

## जीवाजी विश्वविद्यालय, ग्वालियर

क्रमांक/स्टोर/23/308

दिनांक: 15/9/23

### ई-निविदा-सूचना

जीवाजी विश्वविद्यालय, ग्वालियर द्वारा भौतिकी प्रयोगशाला उपकरण क्रय किये जाने हेतु ई-निविदा <https://mptenders.gov.in> पर (TWO BID TENDER SYSTEM) आमंत्रित की जाती है। निविदाओं का विस्तृत विवरण जीवाजी विश्वविद्यालय, ग्वालियर की वेब साइट [www.jiwaji.edu](http://www.jiwaji.edu) पर भी उपलब्ध है।

  
कुलसचिव  


सम्पर्क :-

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# JIWAJI UNIVERSITY, GWALIOR

Tender No./Store/2023/308

Date: 15-09-23

## E-Tender Notice

Online E-Tenders on <https://mptenders.govt.in> are invited from the reputed and established manufactures for supply of Physics Laboratory Apparatus and experimental setup for graduate student as per tender document.

The Tender Document along with all Terms and Conditions can also be seen on our website [www.jiwaji.edu](http://www.jiwaji.edu).

S.No	Tender MP/JUG/Tender NO.	ID	Description of work	of Qty.	Estimates Cost of work	EMD	Cost of Tender
1.	2023_JIWAJ_308343-1		supply and installation Physics Laboratory Apparatus and experimental setup for graduate student	1 No.	15,00,000/- (Lakh)	45,000/-	2,000/- (Non refundable)

1. Last date of purchase of tender online 6.10.23 up to 5:00 P.M.
2. Last date of submission of online price bid 7.10.23 up to 5:00 P.M.
3. Opening of Technical bid 10.10.23 at 3:00 PM.
4. The remaining term and condition, corrigendum and amendment is issued (if any) related above were will be published on website only.
5. Registrar reserves the right to cancel, amend or extend the tender at any time without assigning any reason.

  
Registrar  


# **Jiwaji University, Gwalior**

## **TENDER NOTICE**

No. JU/BSC/STORE/308/2023

Date : 15-09-2023

Sealed tenders are invited from reputed manufacturer or their authorized representative for the supply and installation of the apparatus related to B.Sc. Honors courses. Details about the list of the instruments can be downloaded from the website [www.jiwaji.edu](http://www.jiwaji.edu). The picture of each apparatus or experimental set up should be enclosed along with tender. It should be clearly mentioned that complete practical manuals are available or not. Technical specification/details related to each apparatus should be enclosed. The completed tender should reach the office of the Registrar, Jiwaji University, Gwalior.

**TENDER DOCUMENT**  
**FOR**  
**Procurement of Laboratory Apparatus**  
**and**  
**Experimental setup**  
**For Graduate Course**  
**for**  
**School of Studies in Physics**  
**JIWAJI UNIVERSITY, GWALIOR**



**Registrar**

**Jiwaji University**  
**Gwalior - 474011 (M.P.)**

# जीवाजी विश्वविद्यालय, ग्वालियर

क्रमांक/स्टोर/23/308

दिनांक: 15.09.2023

// ऑनलाइन ई-निविदा-आमंत्रण //

आवश्यक नियम और शर्तों के साथ निविदा दस्तावेज रुपये 2000/- निविदा शुल्क जमा करने के बाद डाउनलोड किया जा सकता है।

Sr. No.	Experiment
1	<p><b>NEWTON'S RINGS APPARATUS</b></p> <p><b>Experiments:</b></p> <p>Exp-1 To determine the wavelength of sodium light.</p> <p>Exp-2 To determine the refractive index of a liquid by using newton's rings apparatus.</p> <p>Exp-3 To find the radius of curvature of planoconvex lens using newton's rings experiment, given <math>\lambda=5893\text{Å}</math>.</p> <p>Exp-4 To find the thickness of a thin sheet of paper (air wedge experiment).</p> <p><b>NEWTON'S RINGS</b></p> <p><b>Dimension : 390 x 480 x 170mm approx.</b></p> <p>Micrometer : 0.01 mm least count</p> <p>Eyepiece : Ramsden 10X</p> <p>Objective : 3X</p> <p>Weight : 12.6 kg approx.</p> <p><b>SPHEROMETER (DISC BRASS)</b></p> <p><b>Types : 3 legs</b></p> <p>Vertical scale : 6mmx6mm (WxT)</p> <p>Micrometer : Dia. 40mm, Brass</p> <p>Lower disc : Dia. 60mm</p> <p>Range : 10-0-10mm</p> <p>Least count : 0.01mm</p> <p><b>PLANO CONVEX LENS</b></p> <p>Dia. : 61.5mm, Glass</p> <p>Focal length : 200mm</p>
2	<p><b>SPECTROMETRY KIT</b></p> <p><b>Exp-1</b> To determine the Refractive index of the material of Prism using Sodium Light.</p> <p><b>Exp-2</b> To determine dispersion power of a prism.</p> <p><b>Exp-3</b> To determine the resolving power of the prism.</p> <p><b>Exp-4</b> To verify the Cauchy formula.</p> <p><b>Exp-5</b> To determine the wavelength of Sodium Light using a plane diffraction Grating.</p> <p><b>Exp-6</b> To determine the Resolving Power of a plane diffraction grating.</p> <p><b>SPECTROMETER</b></p> <p>Scale : Brass, Dia 150mm.</p> <p>Objective : Achromatic, focal length 178mm, aperture 32mm</p> <p>Slit : German silver.</p> <p>Reticle : 90° cross on glass.</p> <p>Least count : 1 minute.</p> <p>Base : Aluminium Casting</p> <p><b>SODIUM LIGHT SOURCE:</b></p> <p>Starting Voltage : 470 Volts</p>

