दीन दयाल उपाध्याय कॉलेज
DEEN DAYAL UPADHYAYA COLLEGE
NAAC Accredited Institution-'B' grade (CGPA=2.63)
(दिल्ली विश्वविद्यालय) (UNIVERSITY OF DELHI)
सेक्टर- 3, द्वारका, , Sector-3, Dwarka, नई दिल्ली New Delhi – 110078
दूरभाष/TEL. 011-25099380, 25099381, फैक्स/FAX-011-25099380, Website: www.dducollegedu.ac.in

Ref:DDUC/2016-2017/2071-2082 Dated: 04/03/2017

M/s_____
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Subject: Quotation for purchase of Physics equipment.

Dear Sir,

Quotations are invited in two bid system (Technical and Financial) for supply of Physics equipment (List Enclosed) latest by 20/3/2017 11:30 AM.

The Technical Bid & Financial Bids should be sending in separate sealed envelopes and duly marked on top as Technical Bid/Financial Bid.

Both the bids should be further enclosed in an envelope super scribed "Quotation for Physics equipment" and addressed to "The Principal, Deen Dayal Upadhyaya College, Sector-3, Dwarka, New Delhi-110078". The same should be submitted with the Section Officer (Admin), Room No. 20 (GF).

Terms & Conditions:

1. All prices are F.O.R. Deen Dayal Upadhyaya College.
2. Delivery should be made in the college premises within 7 days from the date of receipt of the order.
3. Sales Tax/VAT if any, applicable should be mentioned separately.
4. At least one year Guarantee or Warranty conditions must be clearly specified.
5. The Quantity of items can be increased or decreased at the sole discretion of the college
6. The technical bid must contain detailed specification, Make, Model, and other relevant information and literature about the items quoted.
7. The vendor must submit Earnest Money Deposit (EMD), alongwith Technical Bid, in the form of DD for a sum of Rs. 10,000/- in favor of Principal, Deen Dayal Upadhyaya College. The non-submission of EMD will lead to the rejection of the bid. The EMD of unsuccessful bidders will be returned to them within Three (3) months of selection of vendors. The successful bid, if withdrawn or fails to supply items within stipulated time, is liable for forfeiture of the EMD.

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8. The Technical Bid will be opened on 20/3/2017 at 1:00 PM in the Committee Room (Ground Floor) of the college. The bidders may be asked to bring the specimen of their goods for technical approval.
9. The Financial Bids of only those vendors will be opened whose technical specifications will be approved by the Technical Committee.
10. Special discounts/ rebates, wherever applicable, keeping in view that the supplies are being made to an educational institution, must be indicated clearly.
11. Vendor has to supply the goods by 30/3/2017 positively failing which the EMD will be forfeited.
12. Articles which fail to satisfy the inspection/tests or does not conform to prescribed specification will be rejected and shall not be accepted and or to be removed/taken by the vendors at his own cost and responsibility.
13. The undersigned reserves the right to accept or reject, wholly or partly, any or all quotations without assigning any reason.
14. The Technical Committee, may at its discretion, waive any minor non conformity or any minor irregularity in an offer. This shall be binding on all vendors and the undersigned reserves the right for such waivers.
15. The payment will be made to the vendor after satisfactory completion of delivery duly certified by the competent Technical Committee.
16. The payment will be made through RTGS.

PRINCIPAL

Encl: as above.

