AQA – Bioenergetics – GCSE Biology Paper_1

1. June/2021/Paper_1F/No.3

0 3 Anaerobic respiration in yeast is called fermentation.

The equation for fermentation is:

glucose → ethanol + carbon dioxide

0 3 . 1 How does the equation show that fermentation is an **anaerobic** reaction?

[1 mark]

Fermentation in yeast is used in the manufacture of beer, wine and bread.

0 3 . 2 Why is fermentation used when making beer and wine?

[1 mark]

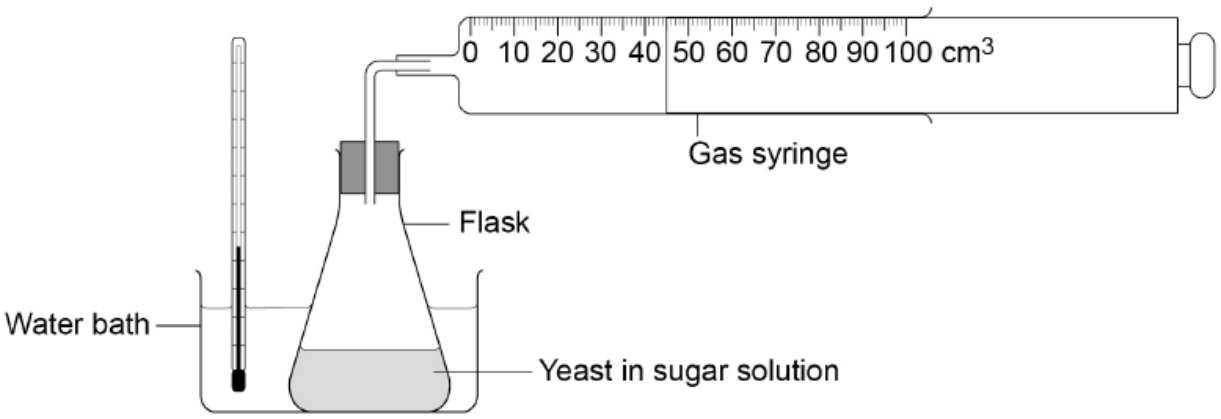
0 3 . 3 Explain why fermentation is used when making bread.

[2 marks]

A student investigated fermentation in yeast.

Figure 3 shows the apparatus.

Figure 3



This is the method used.

1. Mix yeast with sugar solution in a flask.
2. Put the flask in a water bath at 35 °C.
3. After 10 minutes attach a gas syringe to the flask.
4. Record the volume of carbon dioxide collected every 5 minutes for 1 hour.

0 3 . 4 What volume of carbon dioxide has been collected in the gas syringe in **Figure 3**?

[1 mark]

Volume of carbon dioxide = _____ cm^3

0 3 . 5 Why did the student wait 10 minutes before attaching the gas syringe?

[1 mark]

Tick (✓) **one** box.

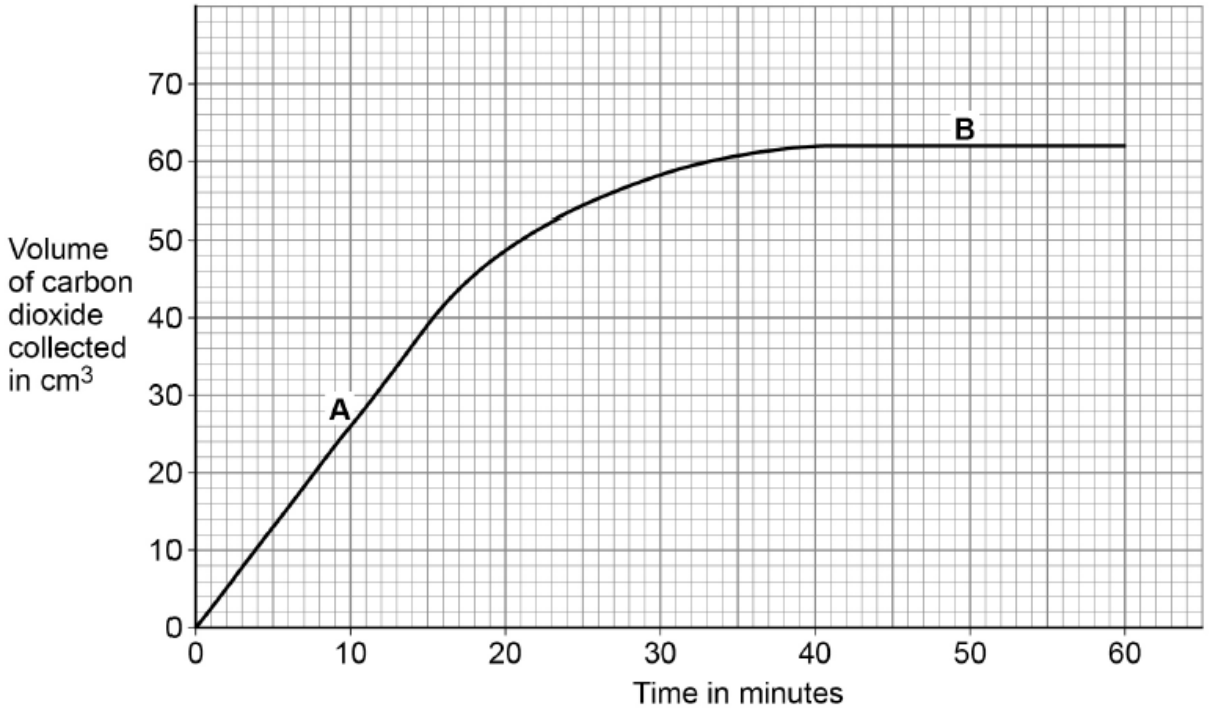
To allow time for the mixture to reach 35 °C ☐

