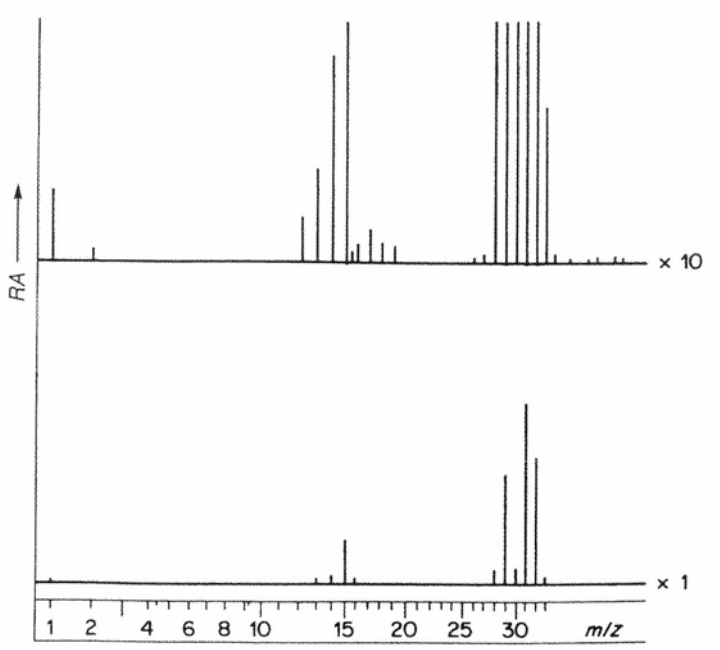
1)

Let us take a simple molecule, e.g. C_2H_6. Draw three fragmentation pathways for the molecular ion, with each involving only C—H bond cleavage but which lead to the production of a neutral atom, a neutral radical and a neutral molecule, respectively.

2)



Mass spectra of methanol (CH_3OH)

Draw up a fragmentation pattern for methanol based on the above assignments and underline the most intense ion in the spectrum.

3)

The mass spectrum of ethanol, C_2H_5OH, is shown in Figure. Use this to carry out the following:

(a) write down the *m/z* value of the molecular ion;

(b) write down the *m/z* value of the base peak;

(c) the base peak is formed from the molecular ion via a single step—write down a pathway for this process;

(d) write down two fragmentation pathways for the production of ions of *m/z* 29 which may have different formulae;

(e) write down fragmentation pathways for the following stepwise decompositions:

m/z 46 ⟶ *m/z* 45 ⟶ *m/z* 43

(f) assign a formula to *m/z* 18 and give a fragmentation pathway for its direct formation from the molecular ion;

(g) combine the fragmentation pathways mentioned above to give the fragmentation pattern for ethanol.

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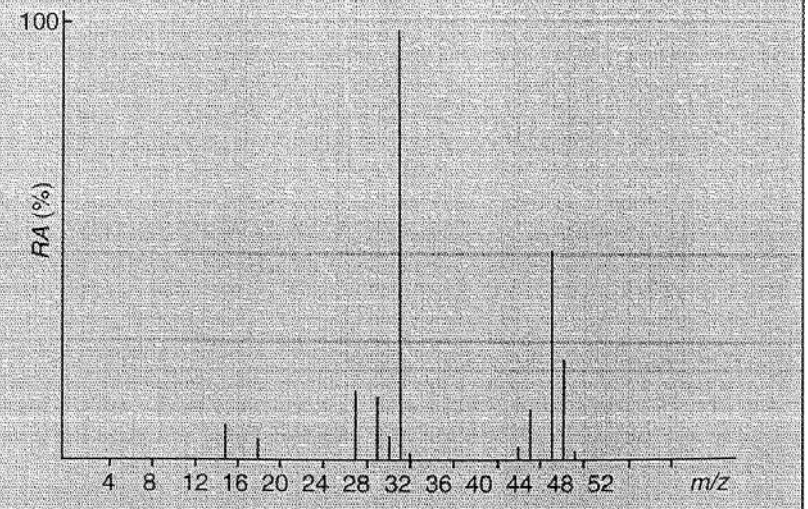

Mass spectrum of ethanol (C_2H_5OH)