NOTICE INVITING QUOTATIONS TO SUPPLY & INSTALL THE FOLLOWING SOPHISTICATED LABORATORY INSTRUMENTS TO QUEEN MARY'S COLLEGE , CHENNAI 600 004

NO. 1/ QMC / 2013-14 19.12.2013

The Principal, Queen Mary's College, Chennai 600 004 invites sealed quotations from original equipment manufacturers / Authorized dealers / distributors for the supply and installation of the following laboratory instruments as per the requirements and specifications mentioned in the document below. Quotation cover to be superscribed as "QMC/ Instrumentation- Quotation" and sent by registered post so as to reach us on or before 21.1.2014.

Technical Presentation & Technical Bid: 22.1.2014 at 11 A.M
Commercial Bid : 24.1.2014 at 11 A.M

1. **FTIR SPECTROPHOTOMETER**
2. **UV-VIS SPECTROPHOTOMETER**
3. **ATOMIC ABSORPTION SPECTROPHOTOMETER**
4. **TRINOCULAR RESEARCH MICROSCOPE**
5. **ELECTROCHEMICAL WORK STATION**
6. **REFRIGERATOR**
7. **LYOPHILISER**

The detailed Specifications for the items is given below.

Terms and conditions:

1. The quoted price should be in Indian rupees & shall include all taxes etc .
2. The scope of work includes delivery, installation and demonstration / training at Queen Mary's College, Chennai 600 004
3. Customs duty exemption certificate will be provided.
4. Payment will be made upon satisfactory installation and demonstration at our site.

5. The EMD for
    a. FTIR spectrophotometer will be Rs. 30,000
    b. UV-VIS spectrophotometer will be Rs. 21,000
    c. Atomic Absorption spectrophotometer will be Rs. 51,000
    d. Trinocular Research Microscope will be Rs. 30,000
    e. Electrochemical Work station will be Rs. 16,000
    f. Refrigerator will be Rs. 1700
    g. Lyophiliser will be Rs. 15000

payable as demand draft drawn in favour of Principal, Queen Mary's College, Chennai.

6. EMD will be returned only after warranty period.
7. Room preparation (flooring, AC, water connection, work table) costs to be included.
8. Local service support required.
9. Customer list with contact details to be provided.
10. Details of 5 working installations in India in the last 3 years for equipment bidding to be enclosed.
11. Must support with accessories atleast for next 10 years.
12. During Warranty period technical visit and service by personnel to be done quarterly and whenever necessity arises.

MINIMAL TECHNICAL CRITERIA

ITEM 1: FTIR SPECTROPHOTOMETER

SPECIFICATIONS OR SUPERIOR THAN SPECIFIED

- Interferometer : Permanently aligned, Michelson, 45°, mechanical flexture.
- Optics : Zn Se
- Enclosure : Sealed and desiccated
- Spectral range : ZnSe optics 7000–400 cm^{-1}
- Spectral resolution :< 2 cm-1 & should be upgradeable to 0.8 cm-1 resolution
- Wavenumber accuracy :0.05 cm-1
- Wavenumber reproducibility:0.005 cm-1
- Modes : ATR, ATR crystal should be made of Diamond
- Microsoft Windows based software for instrument control and data analysis.
- 2 No.s Polystyrene film standards to be included in the offer.
- Optical components like detector and source must be electronically coded.
- Sampling modules such as Micro-ATR must be available. Change between different modules must be easy.
- Sampling modules must be automatically identified and spectral test routines must automatically start to verify accessory performance.
- The FT-IR must incorporate a high throughput 45 degree interferometer and Gold Coated optics for maximum light throughput.
- The interferometer must be permanently aligned. Interferometer designs that require alignment (either manual or automatic) are not acceptable.
- The system must incorporate an automated internal instrument validation unit. The internal validation unit must be able to incorporate different validation standards and be fully software controlled. This instrument validation must not require user interaction and must produce a report documenting the results of the validation tests.
- Communication between the spectrometer and controlling PC must be performed using an Ethernet protocol.
- The system must be able to be controlled by a laptop / desktop computer.
- System should be supplied with 10,000 spectral library.

