

MAHARSHI DAYANAND UNIVERSITY ROHTAK
TENDER NOTICE

Sealed tenders superscribing as “Tender for various Lab Equipments” of Electrical Engineering are invited for the purchase of equipments for UIET latest by 01:00 P.M on 10.10.2012 alongwith Earnest money @ 2% of involved value as demand Draft in favour of Finance Officer, M.D. University, Rohtak. For details may visit University website www.mdurohtak.com . Tenders will be opened on 10.10.2012 at 3.00 p.m. in the office of the Director, University Institute of Engineering & Technology.

REGISTRAR

**UNIVERSITY INSTITUTE OF ENGINEERING & TECHNOLOGY
MAHARSHI DAYANAND UNIVERSITY ROHTAK
TERMS & CONDITIONS OF THE TENDER FOR SUPPLY OF LAB EQUIPMENT FOR
ELECTRICAL ENGG.**

The articles/material as per specifications attached are to be purchased for this Institute. You are requested to kindly quote your rates for the same. The following terms and conditions for quoting the rates may kindly be kept in view while you do so:-

1. All charges payable by the University should clearly be stated.
2. Sealed quotations/tender should be addressed to the Director, UIET, M.D. University, Rohtak and reach the office of the undersigned on or before **1.00 p.m. on 10.10.2012** quoting our reference and due date of opening on the envelope.
3. The quotation/tender should be submitted only if the material is available in your ready stock or can be supplied within 15 days after the order is placed.
4. The quotation/tender will be opened in the office of the undersigned **on 10.10.2012 at 3.00 p.m.** in the presence of the parties or their representatives who so ever like to be present.
5. An amount of 2% of quoted amount only in the shape of Bank Draft in favour of Finance Officer, M.D. University, Rohtak as earnest money should accompany the quotation/tender in absence of which the tender/quotation will not be entertained.
6. Tender received without earnest money or after the due date shall not be entertained except with the special approval of the Registrar.
7. As far as possible the rates should be quoted for the make and specification of the items given. In case any alternative/equivalent item is offered its specifications and leaflets may be sent with the tender/quotation. The sample of material should accompany the tender/quotation for record.
8. Guarantee/warranty period for equipments should be clearly specified /mentioned.
9. 100% payment will be made on receipt and inspection of goods/items to ensure the specifications and their good condition by the inspection Committee.
10. Dispute, if any, will be subject to Rohtak jurisdiction.
11. The University reserves the right to reject any or all quotation/tenders without assigning any reason thereof.
12. If your rates are approved by the DGS&D and other Central/State Agency, the rates of the same must be quoted and the copy of the rate contract be attached.
13. Tender must be submitted by Either Manufacturer or their authorized dealer/Distributor. Authorization letter in proper format must be attached with tender otherwise Bids will not be considered. Authorization letter should be on letter head of Manufacturer and should be signed & stamped. Tenders from dealers will be rejected without proper authorization letter from the manufacturers.
14. In case the contractor backs out of his contract, the earnest money deposited by him shall be forfeited besides any other action as may be considered necessary by the Vice-Chancellor.

DIRECTOR

Maharshi Dayanand University Rohtak
University Institute of Engineering & Technology

**Subject: Requirement of Lab equipments for Electrical Engineering
 Electrical Workshop**

S.No	Name of item	General Specifications	Qty	Mode of Purchase
01	<u>Panel to study Different circuits used in Home electrical wiring</u>	<u>Panel to study Different circuits used in Home electrical wiring</u> The Panel should consists of Single Phase Energy Meter, MCB, Controlling Switches, Tube Light with Choke, Regulated Switch, Ceiling Fan, etc. Good quality sockets should be provided on board for power supply and load connections. Energy Meter, Voltage and Current display on Graphical LCD (128x64) Test points should be provided to measure the voltages at different points Energy Meter Specifications Meter Constant : 1600 impulses /KWh Display Counter : 100 impulses /Kwh (On LCD) Single Phase MCB : 6 A Load specifications Tube light : 20 Watt ,220-240 V Ceiling Fan : 50 Watt ,220-240 V with appropriate jig to show rotation of motor only. Maximum Load Current : 4 Ampere Measurement Display : Graphical	01	Tender

