Pt.Ravishankar Shukla University, Raipur-492010 (C.G)

(Center for Basic Sciences)

Tender Notice

No. 1694/CBS /2019 Raipur, Date 14 /06 /2019

Sealed tenders are invited from reputed firms/manufacturers/ authorized dealers for the Supply and Installation of Equipment for Physics Laboratory in Center for Basic Sciences, Pt.RSU by Registered post/Speed post only. Details of the tender and specification of equipment is available in the University website www.prsu.ac.in. The tender should accompany two separate DDs for document cost Rs.1000 /- and EMD Rs.70,000 /-.

Last date of Purchase of tender form	:	10/07/2019, 05:00 pm
Last date of receipt of tender	:	11/07/2019, 05:00 pm by Registered post/Speed post only.
Opening of Tender	:	12/07/2019, 03:00 p.m.
Place of Opening Tender	:	Center for Basic Sciences, Pt.RSU, Raipur (C.G.)

14.6.19

Registrar

12.6.19

DIRECTOR
Center for Basic Sciences
Pt. Ravishankar Shukla University
Raipur (C. G.) 492 010

Pt. RavishankarShuklaUniversity
Amanaka, G.E.Road, Raipur (C.G.) 492010

TENDER DOCUMENT FOR

the supply and installation of equipment for Physics Laboratory

Center for Basic Sciences

Pt. Ravishankar Shukla University

TENDER NO. : - 1694/CBS /2019 dated: 14/06/2019

TO BE SUBMITTED BY : - on or before 11 / 07 /2019 (05:00 PM)

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Center for Basic Sciences
Pt. Ravishankar Shukla University

Related Information

Sr. No.	Item	Description
1.	Scope of Work	Tender for the supply and installation of equipment for Physics Laboratory in Center for Basic Sciences, Pt. Ravishankar Shukla University, Raipur (C.G.)-492010
2.	Cost of Tender Documents	Rs. 1000.00 (non-refundable) by Demand draft in favor of Registrar, Pt. Ravishankar Shukla University, Raipur. Downloaded Tender documents must enclose Demand draft of the cost of Tender Document.
3.	EMD	Rs 70,000 by Demand draft in favor of Registrar, Pt.RavishankarShuklaUniversity, Raipur
4.	Last date of submission of bid	11/07/2019 (05:00 PM)
6.	Place of opening of bids	Center for Basic Sciences, Pt. Ravishankar Shukla University, Raipur (C.G.)
7.	Date and Time of opening of bids	12/ 07 /2019, (03:00 PM)
8.	Address for communication	Registrar, Pt. Ravishankar Shukla University, Raipur (C.G.) Ph : 0771-2262216 Email: cbsprsu@gmail.com
9.	Time period for the supply ordered item	45 Days (forty five days) from the date of placing supply order.

Note: The University shall not be responsible for any postal delay about non-receipt/ nondelivery of the document.

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Pt. Ravishankar Shukla University, Raipur
Center for Basic Sciences

SECTION - I

INVITATION FOR BIDS

This invitation of bids is for the supply and installation of equipment for Physics Laboratory in Center for Basic Sciences, Pt. Ravishankar Shukla University, Raipur (Chhattisgarh)-492010 (INDIA).

1.1 Bidders are advised to study the Tender Document carefully. Submission of Tender shall be deemed to have done after careful study and examination of the Tender Document with full understanding of its implications.

1.2 Sealed offers prepared in accordance with the procedures enumerated herein should be submitted to the Registrar, Pt. Ravishankar Shukla University, Raipur (C.G.) not later than the last date and time of submission.

1.3 All technical bids must be accompanied with refundable Earnest Money of Rs. 70,000 (Rupees Seventy thousands only) in the form of Bank Draft in favour of Registrar, Pt. Ravishankar Shukla University, Raipur (C.G.), payable at Raipur. The cost of Tender Document is Rs. 1000/- (Rupees One Thousand only). In case the Tender Document is downloaded from the university website www.prsu.ac.in/ , the cost of tender document in the shape of a Demand Draft for Rs. 1000/- in favour of Registrar, Pt. Ravishankar Shukla University, Raipur (C.G.), payable at Raipur. is to be attached with the Technical Bid. The demand draft of the earnest money shall be returned to the firms concerned if their tenders are not approved.

1.4 This Tender Document is not transferable.

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Pt. Ravishankar Shukla University, Raipur (C.G.)

No. 1699 /CBS./2019 Dated 14 / 06/2019

SECTION - II
Equipment (ITEMS)
Commercial Bid (Summary)

Pt. Ravishankar Shukla University, Raipur invites sealed tender offers from eligible, reputed firms/agency/organizations for supply of equipment in the Center for Basic Sciences, Pt. Ravishankar Shukla University, Raipur.

