



Sidho-Kanho-Birsha University

Ranchi Road, P.O.- Sainik School
District - Purulia, PIN – 723104, W.B.
Phone : 03252- 202419 Website-www.skbu.ac.in

Ref No: R/60 /SKBU/17

Date: 11/01/2017

E- Tender Notice

1. SIDHO-KANHO-BIRSHA University, Purulia intends to procure Lab Instruments for **Physics Department** at Purulia. The tentative quantity of the required items along with technical configuration of each items are mentioned at Annexures separately. SKB University is looking for interested bidders who have experience in supplying of above type of instruments.
2. Bidders are advised to study all technical and financial aspects, instructions, forms, terms and specifications carefully in the tender document. Failure to furnish all information required in the Tender Document or submission of a bid not substantially responsive to the Tender document in every respect will be at the Bidder's risk and may result in the rejection of the bid.
3. Intending bidder may download the tender documents from the website <https://wbtenders.gov.in> OR www.skbu.ac.in. **Only Online Submission of Tender will be accepted.** Last date of submission: **27/01/2017 up to 12:00 hrs. Opening Date 27/01/2016, 1 PM.**
4. The categories of items and quantity indicated in the Tender Document are tentative. SKB University (SKBU), however, reserves the right to increase or decrease the quantity or delete some or all of the items depending on the needs of the SKBU and availability of funds without assigning any reasons.
5. The bidder should indicate specifically the **Basic Price, Taxes/Excise duty, VAT, Entry tax, other duties (if any)**, and levies chargeable quantitatively against each item. **University will assist to have way bill (if necessary) but the pay will be borne by the bidder.** No additional information will be entertained after due date. SKBU may reject bids if they do not carry such information separately and specifically quantitatively.
6. The tender should be submitted in two cover system (electronically) as defined in E-Tender participation system: (a) Technical Bid (b) Financial Bid.
7. The bidder should clearly indicate the delivery period and validity period of tender.
8. The bidder should clearly indicate the availability of service and maintenance facilities at Purulia for the items quoted.

9. The bidders are required to quote for each item separately in terms of basic price and all other charges. Prices can be quoted in Indian Currency only (₹).
10. The bidder (Technical Bid) must be submitted along with the copies of OEM license or authority from the manufacturer.
11. SKB University reserves the right to reject any or all tenders without assigning any reason whatsoever.
12. No advance payment or payment against Performa invoice will be made. Payment will be made after receipt, inspection, and installation/testing.
13. All damaged or unapproved goods shall be returned at the bidder's risk and cost and the incidental expenditure thereupon shall be recovered from the concerned party.
14. On acceptance of tender, the date of delivery should be strictly adhered to otherwise, the SKB University reserves the right not to accept the delivery in full or in part. In case the order is not executed within the stipulated period, the SKB University will be at liberty to make purchases through other sources.
15. Payment of bill will be made through by crossed account payee Cheque or electronic payment (NEFT) only after delivery and successful installation of each of the items.
16. Delivery Schedule: The Company shall be able to deliver the required items within 15 days of the receipt of order. Delivery/Installation is to be done at Purulia, West Bengal.
17. Warranty : All the products must carry minimum one year comprehensive warranty.
18. The products asked for should be of very high standard and of mentioned brand.
- 19. Liquidated Damages** : The Company shall be liable to indemnify the SKB University in all respects and meet and pay off the litigation expenses and all the liabilities including damages, sums etc. arising out of and as a consequence of the negligence, deficiencies, mistakes, lapses, delays etc. in the execution of the various jobs and the services provided.
20. The company should ensure quick back up response in case of equipment failure which should be replaced if needed within 48 hours of the distress call.
- 21. Payment:** There is no provision for making advance payment to the Company. However, the running bills for the jobs completed can be submitted by the company and will be cleared for payment within reasonable period.
- 22. Purchase Order:** The purchase order for the entire quantity can be placed either in one lump sum or as per the requirement through repeat order subject to availability of fund of the required items. The quantity shown is tentative and may increase or decrease.

Registrar

Annexure 1

Proforma For Technical Bid

Sl	Particulars	Information
1	Name of the Firm & Owner : (with Telephone/Mobile Numbers, email)	
2	Type of Organisation (Proprietorship/Partnership/Pvt. Ltd./Limited Company) Month/Year of Establishment	
3	Website of Bidder, if any	
4	Month/Year of Establishment	
5	PAN/Sales Tax/VAT Regd. Nos.	
6	Annual Turnover 2015-16	
7	Whether product(s) offered by the bidders are exactly as per the configuration of SKB University. If not, indicate the changes in each product	
8	Clientele (submit copies)	
9	Validity of Tender	
10	Whether Terms & Conditions issued by SKB University are acceptable to the Firm	
11	Whether Warranty as per the desired specification	

**** Bidder should only quote rate for 1 unit of each item in BOQ.**

Date

Name: _____ Signature of Owner/Authorized Representative

Designation:

