

B.I.T. Sindri
P.O. - Sindri Institute, Sindri,
Dhanbad, Jharkhand -828123

Notice

Description : Supply and installation of Physical Quantities Measurement System (PQMS) for NANO technology laboratory

Package Code : TEQIP-III/JH/bits/19

Package Name : TEQIP-III/BITSindri/OTH/NANO-PQMS

B.I.T. Sindri, Dhanbad wishes to establish a Nanotechnology lab as a central research facility. The Technical specifications of the equipments/goods are provided below.

Interested manufacturers / authorized supplier are requested to fill in the Information Form (Annexure - A) given below and send the filled, signed and stamped hard copy on or before **4:00 P.M. of 10/07/2019** at following address -

Director, B.I.T. Sindri,
P.O. - Sindri Institute, Sindri,
Dhanbad, Jharkhand -828123

Formal request for Financial and Technical proposal will be sent to the applied valid firms after 10/07/2019.

Technical Specification

Following are the specifications and details for **Physical Quantities Measurement System (PQMS)** for nanotechnology laboratory at B.I.T. Sindri, Dhanbad.

Physical Quantities Measurement System with additional accessories and components which can be effectively used to measure the DC electrical conductivity and AC magnetic susceptibility of various materials in the temperature range 80-450K. This integrated transport properties measurement system should be able to identify changes in the transport properties of the sample from conducting, say, to insulating, semi-conducting or superconducting, and magnetic phase transitions in materials. The Physical Quantities Measurement System (PQMS) must have the following technical specification:

Sl. No.	Features	Detailed specifications of the features
1.	Hall effect set up for metals and semiconductors	<ol style="list-style-type: none"> 1. Constant current source with Current Display : 0-20 mA DC or better Voltage Display : 0+200mV@0.1mV or better Resolution : 10 micro ampere or better Current Adjust : 10-turns potential meter or better Power : 220V \pm 10%, 50 Hz AC or better Display : 3½ digit LED 2. Power Supply Voltage : 0-20V DC (or better)continuously variable & stabilized Voltage display : 3½ digit LED Ripple : Less than 25mV Overload : Current limiting protection Current : 5 A continuously variable, or better 10% to full rating Current display : 3½ digit LED Working voltage : 230V AC, 50 Hz single phase 3. Electromagnet arrangement Coils : 500 turns. Coil Current : 8.5Amp (Max.) Core material : Ferromagnetic. 4. DIGITAL MICROVOLTMETER Operating voltage : 230V, 50Hz Operating range : 0-20mV, 0-200mV, 0-2000mV, 0-2V Accuracy : \pm 0.01mV or better least count : 0.001mV or better 5. 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, \pm 5 %, 50 Hz AC Axial Hall Probe 6. METALLIC SAMPLE: TUNGSTEN / SILVER Current : approx. 20 A DC Magnetic field : 1000 ... 6000 gauss Thickness : 5 x 10⁻⁵ m Dimensions : Appropriate for the apparatus quoted Stand rod : Appropriate for the apparatus quoted. Material : Silver, Tungsten 7. Semiconducting probe Sample: GE CRYSTAL PCB Crystal : Ge Wafer, P type

		<p>Crystal Size : 6x7 x 0.5mm³ (LxWxThickness) Resistivity : 1~ 10 ohm-cm Orientation : <100> VII) All other accessories for the operation of the equipments including but not limited to power cords, flexible plug leads, screw drivers etc should be included. To demonstrate dia-para-ferro magnetism in an inhomogeneous magnetic field.</p>
2.	Dia-, para-, ferro-magnetic materials in inhomogeneous field	<ol style="list-style-type: none"> 1. POWER SUPPLY Voltage : 0-30V (or better) DC continuously variable & stabilized Voltage display : 3½ digit LED Ripple : Less than 25mV Overload : Current limiting protection Current : 10 A continuously variable or better , 10% to full rating Current display : 3½ digit LED Working voltage : 230V AC, 50 Hz single phase 2. ELECTROMAGNET Coils : 500 turns. Coil Current : 8.5Amp (Max.) Connection : 4mm safety socket. U Core : 150x130mm²(LxH), 40x40mm² cross section. Pole piece : 40x40mm² cross section with pointed attachment pair Core material : Ferromagnetic. Bore piece : Iron with 5mm graduated scale Ventilation on three sides of coil to protect from overheating. 3. SAMPLES: Bi, Ni, Al 4. All other accessories for the operation of the equipments including but not limited to power cords, flexible plug leads, screw drivers, attachment assemblies, etc should be included.
3.	Electrical Transport Measurement Set-up (Physical Quantity Measurement System)	<ol style="list-style-type: none"> 1. Cryostate with (a) a complete set-up for evacuation; flushing (with an exchange gas) to access a temperature range 80-450K. (b) temperature control with a resolution of 0.01K and stability (in the isothermal mode) better than ±0.1 K. The system should be capable of bipolar ramp rates upto 10 K/min in steps of 0.1 K/min. 2. I-V source and measurement units for 2-/4-probe DC electrical transport property measurements in the range of 10 micro-ohm or lower to 100 Tera-ohm or better. The system should allow I-V measurements in different measurement configuration easily like two probe, 3 -probe, 4 probe local and 4-probe non-local measurement geometries. All I and V measurements should be at least 6½ digit. All set-point resolutions must be better than 0.05 % of full-scale. The following resistance measurement ranges should be supported.

