VIJAYANAGARA SRI KRISHNADEVARAYA UNIVERSITY

Jnana Sagara Campus, Vinayakanagara, Cantonment, Ballari - 583 105.

NO. VSKUB/CEMARF/Quotation/2023-24/ 62   Date: 11/11/2023

QUOTATION

Sealed quotations subscribing the name of work 'Supply and Installation of Equipments to Center of Excellence for Multidisciplinary Advanced Research Facility (CEMARF) at Vijayanagara Sri Krishnadevaraya University, Jnana Sagara Campus, Ballari'. So as to reach this office on or before 20/11/2023 upto 5.30PM and quotation should be addressed to Registrar, V S K University, Vinayakanagara, Cantonment, Ballari.

NAME OF WORK: SUPPLY AND INSTALLATION OF EQUIPMENTS TO CENTER OF EXCELLENCE FOR MULTIDISCIPLINARY ADVANCED RESEARCH FACILITY (CEMARF) AT VIJAYANAGARA SRI KRISHNADEVARAYA UNIVERSITY, JNANA SAGARA CAMPUS, BALLARI.

TABLE

Sl. No.	Instrument Name and specification	Unit	Qty	Rate quoted per Unit (In Rs)	
				In words	In figure
	CEMARF				
1	**X-ray Diffractometer** • **X-ray Generator**: Tube load-500W or more, Tube voltage-30k V (Variable) or more, Tube current-15mA (Variable) or more, High voltage generation-High frequency method, Stability ±0.05% (for a ± 10% variation in line voltage), X-Ray shutter-Mechanical rotary shutter linked to Main door. X-ray tube-Cu 1.0kW or higher • **Goniometer Details:** Type-Vertical Theta θ or 2θ , Radius minimum 140mm or more, Scanning method: θ-2θ coupling mode, Drive system-Pulse motor drive , Scanning range –at least -3 ~ +145° (2Theta) or more, Scanning Speed-atleast 0.01~ 100°/min (2Theta) or more, Minimum step width- atleast 0.005° (2Theta), Variable DS- Effective below 20°(2 θ) to limit measurement area 20mm width, Angular Accuracy Better than-0.02°, Variable Divergence-Slit, SS (Scattering slit)-1.5°or better, Soller slit-2.5° or better, K-Beta reduction-Ni-Filter • **Sample Holder**-Standard sample holder for accommodating both solid (metallic) and powder samples.	No	1		

- X-ray Detector Details-Fast 1D solid state multistrip detector.
- Peak Search Background calculation and subtraction; Profile smoothing, K-a2 calculation and removal, Peak Search.
- Integrated Intensity calculation, Background calculation and subtraction, Profile Smoothening,K-a2 calculation and removal, Peak search, LPA calibration, Integrated calculation
- Multiple Recording Software: Software for Qualitative Analysis: Si Standard (NIST Traceable)
- **Chiller**: External , **Computer**: Computer and Suitable Software,
- A detailed system description document and operation manual should be provided along with the system. The document should include part details and allowable detachment/replacement procedures for all important components of the system.

Installation & training Installation of the instrument to be done at VSKU-Bellary, at free of cost. Operational training to be provided to respective group of instrument operators

2	Scanning Electron Microscope with EDX				

- **Electron Microscope type:**Conventional/ Floor Model High Resolution Variable Pressure SEMshould have high and low vacuum modes as standard. **Resolution:**a. 4nm at 20KV (WD=5 mm, High Vacuum mode) b. 15nm at 1KV (WD=5mm, High Vacuum mode)c. 5nm at 20KV (WD=5mm, VP mode) Image Shift: ± 50um (WD= 10mm)
- **Acceleration Voltage:** 0.3 to 20KV, **Magnification:** x5 to x300,000 (magnification of image) X16 to x800,000 (magnification of actual display), **Beam Brightness System:**Constant and high emission current at several accelerating voltage levels for enhanced brightness retention and best-in-class image sharpness with high S/N ratio even at low accelerating voltages for capturing beam-sensitive samples. **Column Liner Tube Design:** for easy cleaning and replacement of condenser lens aperture without dismantling column and without disturbing the beam alignment to perform the quick analysis, **BSE Image Band Improvement Filter:** capable to observe the images in the FAST scan mode without distortion like a drifted image in the high gain, **Low Vacuum Range:** 6 to 100Pa (13 steps) for low vacuum analysis

