Respiration

Question Paper 2

Level	IGCSE
Subject	Biology
Exam Board	CIE
Topic	Respiration
Sub-Topic	
Paper Type	Alternative to Practical
Booklet	Question Paper 2

Time Allowed: **47 minutes**

Score: **/39**

Percentage: **/100**

1 Some students compared the metabolism of two yeast mixtures in test-tubes **W1** and **W2**, using the apparatus shown in Fig. 1.1. Both mixtures contained the same concentration of sucrose.

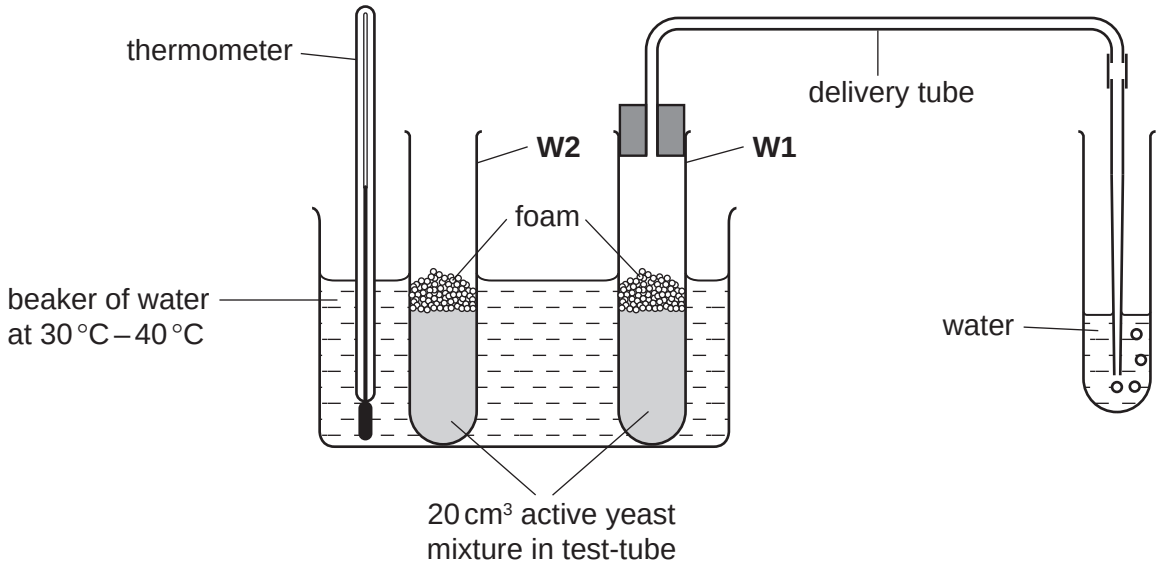


Fig. 1.1

The apparatus was left for two minutes. After this period, the number of gas bubbles released from the delivery tube was counted for two minutes. This number was recorded as **trial 1** in Table 1.1.

The yeast mixture was shaken and the number of bubbles was recorded for two more minutes as **trial 2**. This was repeated for **trial 3**.

The whole procedure was then repeated using test-tube **W2**.

The results for all three trials for test-tube **W2** were recorded in Table 1.1.

Table 1.1

yeast mixture	number of bubbles of gas released in two minutes		
	trial 1	**trial 2**	**trial 3**
W1	5	3	2
W2	20	15	10

(a) Gas bubbles are produced in this experiment.

(i) State which metabolic process is being carried out by the yeast cells to produce this gas.

..... [1]

(ii) Name this gas. ..... [1]

(iii) Describe a test for this gas and the result that you would expect.

.....

.....

.....

..... [2]

(b) Suggest why the test-tubes **W1** and **W2** were placed in a beaker of warm water during the experiment.

.....

.....

.....

..... [2]

(c) Describe **and** explain any differences observed in the number of bubbles of gas released.

.....

.....

.....

.....

.....

..... [3]

(d) State **two** sources of error in the **method** of this investigation.
Suggest how to improve the method to reduce **each** source of error.

source of error .....

.....

improvement .....

.....

source of error .....

.....

improvement .....

