Specifications for Gas Chromatography with triple quadrupole, FID, Auto sampler, Head space analyser	
Chromatographic performance:	
System Capabilities:	
GC Configuration	- Two- three inlets - Three to four detectors
EPC/APC Modules / EPC Channels	Must be able to install up to 6-7 APC/EPC modules, providing control of up to 16 channels of APC/EPC
Leak tests	Must provide pre-programmed leak tests available from keyboard or monitoring software
Column Oven:	
Oven ramps / plateaus	Oven must support 20 oven ramps with 21 plateaus. Negative ramps are allowed**.**
Oven cool down	Oven cool down (22 °C ambient) 450 to 50 °C in 4.0 min (3.5 min with oven insert accessory).
Oven power safety	Oven power must turn-off automatically when the lid/door is opened.
Electronic pneumatic control:	
Inlet Pneumatics	Inlet must have Electronic pneumatic control of carrier, split and septum purge gases, including electronic ON/OFF
Pressure set point precision and control	Pressure set points must be able to be adjusted by increments of 0.001 psi, with typical control ± 0.001 for the range 0.000 to 99.999 psi; 0.01 psi up to 150.00 psi
Split / Split less Inlet: 01	
Inlet type	PTV 01
Total flow range of SSL	Must be able to set total flow range: 0 to 200 mL/min N_2 0 to 1200-1,250 mL/min H_2 or He
Inlet maintenance of SSL	Inlet sealing system is built in standard with each S/SL inlet for quick, easy, injector liner changes in less than 30-35 seconds.
Purged packed Inlet:	
Back flush	Column back flush with union connected to pressure control module
Direct injection	Must be able to direct inject onto capillary columns.
Sampler type	Auto sampler/ Auto liquid injector 10-12 vails
Flame Ionization detector	
Sensitivity	Minimum detectable level (for tridecane): < 1.8 pg C/s
Linear Dynamic Range	Linear dynamic range: $>10^7$ (± 10%).
Linear Dynamic Range	Full-range digital data path with 10^7 concentration range in a single run
Data rate of FID	Up to 500 Hz / 4 m sec
Software: Compatible with Latest Windows operating system with seamless integration & control of all the GC parameters.	

Software -Monitoring & Diagnostic Software:	The GC (even multiple GC's) must be able to interface to a (optional) comprehensive real-time monitoring and diagnostic software which includes all of the following items: Real time notification via advisories and indicators, Counters, Chromatographic attributes, Instrument diagnostics, including leak tests, Access to maintenance, run and even logs, Access to maintenance information, such as manuals and videos, Provides a link to optional, Web-enabled Services to back up your internal service and support resources
AART or Software -Retention Time-Locking software	The GC data system must have an integrated retention time - locking module for analyzing target compounds in complex matrices.
Columns:	One general purpose J & W DB-5 MS Capillary column 0.32 mm id. Twin line MS system
Head Space Sampler with heated Transfer line only:	Loop & Valve based Static HS with direct interface with GC 12 Vial pre-incubation is must with 80 Vials or more vial carousal for high throughput and high productivity Vial Temp. up to 300^{0}C, with heated Transfer line Electronic carrier gas Control & Vial pressurization with leak check Fully PC Controlled through GC MS Software Complete inert sample flow line with Sulfone Sample Loop (1ml) USB interface

Specifications for Mass Spectrometer

The following are specifications for a Mass Spectrometer, which is to be interfaced in a gas chromatograph, auto sampler and data system.

Detector Type	Triple-Axis HED-EM, which places the HED-EM doubly off-axis from the axis of the transmission quadrupole
Quadrapole temperature	Heating at 150^{o}C or maintance with rotatable pre rods metallic
Electron voltage	-70eV
Collision gas:	Argon or N2 with Helium
Type of collision cell	Collision cell with nitrogen or Argon gas
Modes	SIM, MRM, DMRM
Gain Normalization Auto tune	Should be present to ensure the optimal balance between ion count, linearity and EM life expectancy.

