

**INDIAN ASSOCIATION FOR THE CULTIVATION OF SCIENCE**  
**2A & 2B , Raja S.C. Mullick Road, Jadavpur, Kolkata-700032**

**NIT No. : IACS/OC/JG/2017-18/87**

**Date: 10/01/2018**

Sealed tender in two bids system (technical bid and price bid) is invited from bonafide, resourceful and eligible manufacturer/exclusive distributor/vendors for **High Resolution Mass Spectrometer (HRMS) system**.

**Part-I (Technical Bid)** of the tender should contain technical specifications in detail as well as commercial terms and conditions. **Part-II (Price Bid)** should clearly indicate item-wise price, if needed, as mentioned in the technical bid. The Technical Bid and Price Bid are to be submitted in separately sealed envelopes, distinctly marked accordingly and both to be put inside another envelop, that should be sealed and superscribed with tender notice no. and due date. The bidders may submit bids in their own letterheads with signature on each and every page.

Completed tender bids should reach the office of the **Registrar, Indian Association for the Cultivation of Science (IACS), 2A & 2B Raja S. C. Mullick Road, Jadavpur, Kolkata-700032** on or before the scheduled date and time specified below:

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| Tender Notice No.                                                                             | <b>NIT No. IACS/OC/JG/2017-18/87,     Date: 10-01-18</b>                                                                                                                                                         |
| Last date and time of submitting tender                                                       | 02-02-2018, UPTO 3.00 PM                                                                                                                                                                                         |
| Pre-bid meeting(date, time & place) to discuss technical specification/technical presentation | 24-01-2018, 3:00 pm, C. V. Raman Hall of IACS                                                                                                                                                                    |
| Date and time of opening tender (Technical Bids)                                              | 02-02-2018 AT 3.30 PM                                                                                                                                                                                            |
| Place of opening tender                                                                       | At CSS Office                                                                                                                                                                                                    |
| Date and time of opening of Price Bid                                                         | The Price Bids of the bidders qualifying the technical bid will only be opened, the date of which will be intimated to the short-listed bidders at their email addresses. The rest of the bids will be rejected. |
| Contact                                                                                       | Email: <a href="mailto:ictkp@iacs.res.in">ictkp@iacs.res.in</a> and <a href="mailto:ocjg@iacs.res.in">ocjg@iacs.res.in</a><br>Tel.+91 33 2473 4971 [Ext 1357, 1426]                                              |

The technical bids will be opened first to judge/evaluate the technical specifications of the said instrument and thereafter the price bids of only technically qualified bidders will be opened.

**Technical Bid Evaluation:** The Technical Bids will be evaluated in the presence of the representatives of intending bidders who will be able to clarify technical aspects of their bids, if any, required by the Technical Evaluation Team.

**Opening of price-bid:** The Price Bids of the bidders qualifying the technical bid will only be opened, the date of which will be intimated to the short-listed bidders at their email addresses. The rest of the bids will be rejected.

Please note that IACS will not provide any accommodation or reimburse any expenses to any of the bidders for attending opening of technical bid.

Quotations received incomplete or beyond the stipulated time will be summarily rejected.

## 1. TECHNICAL BID

The technical bid should contain technical specifications and should be kept in a separate sealed envelope duly superscribed as 'TECHNICAL BID' on the outer cover of the envelop as already detailed above. **It should be clearly mentioned on the envelope as "Technical Specification for High Resolution Mass Spectrometer (HRMS) system".**

**Technical Specification for High Resolution Mass Spectrometer (HRMS) system:**

**Technical Specification for Quadrupole with Time of Flight / Quadrupole with Time of Flight Equivalent Technology as High Resolution Mass Spectrometer HRMS system with facility to connect Fast Liquid Chromatography system using lesser than 2 µm particle size columns for high sensitivity for both qualitative and quantitative analysis.**