..... [4]

[Total: 13]

2 Fig. 3.1 was set up with a number of respiring maggots placed in the large test tube. The apparatus was left for 20 minutes and then a drop of coloured liquid was introduced into the capillary tube as shown.

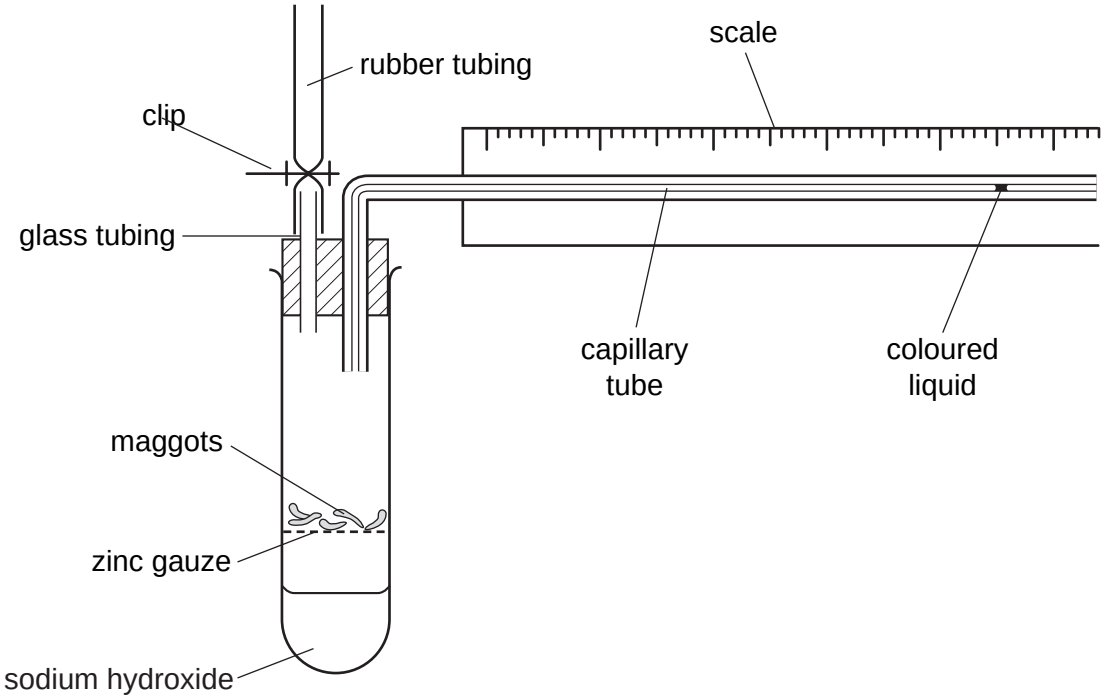


Fig. 3.1

During the next 5 minutes, the drop of coloured liquid moved along the capillary tube. The sodium hydroxide absorbs carbon dioxide.

(a) (i) Explain why the drop of coloured liquid moved towards the test tube.

.....

.....

.....

.....

..... [3]

(ii) Describe a suitable control for this investigation.

.....

.....