		<p>LCD (128x64) Mains Supply : 230 V \pm10 %, 50 Hz BS 10 Type safety terminals & patch cords should be provided For Proper safety .</p>		
02		<p><u>Power supply Trainer</u> Outputs Zener diode outputs: 10 V, 5.6 V regulated Regulators outputs: +12 V regulated & -12 V regulated 1.8 to 17 V adjustable Load: 5 K variable with 1 K fixed resistance. Bleeder Resistor: 5 K variable with 1 K fixed resistance. Astable Multivibrator: 1 Hz, 14 Vpp Transformer : Primary 0 to 220 V Secondary 18-0-18, 6-0-6 (500 mA) Fuse: 500 mA (slow blow) spare fuse should be provided in mains socket) Input : 230 V \pm10%, 50 Hz Accessories included : Operating and E Manual Cabinet Housing : Enclosed on a plastic Molded box with molded cover</p>	01	Tender
03	SMPS Trainer	<p>Trainer should demonstrate study of Switching Transformer, Should have facility to connect Variac Should have provision for Fault identification Study of PWM switching device, Optocoupler & regulation</p>	01	Tender

		Input : 80 to 230 V AC $\pm 10\%$, 50 / 60 Hz Outputs : +12 V DC regulated : -12 V DC regulated : +5 V DC regulated Switching Transformer Input : 320 V DC switching at 132 KHz Output : 30 V AC (approx) Fuse : 500 mA (Slow blow, spare fuse is given with mains socket) Trainer should be encased in a plastic molded box.		
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S.No	Name of Item	General Specifications	Qty	Mode of Purchase
04		<u>U.P.S Trainer</u> Trainer should have facility to study circuits used in UPS like PWM switching , AVR etc. Various test points should be provided at different stages to measure voltage & observe waveforms. Input : 190 to 260 V 10%, 50 Hz Output : 230 V Transformer specifications Input : 12 - 0 - 12 V Outputs : 0, 190, 220, 240, 260 V 18 - 0 for battery charging Trainer should be encased in a plastic molded box. Only block diagram on the top of the trainer.	01	Tender
05	<u>Home inverter trainer</u>	Trainer should have facility To understand the function of Inverter	02	Tender

		<p>in presence of main supply and understand the charging of battery ,working of Relay , To study the AC Mains sensing circuit of Inverter & troubleshooting of different faults in Inverter circuit Rated Power : 60 Watt Power Supply : 230 V $\pm 10\%$,single phase, 50 Hz Charging Transformer : Step down type, Input voltage : 230 V Output voltage : 16 V Inverter Transformer : Step up type Input voltage : 0 -12 V Output voltage : 230 V Inverter output voltage : 230 V $\pm 10\%$,50 Hz $\pm 5\%$ Inverter voltage control : By PWM technique Battery : 12 V DC /7.5 Ah /12 Hours Relay : 2 Pole/12 V/285 W LED Indicators : Inverter ON, mains ON, charging ON Fuse for inverter protection : 1 A (on Trainer board) Mains Fuse : 1 A Insulated sleeves on test points for safety</p>		
06	Electrical Safety Demonstrator	<p>Trainer should be able to perform experiments like study of Study of importance of Earthing in any electrical device. Study of role of Fuse in any electrical or electronic circuit.</p>	02	Tender

		<p>Study of importance and working of Miniature Circuit Breaker (MCB). Transparent Model of MCB should be provided on board. Fuse with variable supply on board. Simulation diagram of earthing circuit printed on board. Ammeter should be provided on board. Trainer should be encased in a plastic molded box. Mains : 230 V \pm10%, 50 Hz (Detachable mains chord to be provided) Accessories included : Operating and E Manual & Necessary Patch cords Trainer should be on Legend PCB .Housed in a Molded case with molded cover .</p>		
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S.No	Name of Item	General Specifications	Qty	Mode of Purchase
07.	<u>30 MHz Microcontroller based Dual Trace Oscilloscope</u>	<p>Bandwidth : 30 MHz No. of Channels : 02 Digital Readout with Backlit LCD for Volts/Div & Time/division. X 10 Magnification 20 ns max sweep speed Stable Triggering up to 40 MHz Alternate Triggering Sharp Trace CRT & Auto focus Gold Plated BNC Connectors Built in one touch component Tester Accessories: BNC to Test probe, BNC to crocodile cable, Component tester cable & Manual in CD. Power supply : 230 V</p>	4	Tender