	<p>Operating Voltage : 220 Volts, 50 Hz.  Lamp House : Excluding Rod (300 x 85 mm dia.)  <b>PRISM (EDF)</b>  SIZE : 38 X 38 X 38 MM.  Height : 38mm  Material : EDF  <b>DIFFRACTION GRATING</b>  Size : 38 x 50 mm.  Lines/inch : 15000  <b>MICROMETER SLIT</b>  Pitch : 0.5 mm.  Least Count : 0.005 mm.  Range : 0 - 6.5 mm.  Diameter : 38 mm approx.</p>
3	<p><b>MICHELSON INTERFEROMETER WITH SODIUM LIGHT SOURCE</b>  <b>Experiment:</b>  Exp-1 To determine the wave length of monochromatic light. using sodium light source.  <b>Michelson Interferometer</b>  Base dimension : 290 x 212 x 168mm (L x W x H)  Distance of mirror M2 from Beam Splitter : 100mm.  Dimensions of beam splitter : 50 x 38 x 7 mm (L x W x T)  Dimensions of compensating plate : 50 x 38 x 7 mm (L x W x T)  Dimensions of mirrors M1 and M2 : 30 mm dia, Thickness 10 mm.  Reflectivity : Transmittivity : 50 : 50  Flatness of beam splitter : <math>\lambda/8</math>  Least count : 0.01 mm (coarse adjustment knob)  Least count : 0.0001 mm (coarse adjustment knob)  <b>Sodium Light Source</b>  Starting Voltage : 470 Volts  Operating Voltage : 220 Volts, 50 Hz.  Lamp House : Excluding Rod (300 x 85 mm dia.)  Aperature Dia : 25mm</p>
4	<p><b>MICHELSON INTERFEROMETER WITH DIODE LASER</b>  <b>Experiment:</b>  Exp-2 To determine the wave length of monochromatic light. (using diode laser).  <b>Michelson Interferometer</b>  Base dimension : 290 x 212 x 168mm (L x W x H)  Distance of mirror M2 from Beam Splitter : 100mm.  Dimensions of beam splitter : 50 x 38 x 7 mm (L x W x T)  Dimensions of compensating plate : 50 x 38 x 7 mm (L x W x T)  Dimensions of mirrors M1 and M2 : 30 mm dia, Thickness 10 mm.  Reflectivity : Transmittivity : 50 : 50  Flatness of beam splitter : <math>\lambda/8</math>  Least count : 0.01 mm (coarse adjustment knob)  Least count : 0.0001 mm (coarse adjustment knob)  <b>Microscope Objective In Holder:</b>  Objective : 10X  Rod diameter : 10mm  Holder diameter : 25mm  <b>Object Screen:</b>  Material : Translucent, acrylic</p>

	Size : 300 x 300mm Rod : 10 mm diameter <b>Cylindrical Base:</b> Material : Ferrous Mount : Rod 10-14mm dia : Flat object up to 10mm Groove : Slide object, 30x10mm (Lx W) <b>Diode Laser</b> 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
5	<b>TWO BEAM INTERFERENCE WITH SODIUM LIGHT SOURCE</b> <b>Experiment:</b> <b>Exp-1</b> To determine the wavelength of monochromatic light source using Fresnel's biprism. <b>Exp-2</b> To determine the wavelength of monochromatic light source using Fresnel's mirror. <b>OPTICAL BENCH:</b> 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 feet. <b>UNIVERSAL LENS HOLDER</b> Object : upto 60mm Jaws : 3 no. at 90° Frame : 100 mm dia. Rod : 10mm dia. Rotation : By knurled screw <b>FRESNEL'S BIPRISM (RECTANGULAR)</b> Material : Glass Size : 40x30mm (L x W) Prism angle : 178° approx. <b>SODIUM LIGHT SOURCE:</b> Starting Voltage : 470 Volts Operating Voltage : 220 Volts, 50 Hz. Lamp House : Excluding Rod (300 x 85 mm dia.) Aperature Dia : 25mm <b>ADJUSTABLE SLIT SELF CENTERING:</b> Slit Width : 0-2 mm Height : 6 mm Frame : 120mm dia., to avoids scattering of light Rod : 10mm dia. <b>MICROMETER EYEPIECE:</b> Eyepiece : 10X, Ramsden Pitch : 0.5mm Least count : 0.01mm Displacement : 20mm <b>CONVEX LENS IN HOLDER:</b> F. L : 200mm Lens : 50mm dia.

	<p>Frame : 130mm dia, to Rod : 10mm dia.</p> <p><b>MICROSCOPE OBJECTIVE</b> Objective : 10X Diameter : 25mm(approx)</p>
6	<p><b>ADVANCE POLARIMETER</b> <b>Experiment:</b> Exp-1 To measure the rotation of the polarisation plane through optically active liquids and determine the concentration of sugar solution. Exp-1 To observe the rotation of the plane of polarization of monochromatic light by sugar solution for determining the concentration of solution of optically active substance</p> <p><b>Compact Quartz Polarimeter</b> Measuring range of optical rotation : +/- 180 Division Value : 1o Least count : 0.05o Magnifying factor of the magnifying glass : 4 times Monochromatic light source : 5893Ao Power line voltage : 220V, 50 Hz Working current : 1.3A Discharging power : 20W Stabilization time(approx.) : 5 minutes</p>
7	<p><b>HE-NE LASER KIT (SUPPLIED WITH INDIAN SLITS)</b> <b>Experiments:</b> Exp-1 To demonstrate that light spreads when it passes through a narrow aperture. Exp-2 To observe the diffraction patterns by holes, single slit and double slit, mesh, grating, grid, opaque spots. Exp-3 To demonstrate Young's fringes. Exp-4 To demonstrate Fresnel's diffraction. Exp-5 To measure wavelength of light using a millimeter scale as a grating. Exp-6 To demonstrate fringes of equal inclination</p> <p><b>OPTICAL BENCH TRIANGULAR</b> 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 feet.</p> <p><b>SETOF13 OBJECTS R5199</b> 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 &amp; grid pattern. Frame Size : 50mm x 50mm</p> <p><b>MEASURING TAPE</b> Length : 3m Least Count : 1mm Width : 16mm</p> <p><b>FIXED SLIDER WITH LARGE WIDTH</b> Material : AL Extrusion Base width : 80mm Height : 115mm It can hold rod from 8mm to 15mm</p> <p><b>OBJECT SCREEN</b> Material : Translucent, Acrylic.</p>



