Technical University, Takyelpat	
5	Hall Effect Experiment Kit	1	Manipur Technical University, Takyelpat	
6	DIELECTRIC CONSTANT KIT	1	Manipur Technical University, Takyelpat	
7	e/M by Thomson Method/ Helical Method	1	Manipur Technical University, Takyelpat	

2. Government of India has received a credit from the International Development Association (IDA) 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.

3. Quotation

- 3.1 The contract shall be for the full quantity as described above.
- 3.2 Corrections, if any, shall be made by crossing out, initialling, dating and re writing.
- 3.3 All duties and other levies payable by the supplier under the contract shall be included in the unit Price.
- 3.4 Applicable taxes shall be quoted separately for all items.
- 3.5 The prices quoted by the bidder shall be fixed for the duration of the contract and shall not be subject to adjustment on any account.
- 3.6 The Prices should be quoted in Indian Rupees only.

4. Each bidder shall submit only one quotation.

5. Quotation shall remain valid for a period not less than **15**days after the last date of quotation submission.

6. Evaluation of Quotations: The Purchaser will evaluate and compare the quotations determined to be Substantially responsive i.e. which

6.1 are properly signed; and

6.2 Confirm to the terms and conditions, and specifications.

7. The Quotations would be evaluated for all items together.

8. Award of contract The Purchaser will award the contract to the bidder whose quotation has been determined to be substantially responsive and who has offered the lowest evaluated quotation price.

8.1 Notwithstanding the above, the Purchaser reserves the right to accept or reject any quotations and to cancel the bidding process and reject all quotations at any time prior to the award of Contract.

8.2 *The bidder whose bid is accepted will be notified of the award of contract by the Purchaser prior to expiration of the quotation validity period. The terms of the accepted offer shall be Incorporated in the purchase order.*

9. Payment shall be made in Indian Rupees as follows:

Payment Description	Expected Delivery Period (in Days)	Payment Percentage
Satisfactory Delivery & Installation	30	10
Satisfactory Acceptance	30	90

10. Liquidated Damages will be applied as per the below:
Liquidated Damages Per Day Min %: N/A
Liquidated Damages Max %: N/A
11. All supplied items are under warranty of **N/A** months from the date of successful acceptance of items and AMC/Others is .
12. You are requested to provide your offer latest by **10:30** hours on **19-Dec-2019**.
13. Detailed specifications of the items are at Annexure I.
14. Training Clause (if any)
15. Testing/Installation Clause (if any)
16. Performance Security shall be applicable: **0%**
17. Information brochures/ Product catalogue, must be accompanied with the quotation clearly indicating the model quoted for.
18. Sealed quotation to be submitted/ delivered at the address mentioned below, **Manipur Technical University, Imphal**

19. We look forward to receiving your quotation and thank you for your interest in this project.

(Authorized Signatory)