**A single vendor shall be responsible for the main instrument and all the accessories supplied with the system.**

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| 1. Ionization Source :     | <ul style="list-style-type: none"><li>• The instrument must be equipped with combined/dual electrospray ionization (ESI) and atmospheric pressure chemical ionization (APCI) and combined/dual atmospheric pressure chemical ionization (APCI) and atmospheric pressure photo ionization (APPI) as standard capable of handling flow rates upto 2 ml/min. Sample introduction must be possible either directly or combined with suitable liquid chromatographic system automatically through integrated fluidics or via external syringe pump.</li><li>• The combined/dual ionization (ESI/APCI &amp; APCI/APPI) source must operate along with reference spray to facilitate automated accurate mass measurements within single LCMS experiment. The instrument should be capable of internal reference mass correction for MS and MS/MS operation without losing sensitivity. The ionization must be done both in a positive &amp; negative modes.</li><li>• An atmospheric pressure solids analysis probe (ASAP) for the direct sampling and introduction of solids and liquids should be available as an additional source.</li><li>• The ion source must be of dual orthogonal design. The cleaning of the source should be done without venting the system and facility to Vacuum Interlock should be provided.</li></ul> |
| 2. Ion Optics :            | <ul style="list-style-type: none"><li>• Latest ion optics must be available which should maximise sensitivity whilst maintaining system robustness.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 3. Desolvation Temperature | <ul style="list-style-type: none"><li>• The desolvation temperature must be more than or equal to 600 °C.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

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| 4. Quadrupole :                                    | <ul style="list-style-type: none"> <li>Instrument should have Quadrupole for isolation followed by collision cell and appropriate assembly required for high resolution mass data. An isolation valve/suitable device must be available to allow the source elements to be removed and cleaned without breaking instrument vacuum, maximizing instrument uptime. The routine maintenance should be tool free and user friendly.</li> <li>The instrument should be equipped with a segmented quadrupole collision cell for superior ion transmission characteristics leading to enhanced resolution and sensitivity. Specific design must be shared or submitted which must show the same.</li> <li>Precursor ion selection should be done using Quadrupole.</li> <li>Mass Range: The instrument must have a high mass filter (quadrupole) for efficient transmission of ions having mass range at least <math>\leq 30</math> to <math>&gt; 30,000</math> m/z or higher in resolving mode &amp; <math>\leq 30</math> to <math>\geq 1,00,000</math> m/z in non-resolving mode or better for QTOF Technology. With Quadrupole &amp; Equivalent TOF Technology the Mass Range must be 6000 m/z or higher.</li> </ul> |
| 5. Time of Flight (TOF) or Equivalent Technology : | <ul style="list-style-type: none"> <li>Analyzer: Geometry with quadrupole as Q1 followed by TOF/Equivalent with a collision cell in between should be present.</li> <li>The mass range of the Time of Flight analyzer must be at least <math>\leq 30</math> to <math>\geq 50,000</math> m/z.</li> <li>The TOF/ Equivalent mass analyzer must have linearity of response of minimum 4 orders or better of magnitude whilst maintaining specified resolution for quantitation purposes.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 6. Resolution :                                    | <ul style="list-style-type: none"> <li>The resolution of the TOF mass analyzer must be more than 40,000 FWHM or better between m/z 950-960 and more than 35,000 FWHM or better of around 200 m/z.<br/>(Proof of Statement must be provided).</li> </ul> <p>In case of Equivalent Technology other than TOF, the resolution of the mass analyzer must be more than 1, 20,000 FWHM or better at around 200 m/z.</p> <ul style="list-style-type: none"> <li>Data acquisition rate must be 30 Spectra per second or better in MS and MS/MS mode &amp; for Equivalent Technology mass analyzer of minimum 12 Spectra or better.<br/>(Proof of Statement must be provided)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 7. Mass Accuracy & Sensitivity :                   | <ul style="list-style-type: none"> <li>The mass accuracy of the system should be a minimum of less than 0.5 ppm, with both internal &amp; external calibration standards for both MS &amp; MS/MS modes on 10 consecutive repeat measurements on column analysis.</li> <li>The instrument must be sensitive enough for detecting sub ppb/femtomole levels of compounds. The sensitivity achieved in MS/MS modes must be stated. The signal to noise (S/N) ratios or counts per second must be specified along with the full analyses conditions.</li> <li><u>Sensitivity</u>: Full MS/MS mode <math>\leq 10</math> femtogram or better on column, at S/N ratio <math>\geq 600:1</math> (Proof of statement must be provided for S/N ratio)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 8. Scan modes & Capability :                       | <ul style="list-style-type: none"> <li>The instrument must be able to operate in MS Scanning, MS/MS product Ion Scanning, Simultaneous MS &amp; MS/MS scanning modes. The software should be capable of data acquisitions whereby high and low collision energy data is acquired simultaneously to provide fragmentation data for all detectable molecular ions and TOF-MRM/Equivalent.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 9. Vacuum                                          | <ul style="list-style-type: none"> <li>A high efficiency vacuum system with turbo molecular pumps followed by</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

