[PHY]

Department of Physics, Gujarat University.

Technical Specifications:

Important Note : The Quoted prices must be inclusive of supply, delivery at Physics department, all taxes and levies, customs clearance charges, transportation, loading, unloading, installation, testing, commissioning, insurance (if any) and warranty of the required instruments / equipments.

Sr. No.	Equipment Specifications / Details	Unit	Quantity
1.	**CST studio suit software:** Multiuser CST studio suit software with different solver modules. **Technical Specification:** i) **General Features:** Native graphical user interface based on Windows, Multiple document Interface, Dockable tool, parameter and message windows, based on OLE automation server, VBA programming, Automatic post processing, Parameter sweeps, Automatic optimization, Animated plot export, Automatic Power Point slide creation, Automatic updates, Project management, Import of sub-projects, Copy and paste of 3D objects, inside and between projects. ii) **3D Modeling Interface**: The 3D modeler interface should have features like fast interactive, mouse supported model input, Design intent capture using relationships between objects, Fully parametric 3D modeling (including parameterization of previously created structures), History list with unlimited undo/redo, Advanced modelling features such as helices, blends, chamfers, lofts, 2D objects sweeps along 3D curves, Boolean operations on objects, Parameterisation of imported objects. iii) **Solver Modules**: Software should consist of various solvers like Time domain, Frequency	Number	01

	domain, Eigenmode, Integral equation, Thermal, Structural mechanics, Cable harness, 2D circuit simulator, with one user interface for all the solver modules. Time Domain Solver with well developed conformal meshing algorithm named Perfect Boundary Approximation, Thin Sheet Technology, Multi-level Sub gridding meshing scheme. Frequency Domain Solver with both Tetrahedral and Hexahedral meshing. Solver available in the software should be based on different numerical techniques- Time Domain (FIT-finite integration technique), Time-domain Transmission-Line Matrix (TLM) method with Octree-based meshing, Frequency Domain (FEM-finite element method) and Integral Equation Solvers (MOM-method of moments, MLFMM-multilevel fast multipole method).		
2.	**<u>Up gradation of Basic AFM to Multimode</u>** • <u>Easyscan 2 AFM Dynamic Module</u> Controller module adds DFM functionality to the easyScan 2 Controller. The easyScan 2 AFM Dynamic Module requires the easyScan 2 AFM Basic Module. Added functionalities / specifications: Imaging modes: Dynamic Force (Intermittent Contact): Constant Amplitude (Topography), Constant Height (Amplitude), Spectroscopy modes: Amplitude - Distance Dynamic Frequency Range 15 - 500 kHz; Dynamic Frequency Resolution <0.1 Hz; • <u>Easyscan 2 AFM Mode Extension Module</u> Controller module adds additional modes to the easyScan 2 Controller. The easyScan 2 AFM Mode Extension Module requires the easyScan 2 AFM Basic Module. Added functionalities / specifications: Imaging modes: Phase Contrast, Force Modulation, Spreading Resistance, Magnetic Force, Electrostatic Force, Lateral Force (with FlexAFM Scan Head) Spectroscopy modes: Phase-Distance, Current-Voltage and Current-Distance (and more with the Signal Module A) Phase contrast range +/- 90°	Number	01

	Phase contrast resolution <0.05° Phase reference range 0-360° Tip Current measurement +/- 100µA • Easyscan 2 AFM Video Module Needs the AFM Video Camera for operation Contents: - Controller module - Video Camera cable • Easyscan 2 AFM Video Camera Dual view camera system Can only be used together with the AFM Video Module • Cantilever Tap190Al-G-10 (10 pcs) For dynamic mode operation Contents: - Package with 10 Tap190Al-G Cantilevers • Cantilever ContAl-G-10 (10 pcs)		
3.	**Dielectric assessment kit :** • To measure the dielectric and magnetic properties of thin material layers.. • To characterize PCB and microwave substrate • To measure permittivity of thin layers (thickness range about 0.1 mm to 10 mm) of solids. • To measure permittivity of small volumes (approx. 0.5 ml to 30 ml) of liquids. **Specifications:**	Number	01

