

Corrigendum/Addendum – 01

NIT no: IISERBpr/S&P/GTE/2024-25/51 Dt. October 22, 2024

1. This is to inform all concerned that based on the pre-bid meeting held on October 29, 2024 and as per the Institute requirement, the technical specification, technical compliance sheet have been revised and re-uploaded in the www.gerpegov.com/IISERBP portal
2. The above changes will be part of the tender documents.
3. This is for information of all concerned.

S. No.	Section	Item	For	Read as
1	Section-IV	C]. Mass Analyzer HRMS :	Should have Data Dependent Acquisition (DDA), MS2 scan by DDA with Top N experiments. in targeted SIM manner based upon a sample dependent, Triggered MS2 by exclusion mass list .M2 Scan by Data Independent Analysis.	Should have Data Dependent Acquisition (DDA), MS2 scan by DDA with Top N experiments. Triggered MS2 by exclusion mass list. M2 Scan by Data Independent Analysis
2	Section-IV	C]. Mass Analyzer HRMS :	On-the-fly charge state deconvolution for intelligent ddMS2 on intact proteins applying Smart HCD.	On-the-fly charge state deconvolution for intelligent ddMS2 on intact proteins applying
3	Section-IV	K. Detail Specifications for Nano LC (i)Nano LC Source	In-Source column options: Suitable integrated column option to be offered.	Deleted
4	Section -IV	B. Gas Chromatograph:	Number of Ramps/Plateaus: 30 or more.	Read as Number of Ramps/Plateaus: 20 or more
5	Section -IV	D. Auto Sampler:	150 vial carousel samplers	150 vial carousel/Tray based samplers
6	Section-IV	G. Ramps/Plateaus	Equal or higher than 25	Equal or higher than 20
7	Section-IV	G. Mass Spectrometer	Electronic dynamic range > 10 ⁸ or better	Deleted
8	Section-IV	G. Mass Spectrometer	Mass Range: 2 –1000 u or more	Mass Range: 10 –1000 u or more



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Indian Institute of Science Education and Research Berhampur
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9	Section-IV	G. Mass Spectrometer	<ul style="list-style-type: none">• Detector :10KV conversion dynode detector with Overdrive lens	Deleted
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Stores & Purchase Officer

Section IV

Schedule of Requirements and Compliance

SI No.	Description	No. of Units
1	Supply, Installation, Testing and Commissioning of Instruments for Mass Spectrometry based OMICS facility(LC-MS, Nano-LC, GC-MS with ancillary instruments)	1

Annexure I

Technical Specification

Technical Specification of Ultra High-Resolution Mass spectrometry with nano LC and UHPLC for both Quantitative and Qualitative Applications:

Description	Specification
A]. General Description:	High Resolution Mass Spectrometry should be a combination of Quadrupole with ultrahigh resolution MS with UHPLC and accessories for metabolomics, Pharmaceuticals, and Proteomics applications. The complete workstation should be quoted with all required softwares and all pre -requisites for operation of the system.
B]. Sources:	<ul style="list-style-type: none"> ● The System should have ESI. APCI source capable to handle flow rate from 1ul /min to 1000ul/min or better. ● Nano ESI source handles flow rate from 50nl/min to 2000nl/min for Nano columns up to 50cm length. Desolvation temperature 500 DEG C or better ● APCI Source without splitting upgradable to APPI Source in future ● The system should be upgradable to suitable Ion mobility option; enabling identification and quantitation of more proteins.
C]. Mass Analyzer HRMS :	<ul style="list-style-type: none"> ● The MS should have high-performance advance quadrupole design with pre & post filter quadrupole works as precursor isolation from 40-3000da. The quadrupole should work variable precursor isolation width from 0.4 to 1200da for DIA experiments. ● Segmented mass filter, providing variable and step-less precursor isolation width selection from 0.4 Da to full mass range. ● The HRMS should have ultra-high-resolution capability of >1,00,000 FWHM at 200m/z and above. ● The high-resolution MS should have a mass range up to 3000Da. ● System is cable to demonstrate the Mass Accuracy measurement of <3ppm with external calibration and <1ppm with internal calibration. ● For Internal calibrant should be in vacuum for maintaining the accuracy <1ppm without contamination of the API source. ● Sensitivity: MS/MS: 200 fg reserpine on column S/N 100:1, SIM: 200 fg reserpine on column S/N 250:1 or better ● Should and scan speed of 20hz/sec in MS and MS/MS mode. ● Should have Data Dependent Acquisition (DDA), MS2 scan by DDA with Top N experiments. Triggered MS2 by exclusion mass list. M2 Scan by Data Independent Analysis ● The mass spectrometer must be capable of fast polarity switching acquiring one spectrum in positive and one in negative with <1.4hz cycle time or better ● On-the-fly charge state deconvolution for intelligent ddMS2 on intact proteins applying ● System should demonstrate in spectrum dynamic range of >5000:1 or better within one spectrum.
D]. Scan Functions :	<ul style="list-style-type: none"> ● The mass spectrometer instrument set up must allow scheduled set up of different events using a graphical user interface ● Must acquire and display Full Scan mass spectra

