

Appendix - I

Technical Specifications of GC –MS

Bench-top Gas Chromatograph system to be coupled with quadrupole based mass chromatographic system.

Gas Chromatograph:

- ❖ GC-main frame with Split / Splitless Injection port with Fast GC capability.
- ❖ Carrier gas head pressure setting upto 965 kPa (140 psi) or better.
- ❖ Oven heating rate should be in range of 70 – 120 °C/minute or higher.
- ❖ Injection Port heating up to 450 °C.
- ❖ Oven cooling should be within 4.5 minutes (without any modification of GC Oven).

Auto Injector:

Auto injector with atleast 10 vials capacity.

Mass Analyzer:

- ❖ Mass range should be 10 m/z to 1050 m/z or better range.
- ❖ Resolution of R > 2M / Unit Mass Resolution.
- ❖ Scan rate should be minimum of 20,000 amu/second or higher.
- ❖ Ionization modes: EI (Standard).
- ❖ Differential evacuation system with TMP vacuum pump with total capacity of 250 litre/second or higher in order to obtain maximum sensitivity and high flow rates.
- ❖ Direct interface between GC & MS with independent heating up to 350 °C or higher.
- ❖ Independent Ion source heating up to 300 °C or higher.
- ❖ Variable Ionization voltage range of 10 to 200 eV or better.
- ❖ Variable Ionization current range of 5 to 250 µA or better.
- ❖ EI Performance Scan Sensitivity: S/N Ratio > 1500 for 1pg OFN m/z 272 with the standard configuration.
- ❖ IDL < 10 fg.
- ❖ Methodology (MDP) with database for various applications should be provided with on site practical training.

GCMS Software:

- ❖ Instrument control through latest MS-WINDOWS based 32/64-Bit GCMS Software for control of GC and MS parameters. Software should have Manual and Auto tuning; Display of chromatograms and mass spectra of data under acquisition, Automatic analysis; Post Run analysis, Private and Public Library Search software. GC-MS software should be upgradable online for free for at least two years. GC-MS software should also be provided in CD-ROM.
- ❖ Latest liscenced NIST version library database should also to be offered in CD-ROM.

❖ **GC-MS Accessories and Consumables:**

Consumables/Accessories	Min. Quantity
• Glass Insert, Split	2
• Glass Insert, Splitless	2
• Injection Port Rubber septa	5
• Low Bleed Septum	1
• Various Graphite Vespel Ferrules	5

• Capillary Column Ferulle (0.5 mm)	1
• AU Gaskets	
• O Ring (4D P50)	5
• O Ring (4D P5)	5
• Nipple for Gasket (Injector)	1
• Capillary Adapter, Nipple (MS)	1
• Buffer Tube Assembly	2
• Filter Assembly	2
• Molecular Seive Filter	2
• Filament (common for EI, PCI, NCI)	2
• Standard Tool Kit	1
• SS Nut (NE16/012)	2
• GC-MS Running Kit inclusive of:	
○ MS Column (L xI .D. 30 m x 0.25 mm, df 0.25 µm) – (Equivalent of HP-5 ms)	1
○ Gas Filter Kit	1
○ 1.5 ml Screw Top Vials with caps and Septa	1
• GC-MS Consumables kit inclusive of:	1
○ Micro Liter Syringe 10µL, AOC- 20i Syringe (or Manual Injection)	
○ Glass Insert, Split	
○ Glass Insert, Splitless	
○ Graphite Ferrules	
○ Viton O-Rings	
○ Ceramic Column Cutter	
○ Injection Port Rubber Septa	
• Capillary MS Column (L xI .D. 30 m x 0.25 mm, df 0.25 µm) – (Equivalent of DB-35 ms)	1
❖ 47 Litres Capacity High Purity Helium Gas Cylinder with double stage SS diaphragm regulator	1
❖ 47 Litres Capacity High Purity Hydrogen Gas Cylinder with double stage SS diaphragm regulator	1
❖ 47 Litres Capacity High Purity Zero Air Gas Cylinder with double stage SS diaphragm regulator.	1
❖ 47 Litres Capacity High Purity Nitrogen Gas Cylinder with double stage SS diaphragm regulator.	1
❖ Gas Filter/ Purification Panel for all gases	1
❖ Desktop PC with i7 processor, atleast 8GB RAM, atleast 1TB Hard Disk, Keyboard & Mouse, 21.5 inches Monitor Screen, DVD-RW, Atleast 2GB Graphics card, Ethernet cable with Professional Liscenced Latest Windows.	
❖ Laser Jet Printer with following specifications:	
○ Best Print Quality: Up to 600 x 600 dpi (1200 dpi effective output)	
○ Compatible with latest windows	
○ Duty cycles (monthly): Up to 4000 pages or higher	
○ Print Speed: Up to 14 ppm or higher	
❖ 10 kVA, 230V AC & 50 Hz Single Phase Input and Output Online UPS with 30 minutes back-up.	
❖ Warranty: Systems should be provided with minimum 2 years warranty	
❖ All the essential consumables/accessories needed for device operation.	