		±10%/50Hz		
08.	<u>3 ¾ digit (4000 counts) Digital Multimeter with embedded rubber Holster</u>	DC voltage range : 400 mv to 1000volts. AC voltage range : 4 V to 750volts. DC Current range : 400 µA to 10 A. AC Current range : 400 µA to 10 A. Resistance range : 400 Ω to 40 M Ω Capacitance range : 40nF to 100µF Frequency range : 10 Hz to 10 MHz Duty Cycle : 01. to 99 %. Display : LCD 63X31mm with backlit Battery : 9V Holster : Should be Embedded with DMM Accessories : Test leads, Test clips & manuals. Other Functions : Diode test, continuity ,relative measurement, Data hold, Backlit LCD, sleep mode, low batt. Indicator.	6	Tender

Electrical Measurement & Measuring Instruments Lab

S.No	Name of Item	General Specifications	Qty	Mode of Purchase
01	<u>Panel to study different types of meters & there connectivity in circuit</u>	<p>The Panel should have facility to Study the operation & working of Moving Coil , Moving iron & Dynamometer type Instruments</p> <p>Circuit diagram should be screen printed on the top of the Panel.</p> <p>Inbuilt Variable AC supply : 0 to 230 V</p> <p>Inbuilt Variable DC supply : 0 to 6 V (with load)</p> <p>Meters Used for study with Transparent front</p> <p>AC Voltmeter (MI) : 0 to 300 V</p> <p>DC Voltmeter (MC) : 0 to 1A</p> <p>AC Ammeter (MI) : 0 to 1A</p> <p>DC Ammeter (MC) : 0 to 10 V</p> <p>AC Wattmeter (Dynamometer) : 0 to 500 W</p> <p>Mains Supply : 230 V \pm10 %, 50 Hz</p>	01	Tender
02	<u>Experiment setup to to calibrate a voltmeter & Ammeter by a Potentiometer.</u>	<p>The set up should consist of :</p> <p>Standard Calibrated Digital Voltmeter & Ammeter</p> <p>Trainer board with Ammeter & Voltmeter to be calibrated</p> <p>Potentiometer</p> <p><u>Technical Specifications</u></p> <p>Analog Voltmeter : 0 - 10 V</p> <p>Analog Ammeter : 0 - 1 A</p> <p>Potentiometer Wire : Constantan</p> <p>Length : 10 m</p>	01	Tender

		DC Supply (Standard) : 1.016 V Variable Resistance : 3 – Decade : X0.1 , X 1 , X 10 Voltage Ratio Factor : 0, 1.5, 15, 30, 150, 300 Total Resistance : 15 k Variable Supply : 0 - 12 V Mains Supply : 230 V \pm 10%, 50 Hz Fuse : 0.5 A		
03	Experiment setup to To study Single Phase energy meter.	Trainer should be able to perform experiments like study of Study of measurement Power consumption by any electrical load Circuit diagram should be screen printed on the top of the Panel. Micro controller based LCD display. The display acts as a counter of units consumed as well as it shows the wattage of load and the time since the system has been On. Technical specifications: Meter Constant : (1600 / 3200) impulses / kWh (On LED) Maximum Current : 30 A Shunt : 350 mW Resolution : 0.01 unit Mains Supply : 90 V - 275 V, 50 / 60 Hz Only circuit diagram should be printed on the top of the trainer with no components on the top. Trainer should be encased in a plastic molded box.	01	Tender

S.No	Name of Item	General Specifications	Qty	Mode of Purchase
04	<u>Panel for Power & Power factor measurement using 3 voltmeter & 3 Ammeter</u>	<p>The Panel should have facility to calculate the Power and Power factor in a Single-Phase circuit using 3 Voltmeters. or 3 ammeters. Circuit diagram should be screen printed on the top of the Panel. BS 10 Type safety terminals & patch cords should be provided</p> <p>For Proper safety <u>Technical Specifications</u> Mains supply : 0-230V±10%,50Hz Auxiliary supply : 230V ±10%, 50Hz Choke Coil : 300mH, 5A Voltmeter : 0-500V Ammeter : 0-5A MCB : 5A Rheostat : 45 ohms/5 A External Variac: 230V/10 A single phase</p>	01	Tender
05	<u>Experiment setup to To study Measurement of Power in 3 Phase by 2 Watt meter Method.</u>	<p>The Panel should have facility to perform experiments like study of Measurement of Power Factor in a Three Phase Circuit Measurement of Active, Reactive and Apparent Power in a Three Phase Circuit Circuit diagram should be screen printed on the top of the Panel. BS 10 Type safety terminals & patch cords should be provided</p> <p>For Proper safety.</p>	01	Tender