	<ul style="list-style-type: none"> ● Must acquire and display Selected Ion Monitoring (SIM) scan data for monitoring selected ions for target compound analysis (tSIM) ● Must acquire and display MS/MS spectra ● Must acquire and display Selected Reaction Monitoring/Multiple Reaction Monitoring (SRM/MRM) like data sets (targeted MS/MS scan) ● Must acquire and display multiplexed SIM mass spectra of up to 20 simultaneously detected precursor ions ● Must acquire and display multiplexed MS/MS mass spectra of up to 2 different precursor ions ● All-Ion-Fragmentation scan, fragmenting all ions of a defined mass range with high-resolution, accurate mass acquisition ● Timed SIM for scheduled data acquisition of target compounds ● Timed MS/MS for scheduled data acquisition of target compound fragment spectra ● Must acquire “Data Independent Acquisition” (DIA) data sets with minimum isolation width of 50 u and with max number of DIA scan windows of 20.
<p>E]. Ultra High Performance Liquid Chromatography :</p>	<ul style="list-style-type: none"> ● Fully Bio Compatible Quaternary gradient system with four channel vacuum degasser, auto sampler and column oven for ultra-fast separations ● Flow rate range 0.001 to 2.0 ml or better, programmable in 0.001 ml increment and should be suitable for LC-MS/MS operations. ● pH and salt compatibility 2-12 or better ● Flow accuracy of $\pm 0.1\%$ or better ● Gradient precision 0.15% RSD or better ● Flow path free from stainless steel component suitable for separation of biomolecules. ● Selectable Gradient delay volume 200-1000 ul or better ● Auto sampler should be available with a capacity of 120 vials of 1.5 ml and should be capable of accommodating 96 well plate with injection volume range from 0.1– 25 ul, 0.01 ul increment, Split loop mode with Flow through design. ● Injection volume accuracy $\pm 0.5\%$ or better ● Injection volume precision 0.25% RSD or better ● carry over 0.004% or better ● The system should have sample temperature control auto sampler from 4° - 40°C programmable in 1 ° C increment (ambient temp 20°C) ● Thermostatic column compartment ● Temperature accuracy $\pm 0.5^\circ\text{C}$ or better ● Column capacity: up to 2 columns, depending on column length ● System should have max. pressure 15000 psi or better. ● The HPLC system should have single point software-based control with Mass spectrometer.
<p>F]. Columns:</p>	<ul style="list-style-type: none"> ● Sub 2-micron particle size C18 column -3 Qty ● Suitable MS Columns for HILIC Application -3 Qty ● Suitable MS Column for Metabolomics Application-4 Qty.
<p>G]. System Software and Hardware:</p>	<ul style="list-style-type: none"> ● System software is to be capable of detecting, recording and analyzing the data. It should have following capabilities ● Software packages include latest versions of data acquisition, data processing, qualitative, quantitative analysis, targeted screening, ● Suitable Software/Database for small molecules, Metabolite ID and metabolomics, C13 isotope tracing with most updated library. ● High configuration recent i7 or i9 dual core processor, with 64 GB Ram, 1 TB HDD, 32inch monitor, Graphics card and compatible for Metabolomics and isotope tracing software. ● Licensed MetaboAnalyst 6.0 software should be provided.
<p>H]. ESSENTIAL PRE-REQUISITE :</p>	<ul style="list-style-type: none"> ● Imported Nitrogen Generator with in-built compressor to supply the required flow at required pressure.

	<ul style="list-style-type: none"> • Branded 15 KVA UPS with Isolation transformer with 1 Hour battery backup with warranty certificate for the battery. • Suitable LaserJet printer. • Required Solvent & standards for Initial Installation, demonstration. • System should be provided with all essentials for smooth running of the instruments.
<p>K. Detail Specifications for Nano LC</p> <p>(i) Nano LC Source :</p>	<ul style="list-style-type: none"> • Should offer exceptionally stable spray. • Integrated union: should offer Zero dead volume column to emitter connection • Should delivers narrower peaks and maximized peak capacity, leading to improved sequence coverage. • Should offer tool free fitting: Easy to use, finger tight fitting to 1000 bar • Column with integrated temperature control:
<p>L) Nano Liquid Chromatography (nLC) - for Proteomics Application</p>	<ul style="list-style-type: none"> • Split less Nano LC. • Must have direct pumping system with Nano flow capability without flow splitting • System must be compatible with all mobile phase and from acidic to basic pH • The pump must not require hardware changes to cover the entire flow range specified. • The pump must have a settable flow range from 1 nL/min to 100 μL/min in 1 nL increments. • The pump must have active flow control from 1 nL/min to 100 μL/min. • The pump gradient delay volume contribution must be < 25 nL. • The pump must be pre-calibrated for usage with common solvents. • The system must provide a retention time precision of $\leq 0.2\%$ RSD or ≤ 0.1 SD min, whichever is greater for Cytochrome C protein digest peptide based on the installation qualification procedure.
<p>(ii) Auto Sampler:</p>	<ul style="list-style-type: none"> • The sampler must be able to thermostat samples between 4 and 40°C and stable within +/- 1K. • The injection principle of the autosampler must be in-line split-loop (also called flow through needle) for high reproducibility injections with no sample loss. • The sampler must support a sample capacity of four sample racks with any combination of the following types: 54 \times 12 mm OD vials (≤ 1.5 mL), 96 \times 6, 7 and 8 mm OD vials (≤ 1.2 mL), 16 \times 15 mm OD vials (≤ 4 mL), 9 \times 22.5 mm OD vials (≤ 10 mL), and well plates (96 and 384, deep and shallow) without the need for external devices such as plate feeder. • The sampler must offer up to 4 independent wash liquids: outer and inner needle wash, weak and strong each. • The sampler must offer sample loop and inner needle rinsing with two independent wash liquids. • The sampler must offer dip rinse and continuous rinse of outer needle surface with two independent wash liquids. • The sampler must have active pressure monitoring for injection to allow for minimal column shock upon injection. • The sampler should be able to offer a standard injection volume range of 0.01–25 μL and extendable to 100 μL, settable in 0.01 μL increments. The injection volume range must be extendable for trap-and-elute workflows, i.e. high-volume trapping, by use of a larger sample loop and by multiple draw-and-trap cycles up to 500 μL. • The sampler must allow forward-flush and back-flush trap-and-elute injections without fluidics exchange. • The autosampler must be able to fulfill the following injection precision requirements for repeatable analysis: <ul style="list-style-type: none"> • Injection accuracy must fall within +/- 0.5% for a typical aqueous sample injection of 5 μL • minimum 5 °C or maximum 20 °C below room temperature. Integral 6-port bio-compatible injection valve. Carryover must be <0.05%. Three solvents