To allow time for the sugar to dissolve ☐

To allow time to draw a results table ☐

Figure 4 shows the results.

Figure 4



0 3 . 6 **A** and **B** are different parts of the graph in **Figure 4**.

Draw **one** line from each part of the graph to the description of the reaction.

[2 marks]

Part of the graph	**Description of the reaction**
	Carbon dioxide is **not** being produced
A	
	Carbon dioxide production is **fastest**
B	
	Carbon dioxide production is **slowing down**

The equation for fermentation is repeated here.

glucose → ethanol + carbon dioxide

0 3 . 7 Suggest **one** reason why fermentation in the flask stopped.

[1 mark]

_____

_____

0 3 . 8 Fermentation is controlled by enzymes.

The investigation was repeated at 2 °C and at 75 °C.

No carbon dioxide was produced at either of these temperatures.

Suggest why **no** carbon dioxide was produced at 2 °C or at 75 °C.

[2 marks]

Reason at 2 °C _____

_____

Reason at 75 °C _____

_____

0 3 . 9 Anaerobic respiration also happens in animal cells.

Complete the equation for anaerobic respiration in animal cells.

Choose answers from the box.

[2 marks]

carbon dioxide	**ethanol**	**glucose**	**lactic acid**	**water**

_____ → _____

2. June/2021/Paper_1F/No.5

0 5 Plants absorb light for photosynthesis.

0 5 . 1 Which is the equation for photosynthesis?

[1 mark]

Tick (✓) **one** box.

$C_6H_{12}O_6 + 6\,O_2 \rightarrow 6\,CO_2 + 6\,H_2O$ ☐

$6\,CO_2 + 6\,H_2O \rightarrow C_6H_{12}O_6 + 6\,O_2$ ☐

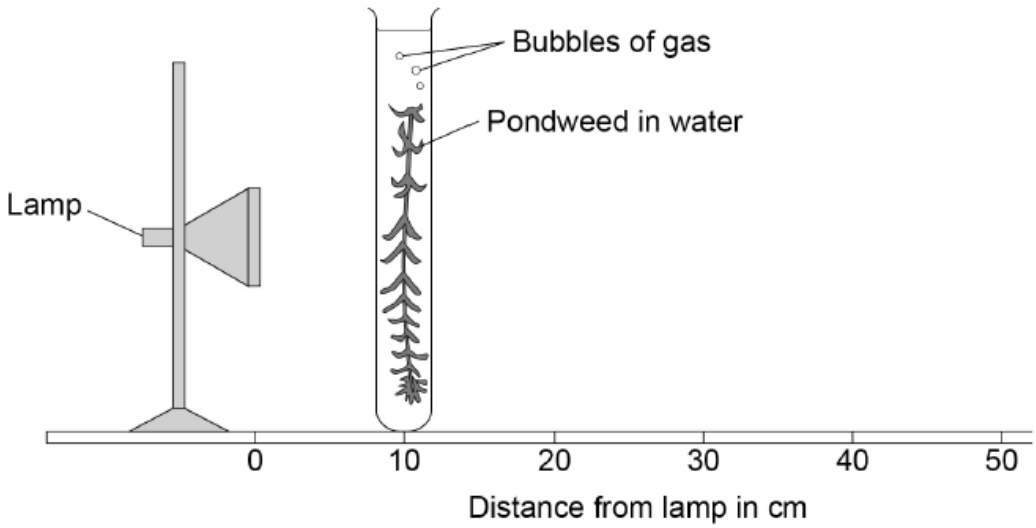
$6\,H_2O + 6\,O_2 \rightarrow C_6H_{12}O_6 + 6\,CO_2$ ☐

$6\,O_2 + 6\,CO_2 \rightarrow C_6H_{12}O_6 + 6\,H_2O$ ☐

A student investigated the effect of light intensity on the rate of photosynthesis.