S.N.	ITEM	Experiment / Objective(s)	QTY	Rate /Unit	Total Rate
1.	GM Counter, Radiation Counter Experiment kit	**Experiments:** EXP1 Detecting Gamma Radiation with a scintillation counter. EXP2 Recording and calibrating Gamma Spectrum. EXP3 Identifying & determining activity of radioactive samples. EXP4 Qualitative observation of the Compton Effect. EXP5 Energy calibration. EXP6 Detector Energy Resolution. EXP7 Pair Production and Annihilation. EXP8 Counting Statistics. EXP9 Absorption of Gamma radiation. EXP10 Multi-channel scaling and Half Life.	01		
2.	Millikan Oil drop Apparatus	**Experiments:** EXP1: Demonstration of the concept of the Millikan's oil drop experiment EXP2 : Finding the charge on the drop EXP3: Finding the terminal velocity of the drop	01		
3.	Stern Gerlach Experiment kit	**Experiments:** EXP1 Determining the dependence of the particle beam density in the detection plane with different values of the non-homogeneity of the effective magnetic field. EXP2 Investigating the positions of the maxima of the particle beam density as a function of the non-homogeneity of the magnetic field.	01		
4.	Electron Diffraction experiment	**Experiments:** EXP1 Measuring the diameters of the two	01		

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		diffraction rings for different accelerator voltages. EXP2 Determining the wavelength of the electrons for different accelerator voltages by applying the Bragg condition. EXP3 Confirming the de Broglie equation for the wavelength			
5.	Dielectric Constant Kit	**Experiments:** EXP1 To determine the capacitance of plate capacitor by charge measurement. EXP2 To measure the capacitance as a function of area of plates. EXP3 To measure the capacitance as a function of distance between the plates. EXP4 To determine the dielectric constant of different dielectric materials .	02		
6.	Diode laser diffraction experiment kit	**Experiments:** EXP1 Diffraction of light by single slit. EXP2 Diffraction of light by double slit. EXP3 Diffraction of light by multiple slit. EXP4 Diffraction of light by fine wire. EXP5 Diffraction of light by cross wire. EXP6 Diffraction of light by wire mesh. EXP7 Diffraction of light by transmission grating. EXP8 Diffraction of light by coarse grating. EXP9 Diffraction of light by circular aperture (Pinhole). EXP10 Diffraction of light by grid. EXP11 Diffraction of light by grey filter. EXP12 Diffraction of light by tapered single slit. EXP13 Diffraction of light by circular opaque spots.	02		
7.	Study of Hall effect in semiconductors	**Experiments:** EXP1 To determine Hall Voltage (p or n type). EXP2 To determine Hall Coefficient. EXP3 To determine the type of Charge carrier . EXP4 To determine Charge Density of carriers. EXP5 To determine the Resistivity of a given sample. EXP6 To determine the mobility of charge carriers. EXP7 To determine the Hall angle .	01		
8.	Study of Zeeman effect using Fabry- Perot Interferometer	**Experiments:** EXP1 Splitting up of the central line into two σ-lines and its measurement in wave numbers as a function of the magnetic flux density. EXP2 Evaluation of value of Bohr's	01		

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		magneton. EXP3 normal and anomalous Zeeman effect EXP4 transversal and longitudinal Zeeman effect			
9.	Determination of Plank's constant experiment kit	**Experiments:** EXP1 To determine planck's constant. EXP2 To verify the inverse square law.	01		
10.	Gyroscope (experiment kit)	**Experiments:** EXP1 Determination of the momentum of inertia of the gyroscope by measurement of the angular acceleration. EXP2 Determination of the momentum of inertia by measurement of the gyro-frequency and precession frequency. EXP3 Investigation of the relationship between precession and gyro-frequency and its dependence from torque. EXP4 Investigation of the relationship between nutation frequency and gyro-frequency.	01		
11.	Thompson tube	**Experiments:** EXP1 Investigate the deflection of an electron beam by a magnetic field. EXP2 Estimate the specific charge of an electron. EXP3 Investigate the deflection of an electron beam by an electric field. EXP4 Construct a velocity filter using orthogonal electric and magnetic fields.	01		
12.	Study of B-H curve	**Experiments:** EXP1 To study BH-Curve. EXP2 To study permeability curve	02		
13.	Elastic and Plastic deformation experiment kit	**Experiments:** EXP1 To investigate the elastic and plastic extension of metal wires.	02		
14.	Van de Graaff Generator	200 KV, 400 KV Van de Graaff Generators	02 each		
15.	Boyle's and Charle's law experiment kit	**Experiments:** EXP1: Verify Boyle's law EXP2: Verify Charle's law	03		
16.	Moment of Inertia experiment kit	**Experiments:** EXP1 Determining torsional coefficient for coupling springs EXP2 Determining the moment of inertia for the given bar EXP3 - Determination of moment of inertia as a function of the distance of weights from the axis of rotation EXP4 Determine the moments of inertia for a disc, a	02		

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		sphere, a solid cylinder and a hollow cylinder EXP5 Verification of Huygen-Steiner theorem			
17.	Precision Dynamometer	0.1 N, 0.2N, 1N, 5N, 10N, 100N	02 each		
18.	Centripital Force apparatus	**Experiments:** EXP1 To measure the force required under static conditions to displace the mass the same distance against the pull of the spring. EXP2 To calculate the moment of inertia.	01		
19.	Recording the line spectra of Hydrogen atom (experiment kit)	**Experiments:** EXP1 Determination of the diffraction grating constant by means of the Hg spectrum. EXP2 Determination of the visible lines of the Balmer series in the H spectrum, of Rydberg's constant and of the energy levels.	01		
Total					

Note: The Department is not bound to purchase all equipment mentioned in SECTION II Equipment (items) above. The purchase of these equipment will depend upon the final cost of the items subject to the fund available (as decided by the university) and will be finalized by Technical and Purchase committees.