(No, 1)

- **Detectors:** Secondary electron detector High sensitivity 5-segment Backscattered electron (Semiconductive type) detector for composition, 3D, and topography which works in both high and low vacuum.
- **Vacuum System:**Must be fully automatedvalve system from renowned manufacturers like pfeiffer, ulvac, agilent, or neodry. The TMP with 61 L/s and RP with 100L/min (50Hz), 120L/min (60 Hz) Pump capacity, pumping down time from cold start and specimen exchange time to be indicated.
- **Filament:** Factory Pre-centered cartridge type Tungsten hairpin filament for optimized performance and must have filament lifetime indication technology.
- **Specimen stage** should be 3 Axis- Motorized StageX=0 to 50mm,Y=0 to 40mm, Z= 5 –33 mm, T= -15° to +90°, R= 360°
- **Maximum specimen size:** 80 mm diameter and Maximum observation

range 64mm in diameter (combined with Rotation) with optimum thickness with online specimen dimension measurement facility.**Image Data Saving and Format:** upto 5,120x3,840 pixel and BMP, TIFF, JPEG, **Auto Axis Alignment:** Multiple alignments, including optical axis and gun alignment after filament replacement, should be automatically controlled. This prevents misalignment of the optical axis or field of view and helps obtaining high quality images repeatedly without relying solely on the user's skills.

- **Automatic Functions and Image controller:** Auto beam adjustment, Auto optical axis alignment (current alignment), auto beam brightness control, Auto Brightness & Contrast Control (ABCC), Auto focus control, Auto astigmatism correction & focus, Auto filament saturation, Auto beam alignment, Auto start, **Image Display:** 2 or more simultaneous display of composition and topography images

- **Other Functions:** Raster Rotation, dynamic focus, image enhancement, data input (measurement between two points, measurement of angle, characters, preset magnification, stage location navigation system (SEM MAP), beam marking, Report creator

- **Safety System:** Protection function for the power failure, electric leakage, and vacuuming operation are equipped.

- **Recommended PC Specifications**

- Operation System: Microsoft Windows 10 Pro 64bit, CPU: Intel Xeon E3-1225 v5 with Intel HD Graphics PS30 or higher compatible processor, On-board Memory: 8 GB or more, Display: 1,920 x 1,080 pixels , Memory Device: HDD, DVD-ROM drive

- **Sputter Coater Specifications:** Diode Discharge Magnetron Type Sputter Coater Coating Time: 5 to 300 seconds , Voltage Range: 0.4kV DC Max or better (variable through phase control)

- Current: 40 mA DC Max or better , Coating time: 5 to 300 Seconds or better , Pressure: 7 Pa , Specimen Size:, Maximum Diameter: 60mm Dia Max. Height: 20mm, Target: Au Distance b/w target and specimen surface: 25-35 mm

- **Essential Accessories for Future Up gradation:** a) Energy Dispersive Spectroscopy (EDS) b) More up gradation option – STEM Holder, 3D Mapping, Multi Zig Zag

- Must supply 10 tungsten filaments and one carbon tape along with the main unit

- Application: Morphological analysis, topography, identification of crystal structure, Chemical Composition, Thin film analysis, Biological specimens and Zoological Specimens.

- Computer and Suitable Software,

- Installation & training Installation of the instrument to be done at VSKU-Bellary, at free of cost. Operational training to be provided to respective group of instrument operators

3	**Gas Chromatography**		
	• Automatic, computer-controlled Dual channel Gas Chromatograph Analyser, Auto liquid Injector min 15 vials capacity and FID. System to be supplied with test chromatograms, method set up parameters,	No	1
	• Large Graphical LCD or better based display to view Realtime		

Chromatogram and their parameters, An automatic computer controlled dual channel gas