	<p>must be available for repeated custom wash cycles for thorough cleaning of injection needle.</p> <ul style="list-style-type: none"> Quote Nano Column -5 No with trap column 5 no each.
iii). Nano LC Columns:	<ul style="list-style-type: none"> Nano LC Column- Qty 10 Nano Trap LC Column- Qty 10.(all columns should be provided by phases as when required within 5 years)
iv). Suitable Software/Database Advance option:	<p>Proteomics Data Base:</p> <ul style="list-style-type: none"> SEQUEST, Mascot, for label free and labeled quantitation. data mining analysis proteomics workflows, from protein and peptide identification to PTM analysis to isobaric mass tagging, and SILAC and label-free quantitation etc. for proteomics application. <p>Metabolomics /Small /Pharmaceutical molecules Advanced Data Base</p> <ul style="list-style-type: none"> Data analysis software licenses Online integration with all available chemical database searches. Easy integration with the compatible third party free Softwares Free Upgradation within the warranty period for the same software version. Elemental composition determination using HRAM MS data, including fine isotope and MS/MS fragmentation data. Automated annotation of spectra with predicted fragments. One Dedicated high-end PC Workstation Factory Fitted for the Data Acquisition Two Dedicated High-End PC Workstation for the offline Data analysis with all necessary software. Data Storage-Extra Storage space 10TB to be supplied. Licensed MetaboAnalyst 6.0 software should be provided. Suitable Software/Database for small molecules, Metabolite ID and metabolomics, C13 isotope tracing with most updated library.
I]. Warranty:	<ul style="list-style-type: none"> All instruments should have a 5 years comprehensive warranty. Should cover all parts and labor for repair or replacement of defective components due to manufacturing defects or malfunctions. Breakdowns of instruments should be addressed within three working days of notification If the instrument breaks down during the warranty, the warranty should be extended by the downtime duration. Periodical (twice a year) visit of the engineer during the warranty period for the maintenance of the instruments.
J]. Additional Notes:	<ul style="list-style-type: none"> All the specification to be supported by online literatures and valid data Training and demonstration should be provided twice/thrice a year throughout the duration of the warranty (1-2 weeks). Company sponsored expert manpower for first 6-months Suitable supporting online literatures and back up data to be supported along with the Tender. The price should be offered up to IISER BERHAMPUR with delivery & clearance. The committee may seek require additional clarification as an when required.
	Technical Specification for High-Resolution Triple Quadrupole GC-MS System
A: GC Mainframe	<ul style="list-style-type: none"> Constant Linear velocity mode, constant pressure, constant flow mode should Triple Quadrupole be available Auto Ignition facility is desirable Split ratio programming with battery protected memory Self-diagnostic function with GLP/GMP support

<p>B. Gas Chromatograph:</p>	<ul style="list-style-type: none"> • The system should have all temperature and time functions should be controlled by microprocessor-based controller. • Temperature: Operating Range Ambient +4°C to 450°C or better • Cooling down rate: from 450 to 50 °C in less than 5 min or better • Temperature programming facility. • Maximum oven temperature ramp rate : 120 DEGC / minute or better for all ranges standard feature. • Should have oven power safety (power off when door is open) • The system should have touch-screen user friendly interface for direct instrument control in larger routine and method development laboratories. • Number of Ramps/Plateaus: 20 or more • Typical peak area repeatability: < 0.3 % RSD • Ambient rejection: < 0.01 °C per 1 °C • Settable column overheat protection
<p>C. INJECTORS: Qty-2</p>	<ul style="list-style-type: none"> • Independently temperature-controlled injection ports. • Split / Split less injector for capillary Columns with Septum Purge functions • Split/Split less Injector: • Must be able to install 3 independently temperature-controlled injector units simultaneously. • Split ratio setting range: 0 to 10,000 or higher. • Maximum operating temperature up to 450°C. • Number of temperature programming steps: 7 or higher • Must be able to set total flow range: 0 to 1,200ml/min for He and H₂, and advanced/electronic flow control pressure range up to 1000 KPa or higher • Efficient gas saver mode is desirable to reduce gas consumption during standby without affecting performance.
<p>D. Auto Sampler:</p>	<ul style="list-style-type: none"> • Auto Injector: • Sample injection method: Liquid sample injection via micro syringe. • Number of samples: 150 vials or more • Number of sample injections: minimum 1-99 injections per sample • Cross contamination: Less than 10-4 • 150 vial carousel/Tray based samplers • Faster injection <100ms • Illuminated syringe compartment for easy syringe viewing and replacement. • Maximum injection volume: 80 µL (with 100 µL syringe) • Area repeatability <0.3% RSD or better • Carryover <0.001% or better • Linearity <4% RSD or better on response factor between 10% and 50% volume
<p>E. Pressure /Flow controller</p>	<p>Integrated Electronic Control/Electronic Pressure Control:</p> <ul style="list-style-type: none"> • Gas Specification: Up to 17 or more channels of integrated electronic gas control; Split Ratio: Up to 9000:1 or better
<p>F. Performance specification</p>	<p>Typical retention time repeatability: <0.0008 min or better Typical peak area repeatability: <0.3 % RSD or better</p>
<p>G. Ramps/Plateaus</p>	<p>Equal or higher than 20</p>
<p>H. FID Detector:</p>	<p>MDL: Equal or less than <1.2 pg C/s; or better Linear Dynamic Range: >10⁷ or better. Integrated Electronic Control/Electronic Pressure Control.</p>
<p>G. Mass Spectrometer:</p>	<ul style="list-style-type: none"> • MS system should be offered with air-cooled >240 Litre single unit vacuum output turbo molecular pump, EI ion source and with the following specifications: • Should have dual filaments in all ionization modes same geometry. Source with Programmable heating at 350 °C or better