Name & Designation

Annexure I

Sr. No	Item Name	Specifications
1	Malu's law apparatus	<p>Malu's Law with Bluetooth Timing Ball: POLARIZATION OF LIGHT AND VERIFICATION OF MALUS LAW Experiments: Exp-1 To measure the light intensity of plane polarized light as a function of the analyzer position. Exp-2 To verify Malus law. Exp-3 To verify inverse square law. OPTICAL BENCH Material : Aluminium alloy Type : Hexagonal section Scale : 0-100cm Least count : 1mm He-Ne LASER Wavelength : 632.8 nm Working current : 4mA ~ 6mA Output power : > 2mW Contour dimension (Outer diameter x length) : f 40 mm x 250 mm Continuous working time : > 8 hrs. Working voltage : AC 220 V ± 22 V Input Power Rating : < 2 W Need no ground connection Contour Dimension(lxbxh) : 300x62x82 mm Weight : 1.5 kg (approx.) PHOTO DETECTOR Detector : Silicon photocell Terminals : 4mm safety socket Aperture : 1 mm Rod : 10 mm diameter POLARIZER / ANALYZER Angle : Adjustable (0° - + 90°) List count : 1° Aperture : 21mm dia. Frame : 130mm dia., to avoids scattering of lights Rod : 10 mm dia. TRANSVERSE SADDLE Material : Aluminium Locking : Spring loaded Motion : X-Y axis Holder : 10mm dia. Special Features: Most direct method to measure 'g', acceleration due to gravity. Learning Science while Playing Approach Excellent Time Measurement with high precision. Very Accurate measurement with least count for time = 1ms. Accessory for exact height measurement. Accessory can be mounted on any scale. Accessory allows to drop the ball from predefined set height. Hence any uncertainty in height measurement is eliminated. Pointer in accessory measures exact free fall height. Even a little error (up to 1 cm) provides an accurate result of 'g' due to very high accuracy in time measurement. Data can be collected in computer / smart phones. Dedicated software and app for analysing motion along with different templates for different experiments.</p>
2	Planck's Constant apparatus using photocell	<p>Planck's Constant Using CS Photocell: PLANCK'S CONSTANT BY Cs PHOTOCCELL Experiment: Exp-1 To determine Planck's Constant by Cs Photocell. Salient features Multipurpose electrometer amplifier. Cs photo cell. Multipurpose power supply. Monochromatic light source may be used in many other experiments also. Hexagonal optical bench OPTICAL BENCH TRIANGULAR Material : Aluminum extrusion Type : Triangular shape Scale : 0-100cm Least count : 1mm This optical bench is rigid, heavy, stable and long lasting. It has four levelling screw and flexible feets POWER SUPPLY 12V AC/DC Output : 2,3,4,5,6,8,10 & 12VAC full wave rectified, unsmoothed & unregulated D.C. Overload : Resettable thermal trip. Input : 230 V AC,50 Hz IRIS DIAPHRAGM Frame dia. :120mm to avoids scattering of lights Rod dia. :10mm Slit opening : upto 20mm DIGITAL MULTIMETER Resistance : 200W, 2000W, 20k, 200k & 2000k W. D.C.Voltage : 200 & 2000 mV : 20, 200 & 600 V A.C.Voltage : 200 & 600 V D.C.Current : 200 & 2000 mA : 20 & 200 mA, 10 A Testing : Diode & transistor Battery : 9V PHOTOCCELL Photocell : Cs, vacuum tube. Output : 4mm safety socket. Mounting rod : 10mm dia.</p>