	<p>Size : 300 x 300 mm  Rod : 10 mm diameter  <b>CYLINDRICAL BASE</b>  Material : Ferrous  Mount : Rod 10-14mm dia  : Flat object up to 10mm  Groove : Slide object,  30x10mm (LxW)  <b>PRISM TABLE</b>  Disc : 75mm diameter.  Rod : 10 mm diameter</p>
8	<p><b>RESOLVING POWER OF A TELESCOPE</b>  <b>Experiment :</b>  Exp- To determine the resolving power of a telescope.  <b>BRIDGE TYPE MICROSCOPE</b>  Eyepiece : Ramsden 10x  Objective : 3x  Scale length : 110 mm  Least count : 0.01 mm  <b>SODIUM LIGHT SOURCE</b>  Starting Voltage : 470 Volts  Input Voltage : 220V, 50 Hz  Lamp House : 300x85mm(LxØ)  Aperture dia. : 25mm  <b>MICROMETER SLIT</b>  Pitch : 0.5 mm.  Least Count : 0.005 mm.  Range : 0 - 6.5 mm.  Diameter : 38 mm approx.  <b>TELESCOPE</b>  Eyepiece : 10X  Focusing : Slide type  Mounting : 10mm dia. rod</p>
9	<p><b>OPTICAL FIBER KIT</b>  <b>Experiments:</b>  Exp-1 Calculate the numerical aperture and study the losses that occur in optical fiber cable.  Exp-2 To study losses at FIBER junctions.  Exp-3 To measure losses in dB of two optical FIBER patchcords and the coefficient of attenuation.  Exp-4 To study the relationship between the LED forward current and the LED optical power output.  Exp-5 To study the relationship between the optical input power, and the resultant photo current.  Exp-6 To study the AC characteristics of a linear intensity modulation system.  Exp-7 To study external circuitry to transmit an audio signal through an optical FIBER using the analogue transmitter and receiver.  <b>Contents :</b>  1 One - meter PMMA Fiber Patchcord  2 Five meter PMMA Fiber Patchcord  3 In -Line SMA Adaptor</p>

	<p>4 Mandrel  5 Numerical aperture measurement Zig  6 Fibre optics Trainer  7 Speaker  8 Mic  9 Circular screen  10 Connecting leads</p>
10	<p><b>FOCAL LENGTH OF A COMBINATION OF LENSES USING NODAL SLIDE ASSEMBLY</b>  <b>Experiment :</b>  Exp- To find out focal length of a combination of lenses using nodal slide assembly.  <b>OPTICAL BENCH TRIANGULAR</b>  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 feet.  <b>POWER SUPPLY 12V AC/DC</b>  Output : 2,3,4,5,6,8,10 &amp; 12VAC full wave rectified, unsmoothed &amp; unregulated D.C.  Overload : Resettable thermal trip.  Input : 230 V AC,50 Hz  <b>NODDLE SLIDE ASSEMBLY</b>  Angular scale : 1800 @ 10  Linear scale : 140mm @ 1mm  Lens Holder : Single &amp; double arrangement  <b>LAMP HOUSING</b>  Lamp : 12V, 21V  Lens : Spherical condenser, to and fro adjustment  Connection : 4mm plug lead  Mounting rod : 10mm dia.  Housing : Aluminium, Heat ventilation arrangement  <b>REFLECTING MIRROR IN MOUNT</b>  Size : 50x50x6mm  Surface : <math>\lambda/5</math>  Coating : Front coated  Mounting Rod : 10mm diameter  <b>SLIT WITH HOLDER</b>  Slit type : Cross  Material : Metal sheet  Mounting Rod : 10mm diameter</p>
11	<p><b>SEXTANT</b>  <b>Experiments:</b>  Exp-1:- To determine height of building, pole etc.  Exp-2:- To measure the area of window etc.  <b>Additional experiments:</b>  Exp-1:- To determine altitude of Sun.  Exp-2:- To determine the angular diameter of Sun.  Exp-3:- To determine the height of distant object with the help of artificial horizon.  <b>Contents :</b>  Tripod Base (C.I.) with levelling screws.  Adjustable Height stand (MS) Height 6 feet.  Measuring Tape 5 meter.</p>