CERTIFICATE

Certified that full contents of tender document have been thoroughly studied and understood by us before quoting above mentioned rates. We shall not claim / charge any other amount by way of charges, expenses etc. The rate quoted by us above is inclusive of everything.

(Signature of Tender with Seal)
Name:
Address:

7/7/19

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Pt. Ravishankar Shukla University, Raipur
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Section-III

Documents required to qualify technical bid

S.No.	Description	Yes/No
1.	Cost of Tender Documents: Rs. 1000.00 (non-refundable) by Demand draft in favor of Registrar, Pt. Ravishankar Shukla University, Raipur. Downloaded Tender documents must enclose Demand draft of the cost of Tender Document	
2.	EMD Rs. 70,000 by Demand draft in favor of Registrar, Pt. Ravishankar Shukla University, Raipur	
3.	GST Registration Number	
4.	PAN Card No.	
5.	Bidder must have cumulative turnover of Rs. 2 crores (two crores) or more in last three financial years ending with 31-3-2018.	
6.	Bidder must have supplied Physics Laboratory equipment (items) to the departments of state/central universities, PSUs/NITs/IITs/IISERs or to reputed academic institutes against a single purchase order of at least Rs. 25 lakhs (twenty five lakhs) within last three years.	
7.	The bidder should be a manufacturer or authorized distributor of manufacturer (refer section 6.1)	
8.	Warranty declaration (refer section 6.19)	
9.	Bidders should not be associated, or have been associated in the past, directly or indirectly, with a firm or any of its affiliates which have been engaged by the University / to provide consulting services for the preparation of the design, specifications, and other documents to be set for the procurement of the goods under this Invitation of Bids	
10.	Bidders shall not be under a declaration of ineligibility for corrupt and fraudulent practices	
11.	The bidders should also enclose a statement on their letter head stating that "We hereby certify that we have taken steps to ensure that no person acting for us or on our behalf will engage in bribery"	

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Section-IV

Broad Technical Specifications of equipment (items) for Physics Laboratory in Center for Basic Sciences, Pt. Ravishankar Shukla University, Raipur

1. GM Counter, Radiation Counter Experiment kit

Required features
Preset Time
Digital Ratemeter
Preset Audio Alarm
Adjustable High Voltage
Volume Control
Operate both manual and software mode.

Radiation Counter:

Inputs	:	BNC connector - Accepts standard Geiger tubes.
	:	MHV connector - Accepts scintillation detectors.
High voltage	:	0 to +1200 volts @ 0.5mA.
Display	:	6-decade LED, 1 in. numerals; 5-segment bargraph LEDs
Modes	:	Counts; Elapsed Time; Preset Time; Count Rate (counts per second); High Voltage Level; Alarm Level; Speaker Volume.
Audio	:	Includes an audio indication of radiation events and a programmable audio alarm.
Interface	:	USB and RS-232 serial ports for both PC and Macintosh
Power	:	9 volt DC, at 500mA
Dimensions	:	10 inches W, x 7 inches D, x 4.5 inches H
Software	:	Windows and Macintosh versions

GM-35 Tube with Stand:

GM35 GM Probe	:	35mm end window with BNC connector.
Plateau	:	2 mg/cm2, 150V
Deadtime	:	200 microsecond
Dimension	:	35 mm OD, x 223 mm L
Stand	:	10 position stand with sample tray
BNC cable	:	3-ft.

Set of at least 20 Absorbers:
The set of 20 calibrated radiation absorbers should cover the range from 4.5 to 7400 mg/cm2 and consists of aluminum, plastic and lead plates. The absorber 2.75"x2.75" (approximate) should be designed to fit all Spectrum Techniques detector stand assemblies.

Set of Five Radioactive Sources:

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Isotope	Activity	Half-life	Emissions	Energies (keV)
Cs137	5uCi 30.	1yrs	Gamma, Beta	γ32, γ661.6, β511.6, β1173.2
Po210	0.1uCi.	138days	Alpha	γ5407.5
Sr90S	0.1uCi.	28.8yrs	Beta	β546
Co60	1uCi.	5.27yrs	Gamma, Beta	γ1173.2, γ1332.5, β317.9,
T1204S1	1uCi.	3.78yrs	Beta	β763.7

Lead Shield:

Wall thickness : 0.5"
Capacity : Holds up to 20 1" discs.
Outside Dimensions : 3.6" x 2.25" (Lx ø) Approximate
Interior Dimensions : 2.65" X 1.25" (Lx ø). Approximate
Wall thickness : 0.5"Wight : Approximately 4.6 lbs
Lead shield container should be suitable for higher activity gamma sources.

Complete Instruction Manual with Connection/Experiment Set-up Diagrams for performing experiments listed in section II.

2. Millikan Oil drop Apparatus

Input voltage : AC 220V, 50Hz
Output power : 5W.
Plate voltage : 0~500V DC
Change over switch : Between +ve, -ve and 0 field
Plate distance : 5±0.2mm.
Total Magnification : 30X
Linear field of vision : ≥3mm.
Scale division : 2±0.01mm.
Objective lens : 100 lines/mm.