Technical Specification

Sl No	Name of the Equipments	Specifications	Qty
1	Atomic Force Microscope	Given below.	01
2	Field Emission Scanning Electron Microscope	Given below.	01
3	Picosecond Fluorescence Life Time Spectrometer	Given below.	01
4	Nanosecond NdYAG pulsed laser	Given below.	01
5	Z-scan system (suitable for Item No 3)	Given below.	01
6	Muffle furnace with Temperature Controller	Given below.	01
7	Sputter Coating Unit	Given below.	01
8	LCR Meter	Given below.	01
9	Water purification system	Given below.	01
10	MOKE Hysteresis Loop tracer	Given below.	01
11	Electromagnet (suitable for Item No. 10)	Given below.	01
12	Vibration Isolation Table	Given below.	04
13	Scanning Tunneling Microscope	Given below.	01
14	Dip Coating Unit	Given below.	01
15	Nitrogen gas generator with compressor	Given below.	01
16	Horizontal Tube Furnace	Given below.	01
17	Grinding jar/Bowl with safety closure devices	Given below.	01
18	Grinding ball	Given below.	01 each
19	Dual frequency GPS receiver (rugged)	Sxbluegps or Trimble BX960	01
20	2-3 metre Radio Telescope	Antenna Dia: 2-3m, Prime Focus, Receiver, Feed, LNB, Equatoria GOTO mount, Control Handpad and Software	01
21	Tripple frequency GPS receiver	L1, L2, L2C, L5, and SBAS signal tracking, GPS, Galileo, GLONASS, 50 Hz data output, Amplitude and phase scintillation indices output	01
22	Dual frequency Scintillation receiver	Fast logging, Dual-frequency, 100Hz data output, Scintillation Power Ratio measurement	01
23	CCD camera	Dual CCD Self-Guiding, pixel array 1530x1020, pixel size 9x9 microns, electromechanical shutter, 16 bit A/D converter, FOV 24'x16', T-thread mounting,	01
24	Solid state photometer	serial output for pc connection, data acquisition program, should include telescope coupler,	01
25	Softpal VLF Receiver	ADI instruments	01
26	UltraMSK receiver	Outdoor VLF	01
27	UltraMSK software		01
28	Fabry-Perot Interferometer	Make: Holmark Optomechanotronics Pvt. Ltd, Model: HO-ED-INT-10 (Complete set) or equivalent	01

29	Detector for He-Ne laser	2 mW power [Make: Reputed branded]. Accessories: Suitable power meter	01
30	Flourescence Cell UV	Type: Non-flourescence quartz cuvette, Volume: 3.5 ml, Pathlength: 10 mm, Open 2/P.	04 pairs
31	Probe (including heating arrangements) for temperature dependent hall effects apparatus	Suitable for SES HEX 22 set up	02
32	Franck-Hertz tube/Valve	Suitable for SES FH 3001 set up	02
33	Measurement of Dielectric constant	Make: SES, Model: 600 or equivalent	01
34	Measurement of magnetoresistance	Make: SES, Model: MRB 11 or equivalent	01
35	Power supply	0 to $\pm 15V$, 1A variable regulated power supply	20
36	Mach Zehnder Modulator 10 GHZ with controller and biasing arrangement	Given below.	02
37	CATV Analyzer	Given below.	01
38	CATV signal Generator	Given below.	01
39	BER tester	Given below.	01
40	PRBS Generator	Given below.	01
41	IC HD74LS76	Hitachi make	100
42	Electronic breadboard	Reputed brand	40
43	Resistance Box		04
44	Rotary Vane Vacuum Pump	Given below.	01
45	Electrode of pH meter	Suitable for Systronics μ pH system, Type no.: 361 with calibrating buffer solutions	01
46	Zero background sample holder for XRD experiments	Make: Imported reputed brand, To be suitable for PROTO AXRD set up.	03
47	Portable digital pH meter	Given below.	01
48	Vacuum Desiccators	Make: Borosil/Reviera Made of clear glass with about 240 mm internal diameter	02
49	Spatula	Made of silicon. Suitable for uses for chemicals in the form of powder of three different sizes.	02 sets
50	Spatula	Made of stainless steel. Suitable for uses for chemicals in the form of powder of three different sizes.	02 sets
51	Magnetic Stirrer Bar	Material : PTFE/Alnico V Magnet Shape : Octagon Suitable for REMI 1ML hot plate cum magnetic stirrer.	05
52	Grating	For JASCO V-639 UV Vis spectrophotometer set up Installation: Installation of the equipment should be done by the vendor/bidder.	01
53	Filter	For JASCO V-639 UV Vis spectrophotometer set up Installation: Installation of the equipment should be done by the vendor/bidder.	01

