

6th Semester (Major)

①  
Mass Spectroscopy

(Introduction and basic Principle),

Mass spectrometry is an analytical technique that measures the mass to charge ratio of ions. It studies the behaviour of positive ions, ~~It study~~ in magnetic and electrostatic fields.

In mass spectrometry a mass spectrum is obtained by converting the sample into rapidly moving ions (generally positive ions) and resolving these ions on the basis of their mass to charge ratio. The spectrum produced, known as mass spectrum gives important information about various masses produced and also about their relative abundances.

In the mass spectrometry a sample, which may be solid, liquid or gaseous is ionized, by bombarding with electrons. This may cause some of the sample molecules to break into charged fragments or simply become charged without fragmenting.



(ii)

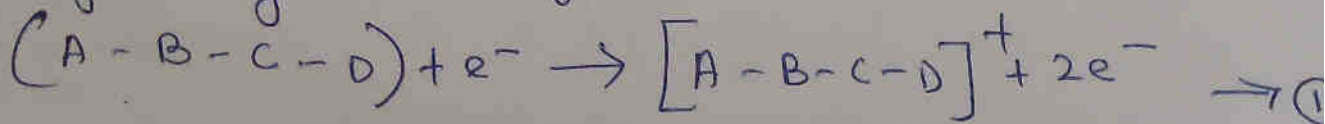
These ions are then separated according to their mass to charge ratio (by accelerating them and subjecting them to an electric or magnetic fields). Ions of same mass to charge ratio will undergo the same amount of deflection. The ions are detected by mechanism capable of detecting charged particles, such as an electron multiplier.

Results are displayed as spectra of the signal intensity of detected ions as a function of mass to charge ratio.

Reaction inside the mass spectrometer.

(Different fragmentation patterns)

When a hypothetical molecule (A-B-C-D) is bombarded with high energy electrons (energy more than ionisation potential), the process which can occur initially, may be as follows.



In most commonly used spectrometers, the process represented by equ<sup>n</sup> ① is most common and most important. If the bombarding electrons have energy