	<p>Sextant Astronomical telescope Terrestrial Telescope</p>
12	<p><b>ZEEMAN EFFECT ELECTROMAGNET</b>          Coils : 500 turns.          Coil Current : 8.5Amp (Max.)          Connection : 4mm safety socket.          U Core : 150x130mm(LxH), 40x40mm cross section.          I Core : Length=150mm, 40x40mm cross section.          Core material : Ferromagnetic.          Bore piece : Iron with 5mm graduated scale          Ventilation on three sides of coil to protect from overheating.  <b>POWER SUPPLY 0-30V DC, 5A</b>          Input Voltage : AC 220V <math>\pm</math>5%          Output Voltage : 0-30V          Output Current : 0-5Amp          Voltage Display : 3½ Digit LED          Current Display : 3½ Digit LED  <b>FABRY PEROT ETALON</b>          Mirror optics : <math>\lambda/20</math>          Mirror gap : 3 mm, adjustable          Filter : 532nm, Green          Interference Filter          Clear view : 40mm dia          Rod : 10 mm dia.  <b>USB CAMERA</b>          Sensor : CMOS          Output : VGA          Connector : BNC          Power : 5V DC          Focus : Manual adjustment          Rod : 10 mm dia.  <b>CONVEX LENS IN HOLDER</b>          Focal Length : 100mm          Diameter of Lens : 50 mm          Frame Diameter : 130 mm to avoids scattering of lights          Rod Diameter : 10 mm  <b>POLARIZER FILTER</b>          Angle : Adjustable (0°-90°)          Aperture : 21mm dia.          Frame : 130mm dia., to avoids scattering of lights          Polarization : Linearly polarized          Rod : 10 mm dia.  <b>QUARTER WAVE PLATE</b>          Angle : Adjustable (0°-90°)          Aperture : 15mm dia.          Frame : 130mm dia., to avoids scattering of lights          Polarization : Circular polarized          Rod : 10mm dia.  <b>MICROMETER EYEPIECE</b></p>

	<p>Eyepiece : 10X, Ramsden  Pitch : 0.5mm  Least count : 0.01mm  Displacement : 20mm  <b>OPTICAL BENCH TRIANGULAR</b>  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.  <b>TRANSVERSAL SLIDER</b>  Material : AL Extrusion  Base width : 35mm  Height : 25mm  Movement : + 25mm  Least count : 0.01mm  It can hold rod from 8mm to 15mm  <b>MERCURY TUBE WITH HOLDER</b>  Tube : High pressure mercury tube  Input : 230V AC  Output : 12V  Connection : Tag with tightening screw  <b>CONVEX LENS IN HOLDER</b>  Focal Length : 50mm  Diameter of Lens : 50 mm  Frame Diameter : 130 mm to avoids scattering of lights  Rod Diameter : 10 mm  <b>DIGITAL GAUSS METER</b>  Range : 200 G &amp; 2 kG  Resolution : 1G at 0 - 200G  Power : 220 V, 50 Hz AC  Hall probe : InAs</p>
13	<p><b>BABINET COMPENSATOR</b>  <b>Experiment:-</b>  Exp:- To analyse elliptically polarised light by means of Babinet`s compensator.  <b>Contents :</b>  White light source (Lamp)  Quarter wave plate  Polariser  Analyser  Eye piece  Sodium lamp (optional)</p>
14	<p><b>LOW RESISTANCE ( CAREY-FOSTER-BRIDGE)</b>  <b>Experiment:-</b>  Exp:- To calibrate the wire of Carey-Foster-Bridge and hence determine the value of given low resistance.  <b>Contents :</b>  Carey-Foster-bridge with Jockey  Resistance module 10 ohm</p>

	<p>Resistance modules 0.5,1,1.5 &amp; 2.5<math>\Omega</math> (each)  Sensitive galvanometer 20 <math>\mu</math>A/Div.  Thick brass strip  Power supply 2V/100mA  Connecting leads (red &amp; black) 50cm (pair)  Connecting leads black 25cm  Unknown low resistances (approx. 0.22 &amp; 2<math>\Omega</math>)</p>
16	<p><b>MILLIKAN OIL DROP APPARATUS</b>  <b>MILLIKAN'S APPARATUS</b>  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<math>\pm</math>0.2mm.  Total Magnification : 30X  Linear field of vision : <math>\geq</math>3mm.  Scale division : 2<math>\pm</math>0.01mm.  Objective lens : 100 lines/mm.  <b>DIGITAL STOP WATCH</b>  Display : 6 Digit  Accuracy : 0.01sec  Digit size : 5mm  Mode : Start, Stop &amp; Reset  Necklace length : 2 feet</p>
17	<p><b>MAGNETIC FIELD ALONG THE AXIS</b>  <b>Experiments:</b>  Exp-1 To study Biot-Savart's law.  Exp-2 To study the magnetic field along the axis of a current carrying multiturn coil.  Exp-3 To study the dependency of magnetic field on coil diameter and number of turns.  <b>POWER SUPPLY</b>  Voltage : 0-20V DC continuously variable &amp; 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  <b>GAUSS METER WITH AXIAL PROBE</b>  Range : 200 Gauss &amp; 2 k Gauss  Resolution : 0.1Gauss at 0 - 200 Gauss  Offset : By Potentiometer to set ZERO  Display : 3½ Digit LED  Input Voltage : 220 V, <math>\pm</math> 5 %, 50 Hz AC  Axial Hall Probe : InAs  <b>INDUCTION COIL SETS</b>  Material : Copper  <b>OD(mm) L (mm) N R (<math>\Omega</math>) L ( mH) I max</b>  40 75 165 0.7 0.5 2A  40 100 220 1 0.71 2A  40 125 275 1.2 0.91 2A  32 75 165 0.6 0.36 2A  32 100 210 0.8 0.51 2A  32 125 275 1 0.66 2A</p>

