AQA

Please write clearly in block capitals.

Centre number | | | | | | Candidate number | | | | |

Surname _____

Forename(s) _____

Candidate signature _____

I declare this is my own work.

GCSE
COMBINED SCIENCE: TRILOGY

F

Foundation Tier
Biology Paper 1F

Time allowed: 1 hour 15 minutes

Materials

For this paper you must have:
- a ruler
- a scientific calculator.

Instructions
- Use black ink or black ball-point pen.
- Pencil should only be used for drawing.
- Fill in the boxes at the top of this page.
- Answer **all** questions in the spaces provided.
- If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).
- Do all rough work in this book. Cross through any work you do not want to be marked.
- In all calculations, show clearly how you work out your answer.

For Examiner's Use	
Question	Mark
1	
2	
3	
4	
5	
6	
TOTAL	

Information
- The maximum mark for this paper is 70.
- The marks for questions are shown in brackets.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.

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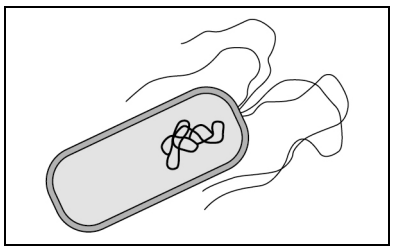
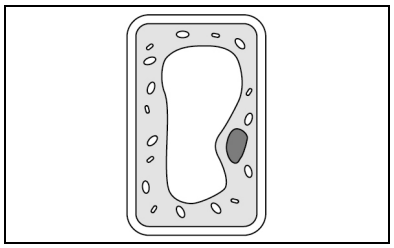
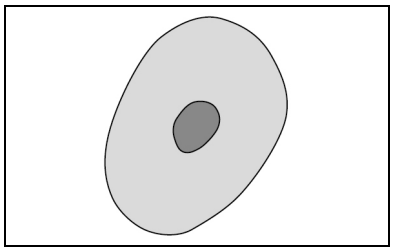
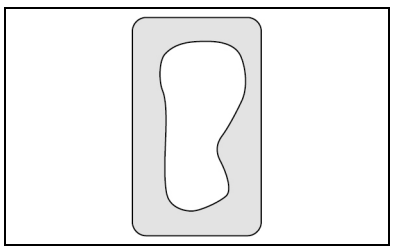
0 1 Cells are the building blocks of life.

0 1 . 1 Draw **one** line from each type of organism to the diagram of one of its cells.

[3 marks]

Type of organism	**Diagram of one cell**
Animal	
Bacterium	
Plant	
	

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0 1 . 2 Cells contain structures. These structures have different functions.

Draw **one** line from each function to the correct structure.

[3 marks]

Function	Structure
Contains genetic information	Cell membrane
Controls what enters and leaves a cell	Cell wall
Where photosynthesis happens	Chloroplast
	Nucleus

Question 1 continues on the next page

Do not write outside the box

0 1 . 3 Chemicals are produced in cells.

Complete the sentences.

Choose answers from the box.

[4 marks]

cellulose	**DNA**	**glycogen**	**starch**	**urea**

A chemical excreted by animals is _____ .

A chemical stored in animal cells is _____ .

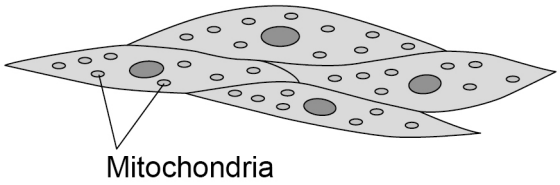
A chemical stored in plant cells is _____ .

A chemical that strengthens plant cell walls is _____ .

Do not write outside the box

Figure 1 shows a diagram of muscle cells.

Figure 1



0 1 . 4 Give **one** function of muscle cells.

[1 mark]

0 1 . 5 Explain how muscle cells are adapted for their function.

Use **Figure 1**.