Figure 6 shows the apparatus.

Figure 6



This is the method used.

1. Set up the apparatus as shown in **Figure 6**.

2. Place the pondweed 10 cm away from the lamp.

3. Switch on the lamp.

4. Record the number of bubbles of gas produced in 5 minutes.

5. Repeat steps 2 to 4 with the pondweed at different distances from the lamp.

0 5 . 2 What was the independent variable in this investigation?

[1 mark]

Tick (✓) **one** box.

Distance of the pondweed from the lamp ☐

Length of the piece of pondweed ☐

Number of bubbles of gas produced ☐

Time taken to collect the gas ☐

The lamp gets warm when it is on. This causes the temperature of the water to increase.

0 5 . 3 Explain how an increase in temperature would affect the results of this investigation.

[2 marks]

0 5 . 4 Suggest **one** way the investigation could be improved so the temperature of the water does **not** increase.

[1 mark]

0 5 . 5 Suggest **two** improvements to the investigation so the results would be more valid.

Do **not** refer to controlling the temperature of the water.

[2 marks]

1

2

Table 2 shows the results.

Table 2

Distance of pondweed from the lamp in cm	Number of bubbles of gas produced in 5 minutes
10	120
20	56
30	31
40	16
50	10

0 5 . 6 Calculate the rate of photosynthesis when the pondweed was 40 cm from the lamp.

Give the rate of photosynthesis as the number of bubbles of gas produced per minute.

[1 mark]

Rate = _____ bubbles of gas produced per minute

0 5 . 7 Give **one** conclusion that can be made from **Table 2**.

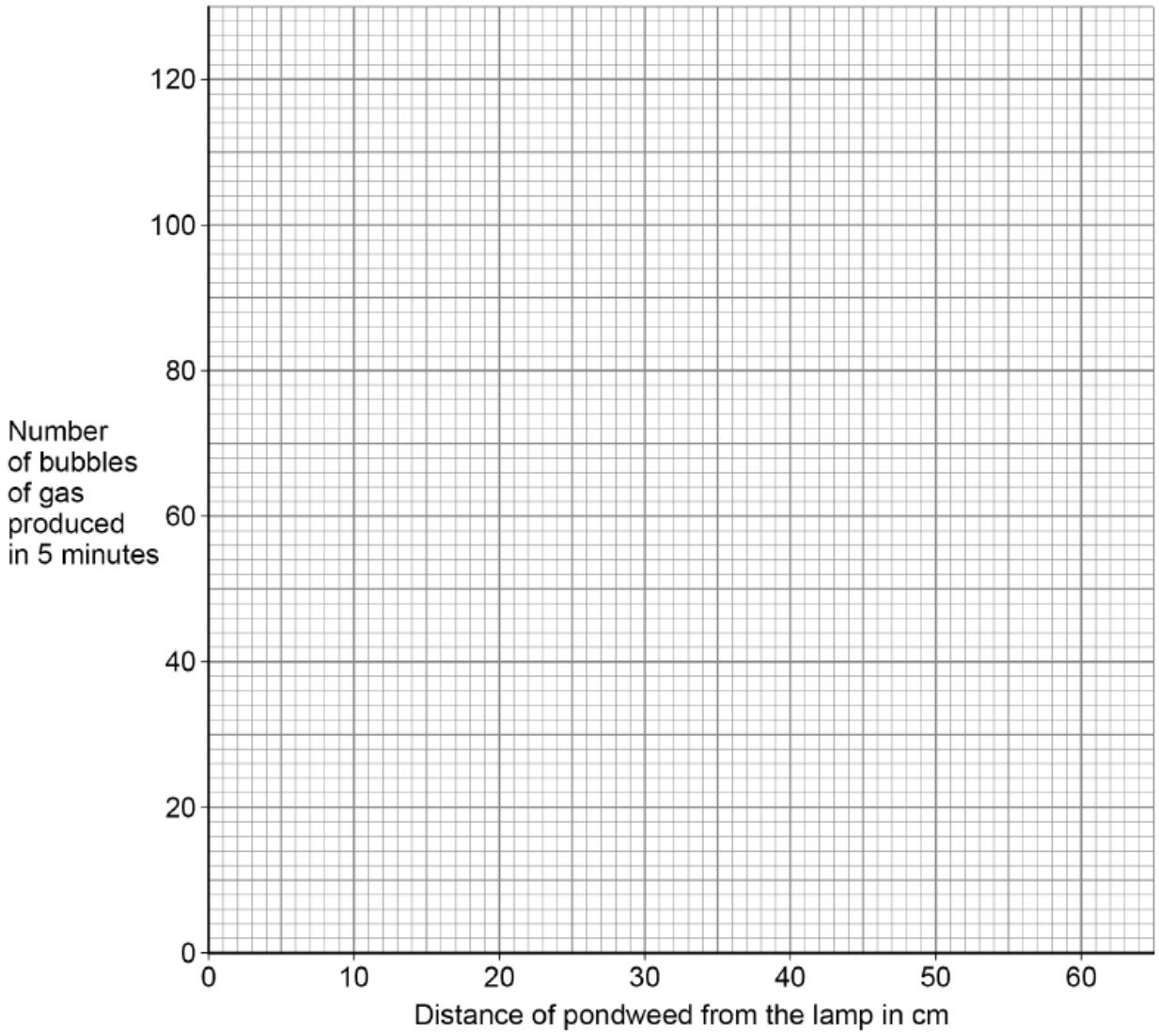
[1 mark]