	<ul style="list-style-type: none"> ● It should have accurate regulation of emission current up to 350 μA or more with improved regulation at low current. ● It should have Integrated, dual filament assembly mounted with the same geometry with improved filament lifetime and effective regulation of emission current across the available emission current range. ● The user definable electron energy should be adjustable from 0-150 eV or more ● It should have constant calibration gas pressure for optimum system tuning. ● The GC transfer line temperature should be programmable up to 400 °C or more. ● The system should have suitable technology to prevent neutrals to enter the main analytical quadrupole without any Helium Burn/bake out process. ● The system should have the upgradation facility for changing the source cleaning without venting the vacuum of MS ● EI source with maximum temperature of 350 degree C or better ● Electron energy up to 150 ev or better ● Emission current range - Up to 350 μA or better <p>Sensitivity Specifications:</p> <ul style="list-style-type: none"> ● Electron Ionization MRM/SRM and Chemical Ionization source ● 1 μL of 100 fg/μL octafluoronaphthalene (OFN) should produce the following minimum signal-to-noise \geq16,000:1 <p><u>Instrument Detection Limit:</u></p> <ul style="list-style-type: none"> ● 0.5 fg or less with OFN or lower ● Scan speed: 20,000 u/s or better ● The Main quadrupole rods should be non-coated, homogeneous, solid metal rod and cleanable. ● It should utilize new generation discrete dynode electron multiplier integrated with linear-log electrometer with maximum linear output Lifetime maintenance free detector. [Additional detector as spare should be offered for the warranty period of the detector doesn't come with lifetime warranty] ● ● Mass Stability: 0.1 u/48 hours or better ● Mass Range: 10 –1000 u or more ● Resolution: Unit mass resolution maintained over the entire mass range ● Scan Rate: Fast quadrupole scanning up to 20,000 u/s or better. ● Evacuation System Control: Fully automatic “Auto Startup” and “Auto Shutdown” automatically should execute Turning - on and - off Turbo pumps, fore line pump, and leak valves. ● EI source should be inert to active compounds. <p>Should have provision for Selected Ion Monitoring Scan while simultaneously acquiring data in the Full Scan Mode.</p>
H. Ion Source:	<ul style="list-style-type: none"> ● should be Free from any form of complex connection, easy to clean, easy to maintain off-axis ion source, with suitable facility to carry out helium ion burn in source before the main analytical quadrupole. ● The Ion Source should be Front access type for easy maintenance. ● There should be provision for Hydrogen and Nitrogen gas to be used as carrier gas apart from He in the GC.
I. Software and Libraries:	<ul style="list-style-type: none"> ● Software for Control of GC as well as GCMS: ● 32 bit/64 bit windows based Software Should Provide Single Point Control of all GC Parameters, Injectors, detectors. ● Software should have Security, Audit trail, System check, Software integrity and system Suitability test should be included as standard functions ● Flexible report Format i.e for Method, chromatogram, Mass Spectrum, Peak table, Quantitation result, calibration curve, Status Log, texts, graphics. ● It should provide automated tuning & File management functions with Library Search facility. ● There should be User friendly post run analysis facility with flagging.

	<ul style="list-style-type: none"> Complete Software control of vacuum system with Auto Start-up / Shut-down and vacuum protection against Power Failures. Latest NIST License Library with MS/MS Suitable Metabolites/Lipid analysis Library/Data base
J. Column:	<ul style="list-style-type: none"> Suitable Non Polar Column Qty-4 Suitable Mid Polar Column Qty-2 Suitable Relatively Polar column Qty-2
K. Workstations /Installation accessories and software specifications: Qty 2	<p>A] One Dedicated high-end PC Workstation Factory Fitted for the Data Acquisition for GC-MS</p> <p>B] One Dedicated High-End PC Workstation for the offline Data analysis for GC-MS.</p> <p>C] Suitable LaserJet printer.</p> <p>D] Suitable Online UPS:</p> <ul style="list-style-type: none"> Suitable Branded UPS for 10 KVA with 30 min backup – 1nos. <p>C] Gas Purification system: for N₂, H₂, He, Zero Air with regulator pressure gauge,</p> <ul style="list-style-type: none"> On/off Valve and Molecular Sieve Filters, Charcoal Filters for moisture trap, oxygen trap. Hydrocarbon trap etc. for H₂, N₂, He and Zero Air
Sample Preparation Accessories/Instruments	<ol style="list-style-type: none"> Vortex Mixer Mechanical Shaker, Mixer Ultrasonic Water Bath, Sonicator with macro and micro probe options Tabletop Lyophilizer with chemical trap filters (Lowest temperature: -85degC and capacity: 4kgs) pH strips Weighing balance Micro pipettes (1000ul, 200ul, 100ul, 20ul, 10ul, 2ul with tips (For the above-mentioned pipettes) Water bath Dry bath Speed Vac Synchronis HILIC Column, 2.1 X 150 Mm, 5µm, 100 Å (Metabolomics) Synchronis HILIC Column, 4.6 X 150 Mm, 5 µm, 100 Å (Metabolomics) Accucore 150- Amide HILIC, 2.6 µm, 250 x 2.1 mm (Metabolomics) 4°C refrigerator -20° C freezer -80° C freezer Refrigerated micro-centrifuge Refrigerated Benchtop centrifuge Multimode microplate reader pH meter Fine weighing balance Table for LC-MS, Nano LC and GCMS.
Necessary chemicals for sample preparation and method development.	<ul style="list-style-type: none"> Mass Spectrometry Calibration Solution Methoxyamine hydrochloride N-Methyl-N-trimethylsilyl trifluoroacetamide (MSTFA) N,O-Bis(trimethylsilyl)trifluoroacetamide (BSTFA) Methanol Chloroform Pyridine Water (with 0.1% formic acid or ammonium acetate/bicarbonate) Acetonitrile

	<ul style="list-style-type: none"> • Formic acid • Ammonium acetate • Ammonium formate • Standards for isotope labeling • Standards for proteomics, lipidomics and metabolomics • Stable universally labeled U-¹³C-glucose, glutamine, acetate, lactate, pyruvate, palmitate, etc. 1g each. • Trypsin • Lys-C, Glu-C (other specific proteases) • Urea • Guanidine hydrochloride • Dithiothreitol (DTT) • Tris(2-carboxyethyl) phosphine (TCEP) • Iodoacetamide (IAM) • Ammonium bicarbonate • Trifluoroacetic acid (TFA) • Methanolic HCl • BF₃ • Hexane • Dichloromethane • Vials and caps for GC-MS and LC-MS • Filtration units (e.g., syringe filters) • Methoxyamine hydrochloride • Mass Spectrometry Calibration Solution
Tender Essential Requirement:	<ul style="list-style-type: none"> • The vendor must also quote all the accessories for the smooth functioning of systems. • The vendor must highlight the desired specifications in their technical brochure sheets, give their website reference for all specifications and mention compliance with proposed specifications. • Suppliers must have active support in the respective areas or nearby. In the bid, the supplier should clearly mention how instrument service and repair time will be minimized. • Suppliers should FastTrack the service response with the minimum instrument down time. • A qualified factory trained engineer shall conduct on site installation, commissioning and training. • The warranty shall commence only upon successful completion of the acceptance test or commissioning. • The vendor should provide onsite training at least thrice for 10 users on the system start up, usage, maintenance, quality control, troubleshooting, etc. including comprehensive classroom training. • The instruments should be provided with necessary toolkits. • The vendor must provide the list of at least 10-15 installations of similar/Equivalent model in last 1-2 year elsewhere in India • During Installation the vendor will prepare the site. [Electric Plug points, Minimum wiring for UPS connect, in room MCPs]
Warranty:	<ul style="list-style-type: none"> • All instruments should have a 5 years' comprehensive warranty. • Should cover all parts and labor for repair or replacement of defective components due to manufacturing defects or malfunctions. • Breakdowns of instruments should be addressed within three working days of notification • If the instrument breaks down during the warranty, the warranty should be extended by the downtime duration. • Periodical (twice a year) visit of the engineer during the warranty period for the maintenance of the instruments.
Additional Notes :	<ul style="list-style-type: none"> • All the specification to be supported by online literatures and valid data.



