1 Fermentation is a process in which yeast is used to convert aqueous glucose to ethanol and carbon dioxide. Fermentation takes place at a temperature of between 25 °C and 35 °C.

$$C_6H_{12}O_6(aq) \rightarrow 2C_2H_5OH(aq) + 2CO_2(g)$$

A student uses the apparatus shown in Fig. 1.1 to make carbon dioxide by fermentation.

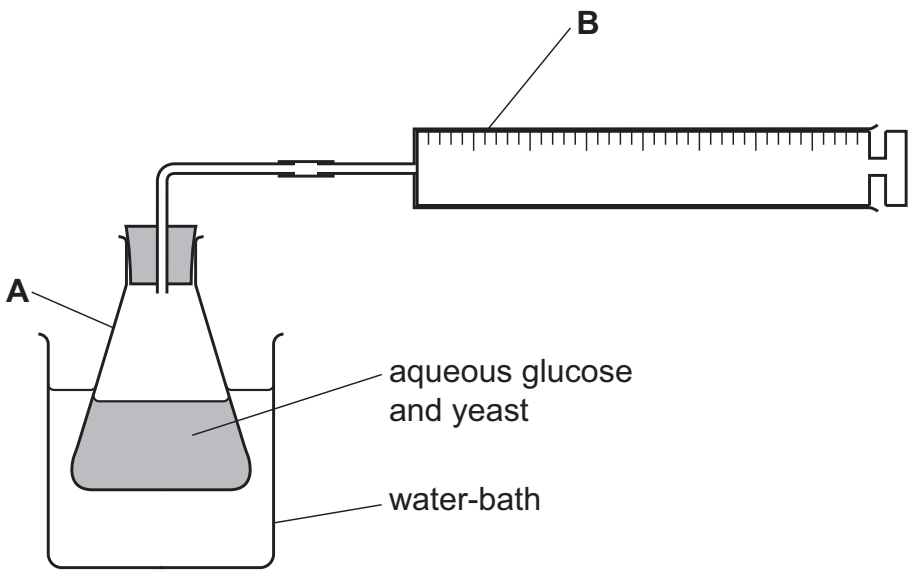

Fig. 1.1

(a) Name the items of apparatus labelled **A** and **B** in Fig. 1.1.

A .....

B .....
[2]

(b) Suggest why a water-bath is used.

.....

..... [1]

(c) The student measures the volume of gas that is collected every 10 minutes for 90 minutes.

Their results are shown in Fig. 1.2.

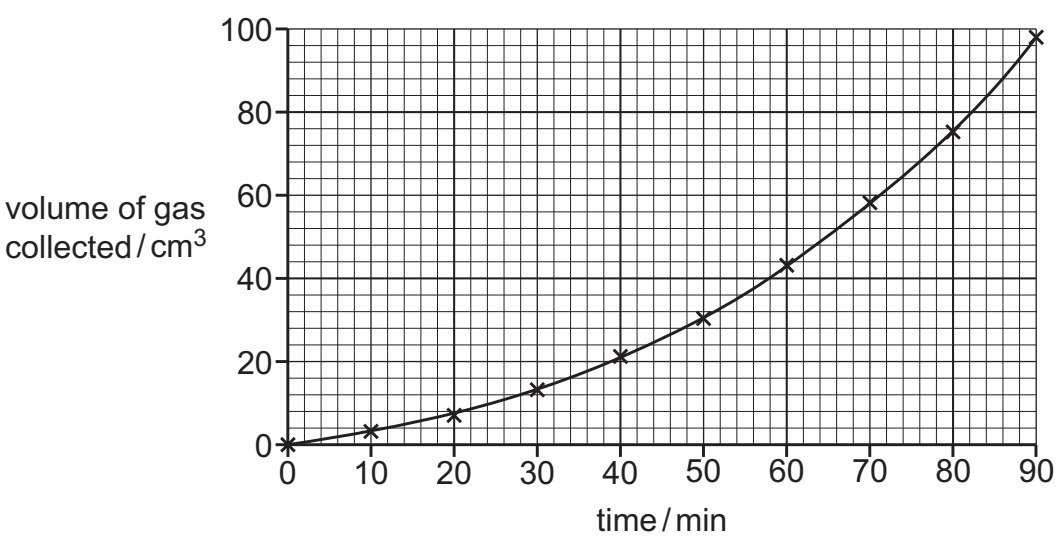

Fig. 1.2

Describe how the results in Fig. 1.2 show that the fermentation is **not** complete after 90 minutes.

..... [1]

(d) The student repeats the experiment using the apparatus shown in Fig. 1.3.

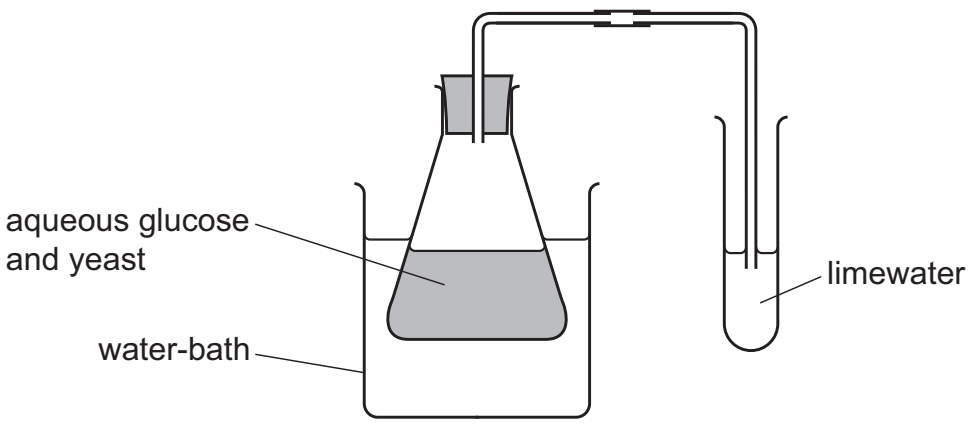

Fig. 1.3

(i) State what happens to the appearance of the limewater during fermentation.

..... [1]

(ii) State **one** observation the student would make that shows that fermentation is complete.

.....

..... [1]

(e) State the method the student should use to obtain ethanol from the fermentation mixture.

..... [1]

[Total: 7]