0 5 . 8 Plot the data from **Table 2** on **Figure 7**.

Draw a line of best fit.

[3 marks]

Figure 7



0 5 . 9 Predict the number of bubbles that would be produced in 5 minutes if the pondweed was 60 cm from the lamp.

Use **Figure 7**.

[1 mark]

Number of bubbles produced in 5 minutes = _____

3. June/2021/Paper_1H/No.6

0 6 This question is about plant transport systems.

0 6 . 1 Describe how water is transported from the soil to the atmosphere through a plant.

[4 marks]

0 6 . 2 Dissolved sugars are moved through a plant in phloem tissue.

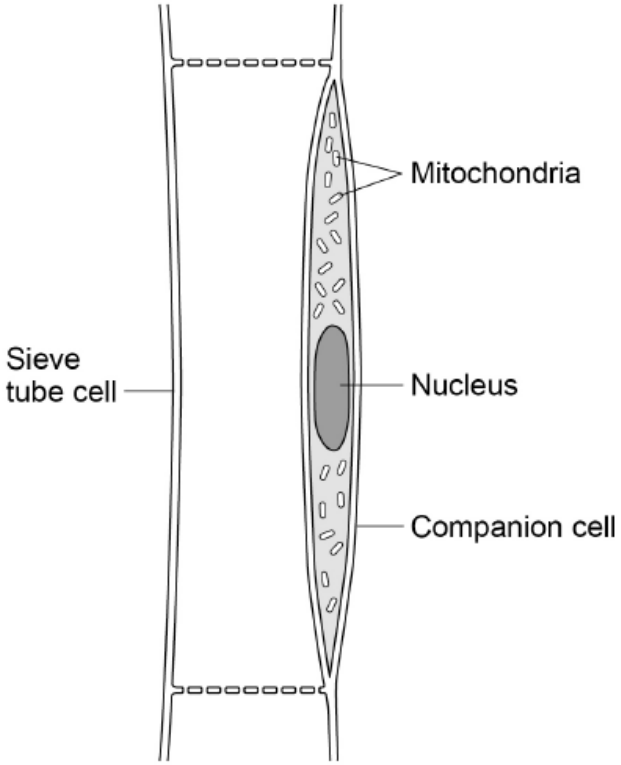
What is the name of the process that moves dissolved sugars through phloem tissue?

[1 mark]

Phloem tissue is made of sieve tube cells and companion cells.

Figure 6 shows a section of phloem tissue.

Figure 6



0 6 . 3 Explain **one** way **sieve tube cells** are specialised for their function.

Use **Figure 6**.

[2 marks]

0 6 . 4 What does the structure of the companion cells suggest about the process that moves dissolved sugars through the phloem tissue?

Give a reason for your answer.

Use **Figure 6**.

[2 marks]

0 6 . 5 Describe why it is important that dissolved sugars are moved both upwards **and** downwards in a plant.

[3 marks]