भारतीय विज्ञान शिक्षा एवं अनुसंधान संस्थान बरहमपुर
Indian Institute of Science Education and Research Berhampur
Established by the Ministry of Education, Govt. of India

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| | <ul style="list-style-type: none">• Training and demonstration should be provided for 15 days upon installation and then twice a year throughout the duration of the warranty.• Suitable supporting online literatures and back up data to be supported along with the Tender.• The price should be offered up to IISER BERHAMPUR with delivery & clearance.• The committee may seek additional clarification as and when required. |
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Technical Compliance Statement

Annexure IA

Description	Specification	Compliance (Y/N)
A]. General Description:	High Resolution Mass Spectrometry should be a combination of Quadrupole with ultrahigh resolution MS with UHPLC and accessories for metabolomics, Pharmaceuticals, and Proteomics applications. The complete workstation should be quoted with all required Softwares and all pre-requisites for operation of the system.	
B]. Sources:	<ul style="list-style-type: none"> ● The System should have ESI. APCI source capable to handle flow rate from 1ul /min to 1000ul/min or better. ● Nano ESI source handles flow rate from 50nl/min to 2000nl/min for Nano columns up to 50cm length. Desolvation temperature 500 DEG C or better ● APCI Source without splitting upgradable to APPI Source in future ● The system should be upgradable to suitable Ion mobility option; enabling identification and quantitation of more proteins. 	
C]. Mass Analyzer HRMS :	<ul style="list-style-type: none"> ● The MS should have high-performance advance quadrupole design with pre & post filter quadrupole works as precursor isolation from 40-3000da. The quadrupole should work variable precursor isolation width from 0.4 to 1200da for DIA experiments. ● Segmented mass filter, providing variable and step-less precursor isolation width selection from 0.4 Da to full mass range. ● The HRMS should have ultra-high-resolution capability of >1,00,000 FWHM at 200m/z and above. ● The high-resolution MS should have a mass range up to 3000Da. ● System is cable to demonstrate the Mass Accuracy measurement of <3ppm with external calibration and <1ppm with internal calibration. ● For Internal calibrant should be in vacuum for maintaining the accuracy <1ppm without contamination of the API source. ● Sensitivity: MS/MS: 200 fg reserpine on column S/N 100:1, SIM: 200 fg reserpine on column S/N 250:1 or better ● Should and scan speed of 20hz/sec in MS and MS/MS mode. ● Should have Data Dependent Acquisition (DDA), MS2 scan by DDA with Top N experiments. Triggered MS2 by exclusion mass list. M2 Scan by Data Independent Analysis ● The mass spectrometer must be capable of fast polarity switching acquiring one spectrum in positive and one in negative with <1.4hz cycle time or better ● On-the-fly charge state deconvolution for intelligent ddMS2 on intact proteins applying ● System should demonstrate in spectrum dynamic range of >5000:1 or better within one spectrum. 	
D]. Scan Functions :	<ul style="list-style-type: none"> ● The mass spectrometer instrument set up must allow scheduled set up of different events using a graphical user interface ● Must acquire and display Full Scan mass spectra ● Must acquire and display Selected Ion Monitoring (SIM) scan data for monitoring selected ions for target compound analysis (tSIM) ● Must acquire and display MS/MS spectra ● Must acquire and display Selected Reaction Monitoring/Multiple Reaction Monitoring (SRM/MRM) like data sets (targeted MS/MS scan) ● Must acquire and display multiplexed SIM mass spectra of up to 20 simultaneously detected precursor ions ● Must acquire and display multiplexed MS/MS mass spectra of up to 2 different precursor ions 	

	<ul style="list-style-type: none"> All-Ion-Fragmentation scan, fragmenting all ions of a defined mass range with high-resolution, accurate mass acquisition Timed SIM for scheduled data acquisition of target compounds Timed MS/MS for scheduled data acquisition of target compound fragment spectra Must acquire "Data Independent Acquisition" (DIA) data sets with minimum isolation width of 50 u and with max number of DIA scan windows of 20. 	
E]. Ultra High Performance Liquid Chromatography :	<ul style="list-style-type: none"> Fully Bio Compatible Quaternary gradient system with four channel vacuum degasser, auto sampler and column oven for ultra-fast separations Flow rate range 0.001 to 2.0 ml or better, programmable in 0.001 ml increment and should be suitable for LC-MS/MS operations. pH and salt compatibility 2-12 or better Flow accuracy of $\pm 0.1\%$ or better Gradient precision 0.15% RSD or better Flow path free from stainless steel component suitable for separation of biomolecules. Selectable Gradient delay volume 200-1000 ul or better Auto sampler should be available with a capacity of 120 vials of 1.5 ml and should be capable of accommodating 96 well plate with injection volume range from 0.1– 25 ul, 0.01 ul increment, Split loop mode with Flow through design. Injection volume accuracy $\pm 0.5\%$ or better Injection volume precision 0.25% RSD or better carry over 0.004% or better The system should have sample temperature control auto sampler from 4° - 40°C programmable in 1 ° C increment (ambient temp 20°C) Thermostatic column compartment Temperature accuracy $\pm 0.5^\circ\text{C}$ or better Column capacity: up to 2 columns, depending on column length System should have max. pressure 15000 psi or better. The HPLC system should have single point software-based control with Mass spectrometer. 	
F]. Columns:	<ul style="list-style-type: none"> Sub 2-micron particle size C18 column -3 Qty Suitable MS Columns for HILIC Application -3 Qty Suitable MS Column for Metabolomics Application-4 Qty. 	
G]. System Software and Hardware:	<ul style="list-style-type: none"> System software is to be capable of detecting, recording and analyzing the data. It should have following capabilities Software packages include latest versions of data acquisition, data processing, qualitative, quantitative analysis, targeted screening, Suitable Software/Database for small molecules, Metabolite ID and metabolomics, C13 isotope tracing with most updated library. High configuration recent i7 or i9 dual core processor, with 64 GB Ram, 1 TB HDD, 32inch monitor, Graphics card and compatible for Metabolomics and isotope tracing software. Licensed MetaboAnalyst 6.0 software should be provided. 	
H]. ESSENTIAL PRE-REQUISITE :	<ul style="list-style-type: none"> Imported Nitrogen Generator with in-built compressor to supply the required flow at required pressure. Branded 15 KVA UPS with Isolation transformer with 1 Hour battery backup with warranty certificate for the battery. Suitable LaserJet printer. Required Solvent & standards for Initial Installation, demonstration. System should be provided with all essentials for smooth running of the instruments. 	
K. Detail		