Warranty :

- The warranty for Light source should be minimum of 10 years.
- 3 Years warranty for the complete system should be included

Accessories :

1. Branded Pc with Laserjet Printer
2. Branded 2 KVA Online UPS with 60 mts Backup .

3. Pellet maker (Hydarulic press) with Agate , Pestle and Mortar , 13 mm KBr Die set & Pellet holder .
4. IR Lamp for KBr
5. Suitable table with draws and granite top and sink with water tap to install complete system
6. KBr window for solid and liquid.
7. Liquid de-mountable cell.
8. KBr powder

SOFTWARE specifications:

- The software must be an "all-in-one" software for data measurement, manipulation and evaluation.
- The software must come with a step by step assistant.
- The software must include search capabilities as well as the possibility to create user own libraries.
- The software must come with a free starter library.
- The software must come with a quantification tool.
- The software must come with an easy to use graphical macro editor.
- The software must include an automatic instrument test (OQ/PQ).
- The software must allow multi level user management.

ITEM 2 : DOUBLE BEAM UV- VISIBLE SPECTROPHOTOMETER

SPECIFICATIONS

Monochromator :Czerny-Turner
Grating :1200 Lines
Detector :Photo Multiplier tube
Wavelength range :190 – 1100 nm
Beam splitting system :Chopper
Wavelength Accuracy : ± 0.02 nm
Photometric Range :4.0 Abs
Stray light : ± 0.05% T
Wavelength Reproducibility : ±0.2nm
Spectral Band width ::0.2 to 4.00 , 0.1 nm Steps
Baseline Stability : 0.0008 Abs/hr
High intensity Tungsten Halogen and Deuterium lamp with automatic changeover.
Automatic 8 cell changer
Max scan rate 3000 nm/min
Microsoft windows based software for complete control of instrument and data analysis .
10 No.s Quartz Cuvettes (Matched pair) & 10 No.s Glass Cuvettes (Matched pair) of 10 mm Pathlength to be included
Holmium oxide filter for wavelength accuracy test to be included .

Warranty :

3 Years warranty for the complete system should be included

Accessories :

1. Branded Pc with Laserjet Printer
2. Branded 2 KVA Online UPS with 60 mts Backup .
3. Suitable work table with granite top, draws and sink with tap to install complete system

Softwre:

Software should be Windows based and supports Windows 98, 2000, XP operating system.

a. Client Management
b. Quality Control
c. 3D Spectra Graph
d. Multi-users management
e. Operation log and Audit Trail for security guarantee as well as compliant to GLP and Pharmacopoeial requirement

f. Data File Incorporation and Instrument Validation – includes 6 items :"Wavelength accuracy", "Photometric accuracy", "Stray light", "Noise", "Baseline flatness", and "Stability

ITEM 3: ATOMIC ABSORPTION SPECTROPHOTOMETER: SPECIFICATIONS

Suitable for flame & Furnace modes of operations.

Optics :

- Narrow beam optics to match both flame and furnace profiles, Double beam, sealed and vibration free optical system with a reflective optical compartment.
- Mirror surfaces are preferred to be quartz over coated for enhanced protection.
- Wavelength range is 185–900 nm.
- Spectral bandwidth should be : 0.1 nm, 0.2 nm, 0.4 nm, 1.0 nm, 2.0 nm (software selectable)
- Wavelength accuracy should be : +/- 0.15 nm
- Wavelength reproducibility should be < 0.05 nm
- Wavelength repeatability: ±0.04 nm.
- Resolution should be : 0.2 nm at 0.02 nm or better
- Baseline stability should be : 0.005A/30min
- Sensitivity (Cu) should be : 0.9 Absorbance or better for 5 ppm Cu solution : 2 ug /ml Absorption > 0.28A (flame)
- Detection Limit shoul be : Cu < 0.004 ug/ml (flame) or better
- Repeatability : Cu < 0.7% (Air/Acetylene flame)
  - Ba < 1.0% (Nitrous oxide / Acetylene Flame)
  - Cu < 2.0% Cd < 2.0% (Graphite furnace)

Monochromator :

- Monochromator should be : Automated self-calibrating Czerny-turner type with Holographic grating of 1200 - 1800 lines/mm with micro stepping driver for enhanced resolution and Reciprocal Linear Dispersion better than 1.6 nm/mm, focal length 300 mm.

PMT :

- Wide range photomultiplier tube detector for best signal-to-noise performance.

Lamps :

- 15 No.s Single element coded lamps to be included in the offer. Elements for the lamps will be provided while placing the order .
- Fast lamp selection using mirror with automated selection (by software).
- Compatible with coded or uncoded lamps.

Flame safety system :

- Safety interlocks to monitor burner type, burner fittings , liquid trap, pressure relief bung, flame shield, flame operation, mains power, oxidant pressure within safety reservoir and deuterium lamp cover.