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| System :                                                                                                                                                                                                                                                                          | rotary mechanical pumps must be provided.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 10. Software:                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>The software should have capabilities to perform the following functions: Automated mass calibration, resolution, sensitivity check should be performed by software. Software tools for addressing Screening, Component Identification &amp; Structural Elucidation workflows. The data processing software must incorporate an elemental composition calculator as standard. Included into the calculator must be algorithms for isotope pattern modeling that allow data interpretation of actual isotope patterns. A goodness of fit from actual to theoretical isotopes must be included. The ability to filter out incorrect elemental composition calculations through the use of intelligent spectral interpretation algorithms must be incorporated. Software should give elemental formula with mass accuracy or ppm error and isotopic fit value.</li> <li>The model offered by the vendor should have capability to demonstrate the above mention parameter like fast LC, high resolution, high mass accuracy in one single run.</li> </ul> |
| 11. Computer & Workstation :                                                                                                                                                                                                                                                      | <p>A Workstation should be provided for controlling the mass spectrometer, the LC and the auto-sampler with data acquisition &amp; for data processing and analysis with following specification:</p> <ul style="list-style-type: none"> <li>Memory: 64 GB (8 X 8GB) DDR4 2133Ghz or better</li> <li>Hard disk: 10 TB or better</li> <li>CPU: Dual-Processor E5-2637 v3 Processor (3,5GHz 4c); Operating system: Windows 7/10 64 - bit or better.</li> <li>21 inch LCD monitor.</li> <li>1 Laser jet printer.</li> <li>All hardware and software including drivers, monitor, device interfaces cards/network must be preinstalled and preconfigured on the computer provided.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                      |
| 12. Nitrogen Generator :                                                                                                                                                                                                                                                          | <p>A noise free Nitrogen Gas Generator with in-built compressor along with other Gas cylinder should be provided to operate the system.</p> <p>The Maximum gas output pressure must be 100 psi.</p> <p>The Maximum outlet Flow Rate must be 32 L/min.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 13. UPS :                                                                                                                                                                                                                                                                         | A suitable online UPS of 10 KVA capacity with at least 60 mins back up for the complete system should be provided.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <p><b>Fast UHPLC System: A liquid chromatography system as an inlet to the Mass spectrometer with following specifications:</b></p> <p>The chromatography system should be capable of being operated both as a HPLC &amp; Fast UHPLC by interchanging the column chemistries.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 1. Pump :                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"> <li>Quaternary operating pump(s) with an operating pressure of minimum 15000 psi or better.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 2. Flow Rate :                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>The flow rate range should be 0.010 to 2.000 mL/min, in 0.001 mL increments.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 3. Degasser :                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>The instrument should have in-built Vacuum degasser facility with minimum four lines and should be efficient to remove dissolved air online.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 4. System Delay Volume :                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"> <li>System Delay Volume should be less than &lt; 400ul, independent of system backpressure &amp; with standard mixer for higher sensitivity.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

