# Department of Physics and Astrophysics
## University of Delhi
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Ref No: Phys/XII Plan/Eqipment-2015/UV-Vis Date: 18-01-2016

Sealed quotations are invited from reputed manufactures/authorized dealers for the supply of Double Beam UV/Vis Spectrophotometer as per specification given in schedule of requirements appended herewith.

The quotation must be accompanied by the following:
1. Authorization letter from principals.
2. Complete technical specifications and deviations if any from the schedule of requirements.
3. Spares and accessories should be mentioned
4. Two kinds of quotations may be submitted, one **technical bid** consisting of all technical details along with commercial terms and conditions, and **financial bid** containing item price for the item mentioned in the technical quotation ***(separate financial quotations will be required if quote for more than one item)*. Both the quotations should be sealed by the supplier in separate envelops duly super scribed and both these sealed covers are to be put in a bigger cover which should also be sealed and super scribed**. The supplier shall bear all costs associated with the preparation and submission of its quotation including samples, literatures etc. The item for which the quotation is being submitted should be indicated by name and number on the envelope.

5. The quotations should be inclusive of all taxes/VAT, handling/delivery charges, maximum educational discounts etc. and should be valid for a minimum of 90 days. If the prices of the quoted equipment is in foreign currency (US Dollar or Euro) the **FOB** (and also CIF Delhi and include all taxes, delivery and installation charges) should be mention along with and without L/C charges if applicable. Name and address of the company on whose name the L/C is to be opened should be clearly mentioned.

6. Warranty conditions should be mentioned for each item quoted. Quotation should also mention time required to deliver and install (if require) the system. Clarifications may be sought on Technical/Commercial aspects, if felt necessary, before deciding to place order. Price negotiations will be done only with the lowest bidder. Institute reserves the right to order equipment with better quality over lower price and to accept or reject any or all the quotations without assigning reasons thereof.

The Department of Physics and Astrophysics reserves the right to cancel the order in the event of delay in supply beyond three weeks, serious discrepancy in the product noticed during the pre-dispatch inspection, if any, breach of any of the terms and conditions of the quotation**.** The envelope containing the quotation should be superscribed **"DOUBLE BEAM UV/VIS**

**SPECTROPHOTOMETER"** along with reference number. The quotations should reach the undersigned on or before 5.00 PM on **08.02.2016 by** The Head, Department of Physics & Astrophysics, University of Delhi, Delhi – 110 007 .

## TECHNICAL SPECIFICATIONS FOR DOUBLE BEAM UV/VIS SPECTROPHOTOMETER

PC based Double Beam UV/Vis Spectrophotometer with scanning and multi wavelength measurement facility. Instrument should have internal wavelength calibration facility.

| S. No | Parameters | Specifications |
|---|---|---|
| 1 | **General** | PC controlled, double beam, double monochromator, ratio recording UV/Vis/NIR spectrophotometers |
| 2 | **Optical System** | All reflecting optical system with holographic grating monochromator with 1440 lines/mm UV/Vis blazed at 240 nm and 360 lines/mm NIR blazed at 1100 nm, Littrow mounting, sample thickness compensated detector optics |
| 3 | **Detector:-** | The system should have two detectors :PMT and Peltier-cooled PbS detector |
| 4 | **Source** | 50W Pre-aligned tungsten-halogen visible source and deuterium UV source (socket type with 2000 hr life). |
| 5 | **Wavelength Range** | 190 nm - 3300 nm or better in lower wavelength region |
| 6 | **UV/Vis Resolution** | 0.1 nm or better |
| 7 | **NIR Resolution** | 0.02 nm |
| 8 | **Stray Light** | Stray Light At 220 nm < 0.00007 % T, At 370 nm < 0.00007%, AT 2365 nm < 0.0005 T |
| 9 | **Wavelength Accuracy** | **UV/Vis** ± 0.20 nm or better **& NIR** ± 0.80 nm or better |
| 10 | **Wavelength Reproducibility** | UV/Vis < 0.080 nm or better **&** NIR < 0.30 nm or better |
| 11 | **Photometric Accuracy** | Double Aperture Method 0.5 A : ± 0.0003 Abs |
| 12 | **Photometric Linearity** | **UV-Vis:-** Addition of filters UV/Vis at 546.1, 2 nm slit, 1 second integration time At 1.0 A : ± 0.0060 A<br><br>**NIR:** NIR At 1.0 A (1200 nm) ± 0.0005 A |
| 13 | **Photometric Reproducibility** | Standard deviation for 10 measurements, 2 nm slit,1 second integration time<br><br>0.3 A with NIST 930D Filter at 546.1 nm : 0.00008 A |
| 14 | **Photometric Range** | UV/Vis 8 A **&** NIR 6 A |
| 15 | **Band Pass** | 0.05 nm - 5.00 nm in 0.01 nm increments UV/Vis range & 0.20 nm - 20.00 nm in 0.04 nm increments NIR range |

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|---|---|---|
| 16 | **Photometric Stability** | After warm-up at 500 nm, 0 A, 2 nm slit, 2 second integration time, peak to peak : 0.0002 A/h |
| 17 | **Baseline Flatness** | 190 nm - 3100 nm, 2 nm slit 0.20 second integration time UV/Vis, no smoothing applied ± 0.24 second integration time NIR, no smoothing applied: ± 0.0008 A |
| 18 | **Photometric Noise RMS** | 2 nm slit, 1 second integration time**,**0 A and 190 nm: 0.00010 A |
| 19 | **Sample Compartment** | Two independent & Separate sample compartments for Liquid & Solid sample Analysis. In addition, the basic system should also include thin film holder. |
| 20 | **Attenuators** | Two ( 1% & 0.1%) reference beam attenuators |
| 21 | **Probe holder** | Provision for Solid and thin film samples. |
| 22 | **Software** | Fully integrated Scan, Time drive, and Wavelength Program data collection modes included with real-time spectral display and live instrument and accessory status bar. Standard software must include Ordinate Modes: Abs, %T, %R, Absolute %R, Log Abs, 1st-4th Derivative, Absorptivity, and Dual Ordinate mode, Kulbelka-Munk functions, Abscissa Mode, Continuous, stepped and multi-point modes: nm, $cm^{-1}$, Å , min/sec, mm, angle. Unlimited baseline scans can be stored. Modes include: Multicell, Multi-angle, 0% and 100% corrections, Standard reference correction, Kinetics. Continuous scanning. Stepped scanning, Signal to noise mode scanning and Independent NIR control scanning. |
| 23 | Power | Available Power supply: 220/230V, 50/60 Hz |
| 24 | Basic Spare parts Kit | Installation and commissioning of the machine & training of 02 persons must be included free of cost |
| 25 | Warranty | Minimum of One year on-site warranty on all parts. |

## Optional items:

- Integrating Sphere/ Diffused Reflectance Accessory (DRA) with 100 mm diameter
- Polarizer and depolarizer.
- Temperature controller and other accessories for temperature dependent measurements with the range of -180 $^{o}$C to 600 $^{o}$C.
- Annual Maintenance Contract (AMC) may be quoted.

## Terms and conditions:

- The vendor should have at least two to three installations in educational and research institutions in India. Please provide the details of the customers and their address.

- The vendor should have office or agents in India. Qualified technical and service personnel should be available in India (preferably in Delhi).

- The payment terms will be through confirmed irrevocable letter of Credit.

- The lead time for the equipment should be not more than six months from the date of receipt of our purchase order.

- Windows based Operating software should have built in features. Personal Computer must have latest configuration, necessary software for data processing and other relevant accessories to be quoted.