		<p>ELECTROMETER AMPLIFIER Input Impedance : $>10^{13}$ Ω Input Current : <0.5 μA Output Voltage : upto +10V Output Current : 5mA (Short Circuit Protected) Output impedance : <1 Ω Supply Voltage : 12 V AC MERCURY LIGHT SOURCE Starting Voltage : 470 Volts Input Voltage : 220 Volts, 50 Hz. Lamp House : 250 x 100mm (L x dia.) Aperture dia. : 25mm Mercury Lamp : 125W SET OF COLOR FILTER Red : 635nm Orange : 570nm Yellow : 540nm Green : 500nm Blue : 460nm</p>
3	Planck's constant by LED'S	<p>Planck's Constant Using LED: Planck's Constant by LED Experiments: Exp-1 Determination of material Constant h. Exp-2 Determination of Temperature Coefficient of Current. Exp-3 Determination of Planck's Constant by LED method PLANCK'S CONSTANT APPARATUS Selector Switch : V-I and T-I experiment Selector Switch at V-I position :- Voltmeter Display : 3½ digit, 7segment LED, auto polarity& decimal indication. Voltage Range : 0.000-2.000V Current Display : 3½ digit, 7segment LED Current Range : 0-2000mA Selector Switch at T-I position :- Current Display : 3½ digit, 7segment LED Current Range : 0-20mA Temperature Display : 3½ digit, 7segment LED Temperature Range : Room temperature to 60.0°C Oven : Heater pin 4 & 5. Temperature pin 1 & 2 Oven Connector : 5 Pin, DIN type LED Connector : 3 Pin, DIN type Input Voltage : 220V, 50Hz AC Fuse : 1A, 250 V OVEN WITH TEMPERATURE SENSOR Heating Element : 20 ohm Oven Connector : 5 Pin, DIN type Ambient Temperature : 60° C Temperature Sensor : Pt100 Output Pin : Heater pin 4 & 5. Temperature pin 1 & 2</p>
4	Newton's Ring	<p>Newton's Ring: NEWTON'S RINGS APPARATUS Experiments: Exp-1 To determine the wavelength of sodium light. Exp-2 To determine the refractive index of a liquid by using newton's rings apparatus. Exp-3 To find the radius of curvature of planoconvex lens using newton's rings experiment, given $\lambda=5893$AO. Exp-4 To find the thickness of a thin sheet of paper (air wedge experiment). NEWTON'S RINGS Dimension : 390 x 480 x 170mm approx. Micrometer : 0.01 mm least count Eyepiece : Ramsden 10X Objective : 3X Weight : 12.6 kg approx. SPHEROMETER (DISC BRASS) Types : 3 legs Vertical scale : 6mmx6mm (WxT) Micrometer : Dia. 40mm, Brass Lower disc : Dia. 60mm Range : 10-10mm Least count : 0.01mm PLANO CONVEX LENS Dia. : 61.5mm, Glass Focal length : 200mm</p>
5	Hall Effect Experiment Kit	<p>Hall Effect Semiconductor: HALL EFFECT Experiments: Exp-1 To determine Hall Voltage (p or n type). Exp-2 To determine Hall Coefficient. Exp-3 To determine the type of Charge carrier. Exp-4 To determine Charge Density of carriers. Exp-5 To determine the Resistivity of a given sample. Exp-6 To determine the mobility of charge carriers. Exp-7 To determine the Hall angle. CONSTANT CURRENT SOURCE Current Display : 0-20 mA DC Voltage Display : 0+200mV@0.1mV Resolution : 10 micro ampere Current Adjust : 10-turns potential meter Power : 220V \pm 10%, 50 Hz AC Display : 3½ digit LED Weight : 3 Kg approx. POWER SUPPLY Voltage : 0-20V DC continuously variable & stabilized Voltage display : 3½ digit LED Ripple : Less than 25mV Overload : Current limiting protection Current : 5 A continuously variable,</p>