[2 marks]

Question 1 continues on the next page

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0 1 . 6 One muscle cell was 0.05 mm wide.

When viewed using a microscope the image of the muscle cell was 2 mm wide.

Calculate the magnification used to view the cell.

Use the equation:

$$\text{magnification} = \frac{\text{width of image}}{\text{width of real cell}}$$

[2 marks]

Magnification = ×

15

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Turn over for the next question

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ANSWER IN THE SPACES PROVIDED

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0 2 Antibiotics are used to treat bacterial infections.

0 2 . 1 Which substance is used as an antibiotic?

[1 mark]

Tick (✓) **one** box.

Aspirin ☐

Digitalis ☐

Penicillin ☐

Gonorrhoea and chlamydia are two sexually transmitted infections.

Gonorrhoea and chlamydia infections can be treated with antibiotics.

0 2 . 2 Give **one** symptom of gonorrhoea.

[1 mark]

Do not write outside the box

A scientist investigated which antibiotics were most effective at treating gonorrhoea and chlamydia.

This is the method used.

1. Grow gonorrhoea bacteria in a Petri dish.

2. Prepare four different antibiotic solutions, **A**, **B**, **C** and **D**, of the same concentration.

3. Cut four filter paper discs to the same size.

4. Soak each paper disc in a different antibiotic solution.

5. Put the four paper discs into the Petri dish.

6. Repeat steps 3 to 5 using a Petri dish with chlamydia bacteria growing in it.

7. Keep both Petri dishes at 25 °C for 3 days.

0 2 . 3 Give **two** control variables used in this investigation.

[2 marks]

1 _____

_____

2 _____

_____

Question 2 continues on the next page

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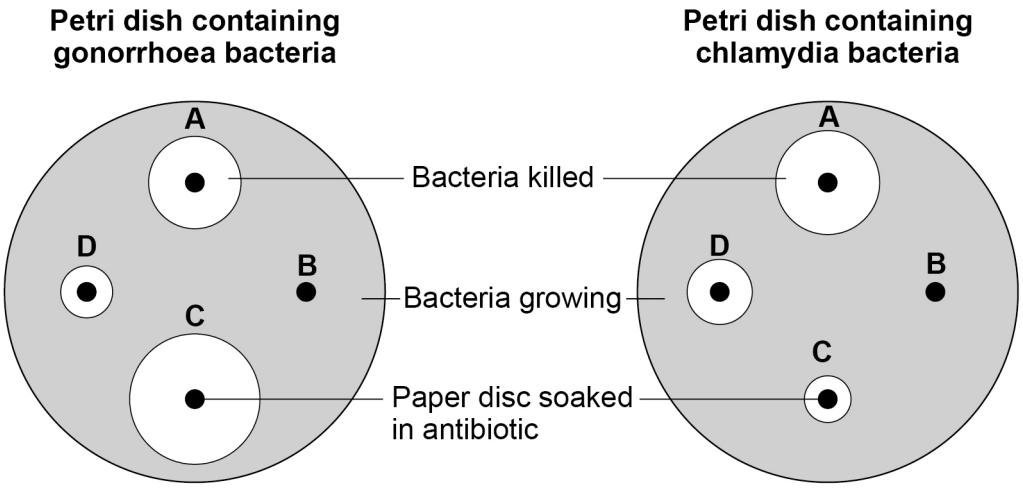
Figure 2 shows the results.

A clear area around a paper disc is where the antibiotic has killed the bacteria.

Figure 2



0 2 . 4 Which antibiotic did **not** kill either type of bacterium?

[1 mark]

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

0 2 . 5 Which antibiotic would be the most effective to treat a person with a **gonorrhoea** infection?

[1 mark]

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

Do not write outside the box

0 2 . 6 Which antibiotic would be the most effective to treat a person who had both gonorrhoea **and** chlamydia infections?

[1 mark]

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

0 2 . 7 Antibiotics **cannot** be used to treat HIV infections.

Suggest **one** reason why.