	• Should be compatible with Anritsu make VNA model: MS 46322 A • Frequency range: 10 MHz to 30 GHz or higher. • Fully automated and software controlled.		
4.	**Electronics TEST BENCH for Laboratory** Each Test Bench with following items: **a.** <u>70 MHz 2 Ch DSO</u> • 200 / 100 / 70MHz Bandwidths 1GSa/s Real Time Sample Rate • Trigger Mode : Edge, Pulse Width, Video, Slop, Overtime, Alternative Trigger etc. • Provides Software for PC Real-time Analysis • Five Math Functions, +, -, *, /, and FFT functions 32 Automatic Measurements and Track Measurement via Cursor Automatically • Large (7") Color Display, WVGA (800 x 480) Support U Disk and Local Files Storage Pass / Fail Function Enables to Output Testing Results **b.** <u>Multi waveform signal Generator With Modulation 3 MHz</u> • 0.3Hz to 3MHz Frequency Output in 8 Ranges Versatile Waveforms : Sine, Square, Triangle, Ramp, Pulse and DC Outputs • Standard AM, Balance AM, FM, ASK, FSK, PWM Modulation and Sweep Mode • Internal / External Modulation • 20V p-p Output Level • 60dB Attenuation • Variable DC Offset Control • Low Distortion for Sine Waveform 1% typically • Variable Symmetry for Generating Sawtooth and Pulse Waveforms 4 Digits Display • Dedicated Auxiliary Function Generator upto 20KHz	Number	10

c. 4 ½ Digital True RMS Bench Multimeter/ Counter (2 Nos)

- 9999 Counts 4½ Digit 40mm High Characters Jumbo LCD Display Dual Slope Integration
- A/D Converter System
- Basic DC Voltage Accuracy of ±0.05%
- True RMS AC Measurement
- Capacitance Measurement
- All Ranges are Fully Overload Protected
- Frequency Measurement upto 200KHz
- Diode Testing
- Continuity Testing (Buzzer)
- Automatic Polarity Indication
- hfe Testing

d. Multi Output Programmable Power Supply

- Multi Output Linear DC Power Supply
- Digitally Controlled Output Settings
- Store / Load 10 Sets of Output Settings in Internal Memory
- USB Interface Provided
- Programmable Arbitrary Variable Output by Feeding Coefficient
- of the Curve
- User Friendly Front End
- Low Cost General Purpose Laboratory Bench Unit
- Fully Protected against Overload and Short Circuit
- 5V/5A with Over Voltage Crowbar Protection for Digital ICs
- Three Independent Outputs Electrically Isolated from Each Other
- Electrically Floating Outputs up to 500V DC w.r.t. Ground
- Precise Regulation, Low Ripple and Noise for Both Constant
- Voltage & Current Operation

5.	**Workstation** • **Processor:** 2 X Intel® Xeon® E5-2690 v3 (2.6 GHz, 30 MB cache, 12 cores, Intel® vPro™) • **Chipset:** Intel C612 • **Operating System:** Windows 8.1 Pro 64 + Linux • **Form Factor:** Rackable Mini Tower • **Memory:** 32 GB DDR4-2133 ECC Registered RAM • **Memory Slots:** 8 DIMM • **Drive Controllers:** Integrated SATA 6.0 Gb/s; Integrated LSI SAS 2308 with RAID; LSI MegaRAID® 9270-8i SAS 6.0 Gb/s ROC RAID Card and iBBU09 Battery Backup Unit • **Internal Storage:** 4 X 1TB SATA HDD 7200 rpm • **Optical Storage:** Slim SATA SuperMulti DVD-RW (reader and writer) • **Additional Storage:** 29-in-1 Media Card Reader • **Graphics:** NVIDIA® Quadro® K6000 (12 GB) • **Audio Adapter:** Integrated Realtek HD ALC • **Communications:** Integrated Intel I210AT PCIe GbE • **Expansion Slots:** 2 PCIe Gen3 x16, 1 PCIe Gen3 x8, 1 PCIe Gen2 x4, 1 PCIe Gen2 x1 • **Ports:** Front - 4 USB 3.0; 1 combo headset; 1 microphone Back - 4 USB 3.0; 2 USB 2.0; 1 serial; 2 PS/2; 2 RJ-45; 1 audio line in; 1 audio line out Internal 2 USB 2.0; 1 USB 3.0 (Internal USB 2.0 available by the 2x5 header. Internal USB 3.0 available by a shrouded 9-pin connector.) • **Internal drive bays:** Two 3.5" • **External drive bays:** Two 5.25"; One slim ODD • **Keyboard:** USB Preferred Pro Full Size • **Pointing Device:** USB Optical Wheel Mouse • **External Speakers:** External Stereo Speakers • **Power Cord:** Line Cord • **Language Pack:** Publication – English • **Microsoft Productivity Software:** Microsoft Office Home and Student 2013 - English • **Additional software application preload:** Anti Virus Protection - 36 Month validity, Adobe Acrobate Reader and writer - 36 Month validity **Monitor:** 24” LED monitor (or higher)	Number	01

Quote must have a compliance report on all the above points.