54	Lamp	For JASCO V-639 UV Vis spectrophotometer set up Installation: Installation of the equipment should be done by the vendor/bidder.	01
55	Sealed Battery for Online UPS	Exide make 12V, 7 AH battery suitable for Better Power Make BP series 2 kVA online UPS. Old batteries (Exide make 12 V, 7 AH, Chloridesafe) 12 in Nos. to be replaced by the above batteries. Warrant: Minimum 2 years.	12
56	Electrical Dryer	Make: Philips Power: 1800 W Both normal and hot air flow facilities.	02
57	Electric Drill machine with bits	Make: Bosch. Model: GSB10 or equivalent Accessories: Bits for wood, cement wall, and aluminum partition – one set each	01
58	10 kVA Isolation Transformer	Given below.	02
59	10 kVA Servo Controlled Voltage Stabilizer	Given below.	01
60	10 kVA Online UPS	Given below	02

Detail Specifications of the Equipments

1. Atomic Force Microscopy (AFM)

Make	Imported reputed brand
X & Y Range	90 μm or higher
X & Y Sensors	<0.5 nm noise, <0.5% nonlinearity (max deviation full travel)
Z Range	>15 μm (Extended range Z option >40 μm)
Cantilever Deflection Sensing	Optical lever in an inverted configuration (incident beam off-vertical) to dramatically reduce interference from light reflected by the sample.
Light Source	Low-coherence infrared (860 nm) superluminescent diode (SLD), FDA/IEC Class 1M (non-hazardous)
DC Detector Noise	< 15 μm
DC Height Noise	< 50 μm
AC Height Noise	< 50 μm
Sample Stage	Accommodates samples up to 80 mm diameter and up to 10 mm thick. Micrometer driven stage allows precise tip-sample alignment
Top-View Optics	Probe, IR SLD spot, and sample can be viewed through top-down brightfield optics with two selectable fields of view, 720 μm and 240 μm , through a 10X objective.
Scanner Drive	Three high-resolution 24-bit DACs are used for XY scanning and Z motion, ensuring that bit noise (< 6 μm XY and < 1 μm Z) never limits scan resolution. Ultra-low-noise amplifiers result in < 70 μV Adev noise on the high voltage (-10 to 150 V) piezo drive signals in a 1 Hz to 10 kHz bandwidth.

Closed-loop Scanner Feedback	Integrated low-noise position sensors in all three axes are immediately digitized and input to three independent, all-digital feedback loops to provide seamless closed-loop operation. This eliminates and corrects position errors in the scanning system due to piezo hysteresis, creep, and non-linearity, and substantially reduces thermal drift.
Deflection Signal	Immediately sampled with 16-bit ADC operating at 5 MHz with seven gains and a 16-bit offset.
AC Mode Support	Two Direct Digital Synthesizers (DDS) are summed to generate the AC drive signal on a 16-bit, 10 MHz DAC at frequencies from DC to 2.0 MHz. Fully digital dual lock-in provides quadrature outputs at bandwidths up to 9 kHz. Digital Q-control can typically enhance or suppress cantilever Q by up to 5X.
Data Acquisition	Limited only by the memory on the PC (i.e., 10 million point force curves, > 8k x 8k pixel images)
Computer Interface	Suitable USB interface to a high-performance, dual-monitor, Windows 7 (or 8 or 10) 64-bit PC.
Computer	Suitable branded computer with laser printer
Software	Suitable software (preloaded) for data acquisition and analysis
Accessories	Suitable vibration isolation table and all other necessary accessories to be offered to run the machine smoothly. Also Au thin film, Au (111) single crystal, HOPG, MoS ₂ , etc samples, power controller, cantilever tip 20 Nos to be supplied with the instrument.
Spares	Commitments to supply spares for at least 10 years to be ensured.
Warranty	Minimum two years warranty should be offered. Product support for period of minimum five years after warranty period to be ensured by vendor/supplier.

2. Field Emission Scanning Electron Microscope (FESEM)

Make	Imported reputed brand
Electron Source	Schottky Thermal Field Emitter
Resolution @ 15 kV	1.2 nm or better
Resolution @ 1 kV	2.2 nm or better
Backscatter Detector (BSD)	HD BSD
Maximum Scan Speed	100 ns/pixel or higher
Accelerating Voltage	0.02 – 30 kV
Magnification	10× – 1,000,000× or better
Probe Current	4 pA – 20 nA and 40 nA
Image Framestore	3 k × 2 k pixels
Ports	10 or more
EDS Ports	2 (1 dedicated port)
High Vacuum	Yes
Variable Pressure	2 – 133 Pa
Stage Type	5 axis compucentric stage
Stage travel X	125 mm
Stage travel Y	125 mm
Stage travel Z	50 mm
Stage travel T	-10 to +90 degrees
Stage travel R	360° Continuous
Computer	Suitable branded computer with laser printer

Software	Suitable software for data acquisition and analysis
Accessories	All other related accessories (including suitable vibration isolation table) to be offered. Also necessary equipments for sample preparation prior to SEM characterization should be provided.
Spares	Commitments to supply spares for at least 10 years to be ensured. Separate Spare kits for this laser should be quoted as optional items.
Warranty	Minimum one year warranty should be offered. Product support for period of minimum five years after warranty period to be ensured by vendor/supplier.