		<ol style="list-style-type: none"> a. 10 micro ohms or lower to 10 Mega Ohms (conductors) : Using a programmable current source (1uA to 10mA or better) and nano-voltmeter (10nV to 10V or better). b. 1 milli-ohms to 1 Giga (generic) : Using selectable current/voltage source (1uA to 10mA or better, 1mV to 10V or better) and meter (1nA to 10mA or better, 1uV to 10V or better). c. 1 Mega to 100 Tera (insulators) Using programmable voltage source (1mV to 100V or better) and pico-ammeter (0.1pA to 1uA or better). <ol style="list-style-type: none"> 3. AC-susceptibility (χ-T) measurement : Lock-in amplifier with operating frequency range 10Hz – 10 KHz, an integration time of at least 1 sec, pre- and post-amp gain(s) of 1, 10, 100 and capable of measuring both phase and amplitude, and includes a built in reference source. Sample positioner for cancellation of thermal drift, with provision for stall detection. 4. Data acquisition and control software, which automates recording of time domain voltage,current and resistance data along with I-V, R-T and χ-T measurements under linear and stepped temperature profile mode, allows easy control of all experimental parameters, supports real time recording and plotting of physical quantities and runs on Linux or Windows. 5. Magneto-resistance; Hall Coefficient Measurement Unit for the temperature range of 80- 450K with a bipolar H-field in the range of 0 - 1000 gauss or better using an air-core electro-magnet, with a set-point resolution better than 0.05 % of full-scale, with a compatible Gaussmeter with resolution better than 1 Gauss and inclusive of a 6 Amp power supply 6. All accessories required to run the system such as rotary pump, Pirani gauge, branded computer (i3 processor or better, 4GB RAM, 500GB hard disk), helium cylinder and regulator,liquid nitrogen dewar (min capacity 3 litres)
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4.	Warranty and support	<ol style="list-style-type: none"> 1. 3 years comprehensive on-site warranty for all parts of the entire system including accessories supplied with the instruments from the date of successful installation and commissioning post warranty period will be for another 3 years for supply of all parts of the entire system, including accessories. If the system breakdown during warranty period, the warranty period will be extended for the full breakdown period after the expiry of initial warranty. 2. Service response time must be 48 hours or less. 3. On-site training must be provided by trained engineering at free of cost.
5.	Maintenance	The supplier is required to confirm that the spares and accessories would be available for more than 6 years after expiry of warranty and post warranty.
6.	Upgradation	The supplier shall supply upgraded software for PQMS operation whenever they are available.
7.	Application notes & Manuals	The supplier shall provide detailed application notes and manuals of PQMS in hard and soft copy along with the detailed drawings and circuit diagrams (in English).
8.	Required Documents	The supplier should have installed at least 10 PQMS across the country for last 3 years. The supplier must provide a comprehensive list of uses of PQMS in India.
9.	Compliance statement	The supplier must submit a table indicating the compliance of the features of the model of the equipment being quoted with those given in indent.
10.	Pre-installation Requirement	Pre-installation requirement such as room size, tolerable limits of EM field and vibration (mechanical), required power rating, utility requirements are to be stated clearly, and to be verified/ surveyed by the supplier at the installation site. It is the supplier's responsibility to clearly provide details of the above mentioned requirements before delivery of the equipment.
11.	Delivery & Insurance Coverage	Vendor will be fully responsible in successful delivery (including unloading), installation and commissioning of the instrument at site of installation in B.I.T. Sindri with fully insurance coverage as per rule.

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INFORMATION FORM

(To be properly filled, signed and stamped)

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Package Code : TEQIP-III/JH/bits/19

Package Name : TEQIP-III/BITSindri/OTH/NANO-PQMS

1) Name of the firm :

2) Official address with Pin Code :

3) e-mail address :

4) Phone/Mobile Number :

5) PAN Number :

6) TAN Number :

7) GST Number :

8) Name of official Representative :

a) Post held :

b) Phone Number :

c) e-mail Address

We declare that we are interested to supply the above mentioned equipments/Goods

Date

Signature and official stamp