	<p><b>OPTICAL BENCH</b>  Material : Aluminium alloy  Type : Hexagonal section  Scale : 0-50cm  Least count : 1mm</p> <p><b>COIL HOLDER</b>  Material : PVC, MS  Dimension : 150 x 90mm  Rod : MS 10mm dia.</p> <p><b>AXIAL PROBE HOLDER</b>  Material : PVC with 4mm knob  Rod : MS 10mm dia.</p>
20	<p><b>FOUR PROBE- RESISTIVITY MEASUREMENT</b>  <b>Experiments:</b>  Exp-1 Measurement of resistivity of semiconductor by four probe method.  Exp-2 Determination of Energy Band Gap</p> <p><b>FOUR PROBE POWER SUPPLY</b>  Voltmeter Display : 3½ digit, 7segment LED,  auto polarity &amp; decimal indication.  Voltage Range : X1 (0-200.0mV DC) &amp;  X10 (0-2.00 V DC), 4mm socket  Current/Temperature : 3½ digit, 7segment LED  Display  Temperature Range : -10 to +200°C @ 1°C  Current Range : 0-20mA DC, 4mm socket  Oven Supply : 60V AC  Oven Connector : 5 Pin, DIN type  Input Voltage : 220V, 50Hz AC  Fuse : 1A, 250 V</p> <p><b>P-TYPE GE CRYSTAL</b>  Crystal : Ge Wafer, P type  Crystal Size : 12 x14 x 0.5mm (LxWxThickness)  Resistivity : 1~ 10 ohm-cm  Orientation : &lt;100&gt;</p> <p><b>FOUR PROBE CRYSTAL HOUSING</b>  Material : Steel metal, Nylon  Pillar : Spring loaded  Height can be adjusted using three screw mounted on top</p> <p><b>OVEN</b>  Heating Element : 35 ohm, 75 Watt  Oven Supply : 60V AC  Oven Connector : 5 Pin, DIN type  Connector Make : MX  Ambient Temperature : 50°C  Fuse : 2A  Temperature Range : -10 to +200° C  Least Count : 1° C  Length : 300mm approx.</p> <p><b>FOUR PROBE CABLE</b>  Pin : Spring loaded  Probe Spacing : 25mm  Connection : 4mm safety socket</p>

22	<p><b>STUDY OF P-N JUNCTION &amp; ENERGY BAND GAP</b></p> <p><b>Experiments:</b>  Exp-1 Determination of reverse saturation current.  Exp-2 Study of Energy Band Gap of p-n Junction.  Exp-3 Study of Junction capacitance</p> <p><b>P-N JUNCTION SETUP</b>  Selector Switch : V-I and V-T experiment, Bias &amp; Junction  Selector Switch at V-I position/Junction :-  Voltmeter Display : 3½ digit, 7segment LED, auto polarity  Voltage Range : 0.000-1.999V  Current Display : 3½ digit, 7segment LED  Current Range : 0-20mA</p> <p><b>Selector Switch at V-T position/Junction :-</b>  Voltage Display : 3½ digit, 7segment LED  Voltage Range : 0.000-1.999V  Temperature Display : 3½ digit, 7segment LED  Temperature Range : 273K to 353K</p> <p><b>CRO in Bias Position :-</b>  Frequency : 5KHz &amp; 20KHz  Voltage : 220mV (p-p)  Output Connector : 3 Pin, DIN type  Voltage Range : 0.00-10.00V  Oven : Heater pin 4 &amp; 5. Temperature pin 1 &amp; 2  Oven Connector : 5 Pin, DIN type  Diode &amp; Transistor : 4mm safety socket  Input Voltage : 220V, 50Hz AC</p> <p><b>OVEN WITH TEMPERATURE SENSOR</b>  Heating Element : 35 ohm  Oven Connector : 5 Pin, DIN type  Ambient Temperature : 353K  Temperature Sensor : Pt100  Output Pin : Heater pin 4 &amp; 5. Temperature pin 1 &amp; 2</p>
23	<p><b>HALL EFFECT</b></p> <p><b>Experiments:</b>  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 .</p> <p><b>CONSTANT CURRENT SOURCE</b>  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.</p> <p><b>POWER SUPPLY</b>  Voltage : 0-20V DC continuously variable &amp; stabilized  Voltage display : 3½ digit LED  Ripple : Less than 25mV  Overload : Current limiting protection</p>

	<p>Current : 5 A continuously variable, 10% to full rating  Current display : 3½ digit LED  Working voltage : 230V AC, 50 Hz single phase  <b>HALL EFFECT APPARATUS</b>  Coils : 500 turns.  Coil Current : 8.5Amp (Max.)  Connection : 4mm safety socket.  U Core : 150x130mm<sup>2</sup>(LxH), 40x40mm<sup>2</sup> cross section.  I Core : Length=150mm, 40x40mm<sup>2</sup> cross section.  Core material : Ferromagnetic.  Base dimension : 360x180x33mm<sup>3</sup>  Weight : 8.8kg (Approx.)  <b>DIGITAL GAUSS METER</b>  Range : 200 Gauss &amp; 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  <b>GE CRYSTAL PCB</b>  Crystal : Ge Wafer, P type  Crystal Size : 6x7 x 0.5mm<sup>3</sup> (LxWxThickness)  Resistivity : 1~ 10 ohm-cm  Orientation : &lt;100&gt;  Offset pot : Trim pot  Connection : 4mm safety socket</p>
24	<p><b>POTENTIOMETER ONE METER SINGLE WIRE</b>  it should consists of a wooden base fitted with 4mm socket terminals, single wire and a 100cm wooden scale. Supplied without jockey.</p>
25	<p><b>Determine Stefan's Constant</b>  <b>Exp:-</b> To determine the value of Stefan`s constant  <b>Scope of Supply</b>  Stefan`s apparatus  Thermometers  Stop watch  Sensitive galvanometer  Silver-constantan thermocouple  Beaker 600ml  Steam generator</p>
28	<p><b>CALORIMETER</b>  <b>Experiment:-</b>  Exp:- To determine mechanical equivalent of heat with Joule's calorimeter  <b>Scope of Supply</b>  Joules calorimeter  Digital voltmeter 19.99 VDC  Digital ammeter 19.99 ADC  Battery eliminator 1.5 to 12V AC/DC, 3A  Rheostat 10Ω / 3.3A  Stop watch  Thermometer  Connecting leads red &amp; black 50cm (pair)</p>