DIGITAL STOP WATCH
Display : 6 Digit
Accuracy : 0.01sec
Digit size : 5mm (at least)
Mode : Start, Stop & Reset
Necklace length : 2 feet

USB CAMERA
Sensor : 1.2 MP (at least)
Eyepiece : 10X with adapter ring
Connectivity : USB

Compatible with System
CPU : PIV 2.0GHz or above
RAM : 1GB or above
O.S : Windows (Linux preferred)

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Complete Instruction Manual with Connection/Experiment Set-up Diagrams for performing experiments listed in section II.

3. Stern Gerlach Experiment kit

Stern-Gerlach apparatus 1
High vacuum pump assembly,compact 1
Electromagnet w/o pole shoes 1
DC measuring amplifier 1
Matching transformer 1
Potassium ampoules, set of 6 1
Varible Power supply 15 VAC/ 12 VDC/ 5 A 1
Steel cylinder,nitrogen,10l, full 1
Two-tier platform support 1
Power supply 0-12 V DC/ 6 V, 12 V AC, 230 V 2
Ammeter 1mA...3 A 2
Meter, 10/30 mV, 200 deg.C 1
Pole piece, plane 2
Voltmeter,0.3-300VDC,10-300VAC / 2
Gas-cylinder Trolley for 10 L. 1
Reducing valve for nitrogen 1
Commutator switch 1
Cristallizing dish, 2000ml 1
Isopropyl alcohol, 1000 ml 1
Storage tray 413x240x100mm (approx) 1
Rubber tubing,vacuum
Connecting cords,

Complete Instruction Manual with Connection/Experiment Set-up Diagrams for performing experiments listed in section II.

4. Electron Diffraction experiment

POWER SUPPLY
High voltage output : 0-5000 V DC, max. 2 mA, max. 5 W
Heater voltage output : 6.3 V AC, max. 3 A
Overload protection : Primary: fuse
Secondary : current-limiting resistors
Connections : 4 mm safety sockets
High-voltage display : Analogue
Dimensions : 235x130x155 mm^3 approx.
Weight : 3.5 kg approx.
High voltage resistant up to 6 kV
SAFETY EXPERIMENT LEADS
Wire cross-section : 2.5 mm2
Continuous current : max. 32 A
Plug and jack : 4 mm (nickel-plated)
Connection cords

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TUBE HOLDER
Terminals : 4 mm safety sockets
Dimensions : approx. 130x190x250 mm^3
Weight : approx. 570 g
ELECTRON DIFFRACTION TUBE
Max. filament voltage : 6.3 V AC
Max. anode voltage : 5 kV
Anode current: approx. 0.1 mA at 4 kV
Lattice constant of graphite: d10 = 0.213 nm; d11 = 0.123 nm

Complete Instruction Manual with Connection/Experiment Set-up Diagrams for performing experiments listed in section II.

5. Dielectric Constant Kit

Required 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.
Capacitor plate : Aluminium, 20cm x 20cm (LxW)
Capacitor plate : Aluminium, 28cm x 28cm (LxW)
Glass sheet : 21cm x 21cm (LxW)
Polystyrene sheet : 21cm x 21cm (LxW)
Two way switch : 4mm socket, 3 nos.
Capacitor : 0.01µF & 0.001µF
Spacer : PVC (1,2,3,4,6 mm)
Switch : Push switch
ELECTROMETER AMPLIFIER
Supply Voltage : 12 V AC
Input Impedance : >1013 ohm
Input Current : < 0.5pA
Output Voltage : up to +10V
Output Current : 5mA (Short Circuit Protected)
Output impedance : <1 ohm
RESISTANCE MODULE

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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

Complete Instruction Manual with Connection/Experiment Set-up Diagrams for performing experiments listed in section II.

6. Diode laser diffraction experiment kit

Required features :

4Class II diode laser.
4Silicon detector

Optical Bench

Scale : 0-100cm
Least count : 1mm
Optical bench should be rigid, heavy, stable and long lasting having leveling screws and flexible feets

Set of (at least) 13 Objects

It consists of 13 Objects : Single slit, double slit, multiple slit 3, multiple slit 4,multiple slit 5,single tapered slit, fine grating, 4 holes, circular opaque spots gray filter, mesh, coarse grating & grid pattern,
Frame Size : 50mm x 50mm

Pin Hole Photo Detector

Detector : Silicon photocell
Terminals : 4mm safety socket
Aperture : 1 mm
Rod : 10 mm diameter

Diode Laser

Peak wavelength : 635nm
Operating voltage : 5V DC
Operating current : 250mA
Optical power : 0.4-0.8mW
Laser product : Class II
Operating temp. : 0 - 40°C
Storage temp. : -10 to 50°C

Digital Multimeter

Resistance :200 W, 2000W, 20k,
200k & 2000k W.
D.C.Voltage : 200 & 2000 mV

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: 20, 200 & 600V
A.C.Voltage : 200 & 600V
D.C.Current : 200 & 2000mA
: 20 & 200mA
: 10 A
Testing : Diode & transistor
Battery : 9V

Complete Instruction Manual with Connection/Experiment Set-up Diagrams for performing experiments listed in section II.