3. Picosecond Fluorescence Life Time Spectrometer

Make	Imported Reputed brand
Spectrometer	
Optical configuration	90 deg between excitation and emission beam path
Mode of operation	Time correlation single photon counting (TCSPC technique)
Life time range	50 pico second to 50 micro second or larger
Mechanical spectral range	200 nm – 900 nm or larger
Spectral band pass	0 nm – 60 nm (computer controlled)
Temporal Dispersion	Very close to Zero or better
Laser beam attenuation	4 order of magnitude, continuously adjustable (computer controlled)
Detector	
Type	Hamamatsu with amplifier, interlock and overload protection in fan assisted TE cooled housing
Detector response width	250 ps
Dark count rate	150 cps at 0 deg C
Lasers	
EPLEDs' wavelength	270 nm, 330 nm, 380 nm, etc picoseconds pulsed type
Accessories	
Laser Input coupling	Suitable Laser input coupler to be offered
Polarizer	Suitable Excitation and Emission polarizer (computer controlled) with spectral range of 220 nm – 900 nm or larger to be offered
Solid Sample holder	Single position front face sample holder with two additional inserts suitable for measurements of powders and film/slide to be offered.
Quartz Cuvette with PTFE cover	5 Nos. of Fluorescence cell (for 170 nm – 2700 nm range) for liquid sample with 10 mm pass length with nominal volume of 3.5 ml to be offered
Computer	Suitable branded computer with laser printer
Software	Suitable software for data acquisition and analysis
	Also all other related accessories to be offered
Spares	Commitments to supply spares for at least 10 years to be ensured. Separate Spare kits for this laser should be quoted as optional items.
Warranty	Minimum one year warranty should be offered. Product support for period of minimum five years after warranty period to be ensured by vendor/supplier.

4. Nanosecond NdYAG pulsed laser

Make	Imported reputed brand
Repetition rate	10 Hz
Energy per pulse	420 mJ @ 1064 nm and 210 mJ @ 532 nm
Pulse Width	5-7 ns @1064

Energy stability	± 2% @ 1064 nm
Accessories	All the necessary accessories including suitable power supplies for the laser, water chiller including pump, branded computer (with preloaded software) if required.
Spares	Commitments to supply spares for at least 10 years to be ensured. Separate Spare kits for this laser should be quoted as optional items.
Warranty	Minimum one year warranty should be offered. Product support for period of minimum five years after warranty period to be ensured by vendor/supplier.

5. Z-scan system

The Z-scan system must be suitable for above mentioned NdYAG laser for carrying out optical non-linearity measurements for solid, powder, and liquid samples. Also this system should be complete in all respects (with suitable detectors, lenses, beam splitter, stepper motor controlled optical bench, latest branded computer (with preloaded software), laser jet branded printer, 5 pairs of cuvette, solid sample holder for film and powder, etc).

6. Muffle furnace with Temperature Controller

Make	Reputed brand
Furnace	
Temperature range	up to 1200 deg C
Heating rate	0 to 10 deg /min (variable type)
Temperature resolution	1 deg C
Temperature controller	Eurotherm EU 100
Stability	≤1% of range
Heating element	SiC
Power supply	Thyreseter controlled
Type of front loading size	5 inch x 5 inch x 10 inch
Overload protection	100%
Accessories	
Alumina boat	Five (standard) Nos.
Cup shaped Alumina Crucible	50 mm size - 2 Nos and 100 mm size - 2 Nos
Gas cylinder	Two in Nos. filled with Ar/N ₂ gas (standard large) including two suitable pressure guages and pipes
Others	In addition, furnace will have a gas flow system of diameter of 10 mm with inlet controlled by a solenoid at a particular temperature, and an automated timer connected to time and temperature. Also other necessary accessories to be provided.

7. Sputter Coating Unit (complete set)

Make	Reputed brand
Work chamber size	15 cm inside diameter and 12.7 cm high (made of borosilicate glass with integral implosion guard) or larger
Specimen stage	Rotation with speed of 8 - 20 rpm or higher
Vacuum system	Internally mounted Turbo pump (pumping speed=70 L /s or higher, air cooled) with controller and two-stage oil mist filtered Rotary pump (pumping speed=50 L/m or higher) with vacuum hose, coupling kit,
Vacuum measurement	Suitable guages for full vacuum range
Typical vacuum	better than 5×10^{-5} mbar
Sputtering	0 - 150 mA to a pre-determined thickness
User interface	Full graphical interface with touch screen buttons

Accessories	Suitable metal evaporation and aperture insert including the ability to evaporate upwards with Mo boats 10 Nos and Tungsten filaments 10 Nos., one additional sputter insert, 5 cm diameter specimen stage with adjustable tilt up to 90 degrees, Film thickness monitor attachment (including oscillator, feed through, quartz crystal holder and quartz crystals), Two cylinders of Ar sputtering process gas (99.999% pure), Few metals such as Au, Ag, Al, Cr, Pt, Ir for film preparation and other necessary accessories.
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8. LCR Meter