29	<p><b>MODULUS OF RIGIDITY BY MAXWELL NEEDLE</b></p> <p><b>Experiments:</b> Exp:- To determine the value of the modulus of rigidity of the material of a given wire by a dynamical method using maxwell's needle.</p> <p><b>Scope of Supply</b> Hollow cylindrical brass tube of length 40cm Maxwell's needle Wire Screw gauge Meter scale Digital Weighing balance Stopwatch</p>
30	<p><b>ELASTIC CONSTANTS</b></p> <p><b>Experiments:</b> Exp:- To determine elastic constants of a wire by searles's method.</p> <p><b>Scope of Supply</b> SS rectangular bars each of length 30cm Vernier calliper Screw gauge Stopwatch Thread reel Weighing balance (optional) Meter scale Experimental wire each L= 30cm, dia 1.2mm, 1.6mm and 2.5mm Wall bracket</p>
31	<p><b>SURFACE TENSION</b></p> <p><b>LABORATORY JACKS</b> Material : Aluminium Top Plate Size : 160x130mm Static Loading : 10kg Vertical Elevation : 65 to 260mm <b>'A' SHAPED BASE</b> Mount : Support rod upto 8-14mm. Material : Cast iron Length : 200mm</p> <p><b>VERNIER CALIPER</b> Material : Steel Type : Ground jaws and slides Internal measurement : 150mm x 0.02mm or 6" x 0.001" External measurement : 150mm x 0.02mm or 6" x 0.001</p> <p><b>BEAKER</b> Material : Borosilicate glass Graduation : 50ml interval Volume : 500ml</p> <p><b>PRECISION DYNAMOMETER</b> Housing : Transparent Plastic Calibration : Zero point Protection : Against over extension Precision : &lt; 1% of total measuring range Scale division : 1% of total measuring 0.2N</p>

32	<p><b>YOUNG-MODULUS DOUBLE BEAM CANTILEVER</b></p> <p><b>Experiment:</b> Exp:- To determine the young modulus by double beam cantilever.</p> <p><b>Scope of Supply</b> Steel strip L=1m, B= 2.5cm, T= 5mm. Knife edges acting as G-Clamp (MS) Stirrup with hook Hanger 500g+9x500g slotted weight of MS Vernier Calliper Screw Gauge Bulb holder on plastic base with bulb Cell holder with cell 1.5 V Red lead of 50cm Black lead of 50cm Connecting leads Banana with U clips</p>
33,3 5	<p><b>COMPOUND PENDULUM (KATER'S PENDULUM)</b></p> <p><b>Experiments:</b> Exp:- To determine the acceleration due to gravity using Kater's Pendulum.</p> <p><b>Scope of Supply</b> Steel rod 120 cm in length, 1.2 cm diameter SS adjustable masses of 600g &amp; 300g (each) Meter scale of length 1m Stopwatch Removable sharp knife edges Adjustable wooden light masses Wall bracket</p>
34	<p><b>MODULUS OF RIGIDITY</b></p> <p><b>Experiments :-</b> Exp:-1 To determine the modulus of rigidity and moment of inertia, using torsional pendulum.</p> <p><b>Scope of Supply</b> Moment of inertia table Stopwatch Screw gauge Metal disc Meter scale L clamp Telescope (optional)</p>
37	<p><b>BIOT SAVART'S LAW</b></p> <p><b>Experiments:</b> Exp-1 To study the magnetic field of a circular conductor as a function of the current. Exp-2 To study the magnetic field of a circular conductor as a function of distance from the axis of the conductor. Exp-3 To study the magnetic field as a function of loop radius.</p> <p><b>Salient Features :</b> Specially designed hexagonal optical bench with <b>locking arrangement</b> for precise positioning. <b>Smooth motion</b> of uprights. Circular loop with <b>different radii</b>. Magnetic field measurement with axial probe. High current power supply. Electrical safety tested.</p>

	<p><b>POWER SUPPLY</b>  Input Voltage : 220V, <math>\pm 5\%</math>, 50Hz AC  Output Voltage : 0-30V  Voltage Resolution : 0.1V  Voltage Display : 2½ Digit LED  Output Current : 0-20 Amp  Current Resolution : 0.1 Amp  Current Display : 2½ Digit LED  Protection : Current-Limiter  Primary fuse : 8 Amp</p> <p><b>GAUSS METER WITH AXIAL PROBE</b>  Range : 200 Gauss &amp; 2 k Gauss  Resolution : 0.1Gauss at 0 - 200 Gauss  Offset : By Potentiometer to set ZERO  Display : 3½ Digit LED  Input Voltage : 220 V, <math>\pm 5\%</math>, 50 Hz AC  Axial Hall Probe : InAs</p> <p><b>CIRCULAR LOOP SETS WITH HOLDER</b>  Loop diameter : 20mm, 80mm, 120mm  Material : Copper  Wire diameter : 3mm  Loop holder rod : 10mm diameter</p> <p><b>OPTICAL BENCH</b>  Material : Aluminium alloy  Type : Hexagonal section  Scale : 0-50cm  Least count : 1mm</p> <p><b>AXIAL PROBE HOLDER</b>  Material : PVC with 4mm knob  Rod : MS 10mm dia.</p>
38	<p><b>FLY WHEEL</b>  <b>Experiment:</b>  Exp:- To determine the moment of inertia of a fly wheel about its axis of rotation</p> <p><b>Scope of Supply</b>  Flywheel with axle supported on bearings  Hanger 100g + 9 X 100g slotted weights  Stop watch  Vernier Calliper  Meter Scale  Thread</p>
40	<p><b>MODULUS OF RIGIDITY</b>  <b>Experiment:</b>  Exp:- To determine the modulus of Rigidity by statical method.</p> <p><b>Scope of Supply</b>  Barton apparatus  Hanger 0.5kg+6x500gm slotted iron weights  Screw gauge  Meter scale</p>
41	<p><b>POISSON'S RATIO</b>  <b>Experiment:</b>  Exp:- To determine the poisson's ratio of rubber.</p>