		<p>Trainer should have :</p> <p>Mains Supply : Three Phase ,415V ±10%, 50Hz</p> <p>Load: R-L</p> <p>Meters Used</p> <p>Wattmeters: 500W (2 Nos.)</p> <p>Voltmeter (MI) : 500V</p> <p>Ammeter (MI) : 1A</p> <p>MCB : 10A</p> <p>Variac : 3 Phase variac 440V/10 A should be provided along with setup to control the input with terminals brought on the top of variac</p>		
06	<u>Desauty's and Schearing Bridge Trainer</u>	<p>Inbuilt Function Generator</p> <p>Microcontroller based Frequency Counter</p> <p>Null detector with audio amplifier and speaker</p> <p>Sine Wave Generator with selectable Frequency range</p> <p>500 Hz to 1 KHz ,1 KHz to 10 KHz & 10 KHz to 60 KHz</p> <p>Amplitude control output :Sine wave : Up to 8 Vpp</p> <p>Speaker : 8 Ohm</p> <p>Display : LCD</p> <p>Fuse : 500 mA, slow blow</p> <p>Mains : 230 V AC ±10%, 50 Hz</p> <p>Unknown Capacitors : 0.1 μF, 0.22 μF, 0.47μF</p> <p>Mains : 230 V ±10%, 50 Hz (Detachable mains chord to be provided)</p> <p>Accessories included : Operating and E Manual & Necessary Patch cords Trainer should be on Legend PCB .Housed in a Molded case with molded cover ,Should have in built power supply.</p>	02	Tender

S.No	Name of Item	General Specifications	Qty	Mode of Purchase
07	<u>Maxwell's Inductance & Capacitance Bridge</u>	<p>Trainer should have Illustration of both Maxwell's inductance bridge and Maxwell's inductance-capacitance bridge on a single board</p> <p>Inbuilt 1 KHz sine wave generator with variable amplitude</p> <p>Null detector with differential amplifier ,audio amplifier and speaker</p> <p>DC Power supply : +12V, -12V</p> <p>Sine wave generator</p> <p>Frequency : 1 KHz</p> <p>Amplitude : 20 Vpp Max</p> <p>Speaker : 8 ohm</p> <p>Unknown Inductors : 12μH, 1.2 μH, 4.7 μH, 10 mH ,20mH, 30 mH</p> <p>Unknown Internal Resistance : 470Ω, 10 Ω, 20 Ω , 30 Ω</p> <p>Mains supply : 230 V \pm10%, 50 Hz</p> <p>Input : 230 V \pm10%, 50 Hz (Detachable mains chord to be provided)</p> <p>Trainer should be on Legend PCB</p> <p>.Housed in a Molded case with molded cover ,Should have in built power supply.</p> <p>Circuit diagram should be printed on the top of the board.</p> <p>Accessories included : Operating and E Manual & Necessary Patch cords</p>	02	Tender
08	<u>Hay's Bridge</u>	<p>Trainer should have facility to Determine unknown inductance and Q factor using Hay's bridge method</p> <p>Inbuilt sine wave generator with variable amplitude</p> <p>Null detector with audio amplifier and</p>	02	Tender

