

Rayat Shikshan Sanstha's
Yashavantrao Chavan Institute of Science Satara,

Tender Notice

Tenders are invited from reputed Original Equipment Manufacturers/
Authorized Venders for the procurement of **X-ray Diffractrometer (XRD) and
Scanning Electron Microscope (SEM)**. The last date and time of receipt of bid is
29/06/2019 (Saturday) on or before 04:00 pm. All rights to accept or reject the
bids are reserved with the institutional authority. More details are available on
www.ycis.ac.in.

Principal
Yashavantrao Chavan Institute of Science
Satara-415001

Instructions

The tender must be sent in a sealed packet, containing two separate sealed envelopes (one each for **Technical Bid and Financial Bid**) along with prescribed tender processing fee Rs 1500/- and Earnest Money Deposit (EMD) Rs. 10,000/- at office Rayat Shikshan Sanstha's Yashavantrao Chavan Institute of Science Satara, MS, India-415001, on or before 29/06/2019 (11:00 am to 04:00 pm). The technical bid will be evaluated first and financial bids will be opened in respect of those OEM/Vendors, who are found technically qualified after evaluation of Technical bids.

The Technical bids will be opened on 10/07/2019 at 01:00 p.m. in the office of Rayat Shikshan Sanstha's Yashavantrao Chavan Institute of Science Satara-415001.

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TECHNICAL SPECIFICATION OF BENCHTOP XRD SYSTEM

S.N.	Item description	Specifications	Qty
01	Bench-Top Powder X-Ray Diffractometer	<p>A portable desktop powder X-ray diffractometer instrument with fully integrated PC, easy to operate and independent of external media such as cooling circuits etc. for the state-of- art quality control and research facility. The XRD machine should be an all-in-one type.</p> <p>Technical Specifications:</p> <ol style="list-style-type: none"> 1. Geometry: Theta / Theta. Sample should always remain horizontal. 2. Goniometer: Vertical. 3. Type of sample: Powder & Thin films. 4. Goniometer Angular range: -2° to min $150^{\circ} 2\theta$ 5. The XRD must be able to scan a sample from a low 2θ angle of at least 0.6 deg. 6. Angular accuracy throughout the whole angular range: $\pm 0.02^{\circ} 2\theta$. Alignment accuracy should be guaranteed by vendor. 7. Min. step size: $0.005^{\circ} 2\theta$. 8. Achievable peak width: $<0.05^{\circ}$ 9. X-ray tube : Cu, long fine focus ceramic sealed tube 10. X-ray generation: 30kV/10mA; 300W or more 11. Alignment: Auto aligned /factory aligned 12. Sample Stage : Spinning sample stage along with standard sample holder. 13. Optics : necessary primary and secondary slits along with k-beta filter. 14. Sample holder: Suitable sample holder for powder samples minimum 10 nos. Silicon low background sample holder for small sample quantity 1 nos. 15. Max. Radiation level $< 1\mu\text{Sv/h}$. 16. Detector: 1- dimensional fast linear detector based on Real time Compound silicon strip or PIXEL or Curved Position sensitive detector Technology with minimum below specification. <ul style="list-style-type: none"> ➤ No. of Strips or PIXEL – 150 or more. ➤ Spatial Resolution : 80 micrometers or better ➤ Minimum Active area : 12 x 12 mm or better ➤ Minimum Capture angle : 3.0 deg. or better ➤ Minimum counts rate : 70 million CPS or better 	01

		<ul style="list-style-type: none"> ➤ Operational mode: 0D & 1D mode should be possible. ➤ Fluorescence suppression : Suitable hardware / software / mechanism for suppressing secondary fluorescence from sample. <p>17. The offered system should be air cooled and should not use external water chiller for cooling.</p> <p>18. Power Supply: 230V, 50/60 Hz</p> <p>19. PC and Interfaces: Necessary computer and operating system should be offered either integrated or external with USB & LAN facility.</p> <p>20. Software: Necessary software with following minimum features.</p> <ul style="list-style-type: none"> ➤ A complete software package that includes from mounting sample to data phase analysis, qualitative, quantitative analysis, Kα2 stripping, percentage of crystallinity measurement, crystal size determination with search match facility. ➤ The software should be compatible with ICDD as well as COD database for phase analysis. ➤ Software for converting the XRD data obtained from the diffractometer to ASCII format for research publication purpose. ➤ Suitable ICDD database with minimum 3 years license, License should be in the name of YCIS Satara. <p>21. Offered system should be factory alignment, plug and analyze type, table mounted & should be minimum space requirement for Installation.</p> <p>22. The system generated quality of data should be $\leq \pm 0.02^\circ 2\theta$ on standard sample; supplier should supply the standard sample along with system to evaluate the performance during installation. The Supplier should also provide the written guarantee for above data quality.</p> <p>23. The XRD system should have all necessary safety protection as per latest International norms.</p> <p>24. Vendors must mention the service support details and no. of service engineers trained on the quoted model.</p> <p>25. Warranty: The vendor must quote comprehensive warranty for 24 months including spares and X-Ray tube. All warranty replacement parts must be supplied on DDP basis to the installation site.</p>	
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TECHNICAL SPECIFICATION OF SCANNING ELECTRON MICROSCOPE (SEM).