	<p><b>Scope of Supply</b>  Poisson apparatus  Burette 25 ml  Plastic Funnel  Hanger 100g + 9 x100g slotted weights (set)</p>
42	<p><b>Viscosity of water</b>  <b>Experiment:</b>  Exp:- To find the coefficient of viscosity of water by Poiseuille's Method.  <b>Scope of Supply</b>  Constant water level reservoir with stand  Rubber tube of length 1m.  Stopwatch  Thermometer  Pinch cock  Graduated cylinder 100ml  Manometer on wooden stand  Glass capillary tube of length 38cm on stand</p>
43	<p><b>VISCOSITY OF GLYCERINE</b>  <b>Experiment:</b>  Exp- To determine the viscosity of glycerine  <b>GLASS TUBE</b>  Length : 110cm  Dia : 50mm  <b>INTELLIGENT TIMER</b>  Display : 2 line LCD  Type : Micro controller based  Time resolution : 0.1 milli second  Mode : Time, Speed &amp; Acceleration  Photogate : 2 Nos.  Interface : USB  Operating voltage : 9V DC, 1.5 A  Dimension : 210x130x65mm.  <b>ELECTROMAGNET</b>  Terminal : 4mm safety socket  Input voltage : 0 - 5 V DC  Mounting rod : 10 mm dia  <b>FERRITE MAGNET</b>  Dimension : 40x25x10 mm  Material : Ferrite</p>
44	<p><b>SONOMETER</b>  <b>Experiment:</b>  Exp:- To verify Laws of transverse vibration of strings by sonometer and to find the frequency of tuning fork.  <b>Scope of Supply</b>  Wooden Sonometer 110 x 10 x 8.5cm<sup>3</sup>  Hanger 500g + 6 X 500g slotted weights  Ruber Pad  Screw Gauge  Tunning forks (512,480,440Hz) with hammer  Weighing balance(not supplied)</p>

45	<p><b>MELDE`S EXPERIMENT</b>  <b>Experiment:-</b>  Exp:- To determine the frequency of an electrically maintained tuning fork by melde's experiment and verify <math>\lambda = 2T</math>.  <b>Scope of Supply</b>  Heavy steel fork  Heavy cast iron base  Electromagnet  Weight box  Voltage source 1.5V – 12V / 3A  Pulley with clamp  Reel of thread  Meter scale of length 1m  Scale pan  Flexible lead (red &amp; black) 50cm (pair)</p>
48	<p><b>VELOCITY OF SOUND APPARATUS</b>  <b>Experiments:</b>  Exp-1 To determine velocity of sound in air or quantitative experiments on resonating columns.  <b>Salient Features :</b>  Easy setup.  Water reservoir can move up or down.  Place for keeping tuning fork over tube facilitates easy resonance.  <b>Item Name</b>  Tuning fork set  Stand base  Stand rod  Clamp assy. (Big)  Al vessel  Acrylic tube  Rubber pipe  Clamp assy. (small)</p>
51	<p><b>Planck's Constant by LED</b>  <b>Experiments:</b>  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  <b>PLANCK'S CONSTANT APPARATUS</b>  Selector Switch : V-I and T-I experiment  Selector Switch at V-I position :-  Voltmeter Display : 3½ digit, 7segment LED,  auto polarity&amp; 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 &amp; 5.  Temperature pin 1 &amp; 2</p>

	<p>Oven Connector : 5 Pin, DIN type  LED Connector : 3 Pin, DIN type  Input Voltage : 220V, 50Hz AC  Fuse : 1A, 250 V  <b>OVEN WITH TEMPERATURE SENSOR</b>  Heating Element : 20 ohm  Oven Connector : 5 Pin, DIN type  Ambient Temperature : 60° C  Temperature Sensor : Pt100  Output Pin : Heater pin 4 &amp; 5.  Temperature pin 1 &amp; 2</p>
52	<p><b>ALTERNATING CURRENT</b>  <b>Experiments:</b>  Exp-1 To study the R-C Circuit.  Exp-2 To study the L-R Circuit.  Exp-3 To study the L-C-R Circuit.  Exp-4 To study the Clipper and Clamper Circuit.  Exp-5 To study the Charging &amp; Discharging of a capacitor  <b>Contents</b>  Circuit Board  Digital Multimeter  Flexible Lead Set (25cm)  Flexible Lead Set (50cm)  Flexible lead Set (100cm)  Capacitor Module 0.47 <math>\mu</math>F  Capacitor Module 0.1 <math>\mu</math>F  Capacitor Module 0.01 <math>\mu</math>F  Capacitor Module 1000 <math>\mu</math>F  Inductor Module 30mH  Inductor Module 60mH  Resistor Module 1k<math>\Omega</math>  Resistor Module 10k<math>\Omega</math>  Resistor Module 4.7k<math>\Omega</math>  Resistor Module 100k<math>\Omega</math>  Diode Module  Signal Generator</p>
53	<p><b>LCR RESONANCE CIRCUIT (SERIES AND PARALLEL)</b>  <b>Experiment :-</b>  Exp:- To study the frequency v/s current characteristics of L C and R when connected in series and parallel.  <b>Scope of Supply</b>  Signal generator 10 Hz to 110 KHz.  Plug in board  Digital Ammeter AC  Resistance module 1K<math>\Omega</math>,2K<math>\Omega</math>,3K<math>\Omega</math>  Inductor 225mH  Capacitor 0.01<math>\mu</math>f, 0.1<math>\mu</math>f  Connecting leads (red &amp; black) 50cm (pair)</p>
57	<p><b>GM Counter Without Source</b>  <b>Experiment:-</b>  1. Plotting a Geiger Plateau  2. Statistics of Counting</p>