- **chromatographic system**; capillary/ packed columns, gas sampling valve, auto liquid injector, oven, pressure &flow control systems, detectors, gas sampling devices with appropriate valves & fittings, and powerful and versatile software capable of analysing gases/liquidis required. The Valves must be fitted in separate enclosure box and not inside column oven.
- Should be equipped with Intelligent self-diagnostic functions for detailed diagnosis of the septum, glass insert usage status, temperature sensor error, gas supply pressure, status of each gas ignition function etc.
- Should be manufactured as per ISO 9001 and in full compliance with international regulatory, safety, and electromagnetic compatibility requirements
- **Column Oven:** Capacity; 15L or above, Temperature Range; Ambient + $10^{\circ}C$ to $400^{\circ}C$, Temperature Program ramps; Minimum 20° or more, Max temperature program rate; Minimum $60^{\circ}C/min$ or more, Cooling time; 300 °C to 50 °C within 6 min (at 25 °C ambient temperature) or faster
- Maximum run time; At least 9999 min or more
- Thermal Conductivity Detector (TCD): Max Operating temperature: $400^{\circ}C$ or more
- Sensitivity: 200 pg tri-decane/mL or <10 microvolt per ppm or >40000mV x mL/mg (Decane), Dynamic range 105 or better
- Flame Ionisation Detector: Max operating temperature: $400^{\circ}C$ or more, Sensitivity: 3 pg C/s (Dodecane) or better, Dynamic Range: 107 or better
- Sample Injection: Channel1 - Suitable sample injection port to introduce sample through gas tight syringe.
- Channel2- Split/splitless type capillary column injector with pressure range up to 100psi and split ratio up to 9000:1
- Liquid Auto Injector & sampler; Auto Injector with sampler for 15 or more vials capacity should be provided with 10uL syringe. Variable injection speed separate was- waste vials should be available.
- Concentration Range: H2: 50ppm-1000ppm, O2: 50ppm-1000ppm
- Other items - Suitable sample loops, gas supply pipes & carrier gas triple filter kit should be included as standard supply.Suitable, Latest, compatible branded PC system with Windows 10 OS to be included& Suitable Printer
- 5KVA Online UPS with Suitable Backup

Installation & training Installation of the instrument to be done at VSKU-Bellary, at free of cost. Operational training to be provided to respective group of instrument operators

| 4 | **High temperature Muffle Furnace (1300 $^{\circ}$C)** Muffle Furnace with Inert gas Chamber (N_2, Ar or other Inert gases), Sample holders, Muffle Furnace Working Chamber Dimensions :8" W x 8" H x 8" D, Rated Maximum Temperature: 1300°C -1400°C ($\pm50^{\circ}$ C). Heating element: $MoSi_2$ or better, | No | 1 | | | |

	Temperature Accuracy: ±3°C or better, Temperature Control: By µP based Programmable PID Controller. Sensor: Chromel/Alumel or Better. Operating Power Supply: 220/440Volts, 50Hz. Power Rating: 6.0kW, Nitrogen cylinder, dual gauge gas flow indicators or better, Gas leakage tool, Safety accessories.				
5	**Gaussian Software with Suitable PC :** • Calculation of one- & two-electron integrals over any contracted gaussian functions • Conventional, direct, semi-direct and in-core algorithms • Linearized computational cost via automated fast multipole methods (FMM) and sparse matrix techniques Harris initial guess • Initial guess generated from fragment guesses or fragment SCF solutions • Density fitting and Coulomb engine for pure DFT calculations, including automated generation of fitting basis sets • (O/N) exact exchange for HF and hybrid DFT • 1D, 2D, 3D periodic boundary conditions (PBC) energies & gradients (HF & DFT), • Shared-memory (SMP), cluster/network and **GPU-based** parallel execution • Electron Correlation: • Geometry Optimizations and Reaction Modeling • Vibrational Frequency Analysis • Molecular Properties • ONIOM Calculations • Self-Consistent Reaction Field Solvation Models • Integration with External Programs **GaussView:* Anharmonic Frequency Analysis * PCM Solvation Cavity *PCM Solvation Cavity * Vibronic Spectra *Enhanced Calculation Summary * One Step Multi-Job Setup *Symmetry *New Job Setup Features • Compatible Computer with intel i9 12th GEN, min. 16GB RAM, min 512GB SSD ROM, Single user academic license on windows/ Departmental academic site license on windows	**No**	1		
6	**Gel Documentation System:** 1. Versatile system to support wide range of applications like Fluorescence, Colorimetry/densitometry & Gel documentation. 2. should support the following dyes – SYBR Green, SYBR Safe, Ethidium Bromide, Stain Free Gel , Coommassie Blue, Zinc Stain, Flamingo, Oriole, Silver Stain, Coommassie Fluor Orange, Sypro Ruby, Krypton & Colorimetric Blots 3. **Should feature touch screen of size 9.7" or more which is Multitouch capable & offer a Display resolution of 1,024 x 768 pixels or better.** 4. Offer **Smart Tray Technology**, 5. Offer pre-calibrated focus for any zoom setting or sample height.	**No**	1		

