Analytical techniques – 2022 June AS Chemistry 9701

1. June/2022/Paper_11/No.40

   A scientist chooses either infrared spectroscopy or mass spectrometry to find a particular piece of information.

   In which row has the **best** choice been made?

	target information	analytic method used
A	identities of functional groups in an organic compound	infrared spectroscopy
B	identities of functional groups in an organic compound	mass spectrometry
C	values of successive ionisation energies of Na	infrared spectroscopy
D	values of successive ionisation energies of Na	mass spectrometry

2. June/2022/Paper_12/No.40

   Three organic compounds are listed.

   1   ethanal

   2   propan-1-ol

   3   propan-2-ol

   Which compounds will have a mass spectrum that contains a fragment peak at $m/e = 43$?

   A 1 only   **B** 1 and 2 only   **C** 2 and 3 only   **D** 1, 2 and 3

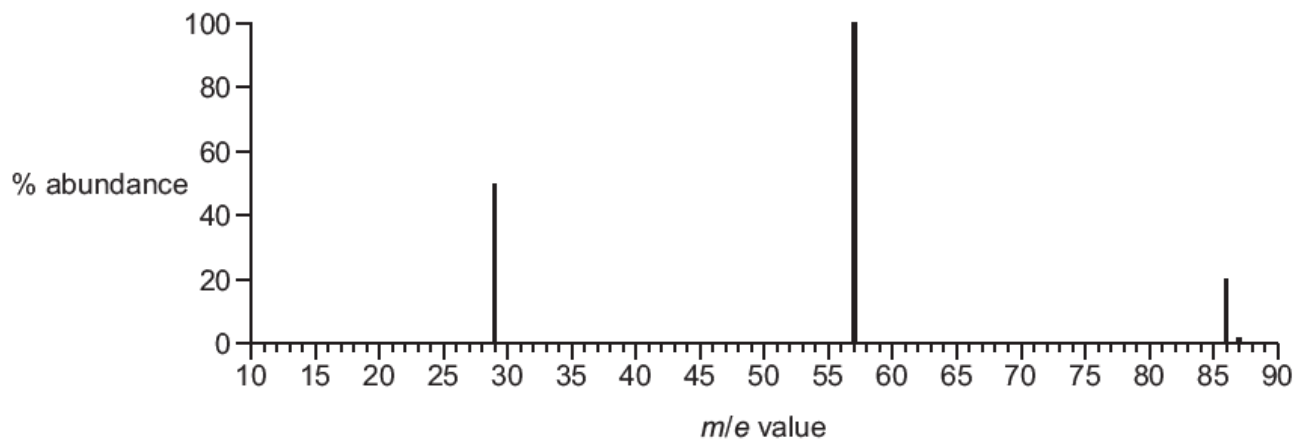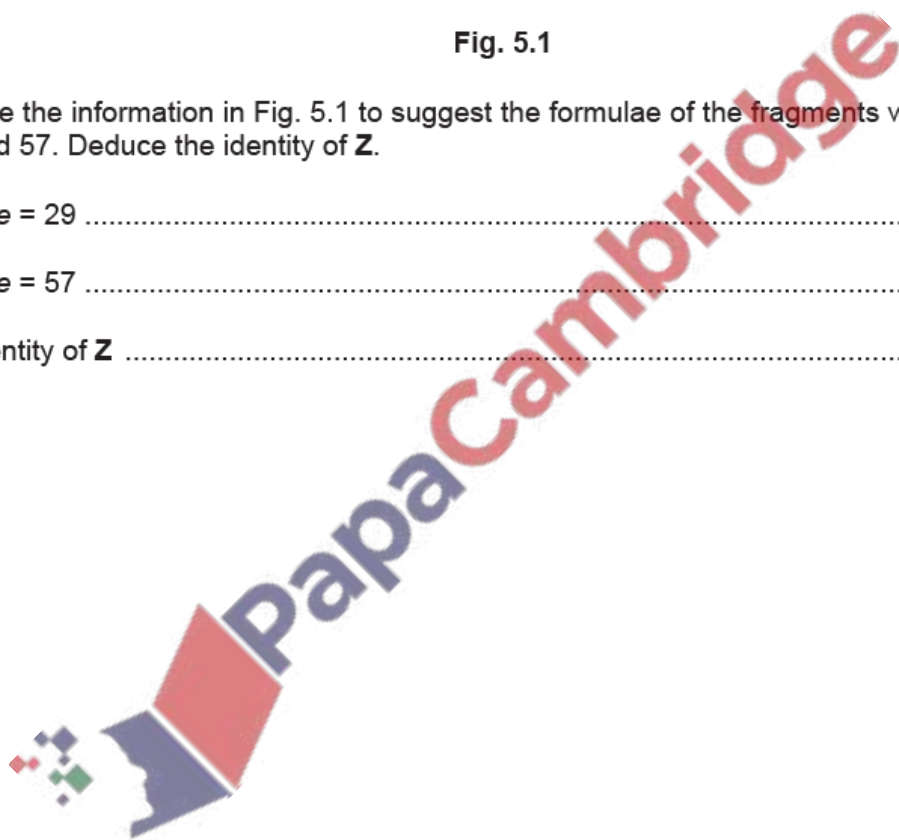**(d)** Fig. 5.1 shows the mass spectrum of ketone **Z**, $C_5H_{10}O$.