7. study of Hall effect in semiconductors

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 ± 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, 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

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Orientation : <100>
Offset pot : Trim pot
Connection : 4mm safety socket

Complete Instruction Manual with Connection/Experiment Set-up Diagrams for performing experiments listed in section II.

8. Study of Zeeman effect using Fabry- Perot Interferometer

Fabry-Perot interferometer 1
Cadmium lamp for Zeeman effect 1
Electromagnet without pole shoes 1
Pole pieces, drilled, conical 1
Rotating table for heavy loads 1
Power supply for spectral lamps 1
Variable transformer, 25 V AC/20 V DC, 12 A 1
Capacitor, electrolytic, 22000 µF 1
Digital multimeter 1
Optical profile-bench, length(at least) = 1000 mm 1
Base for opt. profile-bench, adjust. 2
Slide mount for opt. profile-bench, h = 30 mm 5
Slide mount for opt. profile-bench, h = 80 mm* 2
Lens holder 4
Lens, mounted, f = +50 mm 2
Lens, mounted, f = +300 mm 1
Iris diaphragm 1
Polarising filter, on stem 1
Polarization specimen, mica 1
Connecting cords

CDC-Camera for PC including measurement software 1
With USB interface, O.S : Windows (Linux preferred)
(compatible with the instrument setup)

two slide mounts, h = 80 mm for performing Zeeman effect experiment without CCD-Camera (classical version of the Zeeman Effect)
Slide mount for optical profile-bench, 1
Sliding device, horizontal 1
Complete Instruction Manual with Connection/Experiment Set-up Diagrams for performing experiments listed in section II.

9. Determination of Plank's constant experiment kit

Salient Features:
Inbuilt power supply & photocell.
Different types of filters and LED.
Different types of wave length of filters and LED
Planck's Constant Apparatus

Light source : Tungsten-halogen 12V / 35W
Scale : Length 400mm
Photocell : Cs Vacuum Phototube
Dark-current : < 0.003 μA
Display mode switch : Displays current (m A) or voltage (V)
Current multiplier : X1, X0.1, X0.01 & X0.001
Accelerate Voltage : -15V to 0V & 0 to15V, <±2%
Power supply : 220V / 50Hz
Measuring error : < ± 15% compared with the recognized value (h=6.62619x 10-34J.S)

Set Of Color Filters

Red : 635nm
Orange : 570nm
Yellow : 540nm
Green : 500nm
Blue : 460nm

Complete Instruction Manual with Connection/Experiment Set-up Diagrams for performing experiments listed in section II.

10. Gyroscope (experiment kit) With PC interface

Equipment Gyroscope with 3 axes 1
Light barrier with Counter 1
Power supply 5 V DC/0.3 A 1
Additional gyro-disc w. counter-weight 1
Stopwatch, digital, 1/100 sec. 1
Barrel base 1
Slotted weight, 10 g, 4

Complete Instruction Manual with Connection/Experiment Set-up Diagrams for performing experiments listed in section II.

11. Thompson tube

Required Features

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 voltage : 500 V
Anode current : approx. 0.1 mA at 4 kV (anode), 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

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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 : ≤0.01% ± 100 mV
Residual ripple : ≤20 mV
50 V output : Voltage: 0 – 50 V DC, max. 50 mA
Stability at full load : ≤0.1% ± 30 mV
Residual ripple : ≤50 mV
12 V output : Voltage: 0 – -12 V DC, max. 4 A
Stability at full load : ≤0.1% ± 30 mV
8 V output : Voltage: 0 – 8 V DC, max. 3 A
Stability at full load : ≤0.1% ± 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 mm^3
Weight : approx. 570 g

Complete Instruction Manual with Connection/Experiment Set-up Diagrams for performing experiments listed in section II.

12. Study of B-H curve

Required Features

Auto identification of sensors
High speed data transfer
Programmable delay in data acquisition
Programmable sampling frequency
Graphical Analysis
Automatic & manual mode of demagnetization

Datalogger & Power Unit

Data Logger

Specifications:

Input channels : 4, 6PIN BT (British Telecom)
Input channels resolution : 12 bit ADC @ 100 ksps
Analog input : 0-5 V
Output channels : 12 bit DAC
Analog output : ± 12 V max 10 mA
Current booster : Upto 1 A
Power Connector : 3PIN DIN
Communication : USB

Power Unit

Power Supply Input Voltage : 220V, 50Hz AC
Power Supply output Voltage : ± 12 V, 3PIN DIN

Electromagnet

Coils : 300 turns.

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Wire : 19SWG, Cu.
Connection : 4mm safety socket.
U Core : 150x130mm2(LxH), 40x40mm^2 cross section.
I Core : 150mm(L), 40x40mm2 cross section.
Point Pin : Length=90mm,
Core material : Ferromagnetic

Voltage & Current Sensor

Voltage Sensor

Voltage Sensor : ±1V
Connection out : 4mm safety socket
Connection in : 6PIN BT

Current Sensor

Current Sensor : ±1A
Connection out : 4mm safety socket
Connection in : 6PIN BT

Complete Instruction Manual with Connection/Experiment Set-up Diagrams for performing experiments listed in section II.