3. Background
4. Resolving Time
5. Geiger Tube Efficiency
6. Shelf Ratios
7. Backscattering
8. Inverse Square Law
9. Range of Alpha Particles
10. Absorption of Beta Particles
11. Beta Decay Energy
12. Absorption of Gamma Rays

### **Specifications**

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/cm<sup>2</sup>, 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 20 Absorbers:

This set of 20 calibrated radiation absorbers covers the range from 4.5 to 7400 mg/cm<sup>2</sup> and consists of aluminum, plastic and lead plates. The absorber are 2.75"x2.75" and are designed to fit all Spectrum Techniques detector stand assemblies.

Lead Shield:

Wall thickness : 0.5"

Capacity : Holds up to 20 1" discs.

Outside Dimensions : 3.6" x 2.25" (Lx ø)

Interior Dimensions : 2.65" X 1.25" (Lx ø).

Wall thickness : 0.5"Wight : Approximately 4.6 lbs

## महत्वपूर्ण:

1. ई-निविदा खरीदने की अंतिम तिथि 06-10-2023 शाम 5:00 बजे तक।
2. ई-निविदा जमा करने की अंतिम तिथि 07-10-2023 शाम 5:00 बजे तक।
3. क्रय समिति की बैठक की तिथि की सूचना अलग से दी जायेगी
4. कुलसचिव, जीवाजी विश्वविद्यालय को बिना कोई कारण बताए निविदा को स्वीकार/अस्वीकार/निरस्त करने का अधिकार होगा

## List of Documents to be enclosed

The following documents should be submitted along with the bidding form otherwise the tenders are liable to be disqualified.

1. All the Supporting documents in respect of eligibility criteria i.e. Registration /Incorporation Certificate in support of the existence of the company for FIVE years.
2. Supporting Documents indicating that the Tenderer is the Manufacture or the OEM/ Authorizedrepresentative of the corresponding items/products.
3. IT returns for the last three Assessment years 2019-2020, 2020-2021, 2021-2022.
4. List of users of the experiments in Indian Universities/Colleges.

## Note:

1. The Registrar Jiwaji University, Gwalior will not hold any risk and responsibility for non-visibility of scanned document or **non receipt of hardcopies** or loss in transit.
2. The Documents that are received in time will only be considered for Technical Bid Evaluation.
3. The tenderer will be disqualified at any stage of the tender process, if found to have mislead or furnished false information in the forms/Statement/Certificate submitted in proof of 1 to 5 above.
4. The Registrar, Jiwaji University, Gwalior does not bind himself to accept the lowest or any tender and he reserve the right to reject any offer without assigning any reason.



## ELIGIBILITY CRITERIA AND SPECIAL TERMS AND CONDITIONS

### A. ELIGIBILITY CRITERIA FOR TENDERERS:

- The Company/ the tenderer should be in existence for the last 5 years
- The tenderer should be a Manufacturer or the authorized representative of the manufacture of equipment or other respective products/ items.

### PRE - QUALIFICATIONS CRITERIA

The bidder should have :

#### A. Financial

#### i . experience of having successfully executed :

- a ) three similar works , each costing not less than the amount equal to 20 % of the probable amount of contract during the last 5 financial years ; or
  - b ) two similar works each costing not less than the amount equal to 30 % of the probable amount of contract during the last 5 financial years ; or
  - c ) one similar work of aggregate cost not less than the amount equal to 50 % of the probable amount of contract during the last 5 financial years;
- ii. Average annual construction turnover on the construction works not less than 50 % of the probable amount of contract during the last 5 financial years.

### B. SPECIAL TERMS AND CONDITIONS :

1. **Delivery Period:** The delivery should be made within 20 days from the date of receipt of purchase order by the tenderer.
2. **Warranty: All items supplied by the tenderer shall be under on site Comprehensive warranty for three (3) years from the date of installation by the OEM or its representative.** Comprehensive warranty should explicitly include all spare parts and system consumable parts. Any repair work or replacement of spares needs to be done on site, the manufacturer must confirm this in their quotation.
3. **Installation:** The installation should be done at School of studies in physics, Jiwaji University, Gwalior at no extra cost.
4. Advance payment either direct or through bank will not be accepted in any case. As per rule, full payment will be made after receipt of material, inspection thereof and after satisfactory installation and working of the entire equipment.
5. This institution is exempted from payment of Central Excise duty in terms of Govt. Notification No. 1097-Central Excise dated 01.03.1997. Necessary copy shall be provided by the University.
6. The tenderer should avoid the use of vague terms such as “**extra as applicable**”. Such tenders will be rejected.
7. Printed conditions on the back of the offer submitted will not be binding unless

separately mentioned.

8. Quotations for each item should be quoted separately.
9. Each page of the tender should be signed and stamped by the bidder.

TENDERER  
SEAL