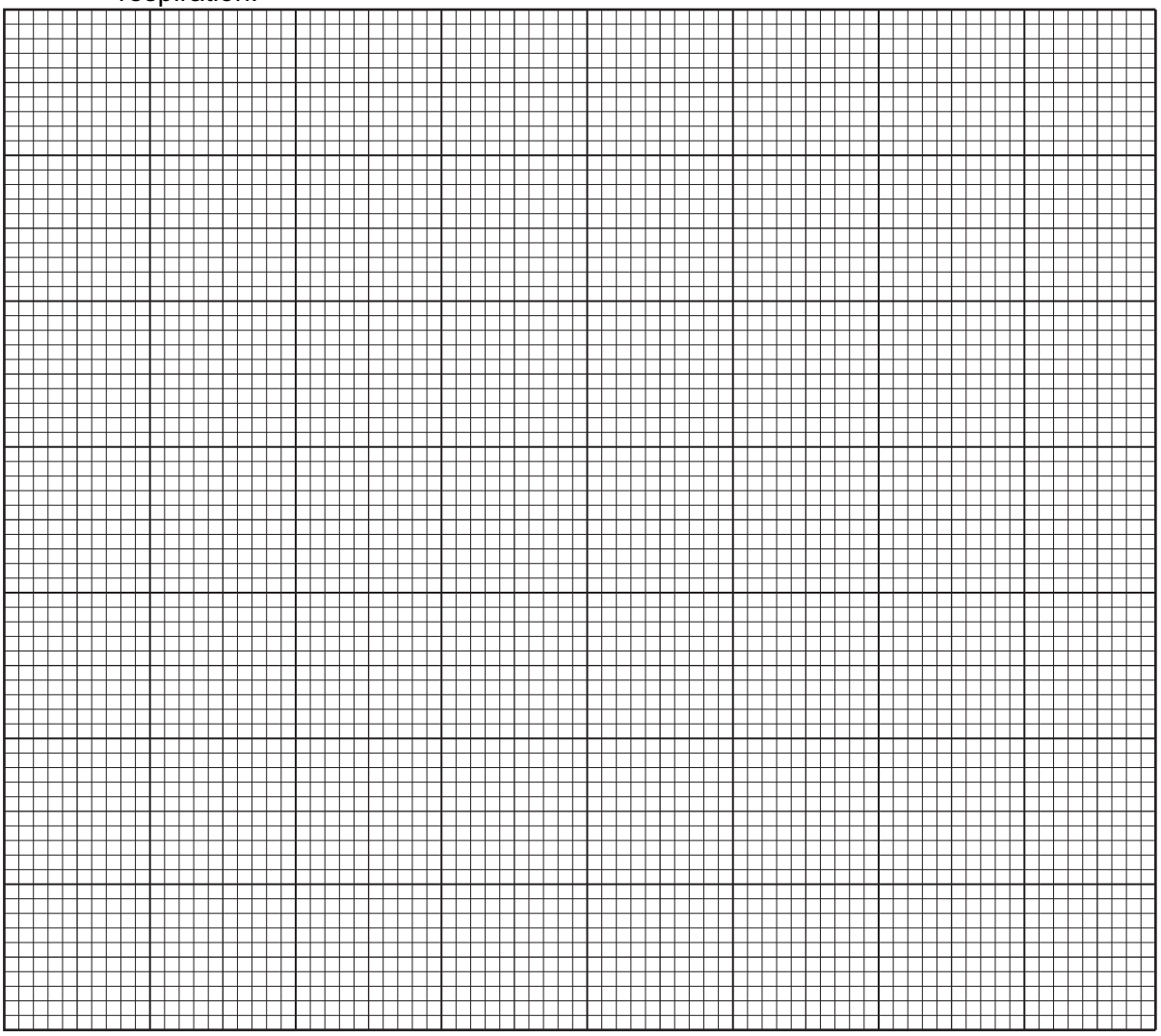
..... [2]

A second sample of maggots was used in an experiment to show the effect of different temperatures on respiration. The distance that the drop of coloured liquid moved along the capillary tube was measured over a period of 60 seconds at each temperature. The drop of coloured liquid was moved back to the start of the capillary tube before each reading was taken. The results are shown in Table 3.1.

Table 3.1

temperature / ºC	distance moved by drop of coloured liquid / mm
20	41
25	63
30	96
35	168
40	120

(b) (i) Using the results given, plot a graph to show the effect of temperature on respiration.



[5]

(ii) With reference to your graph, describe the effect of temperature on the respiration of the maggots.

.....

.....

.....

..... [3]

(iii) Explain the results at 35ºC.

.....

.....

.....

..... [2]

[Total: 15]

3 If all conditions required for growth are present, some yeast cells in a flask can divide every hour.

Fig. 3.1 shows the number of yeast cells in a flask measured over a period of 12 hours.