[1 mark]

Fungi can cause an infection of the fingernails and toenails.

Fungal nail infections can spread from one person to another person.

0 2 . 8 Some people go to nail salons to have their nails shaped and painted.

Suggest **one** way workers in nail salons can reduce the risk of infections being spread.

[1 mark]

0 2 . 9 Suggest **one** reason why fungal infection of toenails is more common than fungal infection of fingernails.

[1 mark]

10

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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.

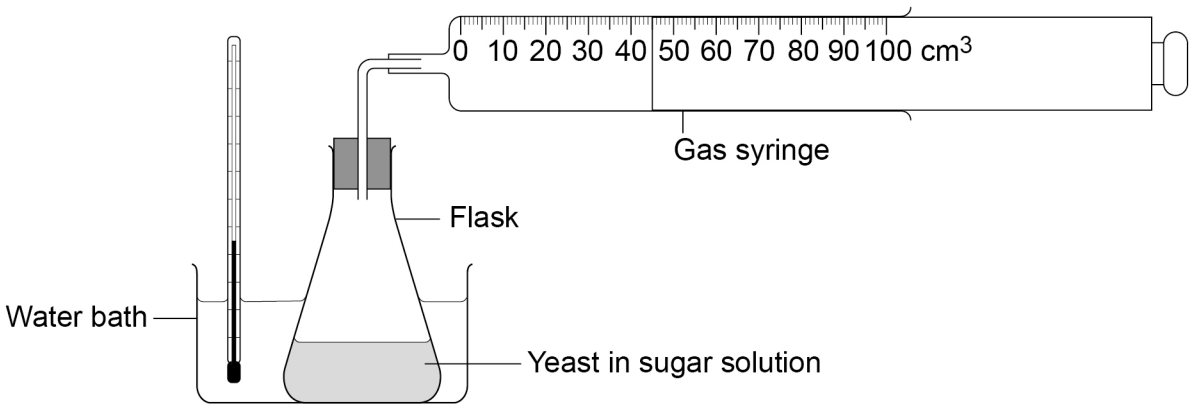
[2 marks]

Do not write outside the box

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 ☐

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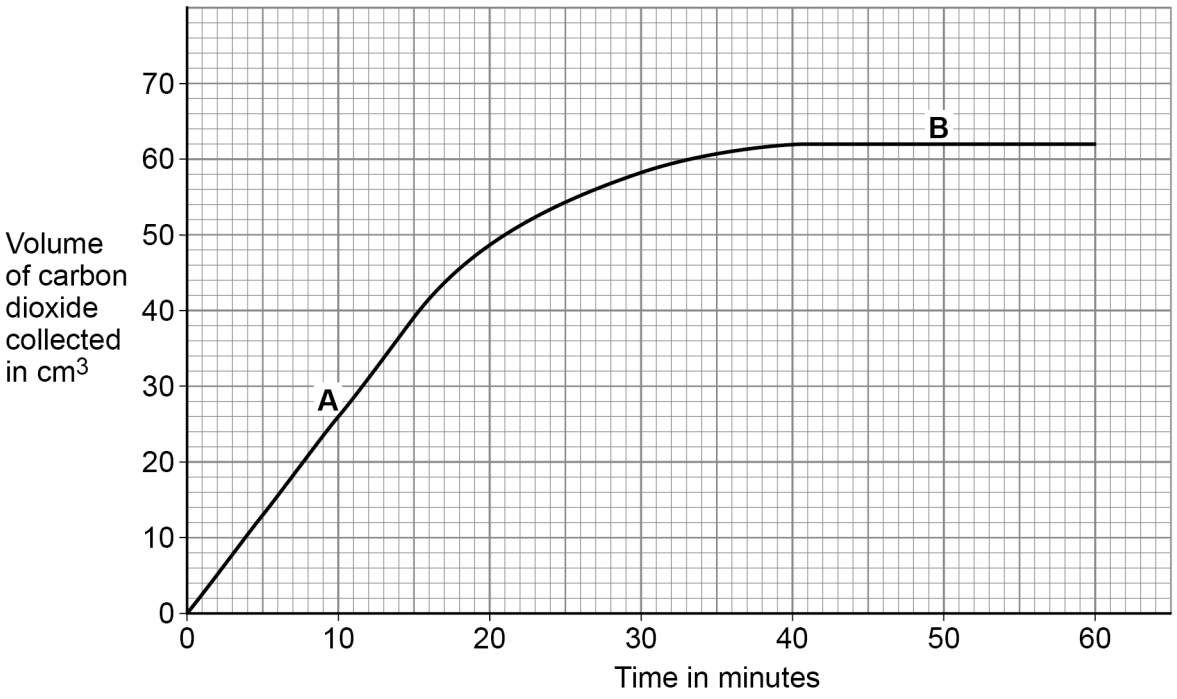
Figure 4 shows the results.