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| 5. Autosampler :              | <ul style="list-style-type: none"> <li>Autosampler should be available with a capacity of approx. 80 vials or more of 1.5 ml or better capacity &amp; sufficient no. of spare sample vials must be provided. The autosampler should have cooling facility upto 10 degrees or better and heating upto 40 degrees or better.</li> <li>Programmable injection volume from 0.5 ul to 20 ul or better must be available.</li> <li>The carryover of the autosampler must be less than 0.005% or better.</li> <li>Compressibility Compensation should be Automatic &amp; Continuous.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 6. Column Oven :              | <ul style="list-style-type: none"> <li>Column Temperature Control should be from 20 deg. C to 90 deg. C or better.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 7. Columns :                  | <ul style="list-style-type: none"> <li>Sub 2 microns (1.7um / 1.6um) C18 &amp; Normal Phase/HILIC UHPLC/UPLC Columns for the analysis should be quoted with Smaller Dimensions with a pH level of 2 – 12.<br/>C18 &amp; HILIC chemistry Columns should be supplied 2 No's each.</li> <li>Column usage history tracking technology must be provided so that all the information should be available related to the usage of the columns &amp; archives all of them.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 8. Photodiode Array Detector: | <ul style="list-style-type: none"> <li>Wavelength range: 190 to 800nm should be covered by single deuterium lamp or better.</li> <li>The sampling/data rate and filter time constants should be independent to maximize resolution and sensitivity.</li> <li>Must have standard analytical flow cell with a 10mm path length and a volume of 500nL or less for optimal peak dispersion of UHPLC separations.</li> <li>It must optimize lamp performance automatically and without user intervention &amp; should compensate for lamp degradation over time without the need to frequently replace the lamp.</li> <li>Optical Bandwidth: 1.2nm or less.</li> <li>Wavelength accuracy: Better than or equal to <math>\pm 1</math>nm.</li> <li>Sampling rate: 80 points per second or higher.</li> <li>It must have a linear range that does not deviate by more than 5% up to 2.0AU.</li> <li>Noise: <math>\pm 3\mu</math>AU &amp; Drift of less than or equal to <math>1 \times 10^{-3}</math> AU/hour/<math>^{\circ}</math>C or better.</li> <li>The photodiode array detector must be able to collect up to 8 independent data channels simultaneously.</li> </ul> |
| Warranty :                    | <ul style="list-style-type: none"> <li>Comprehensive 5 years minimum from the day of functional installation including nitrogen generator, UPS and battery along with all the consumable parts of the LC and HRMS system.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

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| <b>OTHERS :</b> | <ul style="list-style-type: none"> <li>• The system must be attended within 48 hrs of reporting.</li> <li>• The other gases along with regulators should also be supplied along with the system.</li> <li>• Training and Installation: Installation must be done at user's site with no extra costs involved. A one-week (at least) general entry-level training-cum-workshop and advanced-level training-cum-workshop must be arranged at the user's site by the vendor on experimental and data analysis part, with no extra cost involved.</li> <li>• Proof of Performance documents must be provided with the Compliance sheet. The vendors must submit/upload all the Technical Data Sheets as per their claim in original &amp; authenticated. The specification sheets should also be available in the public portal.</li> <li>• Standards/reagents required for successful installation must be supplied.</li> <li>• All related expenses to supply instrument up to the Lab has to be borne by the supplier.</li> <li>• Users lists of similar equipment supplied in India should be provided (Enclose full list of the users in India). Vendor should have at least ten (10) users available in last 5 years in the eastern zone of India.</li> </ul> |
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Service facility: Trained technicians should install the instrument and ensure it is operating correctly and within specifications. User training at site should also be provided. Supplier should mention their details of service setup that are responsible for after sales support.

Servicing facility within India is a must while service engineer stationed at Kolkata will be preferred.

Bidders should submit their past experience for supplying and successful installation of similar units to other research Institutes/Universities/other organizations in India and abroad. Please provide documentary proofs of such successful installation and supportive documents that the instruments are running successfully.

A compliance table (see below) must be prepared and submitted along with the technical bid.

| Sr. No | Tender specification | Your offered instrument specification | Extent of compliance |
|--------|----------------------|---------------------------------------|----------------------|
|        |                      |                                       |                      |
|        |                      |                                       |                      |
|        |                      |                                       |                      |
|        |                      |                                       |                      |

Tender will not be accepted if the technical compliance chart is NOT provided following the above format.