Fig. 5.1

Use the information in Fig. 5.1 to suggest the formulae of the fragments with *m/e* peaks at 29 and 57. Deduce the identity of **Z**.

m/e = 29 ....

m/e = 57 ....

identity of **Z** ....

[3]

2

4. June/2022/Paper_22/No.4(c)

(c) **X** is an addition polymer.

X
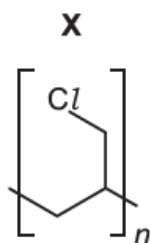
Fig. 4.3

(i) Draw the monomer of **X**.

[1]

(ii) Suggest **one** reason why the disposal of items made from **X** is difficult.

.... [1]

5. June/2022/Paper_23/No.5(b)
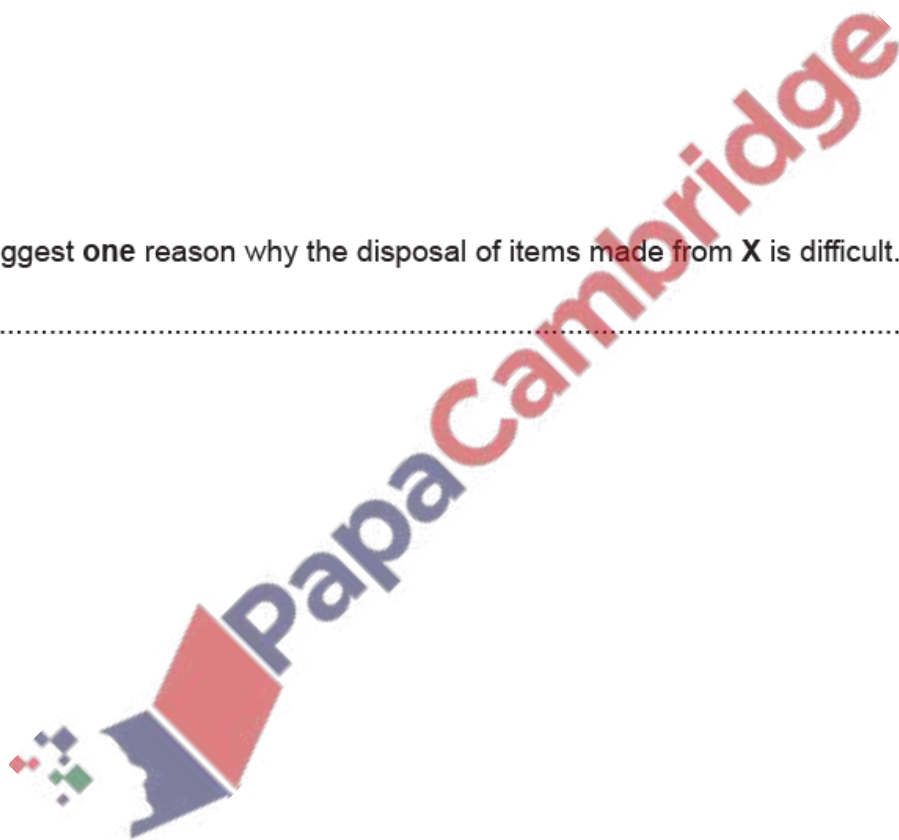
(b) **Z** contains three types of atom: carbon, hydrogen and a halogen. The mass spectrum of **Z** is recorded. Fig. 5.1 shows a section of the mass spectrum at m/e greater than 63. The fragment at $m/e = 64$ is the molecular ion peak.
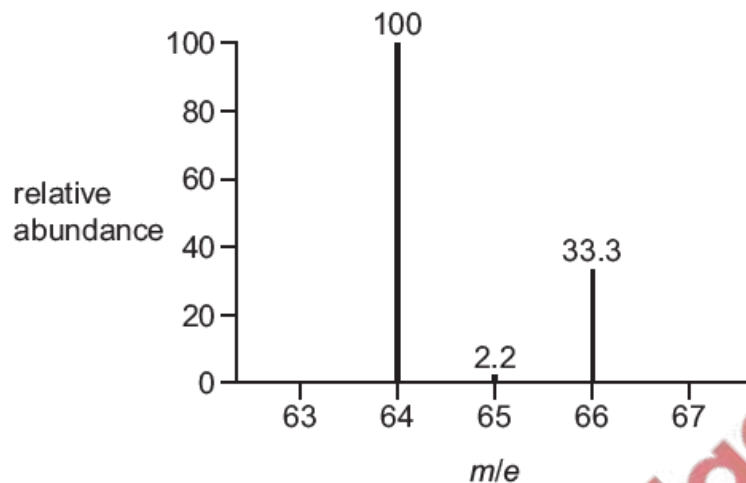

Fig. 5.1

(i) Deduce the number of carbon atoms present in a molecule of **Z** using Fig. 5.1. Show your working.

.... [1]

(ii) Deduce which halogen is present in **Z** using Fig. 5.1. Explain your answer.

....

.... [1]

(iii) There are also peaks at $m/e = 29$ and $m/e = 49$.

Suggest the formulae of these fragments.
Deduce the name of **Z**.

$m/e = 29$ ....

$m/e = 49$ ....

name of **Z** ....

[3]

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