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List of Equipments

S.No	Name of Item	Qty.
1 Tender sr.No. 1	**Set Up for determination of resistivity by Four Probe Method** **Description of the experimental setup** **1.** All Four Probes should be spring loaded, collinear, equal spaced and be mounted on Teflon bush. This arrangement is to be mounted on a suitable stand and leads are provided for the voltage and current measurement. **2.** Germanium crystal(pure/doped) in the form of a chip (approx. 1cm x 0.8 cm x 0.2 cm) should be provided as a sample (one extra Chip is required) **3.** Temperature range of Oven should be from 0 to at least 200°C (with over heating protection optional) **4. Multirange Digital Voltmeter** Range: X1 (0-200mV) & X10 (0-2V) Resolution: 100mV at X1 range Accuracy: ±0.1% of reading ±1 digit Stability: Within ±1 digit Input Impedance: not less than 1Mohm Display:3½ digit, 7 segment LED with auto polarity and decimal indication Overload Indicator should be present **5. Constant Current Generator**. : The current supply must be highly regulated and should have digital panel meters. Open Circuit Voltage: 18V Current Range 0-20mA Resolution 10mA Accuracy ±0.25% or ±1 digit or better Stability Within ±1 digit Load regulation 0.03% for 0 to full load Line regulation 0.05% for 10% change **6.** Oven power supply should be provided with on-off LED indicator	02
2. Tender sr.No. 4	**Ballastic Galvanometer** The coil should be suspended by phosphor bronze strip and is fitted with an optically true concave mirror of 50 cm focus. It should have clamp and free arrangement It should have leveling screws and spirit level for balancing the coil Galvanometer Resistance – approx. 115 ohm CDR: approx. 2000 ohm to 3000 ohm Sensitivity not less than 250mm per micro coulomb at one meter distance. Periodic Time : approx. 12 to 14 seconds It consist of Translucent plastic scale fitted in frame, Length 50 cms, division	10

	25-0-25 and 0-50 cms. The scale is mounted on a stand and its height can be adjusted. The lamp housing is fitted with a lamp operated on Mains through a Step down transformer.(220 V ± 10%/50 Hz)	
3. **Tender sr.No. 6**	**Millikan Oil Drop Method Setup**: 1. A oil drop chamber should have a pair of horizontal parallel plate electrodes separated by approx. 5 mm thick ebonite ring with a hole for viewing the oil droplets. An atomizer should be provided to spray the oil droplets from hole present in the upper plate . A device should be present to illuminate the space between the parallel plate electrodes. 2. There should be three leveling screws at the base in order to make the parallel plate electrodes perfectly horizontal and a water-level placed on top of the panel is essential to verify it. 3. A microscope with CCD camera (good quality) head is required to view and transmit image of oil droplets between the plate electrodes to the monitor. 4. A power supply with continuously variable voltage atleast in the range of 0 – 800 V is to be provided to the upper plate and the lower plate should be permanently grounded. 5. A digital voltmeter to measure the potential applied to the upper plate as well as 'Time Meter' should be provided to display the time for which the oil droplet is allowed to move between the plates. 6 . Further, a timing device with two keys i.e, .'Clear' key, and 'Start/Stop' should be there on the main set up. 7. A monitor of good resolution with graduated screen should be provided. A complete manual should be provided with procedure, description of apparatus and test readings. Extra bottle of Oil should be provided with the set up.	**01**
4. **Tender sr.No. 7**	**Setup to determine Ionization potential of mercury** Setup Should have in built regulated power supply with two multi-range meters for measuring Voltage and current accurately Should be supplied with valve 2d21 (extra 2 valves should be provided) cost of additional valve should also be mentioned	**3**
5. **Tender sr.No. 8**	**Reading Telescope with Stand** The telescope is fitted on universal clamp which can be moved on Steel pillar fitted on heavy tripod base with three leveling screws. The diameter of pillar should be approx half inch and length of the pillar should be approx. 2 ft. / 6 ft.	**20**
6. **Tender sr.No. 17**	**Set Up To determine the complex dielectric constant and plasma frequency of metal using Surface Plasmon resonance (SPR) technique/ To determine the refractive index of a dielectric using SPR technique**	**2**

TECHNICAL SPECIFICATION	DEFINITION
Measuring principle	Surface Plasmon Resonance
Excitation wavelength	685 nm, power = 5 mW (p-polarized)
Angular resolution	0.01°
Motor	Programmable micro-controlled stepp