Specifications for Nano LC (i) Nano LC Source :	<ul style="list-style-type: none"> ● Should offer exceptionally stable spray. ● Integrated union: should offer Zero dead volume column to emitter connection ● Should delivers narrower peaks and maximized peak capacity, leading to improved sequence coverage. ● Should offer tool free fitting: Easy to use, finger tight fitting to 1000 bar ● Column with integrated temperature control: 	
L) Nano Liquid Chromatography (nLC) - for Proteomics Applications	<ul style="list-style-type: none"> ● Split less Nano LC. ● Must have direct pumping system with Nano flow capability without flow splitting ● System must be compatible with all mobile phase and from acidic to basic pH ● The pump must not require hardware changes to cover the entire flow range specified. ● The pump must have a settable flow range from 1 nL/min to 100 μL/min in 1 nL increments. ● The pump must have active flow control from 1 nL/min to 100 μL/min. ● The pump gradient delay volume contribution must be < 25 nL. ● The pump must be pre-calibrated for usage with common solvents. ● The system must provide a retention time precision of $\leq 0.2\%$ RSD or ≤ 0.1 SD min, whichever is greater for Cytochrome C protein digest peptide based on the installation qualification procedure. 	
(ii) Auto Sampler:	<ul style="list-style-type: none"> ● The sampler must be able to thermostat samples between 4 and 40°C and stable within +/- 1K. ● The injection principle of the autosampler must be in-line split-loop (also called flow through needle) for high reproducibility injections with no sample loss. ● The sampler must support a sample capacity of four sample racks with any combination of the following types: 54 x 12 mm OD vials (≤ 1.5 mL), 96 x 6, 7 and 8 mm OD vials (≤ 1.2 mL), 16 x 15 mm OD vials (≤ 4 mL), 9 x 22.5 mm OD vials (≤ 10 mL), and well plates (96 and 384, deep and shallow) without the need for external devices such as plate feeder. ● The sampler must offer up to 4 independent wash liquids: outer and inner needle wash, weak and strong each. ● The sampler must offer sample loop and inner needle rinsing with two independent wash liquids. ● The sampler must offer dip rinse and continuous rinse of outer needle surface with two independent wash liquids. ● The sampler must have active pressure monitoring for injection to allow for minimal column shock upon injection. ● The sampler should be able to offer a standard injection volume range of 0.01–25 μL and extendable to 100 μL, settable in 0.01 μL increments. The injection volume range must be extendable for trap-and-elute workflows, i.e. high-volume trapping, by use of a larger sample loop and by multiple draw-and-trap cycles up to 500 μL. ● The sampler must allow forward-flush and back-flush trap-and-elute injections without fluidics exchange. ● The autosampler must be able to fulfill the following injection precision requirements for repeatable analysis: <ul style="list-style-type: none"> ● Injection accuracy must fall within +/- 0.5% for a typical aqueous sample injection of 5 μL ● minimum 5 °C or maximum 20 °C below room temperature. Integral 6-port bio-compatible injection valve. Carryover must be <0.05%. 	

	<p>Three solvents must be available for repeated custom wash cycles for thorough cleaning of injection needle.</p> <ul style="list-style-type: none"> Quote Nano Column -5 No with trap column 5 no each. 	
iii). Nano LC Columns:	<ul style="list-style-type: none"> Nano LC Column- Qty 10 Nano Trap LC Column- Qty 10.(all columns should be provided by phases as when required within 5 years) 	
iv). Suitable Software/ Database Advance option:	<p>Proteomics Data Base:</p> <ul style="list-style-type: none"> SEQUEST, Mascot, for label free and labeled quantitation. data mining analysis proteomics workflows, from protein and peptide identification to PTM analysis to isobaric mass tagging, and SILAC and label-free quantitation etc. for proteomics application. <p>Metabolomics /Small /Pharmaceutical molecules Advanced Data Base</p> <ul style="list-style-type: none"> Data analysis software licenses Online integration with all available chemical database searches. Easy integration with the compatible third party free Softwares Free Upgradation within the warranty period for the same software version. Elemental composition determination using HRAM MS data, including fine isotope and MS/MS fragmentation data. Automated annotation of spectra with predicted fragments. One Dedicated high-end PC Workstation Factory Fitted for the Data Acquisition Two Dedicated High-End PC Workstation for the offline Data analysis with all necessary softwares. Data Storage-Extra Storage space 10TB to be supplied. Licensed MetaboAnalyst 6.0 software should be provided. Suitable Software/Database for small molecules, Metabolite ID and metabolomics, C13 isotope tracing with most updated library. 	
I]. Warranty:	<ul style="list-style-type: none"> All instruments should have a 5 years comprehensive warranty. Should cover all parts and labor for repair or replacement of defective components due to manufacturing defects or malfunctions. Breakdowns of instruments should be addressed within three working days of notification If the instrument breaks down during the warranty, the warranty should be extended by the downtime duration. Periodical (twice a year) visit of the engineer during the warranty period for the maintenance of the instruments. 	
J]. Additional Notes:	<ul style="list-style-type: none"> All the specification to be supported by online literatures and valid data Training and demonstration should be provided twice/thrice a year throughout the duration of the warranty (1-2 weeks). Company sponsored expert manpower for first 6-months Suitable supporting online literatures and back up data to be supported along with the Tender. The price should be offered up to IISER BERHAMPUR with delivery & clearance. The committee may seek require additional clarification as an when required. 	
	<p>Technical Specification for High-Resolution Triple Quadrupole GC-MS System</p>	
A: GC Mainframe	<ul style="list-style-type: none"> Constant Linear velocity mode, constant pressure, constant flow mode should Triple Quadrupole be available Auto Ignition facility is desirable Split ratio programming with battery protected memory Self-diagnostic function with GLP/GMP support 	