- Gas connections to atomization system should be made directly — there should be no loose gas hoses. Separate upper and lower flame shields and a chimney protect the operator against heat and UV radiation from the flame.
- External adjustment of all burner and spray chamber controls.
- Background correction : Deuterium Arc(High intensity), self reversal covering wavelength range 185–425 nm.

Internal air purge :

- Gas purging should be available for the instrument internally. To exclude dust and corrosive vapors, enhancing corrosion protection.

Gas control :

- Automatic gas control with preset oxidant flow and manual fuel flow control with flow display using a flow meter. Ignition on air/acetylene with automatic oxidant change-over.

- Characteristic concentration : Cu < 0.02 ug / ml, Ba < 0.15 mg/ml
  (N2O/Acetylene) Burner Heads

- Nebulizer : High efficiency nebulizer

- Burner Head: Titanium Alloy

- Atomization chamber : Corrosion – resistant material

- Position adjustment : Automatic setting of optimum height for Flame burner

Safety functions :

Burner Identification, Flame sensor , Gas leak sensor, Low gas pressure sensor, Drain Trap sensor, Power Loss protection, Circulation water (graphite) Over temperature sensor (graphite)

Accessories

- Ultra gas cylinder for acetylene and Nitrous oxide with suitable regulators and purification panel, exhaust system for AAS.
- Air compressor
- Hood
- Eight numbers of HC lamps
- Branded 10 KVa UPS with 1 hour back up
- Branded Pc and Laser printer
- Multi-Element AAS standards for calibration & performance verification
- Suitable Working Table with Granite Top and Water wash sink facility
- 2 Ton Split Air conditioner from Branded manufacturers & Microwave digester system with 8 vessel rotor

Software :

- Microsoft Windows based most recent version of software for complete control of instrument and data analysis

Warranty : 3 Years warranty for the complete system should be included in the offer .

Hydride Generator : (Quote as optional)

- Hydride generation accessory suitable to analyse Mercury , Aresenic & Selenium at ug/L concentrations

ITEM 4: ELECTROCHEMICAL WORKSTATION / ANALYZER SPECIFICATIONS

Electrochemical Workstation with Potentiostat/Galvanostat with Corrosion, Impedance, Electrochemistry s/w, Latest Windows Based Acquisition s/w also includes power supply 220V/50Hz, Interface Cable for USB Port, Cell Cable & Installation.

Cyclic Voltammetry (CV), Linear Sweep Voltammetry (LSV) includes **Solar Plot (Isc, Voc, Pwr Max (W), FF, Voltage max (V))**,, Tafel Plot (TAFEL), Chrono Amperometry (CA), Chrono Coulometry (CC), Bulk Electrolysis with Coulometry (BE), AC Impedance (IMP) **– 10uHz to 1MHz,** Impedance – Time (IMPT), Impedance – Potential (IMPE), DPV, Chrono Potentiometry (CP), Chronopotentiometry with Current Ramp (CPCR), Multi-Current Steps (ISTEP), Potentiometric Stripping Analysis (PSA), Open Circuit Potential – Time (OCPT), Galvanostat, CV simulator, Impedance Simulator, IR Compensation,

External Potential Input, Auxiliary Signal Measurement Channel

Hardware Specification:

- Potentiostat, Zero resistance ammeter
- Maximum potential: ±10V
- Maximum current: ± 250 mA continuous, ± 350 mA peak
- Compliance Voltage: >±13V
- Potentiostat rise time: 0.6 us
- Applied potential ranges: ±10mV, ±50mV, ±100mV, ±650mV, ±3.276V ±6.553V, ±10V
- Applied potential resolution: 0.0015 % of potential range
- Applied potential accuracy: ±1 mV, ±0.01% of scale
- Applied potential noise: <10uV
- Galvanostat applied current range: 3nA – 250mA
- Applied current accuracy: 20pA ±0.2% if >3e-7A, ±1% otherwise
- Applied current resolution: 0.03% of applied current range
- Measured potential range: ±0.25V, ±1V, ±2.5V, ±10V
- Measured potential resolution: 0.0015 % of measured range
- Measured current range: ± 10 pA to ±0.1 A in 12 ranges
- Measured current resolution: 0.0015 % of current range, minimum 0.3 fA
- Input bias current: < 20 pA
- Potential measurement bias: ±10V with 16-bit resolution, 0.003% accuracy
- Reference electrode input impedance: 1e12 ohm
- Reference electrode input bandwidth: 10M Hz
- Reference electrode input bias current: < 20 pA