		motor	
	Mode of operation	Concentric and coplanar movement of sample and detector in user defined steps	
	Rotation direction	Both clockwise and anti-clockwise direction (0.01°)	
	Power resolution	0.01 mW	
	Sensor	Gold coated substrate (3 Nos.), dielectric coated Au/prism (3 Nos.)	
	Measurement media	Solid, liquid or gaseous (optional)	
	Laser mount	Kinematic mount to align the laser beam precisely in horizontal direction with respect to prism table and detector	
	Detector	Silicon photo detector of high resolution (0.01 mW)	
	Measuring wavelength range of detector	500 nm to 700 nm flat field	
	Operating temperature range	5 °C to 55 °C	
	Electrical Power requirements	230 V, 50 Hz	
	(optional: 2 laser spectacles for the protection of eyes are to be provided, price is to quoted separately) Note: A common switch is provided to operate both the stepper motors for the movement of prism table (sample) and detector to move them in clockwise and anticlockwise direction simultaneously in synchronized manner. 1. Soft switches are provided on the front panel to feed the desired angle of rotation to the prism table. 2. The entire system should be table top and attached to one unit only. 3. Vendor must at least have supplied three systems to the academic institutes and supply the list of these institutes with contact details. **4.** Complete Manual should be provided.		
7. Tender sr.No. 21	**Set Up to study Electron Spin Resonance** (i) ESR Spectrometer,. radio frequency oscillator should have frequency range of approximately 12–16 MHz. Phase Shifter : 2.. 50 Hz Sweep Unit : 3. Power Supplies : a) D.C. Power Supply : should be be stabilized for ripple free voltage. b) Helmholtz Coils Power Supply : power supply should consists of a step down transformer (220 to 35 V AC). Variable coil current should be provided in 10 steps using a band switch. the current should be displayed on a 3 1/2 digit panel meter. 4.. Helmholtz coils fitted with R.F. Coil: One (. No, of turns: 500 in each coil, Diameter of the winding: minimum14 cm, Separation of the coil: minimum 7 cm 5.. Sample - DPPH (inside R.F. Coil) is to be placed in a plastic tube, 6. complete Manual.		**1**

	The setup should be complete in all respect.	
8. **Tender sr.No. 22**	**Set up to study Zeeman Effect** 1. High Resolution Fabry Perot Etalon 2. Low pressure Mercury Discharge Tube 3. H.V. Power Supply for mercury tube 4. Narrow Band Interference Filter, (Central Wave Length 546nm Tmax 74% or better HBW upto 8nm or better) 5. Polarizer with lens, 6. Optical Bench of good quality 7. CCD Camera: (High Resolution CCD Camera) 8. Telescope with Focusing Lens: 9. TV Monitor 14": 10. Electromagnet Field Intensity: 7.5KG at 10mm air-gap with flat pole pieces Pole Pieces: 50mm diameter Energizing Coils :Two, each with a resistance of about 3.0W Power Requirement :0-30Vdc, 4A, if coils are connected in series 11. Constant Current Power Supply (Protection against the overload/short-circuit) Current Range: Smoothly adjustable from 0–4A Load Regulation: 0.1% for load variation from 0 to max. Line Regulation: 0.1% for ±10% mains variation Display: 3½ digit, 7 segment LED DPM Power :220V ±10%, 50Hz 12. Digital Gaussmeter Range: 0-2KG & 0-20KG Resolution: 1G at 0-2KG range Accuracy: ±0.5% or better Temperature :Upto 50°C Display :3½ digit, 7 segment LED DPM with auto polarity and over flow indication Power 220V ±10%, 50Hz Transducer: Hall Probe – InAs Special Feature Indicate the direction of the magnetic field A complete manual with test reading is required. The setup should be complete in all respect.	**1**
9. **Tender sr.No. 28**	**Determination of Planck's Constant and Work Function of Materials by Photoelectric Effect** 1. Photo Sensitive Device : Vacuum photo tube. 2. Light source : Halogen tungsten lamp 12V/35W. 3. Colour Filters : 635nm, 570nm, 540nm, 500nm & 460nm. Accelerating Voltage : Regulated Voltage Power Supply, Output: ± 15 V continuously variable through multi-turn pot Display : 3½ digit 7-segment LED Accuracy : ± 0.2% or better Current Detecting Unit : Digital Nano ammeter Range : 1000 mA, 100 mA, 10 mA & 1mA with 100 % over ranging facility Resolution : 1nA at 1 mA range or better	**2**