<p>B. Gas Chromatograph:</p>	<ul style="list-style-type: none"> ● The system should have all temperature and time functions should be controlled by microprocessor-based controller. ● Temperature: Operating Range Ambient +4°C to 450°C or better ● Cooling down rate: from 450 to 50 °C in less than 5 min or better ● Temperature programming facility. ● Maximum oven temperature ramp rate : 120 DEGC / minute or better for all ranges standard feature. ● Should have oven power safety (power off when door is open) ● The system should have touch-screen user friendly interface for direct instrument control in larger routine and method development laboratories. ● Number of Ramps/Plateaus: 20 or more ● Typical peak area repeatability: < 0.3 % RSD ● Ambient rejection: < 0.01 °C per 1 °C ● Settable column overheat protection 	
<p>C. INJECTOR RS: Qty-2</p>	<ul style="list-style-type: none"> ● Independently temperature-controlled injection ports. ● Split / Split less injector for capillary Columns with Septum Purge functions ● Split/Split less Injector: ● Must be able to install 3 independently temperature-controlled injector units simultaneously. ● Split ratio setting range: 0 to 10,000 or higher. ● Maximum operating temperature up to 450°C. ● Number of temperature programming steps: 7 or higher ● Must be able to set total flow range: 0 to 1,200ml/min for He and H₂, and advanced/electronic flow control pressure range up to 1000 KPa or higher ● Efficient gas saver mode is desirable to reduce gas consumption during standby without affecting performance. 	
<p>D. Auto Sampler:</p>	<ul style="list-style-type: none"> ● Auto Injector: ● Sample injection method: Liquid sample injection via micro syringe. ● Number of samples: 150 vials or more ● Number of sample injections: minimum 1-99 injections per sample ● Cross contamination: Less than 10-4 ● 150 vial carousel/Tray based samplers ● Faster injection <100ms ● Illuminated syringe compartment for easy syringe viewing and replacement. ● Maximum injection volume: 80 µL (with 100 µL syringe) ● Area repeatability <0.3% RSD or better ● Carryover <0.001% or better ● Linearity <4% RSD or better on response factor between 10% and 50% volume 	
<p>E. Pressure /Flow controller</p>	<p>Integrated Electronic Control/Electronic Pressure Control:</p> <ul style="list-style-type: none"> ● Gas Specification: Up to 17 or more channels of integrated electronic gas control; Split Ratio: Up to 9000:1 or better 	
<p>F. Performance specification</p>	<p>Typical retention time repeatability: <0.0008 min or better Typical peak area repeatability: <0.3 % RSD or better</p>	
<p>G. Ramps/Plateaus</p>	<p>Equal or higher than 20</p>	

<p>H. FID Detector:</p>	<p>MDL: Equal or less than <1.2 pg C/s; or better Linear Dynamic Range: >10⁷ or better. Integrated Electronic Control/Electronic Pressure Control.</p>	
<p>G. Mass Spectrometer:</p>	<ul style="list-style-type: none"> • MS system should be offered with air-cooled >240 Litre single unit vacuum output turbo molecular pump, El ion source and with the following specifications: <ul style="list-style-type: none"> • Should have dual filaments in all ionization modes same geometry. Source with Programmable heating at 350 °C or better • It should have accurate regulation of emission current up to 350 μA or more with improved regulation at low current. • It should have Integrated, dual filament assembly mounted with the same geometry with improved filament lifetime and effective regulation of emission current across the available emission current range. • The user definable electron energy should be adjustable from 0-150 eV or more • It should have constant calibration gas pressure for optimum system tuning. • The GC transfer line temperature should be programmable up to 400 °C or more. • The system should have suitable technology to prevent neutrals to enter the main analytical quadrupole without any Helium Burn/bake out process. • The system should have the upgradation facility for changing the source cleaning without venting the vacuum of MS • El source with maximum temperature of 350 degree C or better • Electron energy up to 150 ev or better • Emission current range - Up to 350 μA or better Sensitivity Specifications: <ul style="list-style-type: none"> • Electron Ionization MRM/SRM and Chemical Ionization source • 1 μL of 100 fg/μL octafluoronaphthalene (OFN) should produce the following minimum signal-to-noise ≥16,000:1 <u>Instrument Detection Limit:</u> <ul style="list-style-type: none"> • 0.5 fg or less with OFN or lower • Scan speed: 20,000 u/s or better • The Main quadrupole rods should be non-coated, homogeneous, solid metal rod and cleanable. • It should utilize new generation discrete dynode electron multiplier integrated with linear-log electrometer with maximum linear output Lifetime maintenance free detector. [Additional detector as spare should be offered for the warranty period of the detector doesn't come with lifetime warranty] • • Mass Stability: 0.1 u/48 hours or better • Mass Range: 10 –1000 u or more • Resolution: Unit mass resolution maintained over the entire mass range • Scan Rate: Fast quadrupole scanning up to 20,000 u/s or better. • Evacuation System Control: Fully automatic “Auto Startup” and “Auto Shutdown” automatically should execute Turning - on and - off Turbo pumps, fore line pump, and leak valves. • El source should be inert to active compounds. Should have provision for Selected Ion Monitoring Scan while simultaneously acquiring data in the Full Scan Mode. 	