		<p>10% to full rating Current display : 3½ digit LED Working voltage : 230V AC, 50 Hz single phase HALL EFFECT APPARATUS Coils : 500 turns. Coil Current : 8.5Amp (Max.) Connection : 4mm safety socket. U Core : 150x130mm²(LxH), 40x40mm² cross section. I Core : Length=150mm, 40x40mm² cross section. Core material : Ferromagnetic. Base dimension : 360x180x33mm³ Weight : 8.8kg (Approx.) DIGITAL GAUSS METER Range : 200 Gauss & 2 k Gauss Resolution : 0.1Gauss at 0 - 200 Gauss Offset : By Potentiometer to set ZERO Display : 3½ Digit LED Input Voltage : 220 V, ± 5 %, 50 Hz AC Axial Hall Probe : InAs GE CRYSTAL PCB Crystal : Ge Wafer, P type Crystal Size : 6x7 x 0.5mm³ (LxWxThickness) Resistivity : 1~ 10 ohm-cm Orientation : <100>; Offset pot : Trim pot Connection : 4mm safety socket</p>
6	DIELECTRIC CONSTANT KIT	<p>Dielectric constant: DIELECTRIC CONSTANT Experiments: Exp-1 To determine the capacitance of plate capacitor by charge measurement. Exp-2 To measure the capacitance as a function of area of plates. Exp-3 To measure the capacitance as a function of distance between the plates. Exp-4 To determine the dielectric constant of different dielectric materials . Salient Features Charge measurement by electrometer amplifier. All electrical connections are made using safety sockets. Capacitors plates are attached to insulated riders. Electrical safety tested. HIGH VOLTAGE POWER SUPPLY Input Voltage : 220V, ±5%, 50Hz AC Output Voltage : 0-600V DC Voltage Resolution : 10V Voltage Display : Analog Short Circuit Current : 100µ Amp POWER SUPPLY 2-12V AC/DC Input Voltage : 220V, ±5%, 50Hz AC Output Voltage : 2,3,4,5,6,8,10 and 12 V AC full wave rectified, unsmoothed and unregulated D.C. Overload protection : Resettable thermal trip DIELECTRIC CONSTANT KIT Metal Rail : Metal sheet, L=350mm approx. B Capacitor plate : Aluminium, 20cm x 20cm (LxW) C Capacitor plate : Aluminium, 28cm x 28cm (LxW) D Glass sheet : 21cm x 21cm (LxW) E Polystyrene sheet : 21cm x 21cm (LxW) F Two way switch : 4mm socket, 3 nos. G Capacitor : 0.01µF & 0.001µF H Spacer : PVC (1,2,3,4,6 mm) I Switch : Push switch ELECTROMETER AMPLIFIER Supply Voltage : 12 V AC Input Impedance : >10³ ohm Input Current : < 0.5pA Output Voltage : upto +10V Output Current : 5mA (Short Circuit Protected) Output impedance : <1ohm RESISTANCE MODULE Resistance : 4.7MW Socket : 4mm banana type Body cover : Acrylic DIGITAL MULTIMETER Digital Display : 3999(maximum) Model : MECO 801 Auto Direct Current and Voltage measurement AC Current and Voltage measurement Resistance measurement Frequency measurement Capacitance measurement Temperature measurement Continuity mode Diode measurement mode Auto range mode</p>
7	e/M by Thomson Method/ Helical Method	<p>THOMSON TUBE: Experiments: Exp-1 Investigate the deflection of an electron beam by a magnetic field. Exp-2 Estimate the specific charge of an electron. Exp-3 Investigate the deflection of an electron beam by an electric field. Exp-4 Construct a velocity filter using orthogonal electric and magnetic fields. Salient Features Four experiment in one setup. Thompson Tube with built-in capacitor and fluorescent screen. Helmholtz Coil for production of magnetic field. TELTRON THOMPSON TUBE Max. filament voltage : 6.3 V AC Max. anode voltage : 5 kV Max. capacitor</p>

		<p>voltage : 500 V Anode current : approx. 0.1 mA at 4 kV (anode) .008m between tick marks on screen HELMHOLTZ COIL PAIR Number of turns : 320 Coil diameter : 138 mm Load rating : 1.0 A (Continuous operation) 1.5 A (Short-term operation) Effective Impedance : approx. 6.5 Ω Terminals : 4 mm safety sockets Max. field strength : approx. 9 mT POWER SUPPLY 500 V output : Voltage: 0 – 500 V DC, max. 50 mA Stability at full load : $\leq 0.01\% \pm 100$ mV Residual ripple : ≤ 20 mV 50 V output : Voltage: 0 – 50 V DC, max. 50 mA Stability at full load : $\leq 0.1\% \pm 30$ mV Residual ripple : ≤ 50 mV 12 V output : Voltage: 0 – -12 V DC, max. 4 A Stability at full load : $\leq 0.1\% \pm 30$ mV 8 V output : Voltage: 0 – 8 V DC, max. 3 A Stability at full load : $\leq 0.1\% \pm 30$ mV Displays : Analogue, class 2 Connections : 4 mm safety sockets Power consumption : 50 VA TUBE HOLDER Terminals : 4 mm safety sockets Dimensions : approx. 130x190x250 mm³ Weight : approx. 570 g</p>
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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)
Total Cost							

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. _____