	Display : 3½ digit 7-segment LED Accuracy : ±0.2% or better 6. Power Requirement : 220V ± 10%, 50Hz. 7. Optical Bench : The light source can be moved along it to adjust the distance between light source and phototube scale length is 400 mm. A drawtube is provided to install colour filter, a focus lens is fixed in the back end.	
10. **Tender sr.No. 29**	**Set up to find the Inductance of the Coil using Anderson's Bridge Method** Set up should consist of the following: Main Features: R = The Decade resistance dials having range X1000 ohms, X100 ohms and X10 ohms. r= three more decades of same value as in R. S.= Two decade resistance dials having range x10 ohms and 0.1 ohms. P=Q=Two fixed resistances of 1000 ohms each. C=Two fixed standard capacitor. (in micro F) L=Three unknown inductances (in milli H). Inbuilt AC Supply frequency 1KHz, 5Volts D.C. Supply, galvanometer for DC Balance supplied with Head phone for AC/ With one electronic null Detector with sensitivity knob and selection switch marked with A.C. & D.C. both. Additional features optional - having arrangement to connect with CRO to have results- see picture attached herewith. Circuit is engraved and the components are mounted on the top of sun mica bakelite sheet. Patch cord suitable to the terminals are supplied with the board. A complete working manual containing theory circuit details and operating instruction is supplied with the experimental board. With on/off switch with indicating lamp	**3**
11. **Tender sr.No. 30**	**Set up to compare the capacitance using De Sauty's Bridge Method** Set-up should consist of the following. Main Features: R_1 = Three Decade resistance dials having range X1000 ohms, X100 ohms and X10 ohms. R_2= Three more decades of same value as in R_1 .C_1= Single decade Capacitance dial range of x 0.1 microfd. C2= Four unknown Capacitors fixed on the board. (Optional: should have the provision on the board that extra Unknown C can be added or removed) Inbuilt AC Supply frequency 1KHz, 10Volts (peak to peak) D.C. Supply supplied with Head phone/electronic null detector with sensitivity knob. Circuit is engraved and the components are mounted on the top of sun mica bakelite sheet. Patch cord suitable to the terminals are supplied with the board. A complete working manual containing theory circuit details and operating instruction is supplied with the experimental board. With on/off switch with indicating lamp . Additional features optional- having arrangement to connect with CRO to have results	**3**
12. **Tender sr.No. 38**	**Set up to study Characteristics of Tunnel Diode** 1. With Digital ammeters and voltemters for digital display of appropriate range 2. It should have regulated continuous and short circuit proof power supply of appropriate range	**3**

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13. **Tender sr.No.** **43**	**Power supply (Triple output)** Input Voltage 230V AC, ±10%, 50Hz, 1 Phase Output Voltage and Current 0 to 32V/2A ±12V to ±15V/0.5A 4.50 to 5.50V/5A Line Regulation ±0.1% Load Regulation ±0.1% Output Ripple 1mVrms Operating Temp. 0 to 50°C 3 Digit Display V & I Display Accuracy ±3 counts Electrically FloatingOutputs Upto 500V DC w.r.t. Ground	**30**
14. **Tender sr.No.** **46**	**Benchtop LCRQ-D Bridge -Meter** Variable Measured L, C, R, Q and D Measurement Modes Series or Parallel Sort Modes Absolute value or nominal value Measurement Frequency Selectable 100 Hz or 1KHz or higher Accuracy ±0.25% of nominal Max Voltage across 0.285Vrms (0.8V p-p) Display 4 digit LED Connecting to Component Under Test 4 terminal integral test jig Measurement Range : Inductance 0.1µH to 9999H Cap. range 0.3pF to9999µF Input Impedance 0.001Ω to 100Ω Resolution Inductance : 0.1µH ,Capacitance : 0.1pF ,Resistance : 0.001Ω Quality Factor : 0.01 Input protection The input is protected against connection of capacitor of upto 10mF charged to not more than 50V	**2**
15. **Tender sr.No.** **48**	**Microprocessor Kit (8085 Microprocessor)** 8085CPU@6.144MHz, 32K EPROM, 8K/32K RAM, Mem expansion-64KB, 48 I/O Lines & 3 Timer Counters, RS-232-C I/F, Assembler/Dissembler, 50 Pin FRC connector, 16*2 / 20*2 LCD Display, 104 Keys Kbd, RTC(optional). In Built Regulated Power Supply	**40**

Principal