Figure 4



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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**

Question 3 continues on the next page

Do not write outside the box

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**

→

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Turn over for the next question

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ANSWER IN THE SPACES PROVIDED

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0 4 This question is about plant transport systems.

0 4 . 1 Which **organ** in a plant absorbs water from the soil?

[1 mark]

0 4 . 2 The concentration of nitrate ions in the soil is lower than the concentration of nitrate ions inside a plant.

How would the nitrate ions move from the soil into the cells of this plant?

[1 mark]

Tick (✓) **one** box.

By active transport ☐

By diffusion ☐

By osmosis ☐

Do not write outside the box

Dissolved sugars are transported in the phloem.

0 4 . 3 What is the name of the process that moves dissolved sugars through the phloem?

[1 mark]

Tick (✓) **one** box.

Evaporation ☐

Osmosis ☐

Translocation ☐

0 4 . 4 Give **one** use of sugars in a plant.

[1 mark]

_____

_____

Question 4 continues on the next page

Turn over ►

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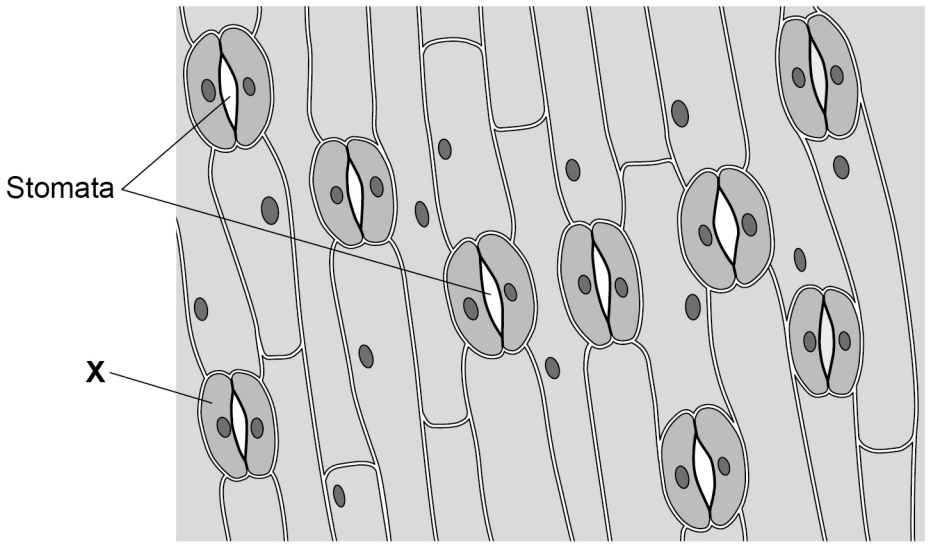
Stomata are openings on the surface of a leaf.

Stomata allow gases to move into and out of a leaf.

Figure 5 shows the surface of a leaf.

Figure 5



0 4 . 5 What is cell **X**?

[1 mark]

Tick (✓) **one** box.