13. Elastic and Plastic deformation experiment kit

DOUBLE HOOK MASS
Material : Brass, Chrome Plated.
Type : Fixed double hook.
Capacity : 50g.(at least)
CLAMP BLOCK
Dimension :30x30x30mm (approx)
PULLEY
Material : Acrylic
Diameter :50mm
ACRYLIC SCALE SCREEN
Material : Acrylic
Scale :1 div=0.25mm
BASE
Mount : Support rod upto 8-14mm.
Length : 200mm

Complete Instruction Manual with Connection/Experiment Set-up Diagrams for performing experiments listed in section II.

14. Van de Graaff Generator (200 KV, 400 KV)

Required features :
Adjustment of belt.
Spark length 50-80mm under favorable ambient condition.
Van-De-Graff Generator
Pointed wheel
Needle on 4mm plug
Perspex jar with pith ball

Thread brush
Point discharge
Perspex pillar
Nylon thread
Faraday's pail
Neon lamp
Electric Chimes
Electric tester
Flexible Lead Pair
Plastic Stool

15. Boyle's and Charle's law experiment kit

Arrangements for performing experiments listed in section II including

beaker
Burret Clamp
Ring stand
Syringe
Weights
Hot plate
Thermometer

Complete Instruction Manual with Connection/Experiment Set-up Diagrams for performing experiments listed in section II.

16. Moment of Inertia experiment kit

Torsion Axle 1
Photo Gate 1
Digital Counter 1
Barrel Foo (heavy), 1000 g (at least) 1
Tripod Stand (with leveling screw system) 1
Precision Dynamometer 1 N (Precision: < 1% of total measuring range)
Dumbbell bar with weights
Set of Test Bodies for Torsion Axle : Disc, sphere, mounting plate, Solid cylinder, hollow cylinder

17. Precision Dynamometer (0.1 N, 0.2N, 1N, 5N, 10N, 100N)

easy-to-read scale,
protection against over-extension of the spring
zero-point calibration capability.
Precision: < 1% of total measuring range
Scale division: 1% of total measuring range

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18. Centripital Force apparatus

CENTRIPETAL FORCE BASE UNIT
Base dimension : 150 x 410mm (length x width)
Vertical shaft : 450mm, mounted in ball bearing
Threaded Rod : 340mm (length) with four wing nut
DIGITAL TIMER & PHOTOGATE
Display : 2 line LCD
Type : Micro controller based
Time resolution : 0.1 milli second
Mode : Time, Speed & Acceleration
Photogate : 2 Nos.
Interface : USB
Operating voltage : 5V DC
Photogate detector : Infra-Red
ACCESSORIES
Weight : 500gm, 60 x 40 mm dimension
Counter weight : 500gm, 50 x 40mm dimension
Rod with thread : 340mm (length)
BOSS HEAD
Object type : Square & round shape
Object size : Up-to 13mm dia
Material : Aluminium alloy
Object can be held both vertically and horizontally.
SLOTTED MASS SET
Material : Brass
Total weight : 1000gm
Accuracy : ±1.0gm
Weight : 10gmx5, 50gx1, 100gx2,
200gx1, 500gmx1, hanger
100gmx1

Complete Instruction Manual with Connection/Experiment Set-up Diagrams for performing experiments listed in section II.

19. Recording the line spectra of Hydrogen atom (experiment kit)

High voltage supply unit with digital display DC: 0...±10kV, 2mA 1
Object holder, 5x5cm(approx) 1
Spectrum tube: hydrogen 1
Spectrum tube: mercury 1
Diffraction grating: 600 lines/mm 1
Tripod base 1
Insulating support 2
Barrel base 1
Cover tube for spectral tubes 1
Stand tube 1
Meter scale, demo. l=1000mm 1
Holders for spectral tubes, 1 pair

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Connecting cords, 30 kV, 1000 mm 2
Right angle clamp 3
Cursors, 1 pair
Support rods
Measuring tape

Complete Instruction Manual with Connection/Experiment Set-up Diagrams for performing experiments listed in section II.

Note: Bidder/s must also submit Brochure consisting of good quality photographs of above equipment with complete technical details about apparatus and components.

SECTION - V
INSTRUCTIONS TO BIDDERS

5.1 This Tender is proposed to have a Two Cover System.

(a) Technical Bid in one cover.

(b) Commercial Bid in another separate cover.

5.2 (a) Technical Bid should be filled in original and should be sealed in separate cover. The cover containing Technical Bid should be superscribed as "**Technical Bid**" and put in a cover along with **earnest money** and the **cost of the Tender Document in case the Tender Document is downloaded from the website**. The bidder should sign all pages of the Technical Bid.

(b) The Commercial Bid as prescribed should be filled in original in a separate cover. The cover containing Commercial Bid should be superscribed as "**Commercial Bid**". The bidder should sign all pages of the Commercial Bid.

(c) The covers containing Technical & Commercial Bids must be put in a single cover. The final cover thus prepared should indicate clearly the name and address of the bidder so as to enable the Bid to be returned unopened in case it is received "late" as the bid received after the due date & time will be rejected and returned unopened to the bidder.