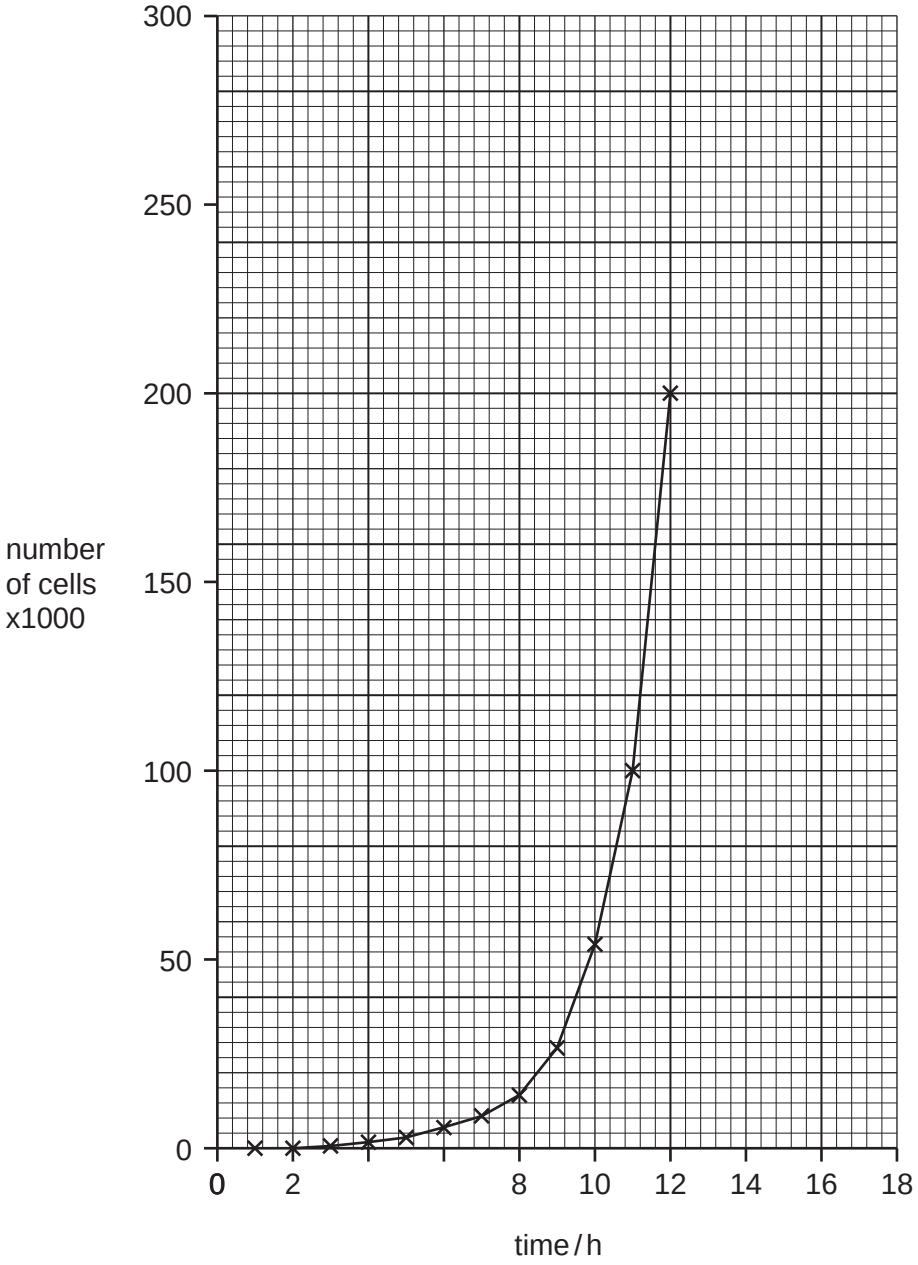


Fig. 3.1

(a) Suggest how you would observe the yeast cells and how you would estimate their total population in the flask.

.....

.....

.....

.....

.....

.....

.....

..... [4]

(b) On Fig. 3.1, indicate clearly and name, the **two** phases shown in this population curve. Mark when the change occurs between the two phases with a **Q**.

[3]

(c) **(i)** State two factors needed to maintain the maximum growth of the yeast population.

1. .....

2. ..... [2]

(ii) Suggest what would happen to the numbers of yeast in Fig. 3.1 if one of these conditions becomes limiting after 12 hours.

..... [1]

(iii) Draw a sketch to show the effect of your suggestion given in (c)(ii), by continuing the curve on **Fig. 3.1**.

[1]

total [11]