Guard cell ☐

Meristem cell ☐

Palisade cell ☐

Do not write outside the box

0 4 . 6 Why do the stomata open during the day?

[1 mark]

Tick (✓) **one** box.

To allow carbon dioxide in ☐

To allow nitrogen in ☐

To allow oxygen in ☐

0 4 . 7 The area of the leaf shown in **Figure 5** is 0.25 mm^2.

Calculate the number of stomata per mm^2 for the leaf in **Figure 5**.

Use the equation:

$$\text{number of stomata per mm}^2 = \frac{\text{number of stomata}}{\text{area in mm}^2}$$

[2 marks]

Number of stomata per mm^2 = _____

Question 4 continues on the next page

Do not write outside the box

A student investigated the number of stomata per mm^2 on the upper and lower surfaces of leaves.

The leaves were taken from the same plant.

Table 1 shows the results.

Table 1

Leaf	Number of stomata per mm^2	
	Upper surface	**Lower surface**
1	0	37
2	1	36
3	2	30
4	1	32
5	1	35
Mean	1	**X**

0 4 . 8 Calculate mean value **X** in **Table 1**.

[2 marks]

X = _____

Do not write outside the box

0 4 . 9 Water vapour is lost through stomata.

Explain the difference in the number of stomata on the upper and lower surfaces of the leaves.

Use **Table 1**.

[3 marks]

13

Turn over for the next question

Do not write outside the box

0 5 Plants absorb light for photosynthesis.

0 5 . 1 Which is the equation for photosynthesis?

[1 mark]

Tick (✓) **one** box.

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

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

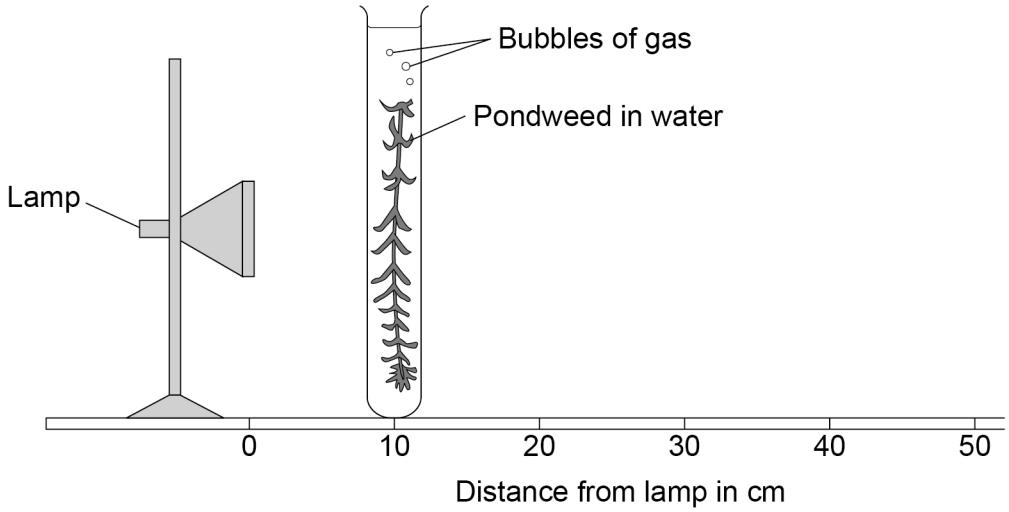
$6\,H_2O + 6\,O_2 \rightarrow C_6H_{12}O_6 + 6\,CO_2$ ☐

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

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

Figure 6 shows the apparatus.