Make	Imported reputed brand	
Measurement Parameters	Z , Y , θ , R _p , R _s (ESR), G, X, B, C _p , C _s , L _p , L _s , D (tan δ), Q or more	
Measurement ranges	Z , R, X	10.00 m Ω to 200.00 M Ω or higher
	θ	-180 ⁰ to +180 ⁰
	C	0.3200 pF to 370 mF or higher
	L	16 nH to 750 kH or higher
	D	0.00001 to 9.99999 or higher
	Q	0.01 to 999.99 or higher
	Y , G, B	5.0000 nS to 99.999 S or higher
Basic Accuracy	Z: $\pm 0.08\%$ rdg. θ : $\pm 0.05^0$	
Measurement Frequency	42 Kz to 5 MHz or larger	
Measurement Signal Levels	10 mV to 5 V rms / 10 μ A to 100 mA rms	
Output Impedance	50 Ω	
Measurement time	FAST: 5 mS, NORMAL: 21 ms, SLOW 1/2: 72 ms/ 140 ms	
Settings in memory	Minimum 30 sets	
Comparator functions	HI/IN/LO settings for two measurement parameters: percentage, $\Delta\%$ or absolute value settings	
External interface	RS-232C	
Software	Suitable software to be offered	
Accessories	All the necessary accessories including branded latest PC (with preloaded software) to be provided.	

9. Water purification system (complete set)

Make	Imported reputed brand
Resistivity	> 10 M Ohm-cm
Flow rate	3 L per hour
TOC	< 30 ppb
Bacteria levels	10 cfu/mL or better
Accessories	one extra suitable cartridge and other necessary accessories to be provided.

10. MOKE Hysteresis Loop tracer – components

1. PEM Head Assembly	Optical Material: Fused Silica
	Operating Frequency: 50 kHz

	Retardation range: 170nm - 1µm (Half-wave)
	Useful Aperture: 16 mm
	Acceptance Angle: ± 20 deg
	Sensitivity: Better than 10 ⁻⁶
	Suitable for Moke measurements
1a) Magnetic Field Compatible Head	For use in Magnetic field up to 4T
1b) Antireflective Coating	632.8 nm
1c) Microprocessor-Based Control	Control of peak retardation
Digital Front Panel Settings & Control	Automatic adjustment of modulator drive level should be based on user-supplied retardation and wavelength values
	Memory protection of controller setup parameters (even when unit is turned off)
	For user convenience, LCD display should show which parameters and modes are in use.
	Display of retardation in user-selectable phase units (waves, radians, degrees)
	Selectable display of wavelength in nm, µm, or cm ⁻¹
	Precise digital setting of retardation
	Incremental increase of wavelength and retardation values
Computer Operation	RS-232 serial interface to computer with selectable baud rate
	PEM100 software should provide for complete computer control including macro capabilities
	Computer monitor of controller status
2. Photodiode Detector/Preamplifier	
	Active area: 16 mm ²
	Operating Temperature Range: 0°C to 60°C
	Type: Silicon Photoconductive
	Active Area: 16 mm ²
	Input power bipolar 12V to 18 V
	Frequency Bandwidth, DC to 1 MHz
	Spectral Response, 350 to 1100 nm
3. He-Ne Laser with power supply	
	Minimum Output power, TEM 00 : 2 (mW)
	Beam diameter, 1/e 2 : 0.63 mm
	Beam divergence: 1.30 (mrad)
	Polarization: 500:1
	Longitudinal Mode Spacing, Nominal : 730(MHz)
	RMS Noise, 30Hz-10MHz: 0.1%

	Wavelength: 632.8nm Spatial mode:TEM 00
	Mode quality, M 2 : >95%
	Pointing Stability(mrad/°C): from cold start,25°: <0.1
	Pointing Stability after Warm-Up (mrad/°C): After 158min: <0.02
	CE certified
4. Calcite prism Polarizer & Analyzer	Glan- Taylor type
	Extinction ratio of 100,000:1
	Clear Aperture: 5 X 5 mm 2
	Coating : 350- 700nm
	With Precision polarizer mounts.
5. Signal Recovery Signal Channel	Modes: Single-ended
	Impedance: 1 MΩ / 10 pF
	Frequency Response: 40 Hz to 250 kHz
	Maximum Input: 2.5 Vpp
	Full-scale Sensitivity: 4 μV
	Gain: 0, 3, 6, 9, 12, 15 db (selectable)
	Gain Accuracy: +/- 1% for ≥ 1 mV +/- 5% for < 1 mV
	Phase Accuracy: +/- 1° for ≥ 1 mV
	DC Accuracy: +/- 2 mV max
	CMRR: > 60 dB
Signal Channel Filters	High-Pass Filter: (- 3 dB) 40 Hz
	Low-Pass Filter: (- 3 dB) 250 kHz
	Frequency Accuracy: +/- 5%
Reference Channel	Frequency Range; 20 kHz - 220 kHz
	Frequency Accuracy: +/- 0.1% max
	Reference Input; TTL or CMOS
	Input Impedance; 10 MΩ, 50 pF
	Phase Resolution: 0.01%
	Acquisition Time 5 ms
6. Accessories	Suitable branded computer (with preloaded software) and laser printer to be provided. Also, other necessary accessories to be provided. The system should be in operation for both transverse and longitudinal modes.

