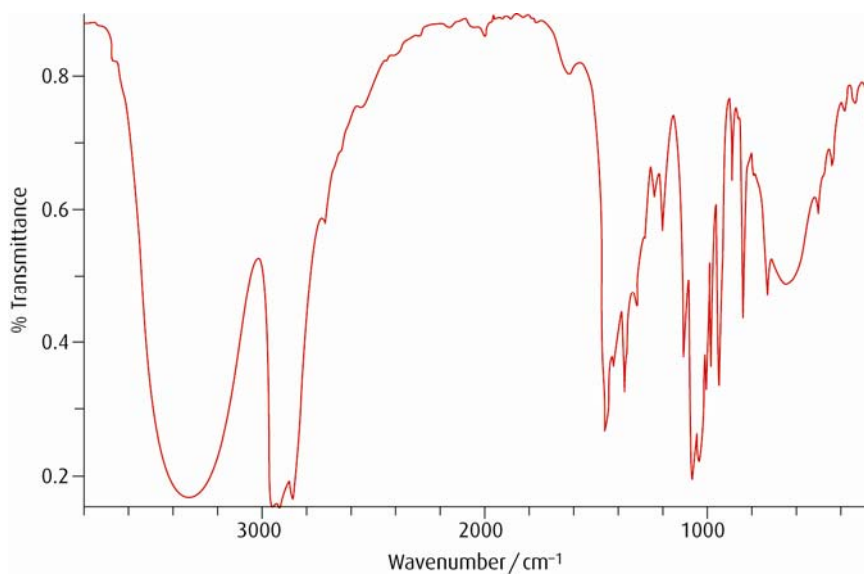


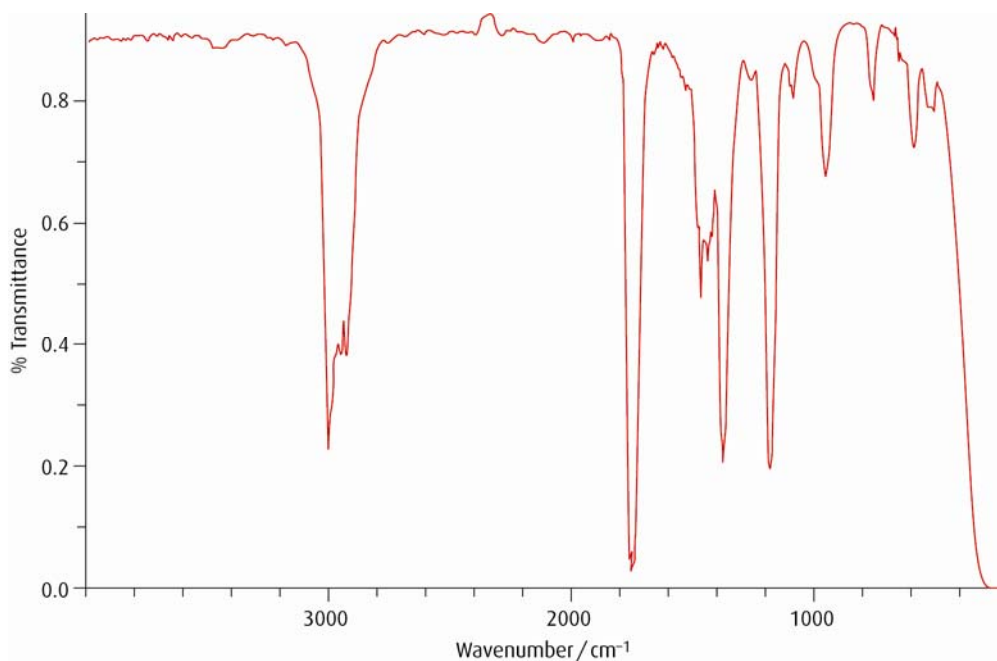
Core Worksheet – Option A

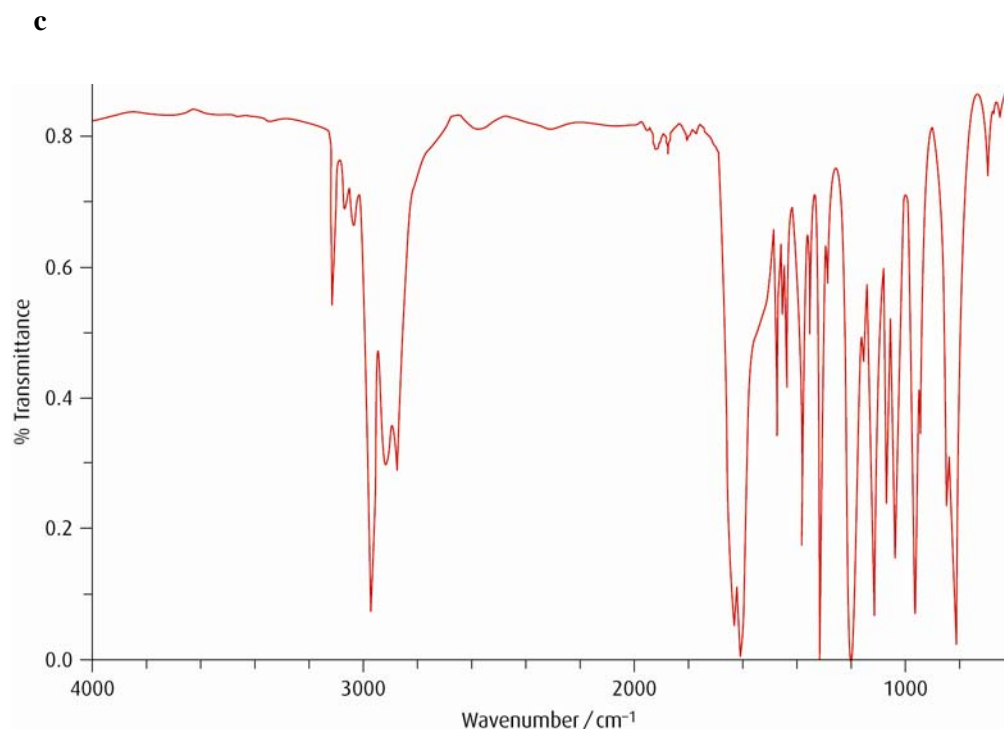
- 1** The infrared spectra shown below are for molecules containing four carbon atoms and one oxygen atom. Identify, with explanations, the functional groups present in the molecules. [7]