5.3 Commercial Bids of only those bidders shall be opened who qualify in the Technical Bid.

5.4 Technical bids will be opened on the prescribed date and time and checked for submission of earnest money and cost of the Tender Document (if applicable) and other applicable documents.

5.5. The Technical Bid will be opened and checked for technical specifications and working of the equipment as per the requirement.

5.6 In case of a tie in cost quoted, the decision of the Tender Evaluation Committee will be final.

5.7 The successful bidder will be issued supply order by Director Center for Basic Sciences, Pt. Ravishankar Shukla University, Raipur. The successful bidder shall have to supply the ordered equipment within 45 days (forty five days) from the date of supply order. In case the successful bidder fails to do so within the given time, then the earnest money deposited by him

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shall be forfeited and the supply order shall be given to the next party which Technical Committee finds fit.

5.8 The bidder shall bear all costs associated with the preparation and submission of its Bids including the cost of presentation for the purposes of technical clarification of the equipment if so desired by the Technical Committee.

5.9 The bidder is expected to examine all the instructions, technical specifications, terms and conditions carefully laid down in the Tender Document. Failure to furnish all information required in the Tender Document or submission of a bid not substantially responsive to the requirement as per the Tender Document in every respect will be at the bidder's risk and may result in the rejection of the bid.

5.10 A prospective bidder may seek any clarification regarding the Tender Document in person from the Director, Center for Basic Sciences, Pt. Ravishankar Shukla University, Raipur or through e-mail: cbsprsu@gmail.com

5.11 At any time up to the last date for receipt of bids, the Director, Center for Basic Sciences may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective bidder, modify the Tender Document by an amendment. Such amendment /s will be notified in the website and by Fax or via email to the prospective bidders who have received the Tender Document from the university by hand and shall be binding on them.

5.12 The bids prepared by the bidders and all correspondence documents related to the bids shall be accepted in English language only.

5.13 The successful bidders has to **install equipment and demonstrate the experiments** (as mentioned in SECTION II) in Physics Laboratory, Center for Basic Sciences, Pt. Ravishankar Shukla University, Raipur. Only then the supply order shall be considered fulfilled. On the completion of the supply order "Successful Completion of Supply Certificate" shall be issued by the Technical Committee for the purpose of payments of the equipment /s cost. Therefore, the bidder should quote the rate inclusive of GST, software, freight and installation charges etc.

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Section-VI
TERMS AND CONDITIONS

6.1 The bidder should be a manufacturer or authorized distributor of manufacturer of the equipment for which the bid is being quoted in the Tender. Such manufacturer / authorized distributor should have sufficient experience in dealing with the Physics Laboratory equipment for which the bid is being quoted. The authorized distributors shall procure recent authorized distributorship certificate from manufacturers dated on or after 31-03-2018.

6.2 The individual signing the Tender or other Document, in connection with the Tender, must certify as to whether he or she has signed as a manufacturer or authorized distributor for the equipment for which the bid is being quoted. Bids with incomplete information in this regard are liable to be rejected

6.3 The implementation schedule specified in the Tender should be strictly adhered to.

6.4 The quotes should be done strictly as per the specifications given in the "Broad Technical Specifications" of this Tender Document.

6.5 The insurance charges, if any should be mentioned. The original payees receipt will be required along with the bill for payment of insurance charges.

6.6 Where full specifications are not incorporated against any equipment in the "Broad Technical Specifications" of this Tender Document or where specifications are such that the supplier cannot quote for exactly, the suppliers should give their own specifications in detail (illustrative literature, if any should also accompany duly stamped and signed).

6.7 No bids shall be considered unless and until all the documents are properly signed and supported with a earnest money as mentioned in Tender Summary in the form of Bank Draft in favour of Ragistrar, Pt. Rvishankar Shukla University, Raipur, payable at Raipur and the cost of Tender Document i.e. Rs. 1000/- (Rupees One Thousand only) in case the Tender Document is downloaded from the university website www.prsu.ac.in .

6.8 The rate and units shall not be over written. Amount shall be both in figures and words. If there is any difference in the rates quoted in words and in figures, then the amount in words will be taken as final. All corrections must be signed in full by the bidder.

6.9 The signatures on the quote and sample etc. (sent there with) will be deemed to be the authorized signatures of the bidder.

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6.10 The delivery of the equipment will have to be made within **45 (forty five) days** from the date of supply order.

6.11 **EMD**

EMD of Rs. 70,000/- in the form of Demand Draft in favor of the Registrar, Pt. Ravishankar Shukla University, payable at Raipur, shall be submitted along with tender, the tender received without EMD or in any other form than as stated above may be rejected. The EMD shall be returned to the unsuccessful tenderer within one month of the opening of tender. The EMD shall be retained in addition to the retention money and shall be returned on completion of the project.

Interest shall not be given on EMD amount.

The earnest money of the Successful Bidder (s) will be refunded only after the completion of installation of the equipment and "Successful Completion of Installation Certificate" be issued by the Technical Committee.

6.12 **Award Criteria**

The University will order to the successful Bidder whose bid has been determined to be substantially responsive and has been determined to be qualified to perform the Contract satisfactory.