Helium (He) Electron Impact Sensitivity SCAN mode:	1 pg OFN gives > 1500:1 S/N scanning from 50-300µ at nominal m/z 272 ion demonstrated at install
He Electron Impact Sensitivity	SIM mode: 20 fg OFN gives > 1000:1 S/N at nominal m/z 272
High Vacuum Pumping Speed	Split flow turbo pumps. Minimum pumping speed of 262 Litters/second with 2.5 to 2.9 (50-60 Hz) m3/hr rotary vane rough pump or with 3.0 to 3.8 m3/hr oil free pump.
Vacuum pumping system	Two inlet pumping system
Max Flow (for optimal chromatography and sensitivity flow should be between 1and 2 ml/min in EI)	6 -10 ml/min
Scan Rate	The Mass Spectrometer shall have an electronic scan rate of **20,000** amu /sec.
Scan increment	Scanning at the increments of 0.1 u for better mass resolution
Quadrupole type	Hyperbolic gold-coated quartz / metallic quartz quadrupole.
Filament type	Dual filament

Mass Range	10 m/z to 1050 m/z or better
Inert ion source	Gold-coated quartz/ metallic quartz
Collision induced dissociation	800 transitions/sec
Programmable source up to 350□C	The ion source of the mass spectrometer must be able to reach 350^{O} C in a programmable way
Entrance Lens	Entrance Lens for ion source with maximum sensitivity
SIM Capacity	100 SIM ion groups with up to 60 ions per group.
SIM speed	Down to 0.1 msec.
High Performance Synchronous SIM/Scan	Synchronous SIM/Scan to be supported SIM dwell time- 1 msec increments from higher than 100 msec to as low as 1 msec dwell
Automatic setup of SIM/scan method	Is to be automatic based on the injected standard
Local User Interface	The Mass Spectrometer is to have a Local User Interface (LUSI) so that local control of the instrument can be achieved while the mass spectrometer's data system is remotely located.
Ionization source	EI mode
Automated SIM setup	The mass spectrometer must have an automated SIM setup that can convert a full scan method to a SIM or SIM/Scan method. The software must automatically configure the number of SIM groups, SIM cycles across the peak, and the ions added to each group.
Multiple instrument and detector control and acquisition	The MS data system must be capable of controlling 2 complete GC/MSD systems and 2 additional GC's with one detector each simultaneously from a single PC data system

AART/Retention Time-Locking software	Integrated retention time-locking module for analyzing target compounds in complex matrices. The software module must provide the creation of custom compound databases as well as the utilization of vendor provided databases. Vendor databases include: pesticides and endocrine disruptors, PCB's, VnceOC's, Fatty Acid Methyl Esters, Drugs of Abuse, and Flavors and Fragras.
Ambient temperature and pressure compensation	The GC must have ambient temperature and pressure compensation feedback for electronic pneumatic control for all inlets and detectors.
Auxiliary APC/EPC modules	The Gas Chromatograph must have an Optional 3 channel module of auxiliary APC/EPC to be used for flow control of external sampling devices such as a thermal desorber shall be available
Factory performance verification and single system shipment	The Gas Chromatograph and Mass Spectrometer to be factory tested in the configuration. All parts of the system should be included in the shipment.
Libraries	Recent versions of NIST, FFNSC, Pesticide robust library, MRM metabolite library, other related databases
Training to faculty and students	10 number
Servicing of the instruments	three year
Updating the software	Regular
Accessories	
	• Control Branded PC & Laser Printer: PC that controls GC can be used concurrently (OS: Windows 10 > USB communication port, 8GB RAM, 1.5 HDD, Core i7 X2 and Laser Printer. • He, Hygrogen, N_2 , O_2 Gas cylinders, regulator for operating triple GC-MS/MS, gas purification panel, tubings, gas cylinder carrier, capillary columns for pesticide, flavonoids quality (min. 3 No.), sample preparation kit, syringes, fittings • 20 KVA online UPS with 3 hour back up. • Three years' warranty should be offered for the complete GCMS/MS System • AMC for Two years after the warranty period needs to be quoted • Training: Onsite training.