a

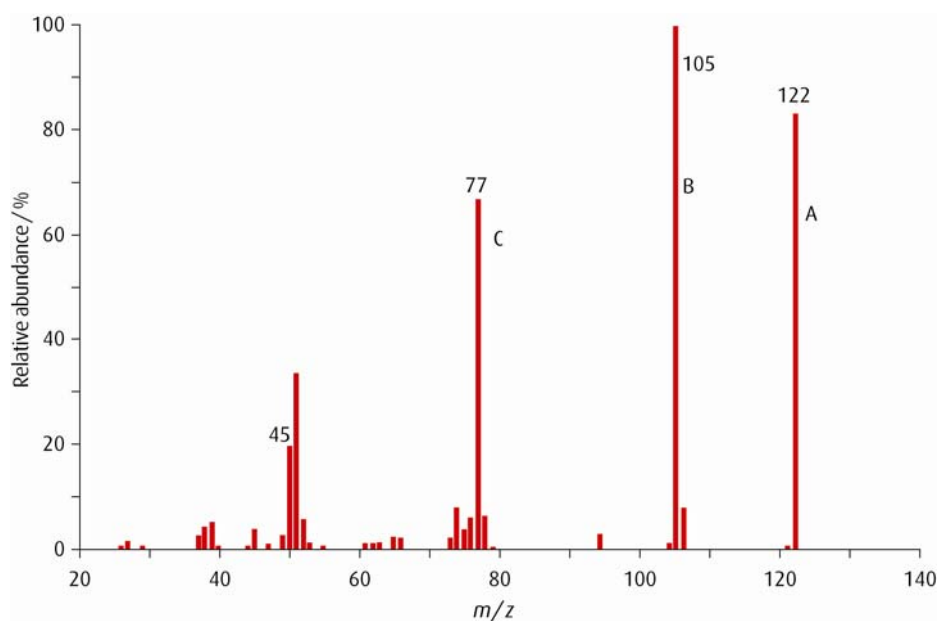


b



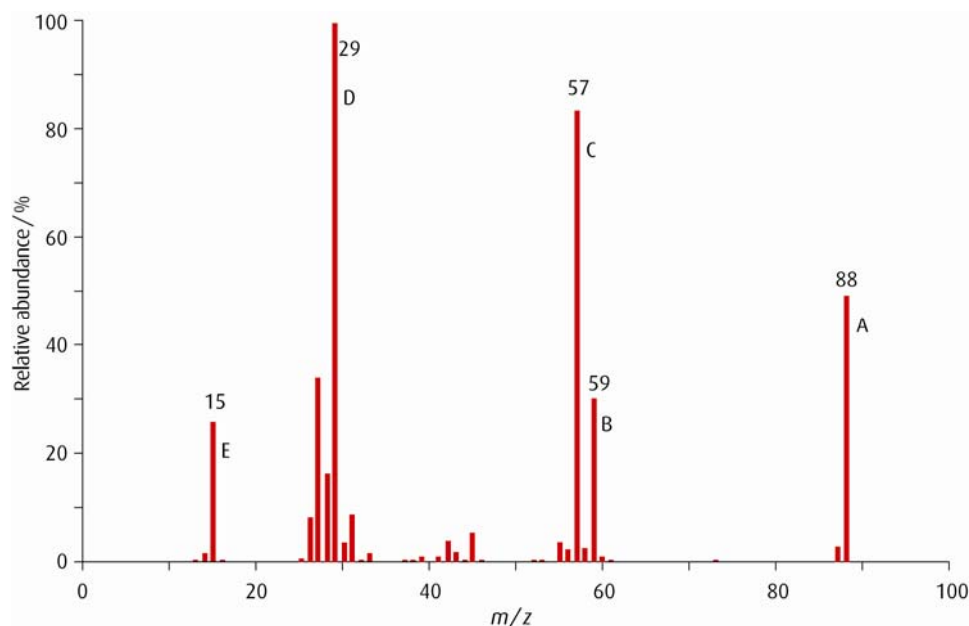


2 The mass spectrum of a compound containing C, H and O is shown below.



- a Identify the molecular ion peak. [1]
- b Which fragment ions are responsible for the peaks at m/z 77 and 45? [2]
- c Which group is lost when fragment ion B is formed from A? [1]
- d Which group is lost when fragment ion C is formed from A? [1]
- e Identify the molecule. [1]

- 3** The mass spectrum of a compound containing C, H and O is shown below. The compound has a band in the infrared spectrum at about 1750 cm^{-1} .



- What bond is responsible for the band in the IR spectrum at 1750 cm^{-1} ? [1]
 - Work out the molecular formula of the compound. [1]
 - Which group is lost when fragment ion B is formed from A? [1]
 - Which group is lost when fragment ion C is formed from A? [1]
 - Identify the fragment ions responsible for the peaks at m/z 29 and 15. [2]
 - Suggest the identity of the fragment ion responsible for the peak at m/z 57. [1]
 - Suggest the identity of the molecule. [1]
 - Work out the number of peaks in the NMR spectrum of this compound and the areas under the peaks. [2]
- 4** Suggest the number of peaks and the ratio between the areas under the peaks in the NMR spectra of each of the following: [12]