6.13 **Dispute**

In case of any dispute, the decision of the Vice- Chancellor, Pt. Ravishankar University, Raipur shall be final and binding.

6.14 **University Right to Accept Any Bid and to Reject Any or All Bids**

The University reserves the rights to accept or reject any or all of the Tenders and increase or decrease the quantity as mentioned in the advertisement without assigning any reason and no claim will be admitted in this regard. The Department is not bound to purchase all equipment and the purchase of these equipment will depend upon the final cost of the items subject to the available fund (as decided by the university) and will be finalized by Technical and Purchase committees.

6.15 **Signing of Contract**

In the event of Tender being accepted, the whole Tender Document shall be converted into contract. The tenderer shall sign the necessary contract papers within 10 days of the contract intimation. Expenses for the agreement including cost of stamp paper etc, shall be bome by the bidder. In case of delay the "Earnest Money" may be forfeited and the tender canceled or the contract enforced as per

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terms of the tender and the tenderer shall thus be bound even though the formal agreement has not been executed and signed by the tenderer.

6.16 Corrupt of Fraudulent Practices

The University requires that Bidders, Suppliers, Contractors observe the highest standard of ethics during the procurement and execution of such contracts. In pursuit of this policy, the University

I. Defines, for the purpose of this provision, the terms set forth below as follows:

i. "Corrupt practice" means the offering, giving, receiving, or soliciting, directly or indirectly, of anything of value to influence the action of a public official in the procurement process or in contract execution;

ii. "Fraudulent practice" means a misrepresentation or omission of facts in order to influence a procurement process or the execution of a contract;

iii. "Collusive practice" means a scheme of arrangement between two or more Bidders. With or without the knowledge of the borrower, designed to establish bid prices at artificial, non competitive levels; And

iv. "Coercive practice" means harming or threatening to harm directly or indirectly, persons or their property of influence their participation in the procurement process or affect the execution of a contract;

II. Will reject a proposal for award it the manufacturer/supplier, in the judgment of the University has engaged in corrupt or fraudulent practices as defined in CC in competing for or in executing the Contract.

III. Will sanction a firm or individual, including declaring them ineligible, either indefinitely or for a stated period of time, to be awarded a contract if it at any time determines that they have, directly or through an agent, engaged, in corrupt, fraudulent, collusive or coercive practices in competing for, or in executing, a contract; and

IV. Will have the right to require that a provision be included in Bidding Documents and in contracts requiring Bidders, Suppliers, Contractors and Consultants to permit the University to inspect their accounts and records and other documents relating to appointed by the University. Furthermore, Bidders shall be aware of the provisions stated in the Conditions ofContract.

6.17 Modification and Withdrawal of Bids

The Bidders may modify or withdraw its bid after the bids submission, provided that written notice of the modification or withdrawal is received by the University prior to the deadline prescribed for submission of bids. The Bidders modification or withdrawal notice shall be prepared, sealed, marked and dispatched. A withdrawal notice may also be sent by fax but followed by a signed confirmation

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copy which should reach the University before the deadline for submission of bids. The university shall not be responsible for any postal and allied delays.

No bid may be withdrawn in the interval between the deadline for submission of bids and the expiration of the period of bid validity specified by the Bidder on the bid form. Withdrawal of a bid during this interval may result in the Bidder's forfeiture of his bid security.

6.18 **Terms of Payment**

I. Payment shall be made in Indian Rupees.

II. Schedule of payment shall be as follows :-

i. 90% of total cost will be released after successful installation and commissioning of equipment and demonstration of experiments.

ii. 10% of total cost will be released in three years in three installments subjected to performance of instrument and coverage of on-site warranty (one third after completion of one year, one third after completion of second year and remaining after completion of third year).

6.19 **On-site warranty**

The successful bidder shall have to provide **three year on-site warranty** on the equipment for which the bid is being quoted and **complete information on the after sale service of the equipment be supplied in the Technical Bid.** Bidders must give the comprehensive on-site warranty as required from the date of successful installation of Equipment against any manufacturing defects and also give the warranty declaration that "everything to be supplied by us here under shall be free from all defects and faults in material, workmanship and shall be of the highest quality and material of the type ordered, shall be in full conformity with the specification and shall be complete enough to carry out the experiments, as specified in the tender document." Any deviation in the material, and the specifications from the accepted terms may liable to be rejected and the bidders need to supply all the goods in the specified form to the satisfaction / specifications specified in the order / contract and demonstrate at the their own cost. Warranty shall include a pickup and return warranty service. In case defective/malfunctioning equipment or its component(s) can not be fixed by the Bidder at our location, Bidder shall pick up the defective/malfunctioning equipment or its component(s) from our location, repair it, and return it back to your location. Bidder shall incur all repair, labor, logistics, and insurance costs in this process. Our location means Physics Laboratory, Center for Basic Sciences, Pt. Ravishankar Shukla University, Raipur (C.G.) in this tender document.

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6.20 **No Escalation**

No escalation on labor, material on any other statutory levy/tax will be paid to the bidder/ contractor during the duration of the contract. No alternation in this clause will be acceptable.

Registrar
Pt. Ravishankar Shukla University
Raipur, Chhattisgarh

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