Figure 6



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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 ☐

Question 5 continues on the next page

Do not write outside the box

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

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Question 5 continues on the next page

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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]

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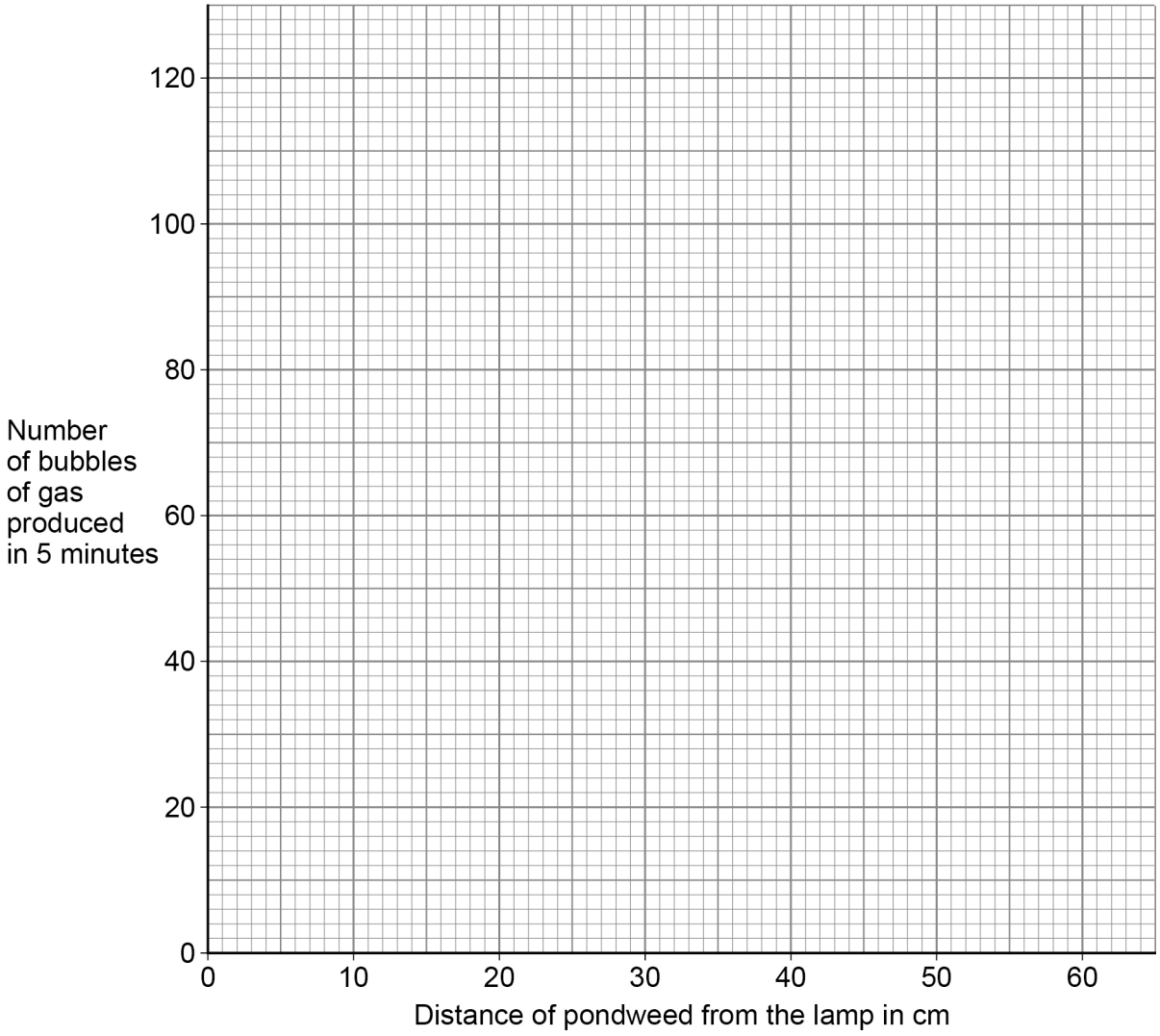
0 5 . 8 Plot the data from **Table 2** on **Figure 7**.

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 = _____

13

Turn over ►

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0 6 Describe how to test a sample of food for protein, starch and sugar.

Give the colours that would be seen if the food sample contained protein, starch and sugar.

[6 marks]

6

END OF QUESTIONS

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