13.11 EXERCISE 1 – Mass spectra

1. Butanoic acid and methylpropanoic acid give slightly different mass spectra. Both give a molecular ion peak at m/z = 88, but butanoic acid give six other peaks whereas methylpropanoic only gives four.

    a) State the species responsible for the four other peaks in the mass spectrum of butanoic acid and write equations to show their formation from the molecular ion.

    b) Suggest which one of these peaks will not be present in a mass spectrum of methylpropanoic acid, giving a reason for your choice.

2. Suggest how pentan-2-one and pentan-3-one could be distinguished in a mass spectrum. Write equations to show the formation of any important fragment ions.

3. Write equations to show the formation of at least two species giving intense peaks in the mass spectra of each of the following molecules:

    a) pentane
    b) ethyl ethanoate
    c) propanoic acid
    d) pentanal