11. Electromagnet

Suitable for MOKE hysteresis loop tracer (SL No. 10 in the list)

Magnetic field strength: up to 4 Tesla

Accessories: All the necessary accessories to be provided for installation in the MOKE hysteresis loop tracer mention above.

12 Vibration Isolation Table

Make: Reputed brand.
Vertical Resonant Frequency: 1.25 Hz,
Horizontal Resonant Frequency: 1.0 Hz,
Vertical Transmissibility at Resonance: 10 dB,
Horizontal Transmissibility at Resonance: 12 dB,
Vertical Transmissibility at 5 Hz: -20 dB (90%),
Horizontal Transmissibility at 5 Hz: -24 dB (94%),
Vertical Transmissibility at 10 Hz: -32.5 dB (97.5%),
Horizontal Transmissibility at 10 Hz: -30 dB (97%),
Max load capacity (set of four): 1500 kg,
adjustment range: -1.0 cm, + 0.5 cm, Height: 70 cm,
Max air pressure: 80 psi (complete set)

13. Scanning Tunneling Microscope (STM)

Make	Imported reputed brand
STM scan Head	1µm or larger
Max scan range	1 µm or larger
Max Z-range	200 nm or larger
Drive resolution Z	3 pm or better
Drive resolution XY	15 p or better
Current set point	0.1 – 100 nA in 25 pA steps
Image mode	Constant current (Topography), Constant height (current)
Spectroscopy modes	Current-voltage, Current-distance
Tip voltage	±10 V in 5 mV steps
Sample approach	Stick-slip motor
Sample size	Max 10 mm diameter
Power supply	240 V AC, 50 Hz
Accessories	n-type single crystalline Si(100) or Si(111) single side polished wafer with resistivity of 1-10 m Ohm-cm of 4 inch diameter - 10 Nos, Au thin film, Au (111) single crystal, HOPG, MoS2, etc samples, power controller, STM wires, sample supports, nanogrid calibration grating, Silver paint to attach samples to supports,

	suitable branded computer and laser printer, etc. Warranty: Minimum of one year warranty should be offered.
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14. Dip Coating Unit

Controller	Micro-controller
No. of Vessels	8 or higher
Dipping and Lifting speed	0.5-450 mm/min or larger range
Dipping & Lifting Length:	Minimum 150 mm
Film Length	About 100 mm
Editable Programs	20 or more
Sequences / Program	At least 50
Program Memory	Non-volatile
Real-time Display of Control Processes	4 Line LCD Console
Blank Distance Adjustment Option	Yes
Self-performance Test Option	Yes
Arrow Display for both Dipper Vertical & Circular Movements	Yes
Extra features	Unlimited Deposition Cycles Unlimited Drying & Wetting Time
Accessories	All the necessary accessories to be offered
Warranty	Minimum of one year onsite warranty should be offered.

15. Nitrogen gas generator with compressor

Technology	Pressure Swing Adsorption (PSA) on carbon molecular sieve bed
Nitrogen flow rate	1 L/min or higher at 5.5 bar
Nitrogen purity	> 99.999%
Noise level	< 55 dB
Inlet /Outlet Connexion	¼ G (BSP) Female
Special Features	(i) LCD display with indication of the model, inlet/outlet pressure, hours run meter and PC status LED (ii) Touch-screen LCD display to show output flow with purity level check (requires optional sensor) (iii) Need to work in auto run mode in which the generator can be programmed for auto-start and auto-stop (iv) Intelligent PLC controller to remind maintenance due and keep the service record
Accessories	(i) Suitable oil free compressor, (ii) A set of coalescing filter, silencer and air intake compressor filter, (iii) including two suitable pressure gauges and pipes to connect with JASCO 4700 FTIR and tube furnace, etc.
Warranty	Minimum two years (onsite comprehensive) warranty should be offered. Product support for period of minimum five years after warranty period to be ensured by vendor/supplier.

16. Horizontal Tube furnace

Make	Imported reputed brand
Maximum Working Temperature	1300 deg C or higher
Temperature accuracy	≤ ± 1 deg C
Temperature controller	PID or equivalent system

Inner diameter of the tube	30 mm
Heated Length	200 mm
Thermocouple type	S type
Time to reach T _{max}	20 minutes or less
Connected load	1.5 kW
Housing made of sheets	Textures SS
Overload	Over-temperature limiter with adjustable cutout temperature for thermal protection class 2 in accordance with EN 60519-2 as temperature limiter to protect the furnace and load
Gas supply	Gas supply system for non-flammable protective or reactive gas
Accessories	
Alumina boat	Five (standard) Nos.
Gas cylinder	Two in Nos. filled with Ar and N ₂ gas (standard large) including two suitable pressure gauges and pipes
Others	One extra S type Thermocouple, One extra suitable Quartz tube, One extra ceramic muffle tube, Quartz rod with narrow curved tip 2 pcs. Also other necessary accessories to be provided.
Warranty	At least one year onsite warranty to be offered.