		<p>speaker Sine wave generator Frequency : 1 KHz to 10 KHz $\pm 10\%$ Amplitude : 0 to 5 Vpp Speaker : 8 ohms Unknown Inductors : 65 mH $\pm 10\%$ with 65 ohms $\pm 10\%$ of resistance, 100 mH $\pm 5\%$ with 174 ohms $\pm 5\%$ of resistance, 130 mH $\pm 10\%$ with 130 ohms $\pm 10\%$ Mains supply : 230 V $\pm 10\%$, 50 Hz DC Power Supply : +12 V, -12 V Trainer should be on Legend PCB .Housed in a Molded case with molded cover ,Should have in built power supply. Circuit diagram should be printed on the top of the board. Accessories included : Operating and E Manual & Necessary Patch cords</p>		
09.	<u>Kelvin's bridge to measure small resistance</u>	<p>Trainer should have Illustration Kelvin's Bridge Inbuilt Galvanometer for null detection. DC Power supply : +5V Galvanometer Deflection : 30-0-30 Unknown Resistors : 0.3 Ω, 0.4 Ω, 0.8 Ω Mains : 230 V AC $\pm 10\%$ (Detachable mains chord to be provided) Trainer should be on Legend PCB .Housed in a Molded case with molded cover ,Should have in built power supply. Circuit diagram should be printed on the top of the board. Accessories included : Operating and E Manual & Necessary Patch cords</p>	02	Tender

		Coil Resistance : 500 Ω Lamp & Scale Lamp : Laser Light Source Scale : 30-0-30 cm Unknown Resistances : Selectable R1 = 20 M Ω ;R2 = 40 M Ω ; R3 = 60 M Ω ;R4 = 80 M Ω Capacitors : Selectable 0.22 μ F ; 0.33 μ F ; 0.47 μ F Mains Supply : 230 V \pm 10%, 50/60 Hz DC Power Supply : 12 V		
12.	<u>3 $\frac{3}{4}$ digit (4000 counts) digital Multimeter embedded rubber Holster</u>	DC voltage range : 400 mv to 1000volts. AC voltage range : 4 V to 750volts. DC Current range : 400 μ A to 10 A. AC Current range : 400 μ A to 10 A. Resistance range : 400 Ω to 40 M Ω Capacitance range : 40nF to 100 μ F Frequency range : 10 HZ to 10 MHz Duty Cycle : 01. to 99 %. Display : LCD 63X31mm Battery : 9V Accessories : Test leads, Test clips & manuals. Other Functions : Diode test, continuity ,relative measurement, Datahold, Backlit LCD, sleep mode, low batt. Indicator.	6	Tender

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13.	<u>30 MHz Microcontroller based Dual Trace Oscilloscope</u>	Bandwidth : 30 MHz No. of Channels : 02 Digital Readout with Backlit LCD for Volts/Div & Time/division. X 10 Magnification 20 ns max sweep speed Stable Triggering up to 40 MHz Alternate Triggering Sharp Trace CRT & Auto focus Gold Plated BNC Connectors Built in one touch component Tester Accessories: BNC to Test probe, BNC to crocodile cable, Component tester cable & Manual in CD. Power supply : 230 V ±10%/50Hz	4	Tender
14	4 Channel Bench top Digital storage oscilloscope with Isolated Channels	Isolated Channels : 4 ; Bandwidth : 100 MHz Sample Rate : 1 GS/s per Channel ;Record Length : 2.5k points Display (1/4 VGA LCD) Color Battery : Lithium-ion battery with fuel gauge ,4 hrs battery life 11 Automatic Measurements Isolated External Trigger Input (Impedance isolated) Vertical Resolution 8 bits (normal or with averaging) Vertical Sensitivity 2 mV to 5 V/div Vertical & Horizontal Zoom facility Max Input Voltage : 300 VRMS CAT II	01	Tender

		<p>Float Voltage 600 VRMS CAT II from BNC shell to earth ground Time Base Range 5 ns to 50 s/div ;Time Base Accuracy 50 ppm Input Impedance 1 MΩ ±2% in parallel with 20 pF FFT Function RS-232, Centronics-Parallel Ports Integrated Compact Flash Mass Storage Accessory :Probes 200 MHz, 10X passive probes (one per channel) ;Battery : Lithium-ion battery with fuel gauge ,4 hrs battery life ;USB to RS-232 Cable ,PC Connectivity Software program to communicate between PC-based NI Signal Express software and oscilloscope ,Documentation User Manual ,AC Adapter with Power Cord , Certificate of Calibration ,Front Protective Cover ,Current Probe: 100 kHz, 10 mA to 100 A,AC/DC, BNC. Power measurement software with high voltage probes</p>		
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