H. Ion Source:	<ul style="list-style-type: none"> • should be Free from any form of complex connection, easy to clean, easy to maintain off-axis ion source, with suitable facility to carry out helium ion burn in source before the main analytical quadrupole. • The Ion Source should be Front access type for easy maintenance. • There should be provision for Hydrogen and Nitrogen gas to be used as carrier gas apart from He in the GC. 	
I. Software and Libraries:	<ul style="list-style-type: none"> • Software for Control of GC as well as GCMS: • 32 bit/64 bit windows based Software Should Provide Single Point Control of all GC Parameters, Injectors, detectors. • Software should have Security, Audit trail, System check, Software integrity and system Suitability test should be included as standard functions • Flexible report Format i.e for Method, chromatogram, Mass Spectrum, Peak table, Quantitation result, calibration curve, Status Log, texts, graphics. • It should provide automated tuning & File management functions with Library Search facility. • There should be User friendly post run analysis facility with flagging. • Complete Software control of vacuum system with Auto Start-up / Shut-down and vacuum protection against Power Failures. • Latest NIST License Library with MS/MS • Suitable Metabolites/Lipid analysis Library/Data base 	
J. Column:	<ul style="list-style-type: none"> • Suitable Non Polar Column Qty-4 • Suitable Mid Polar Column Qty-2 • Suitable Relatively Polar column Qty-2 	
K. Workstations /Installation accessories and software specifications: Qty 2	<p>A] One Dedicated high-end PC Workstation Factory Fitted for the Data Acquisition for GC-MS</p> <p>B] One Dedicated High-End PC Workstation for the offline Data analysis for GC-MS.</p> <p>C] Suitable LaserJet printer.</p> <p>D] Suitable Online UPS:</p> <ul style="list-style-type: none"> • Suitable Branded UPS for 10 KVA with 30 min backup – 1nos. <p>C] Gas Purification system: for N₂, H₂, He, Zero Air with regulator pressure gauge,</p> <ul style="list-style-type: none"> • On/off Valve and Molecular Sieve Filters, • Charcoal Filters for moisture trap, oxygen trap. • Hydrocarbon trap etc. for H₂, N₂, He and Zero Air 	
Sample Preparation Accessories/Instruments	<ol style="list-style-type: none"> 23. Vortex Mixer 24. Mechanical Shaker, Mixer 25. Ultrasonic Water Bath, Sonicator with macro and micro probe options 26. Tabletop Lyophilizer with chemical trap filters (Lowest temperature: -85degC and capacity: 4kgs) 27. pH strips 28. Weighing balance 29. Micro pipettes (1000ul, 200ul, 100ul, 20ul, 10ul, 2ul with tips (For the above-mentioned pipettes) 30. Water bath 31. Dry bath 32. Speed Vac 33. Synchronis HILIC Column, 2.1 X 150 Mm, 5µm, 100 Å (Metabolomics) 	

	<p>34. Synchronis HILIC Column, 4.6 X 150 Mm, 5 µm, 100 Å (Metabolomics)</p> <p>35. Accucore 150- Amide HILIC, 2.6 µm, 250 x 2.1 mm (Metabolomics)</p> <p>36. 4°C refrigerator</p> <p>37. -20° C freezer</p> <p>38. -80° C freezer</p> <p>39. Refrigerated micro-centrifuge</p> <p>40. Refrigerated Benchtop centrifuge</p> <p>41. Multimode microplate reader</p> <p>42. pH meter</p> <p>43. Fine weighing balance</p> <p>44. Table for LC-MS, Nano LC and GCMS.</p>	
<p>Necessary chemical s for sample preparation and method development.</p>	<ul style="list-style-type: none"> • Mass Spectrometry Calibration Solution • Methoxyamine hydrochloride • N-Methyl-N-trimethylsilyl trifluoroacetamide (MSTFA) • N,O-Bis(trimethylsilyl)trifluoroacetamide (BSTFA) • Methanol • Chloroform • Pyridine • Water (with 0.1% formic acid or ammonium acetate/bicarbonate) • Acetonitrile • Formic acid • Ammonium acetate • Ammonium formate • Standards for isotope labeling • Standards for proteomics, lipidomics and metabolomics • Stable universally labeled U-¹³C-glucose, glutamine, acetate, lactate, pyruvate, palmitate, etc. • Trypsin • Lys-C, Glu-C (other specific proteases) • Urea • Guanidine hydrochloride • Dithiothreitol (DTT) • Tris(2-carboxyethyl) phosphine (TCEP) • Iodoacetamide (IAM) • Ammonium bicarbonate • Trifluoroacetic acid (TFA) • Methanolic HCl • BF₃ • Hexane • Dichloromethane • Vials and caps for GC-MS and LC-MS • Filtration units (e.g., syringe filters) • Methoxyamine hydrochloride • Mass Spectrometry Calibration Solution 	
<p>Tender Essential Requirement:</p>	<ul style="list-style-type: none"> • The vendor must also quote all the accessories for the smooth functioning of systems. • The vendor must highlight the desired specifications in their technical brochure sheets, give their website reference for all specifications and mention compliance with proposed specifications. • Suppliers must have active support in the respective areas or nearby. In the bid, the supplier should clearly mention how instrument service and repair time will be minimized. • Suppliers should FastTrack the service response with the minimum instrument down time. 	

	<ul style="list-style-type: none"> ● A qualified factory trained engineer shall conduct on site installation, commissioning and training. ● The warranty shall commence only upon successful completion of the acceptance test or commissioning. ● The vendor should provide onsite training at least thrice for 10 users on the system start up, usage, maintenance, quality control, troubleshooting, etc. including comprehensive classroom training. ● The instruments should be provided with necessary toolkits. ● The vendor must provide the list of at least 10-15 installations of similar/Equivalent model in last 1-2 year elsewhere in India ● During Installation the vendor will prepare the site. [Electric Plug points, Minimum wiring for UPS connect, in room MCPs] ● Electrical Basic and required infrastructure, Transformer set up, Earthen , Instrument AC , Window sealing, Aluminum Enclosures, Platforms are to be provided from the Institute. 	
Warranty:	<ul style="list-style-type: none"> ● All instruments should have a 5 years' comprehensive warranty. ● Should cover all parts and labor for repair or replacement of defective components due to manufacturing defects or malfunctions. ● Breakdowns of instruments should be addressed within three working days of notification ● If the instrument breaks down during the warranty, the warranty should be extended by the downtime duration. ● Periodical (twice a year) visit of the engineer during the warranty period for the maintenance of the instruments. 	
Additional Notes :	<ul style="list-style-type: none"> ● All the specification to be supported by online literatures and valid data. ● Training and demonstration should be provided for 15 days upon installation and then twice a year throughout the duration of the warranty. ● Suitable supporting online literatures and back up data to be supported along with the Tender. ● The price should be offered up to IISER BERHAMPUR with delivery & clearance. ● The committee may seek additional clarification as and when required. 	

Stores & Purchase Officer