17. Grinding Jar/Bowl with safety closure device

Make	Imported reputed brand
Material of grinding jar/bowl	Zirconium oxide
Grinding Jar/Bowl volume	125 ml or larger
Grinding in inert gas	Yes
Gas pressure and temperature measurement	Yes (optional)
Adapter	Suitable adapter for grinding jar/bowl
Additional information	Grinding Jar/Bowl should be compatible for Retsch PM 100 planetary ball mill.

18. Grinding ball

Make	Imported reputed brand
Ball diameter	(i) 5 mm and (ii) 10 mm
Minimum quantity	(i) 1 pkt (about 500 gm) for 5 mm dia ball and (ii) 30 Pcs for 10 mm dia ball
Material of grinding balls	Zirconium oxide

37. Mach Zehnder Modulator 10 GHZ with controller and biasing arrangement

38. CATV Analyzer: Support of DVB-T2, DVB-T/DVB-H and ISDB-T digital TV standards

Wide frequency range up to 3.6 GHz or 8 GHz

Precision MER measurement in realtime (typ. 44 dB at 500 MHz)

39. CATV signal Generator : RF Carriers for Alignment and Testing (5-1200 MHz)

40. BER tester

Data Output

All timing parameters are measured at ECL levels.

Range of operation	150 Mb/s to 12.5 Gb/s (opt. C13) Can be programmed up to 13.5 Gb/s 150 Mb/s to 7 Gb/s (opt. C07) < 620 MHz only with external clock
Frequency accuracy	± 15 ppm typical
Format	NRZ, normal or inverted
Amplitude/resolution	0.10 V to 1.8 V, 5 mV steps Addresses LVDS, CML, PECL, ECL (terminated to 1.3 V/0 V/-2 V), low voltage CMOS
Output voltage window	- 2.0 V to +3.0 V
Predefined levels	ECL, PECL (3.3 V), LVDS, CML
Transition times	
(20% to 80%)	< 20 ps
(10% to 90%) ¹⁾	< 25 ps
Jitter	9 ps pp typical with disabled jitter sources and internal clock
Clock/data delay range	± 0.75 ns in 100 fs steps. Autocalibration possible to compensate for temperature drifts
External termination voltage²⁾	- 2 V to +3 V
Crossing point	Adjustable 20% to 80% typical to emulate duty cycle distortions
Single error inject	Adds single errors on demand
Fixed error inject	Fixed error ratios of 1 error in 10 ⁿ bits, n = 3, 4, 5, 6, 7, 8, 9
Interface³⁾	Differential or single-ended, DC coupled, 50 Ω
Connector	2.4 mm female

Clock output

Frequency range	150 MHz to 12.5 GHz (opt. C13) Can be programmed up to 13.5 GHz 150 MHz to 7 GHz (opt. C07) < 620 MHz only with external clock
Amplitude/resolution	0.1 V pp to 1.8 V pp, 5 mV steps
Output voltage window	- 2.00 to +2.8 V
Transition times	
(20% to 80%)	< 20 ps
(10% to 90%) ¹⁾	< 25 ps
External termination voltage²⁾	- 2 V to +3 V
Jitter	1 ps rms typical with disabled jitter sources and internal clock
SSB phase noise	< -75 dBc with internal clock source, 10 GHz @ 10 kHz offset, 1 Hz bandwidth
Interface³⁾	Differential or single-ended, DC coupled, 50 Ω output impedance
Connector	2.4 mm female

Data input

Range of operation	150 Mb/s to 12.5 Gb/s (opt. C13) 150 Mb/s to 7 Gb/s (opt. C07)
Format	NRZ
Maximum input amplitude	2.0 V
Termination voltage ¹⁾	- 2 V to +3 V or off (true differential mode)
Sensitivity ²⁾	< 50 mV pp
Intrinsic transition time ³⁾	25 ps typical 20 % to 80 %, single ended
Decision threshold range	-2 V to +3 V in 1 mV steps
Maximum levels	-2.2 V to +3.2 V
Phase margin ⁴⁾	1 UI – 12 ps typical
Clock/Data sampling delay	± 0.75 ns in 100 fs steps
Interface	Single-ended: 50 Ω nominal, Differential: 100 Ω nominal
Connector	2.4 mm female

Clock input

Frequency range	150 MHz to 12.5 GHz (option C13) 150 MHz to 7 GHz (option C07)
Amplitude	100 mV to 1.2 V
Sampling	Positive or negative clock edge
Interface	AC coupled, 50 Ω nominal
Connector	SMA female