Sr. No.	Feature	Requirement
1	Resolution at high vacuum	3 nm at 30 kV or better (SE)
		8 nm at 3 kV or better (SE)
2	Resolution at low vacuum	4 nm at 30 kV or better (BSE)
3	Electron Source	Thermionic–emission electron gun
4	Accelerating voltage	0.5 kV -30 kV
5	Operation Mode	<ul style="list-style-type: none"> ▪ High Vacuum and Low Vacuum. ▪ Freely switchable between high vacuum and low-vacuum modes without any mechanical aperture or alignments.
6	Magnification	Magnification 5x to 3,00,000 x or better
7	Standard Detectors to be supplied with SEM	<ul style="list-style-type: none"> ▪ Secondary Electron Detector (High sensitivity) ▪ Fixed Back Scattered Electron Detector Semi-Conductor type capable of forming composition image, topographic image and shadow image with capability for digital signal manipulation through software. BSE should work for entire working distance.
8	Image Mode	<ul style="list-style-type: none"> ▪ Secondary Electron Image ▪ BSE Image (Composition image, Topographic image and Shadow)
9	Vacuum system	Turbo molecular pump backed up by rotary pump to provide ultraclean, fast vacuum. Should freely switch between high vacuum and low-vacuum modes without involving any mechanical aperture and alignments.
10	Pressure Range	Pressure in Low Vacuum mode should be 10 - 100 Pa or better
11	X-axis movement	X-axis: 80 mm or higher
12	Y-axis movement	Y-axis: 40 mm or higher
13	Z-axis movement	Z-axis: 43 mm or higher
14	Tilt Angle	T= -5° to 90°
15	Rotation	360°
16	Specimen Stage Control	5-axes mechanically Eucentric stage with 3-axis motorization. The Stage should be Eucentric over entire working distance to allow specimen tilt without shift in focus or area of interest and auto Z focus to keep image focused even if stage Z position is altered.

17	Specimen Chamber Size	Specimen Chamber should be able to accommodate sample having 150mm diameter and 50 mm in height or more.
18	Number of Ports	Sufficient ports should be available for future upgradations such as WDS, EBSD, Cryo stage, cooling stage, CLD. Total ports must be more than 5 numbers.
19	Microscope Control	All microscope functions should be controlled by keyboard mouse, Joystick and touch screen monitor via windows based software.
20	Auto functions (Operational Controls)	<ul style="list-style-type: none"> ▪ Vacuum control ▪ Gun alignment, bias and saturation ▪ Compensation for kV ▪ Probe current optimized for Spot size ▪ Spot size optimized for magnification ▪ Contrast and brightness ▪ Focus and Stigmator
21	Image display and processing	<ul style="list-style-type: none"> ▪ 23 inch or better monitor for image display (Display Resolution: 1920 x 1080 or better) ▪ Up to 5120 X 3840 pixels or better, adjustable separately for live image (3 standard BMP, TIFF and JPEG formals) and for stored images ▪ Graphical User Interface (GUI) of at least 4 live images in a split window for Simultaneous detection and viewing of SE, BSE,, etc. operable with touch screen monitor. ▪ Multiple user login function for customized workspace and specimen condition settings ▪ Full screen display of the live image should be possible. ▪ Signal mixing of SE and BSE images to enhance image qualities. ▪ Brightness and contrast correction, sharpening, etc. ▪ Colour mapping, plane merging, arithmetic and binary operations etc. ▪ Measurement: Phase Area, length, count. ▪ Multi image calibrator & Shape Factor ▪ Noise reduction by average or integration method
22	Computer and operating system configuration	Windows based computer/workstation with latest configuration available in the market with Windows 10 operating system or latest

23	EDS System	<p>Suitable liquid nitrogen free Dry Silicon Drift Detector (SDD). Energy resolution 130 eV or better at Mn-Kα, Detection area should be ≥ 30 mm² for handling high count rates Elemental analysis (point and line) and elemental mapping with imaging facility. EDS analysis software The EDS detector should be capable of elemental analysis from Boron (B) to Uranium (U). Single Graphic User Interface (Computer system and software) for EDS and SEM will be preferred.</p>
24	Sputter Coater	<p>Gold coater must be quoted as a standard for Sample Preparation.</p>
25	Guarantee/Warranty/Assurance	<p>One-year warranty on all components & subcomponents should be provided.</p>
<p>Resolution Number at given accelerating voltage must be printed on technical catalogue. Any other justification will not be entertained.</p>		