## 2. PRICE BID

The financial bid indicating (item-wise) price for the item(s) mentioned in the technical bid should be kept in a separate sealed envelope duly super scribed as '**PRICE BID**' on the outer cover of the envelop as already detailed above. Price bids of only technically qualified bidders will be opened and they will be intimated the date and time of the opening of price bid at their e-mail ids. Rest of the bidders will stand rejected.

PRICE: Price to be quoted on CIF Kolkata and also FOB basis.

### **3. BID SECURITY:**

- a. An Account payee Demand Draft/Pay Order of Nationalized Bank for Rs. 7,50,000 (Rupees Seven lakh fifty thousand only) drawn in favor of "Indian Association for the Cultivation of Science (State Bank of India, Jadavpur University Branch, A/C No. 11079699211, IFSC: SBIN000093, MICR Code: 700002048)" is to be furnished by the bidders alongwith Technical Bid except those who are registered with the Central Purchase Organizations, National Small Industries Corporation or the concerned Ministry or Department, as Bid Security money or Earnest Money Deposit (EMD). Alternatively, the Bidder shall have the option to furnish the EMD in the format of Bank Guarantee (BG).
- b. The Demand Draft for the Bid-Security should have at least about 90 (ninety) days validity period of opening of the bids.
- c. In case of non-award of the work the Bid Security money would be returned to the unsuccessful Bidders.

### **4. PERFORMANCE SECURITY:**

Performance Bank Guarantee on any nationalized bank of India for 10% of the order value in the name of "Indian Association for the Cultivation of Science" is to be furnished by the successful bidder as Performance security. Performance security money should remain valid for a period of 60 days beyond the date of completion of all contractual obligations of the supplier including warranty obligations. Bid security money or EMD will be refunded to successful bidder on receipt of the Performance security.

### **5. TERMS OF PAYMENT:**

Payment will be made through irrevocable Letter of Credit in two installments. 90% of the money will be released on submission of shipping of documents. Remaining 10% will be released after successful installation of the instrument.

### **6. GENERAL INSTRUCTIONS:**

1. Validity of tender: Tender submitted should remain valid for at least six months from the date of opening the tender. Validity beyond six months from the date of opening of the tender shall be lapsed by mutual consent.
2. The tender should accompany a compliance chart.
3. Incomplete and conditional tenders as well as tenders received after the due date will be summarily rejected without assigning any reasons thereof.
4. At any time prior to the bid due date, IACS may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective bidder during pre-bid meeting, modify the bidding documents. The amendment(s) will be notified on the institute website. Prospective bidders are advised to occasionally visit the website ([www.iacs.res.in/tender](http://www.iacs.res.in/tender)) for any amendment.
5. Installation/Demonstration/Application training at site: Installation & user training at IACS, free of cost by the supplier.
6. Service facility: In India, preferably Kolkata, supplier should mention their details of service setup and man powers who are responsible for after sales support. Response time should be within 24 hrs.
7. The model number, make and a printed literature of the product should be submitted positively.
8. Proposed delivery schedule should be mentioned clearly.
9. Manufacturers / exclusive distributors / vendors should have history of supplying this type of instruments to this or other scientific organizations. Availability of a list in this regard would be preferred.

10. Authorized dealership certificate should be provided in case of principal manufacturing company is not quoting directly.
11. Guarantee certificate, users manuals etc. are to be handed over to the user after successful commissioning of the system.
12. In the event of date being declared a closed holiday for purchaser's office, the due date for submission of bids and opening of the technical bids will be the following working day at the appointed time.
13. In case of any dispute, the decision of IACS authority shall be final and bidding on the bidders.
14. For any clarification regarding technical specifications, information etc., please send your queries to Prof. T. K. Paine and Dr. J. Guin (*ocjg@iacs.res.in*).
15. The authority of IACS reserves the right to reject any or all of the tenders received without assigning any reason thereof.

**Acting Registrar**