- CV and LSV scan rate: 0.000001 to 10,000 V/s
- Provision for Solar cell studies.
- Potential increment during scan: 0.1 mV @ 1,000 V/s
- IMP frequency: 0.00001 to 100 kHz (extend to 1M Hz for impedance 10-1000 ohm)
- IMP amplitude: 0.00001V to 0.7V RMS
- Flash memory for quick software update
- Serial port or USB port selectable for data communication

Available Plots / Features

AC Impedance / Impedance Time / Impedance – Potential Plots

Bode : log Z vs log (freq)
Bode : Phase , vs log (freq)
Bode : log Z" & Z' vs log (freq)
Bode : log Y vs log (freq)
Nyquist ; Z" vs Z'
Interactice 3D Plots
Admittance; Y" vs Y'
Warburg: Z" & Z' vs $w^{1/2}$ w-angular frequency
Z' vs w Z"
Z' vs Z"/w
Cot (phase) vs $w^{½}$
Mott-Schottky Plots

Accessory:

- Pt Working Electrode **– 1 No.**
- GC Working Electrode **– 1 No**.
- Ag/AgCI Reference (aq) **– 1 No.**
- Ag/AgCl Reference (non aq) **– 1 No.**
- Calomel Reference Electrode **– 1 No.**
- Pt Wire Counter Electrode **– 1 No.**
- Electrode Polishing Kit & Cell Stand*
- User's manual, Electrode leads, Communication cable, Power cord

File Management

a) Instrument Control
b) Graphic Display
   - present data plot
   - 3D surface plot: front, rear, side, top and bottom view
c) Data Processing
d) CV Digital Simulator
e) Impedance Simulator and Fitting Program
f) Upgradation of the software will be done once a year or as and when updated versions of software are available.

Computer: Latest Configuration Desktop Computer.
Warranty : 3 Year AMC free from Vendors.

ITEM 5 : TRINOCULAR RESEARCH MICROSCOPE FOR BRIGHT FIELD DARK FIELD, PHASE CONTRAST AND FLORESCENCE ATTACHMENT - SPECIFICATION

Stand Integrated with **power supply 100 W/LED stabilized** / 90-250.Adjustament
Variable Koehler Illumination, Ergonomic Control knobs.
Stage made up of hard ceramic that makes the stage resistant to Scratches and chemicals.
Height adjustable Focus Knobs. **(Advantage: Hand to rest on the focus knob in complete comfort).**
Fast Changeover from Right to Left- Handed Operation **(Beneficial for alternative users on one Microscope)**
Binocular photo tube for Photography attachment.
Built in Filter magazine for 3 filters, (Gray filter, green filter, blue filter)

3 step focusing, coarse/fine for incident as well as transmitted light.
Coarse focus, Intermediate (4um) Focus, Fine (1 um) Focus), Advantage: use full in Higher magnification.

Objective: Hi Plan 4X/0.10 ,Hi Plan 10/0.25 Ph1, **N Plan 40x/0.65 Ph2, N Plan 100X/1.25 oil (Advantage: Better Resolution in N Plan)**

Transmitted light illumination: **12v/100w/LED** or more halogen illumination for transmitted light with stabilized power supply

Fluorescence Attachment:
The fluorescence light source with 10,000 hrs lifetime
Filter system: 405nm, 470, and 530 with Module.
5- Position filter cube Turret for filter cube changer.

Digital camera
Fast, full color real-time live imaging
3 Megapixel standard resolution (2048 x 1536 Megapixel)
Several user selectable image sizes from small (VGA) to huge (7 Mega pixel)
10 bit analog-digital conversion for optimum color reproduction
Shading correction applied to live and captured images
Should be compatibility with a wide range of computers
Ultra compact metallic housing for thermal noise dissipation

Interactive Measurement
Manual measurements drawing on selected image by Linear distance, Curved length, Area, Angle, Count, Grey level
Live Images in real time.
Width and color of drawn lines should be adjusted and labeled with Measurements
Grouping so that objects that consist of multiple fragments should measure as one.
Results should apply to a single image / accumulated over multiple images
Tracings should be stored and recalled for re-measurement by editing.
Result displayed individually and as a statistical summary in tabular form

Data able to export to MS Excel or Word.

ITEM 6 : REFRIGERATOR - specifications

i. Double door
ii. Frost free
iii. 377 L

ITEM 7 : LYOPHILISER - specifications

I. Freezer- drier
II. With cold temperature trap of -40°C