	6. Should have a high-resolution scientific grade 16 bit CMOS camera, a light-tight compact darkroom & a Slide-Out UV Transilluminator. 7. **Maximum image area - 21 x 14 cm (W x H), Pixel density (gray levels) - 65535 or better** 8. Dynamic range - >3.5 orders of magnitude, Emission filter -535–645 nm or better 9. Data output -16-bit or 8-bit: SCN, TIFF, JPEG image files 10. The Gel Placement door should be drawer type allowing access to Gels from either direction for facilitating easy/clutter free gel excision applications. 11. The Imaging System should offer **a camera resolution greater than 6.3 megapixels**& carry a pixel size of 2.4μm x 2.4μm 12. The Instrument should offer Trans-UV (B) and Epi White as Standard Illumination. White Light Trans Illumination and UV/Blue Conversion should be available as optional. **<u>Specifications of the Image Analysis Software:</u>** 1. Automated lane and band identification, molecular weight or base pairs evaluation, band sizing, and quantitation based on a reference band or quantity standards 2. Snapshot tool to copy images, lane profiles, and graphs 3. Allow Publishing resolution (dpi) and publishing dimension to be specified with a one-click image export for publication. Provides functionality to produce image at user-defined dpi and dimension 4. No requirement of license for registration. The full version software should be installable in large number of computers. Lifetime free upgrades of Software & Firmware should be available. 5. Mac and PC compatible software 6. 16-bit and 8-bit tiff images with a one-click export option 7. Software should offer live update of results with any change of analysis parameters. Local/Global background subtraction for individual bands				
7	**Attenuated Total Reflectance Spectrophotometer:** UATR Accessory to be used with FT-IR instrument Should be with diamond crystal which withstands complete range of pH Should capable of working with PerkinElmer Spectrum Two FTIR spectrophotometer. UATR accessory should encompass the following points: 1. Automatic recognition to the software - as soon as the accessory is placed in the sample compartment the accessory is recognized. In addition to recognizing the accessory, the software must also: Record the accessory unique number Allow system suitability checks to be carried out. 2. Once locked into the sample compartment, the accessory must be ready to be used without any manual alignment necessary. 3. Supplied pressure sensor must record the amount of pressure applied to the sample and store this information as part of the data file	No	1		
8	**Dry Ice maker:** • Capacity: 2.5kg-5Kg/hr, • Dry ice pelletizer, Diameter of ice pellets 3mm- 19mm,	No	1		

	• Power supply: 220/400V/ 50Hz/ 3 or 1 phase, • Power Consumption: 1.1kW, • CO_2 Supply: Low pressure CO_2 storage tank, 15-20 bar pressure Inbuilt PLC to Control all function				
	Interdisciplinary Project				
9	**Bio Safety Cabinet L2. (3x2x2):** Size 3ft X 2ft X 2ft Main body constructed with steel, scratch free, 18 gauge stainless steel, filter type supply of HEPA at 99.997% at 0.3micron LCD display. Operating florescent, UV light and blower.	No	1		
10	**Lyophiliser:** Power consumotion-5kV, production capacity-20lt/batch. Model number-r-05. Industrial application, cast iron power source-electricity finish polish.	No	1		
11	**Weighing balance:** Range=0.1mg to 10g. Capacity 10g. Linearity-0.2mg. Response time-3s, repeatability-less than or equal to 0.1mg	No	1		

Registrar
**Vijayanagara SriKrishnadevaraya University,
Ballari-583105**

TERMS AND CONDITIONS:

1. The rates quoted shall inclusive of all taxes and delivery & installation at VSK University, main Campus, Ballari
2. The right to reject the quotation is vested with university authorities.
3. The quoted rates should be valid at least for 06 months.

Copy to:
1. The director, ICT Department, VSK University, Ballari-583105 for necessary action to upload the quotation in university website for 07 days or up to last date.
2. Notice board.
3. Office File.