41. PRBS Generator

Description	
Data rate	0.5 to 12.5 Gb/s ¹
External clock input rate	0.5 to 12.5 GHz
External clock input power required	+10 dBm (2 V p-p) typical < 1.0 GHz +3 dBm (890 mV p-p) typical ≥ 1.0 GHz
Internal clock rate	Single frequency internal oscillator, specify when ordering Default 10.0 GHz Option 301 – 10.66423 GHz Option 302 – 10.51875 GHz Option 303 – 11.09573 GHz Option 304 – 9.95328 GHz Option 305 – 10.709225 GHz Option 306 – 10.3125 GHz
Internal clock output power	600 mV p-p nominal
Divided clock output	Clock rate/16
Divided clock output power	600 mV p-p nominal
PRBS patterns	2 ⁿ – 1, n=7, 10, 15, 23, 31
Mark space density	1/2, 1/4, 1/8
Data output amplitude (single-ended) ²	> 300 mV p-p typical > 750 mV p-p typical (Option 010)
Data output jitter	1.0 ps rms typical ²
Data output rise/fall time (20% to 80%)	< 25 ps typical
Data output external interface	Differential. AC coupled, 50 Ω nominal, female SMA

The unit should have following capabilities :

- Bit error ratio (BER) measurement

- BERT scan
- Jitter decomposition
- Spectral Analysis
- Eye contour
- Level breakdown such as Emphasis Jitter (EJ), Uncorrelated Jitter (UJ), Data Dependent Pulse Width Shrinkage (DDPWS)
- Error location analysis.
- Eye diagram and masking
- Pattern Generator
- Jitter Tolerance Test including margin testing.
- Pattern Detector
- Live data analysis

44. Rotary Van Vacuum Pump

Make	Reputed brand
Vacuum	0.05 Torr or better
Max. flow CFM (L/min)	2.5 (70) or higher
Motor rotation	1440 rpm or higher
Horse power	½
Noise level	52.0 dB or less
Accessories	Suitable pipes (5 mts), flanges, etc. to connect with vacuum desiccators and other vacuum chambers

47. Portable digital pH meter

Make	Imported reputed brand
Range(pH)	-2 to 20 pH
Resolution /Accuracy	0.01 / ± 0.01 pH or better
Calibration Points	5 or more
Pre-defined Buffer Groups	4 or more
Temperature range (°C)	-5.0...105 or higher
Temperature Resolution/Accuracy (°C)	0.1 / ± - 0.5 or better
Accessories	Suitable sensor and all the other necessary accessories to be offered.

58. 10 kVA Isolation Transformer

Make	Reputed brand
Phase number	Single phase
Input voltage	180 V – 250 V
Output voltage	220 V ± 2 V
Frequency	50 Hz ±1Hz
Ambient temperature	-10-50°C
Temperature rise	<60°C
Insulation resistance	>2MΩ
Safety	100%
Accessories	All the necessary accessories to be offered.
Installation	Installation to be done by the bidder/vendor
Warranty	At least one year.

59. 10 kVA Servo Controlled Voltage Stabilizer

Make	Reputed brand
No. of Phase	Single Phase
Input voltage range	170-280 V
Output voltage	220±5 V
Correction speed	50 V/sec.
Cooling	Natural Air cooled
Regulation	Better than ± 1%.
Distortion	Zero waveform distortion
<u>Other Features</u>	<ol style="list-style-type: none"> 1. Linear IC controlled reliable circuitry without relays. 2. Stepless output voltage correction at high speed with minimum overshoot. 3. Output unaffected by load power factor and line frequency variations. 4. Input and output voltage monitoring.
Accessories	All the necessary accessories to be offered
Installation	Installation to be done by the bidder/vendor
Warranty	At least one year.

60. 10 kVA online UPS

Make	Reputed brand
INPUT	
Input Connections	Hard Wire 3 wire (1PH+N+G)
Input voltage range for main operations	160 - 275V
Input frequency	40 - 70 Hz (auto sensing)
OUTPUT	
Output power capacity	10.0 k Watts
Max Configurable Power	10 k Watts
Nominal Output Voltage	230V
Output Voltage Distortion	Less than 2%
Output Frequency (sync to mains)	50 Hz +/- 3 Hz
Load Crest Factor	3 : 1
Topology	Double Conversion Online
Waveform type	Sine wave
Bypass	Internal Bypass (Automatic and Manual)
Communications & Management	
Control panel	Multi-function LCD status and control console
Audible Alarm	Audible and visible alarms prioritized by severity
Emergency Power Off	Yes
Surge energy rating	480 Joules
Conformance	
Approvals	CE
Warranty	At least three years onsite warranty to be offered
Batteries & Runtime	
Battery type	Maintenance-free sealed Lead-Acid battery with suspended electrolyte: leakproof

Battery manufacturer	Exide
Battery Life	Minimum of 3 years
Battery Volt-Amp-Hour Capacity	1805 or higher
Power back up	2 hours or more
Warranty	At least two years warranty to be offered

Sd/-
Dr. Nachiketa Bandopadhyay
Registrar