

Please write clearly in block capitals.

Centre number

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Candidate number

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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.

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.

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



J U N 2 1 8 4 6 4 B 1 F 0 1

0 1

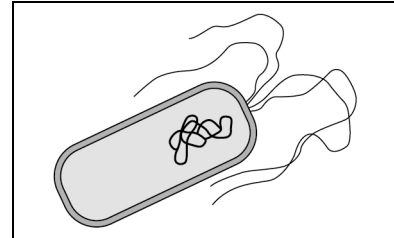
Cells are the building blocks of life.

0 1

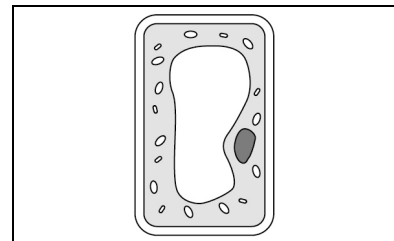
1

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**

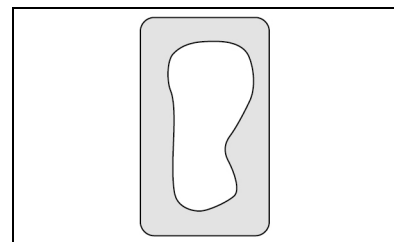
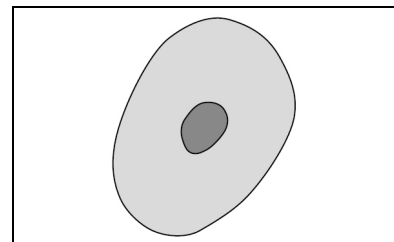
Animal



Bacterium



Plant



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

Cell wall

Controls what enters and leaves a cell

Chloroplast

Where photosynthesis happens

Nucleus

Question 1 continues on the next page**Turn over ►**

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 _____.

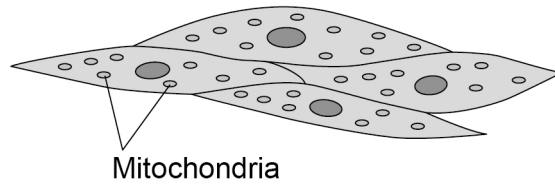
A chemical stored in plant cells is _____.

A chemical that strengthens plant cell walls is _____.



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

Turn over ►



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



Turn over for the next question

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Turn over ►



0 7

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]



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

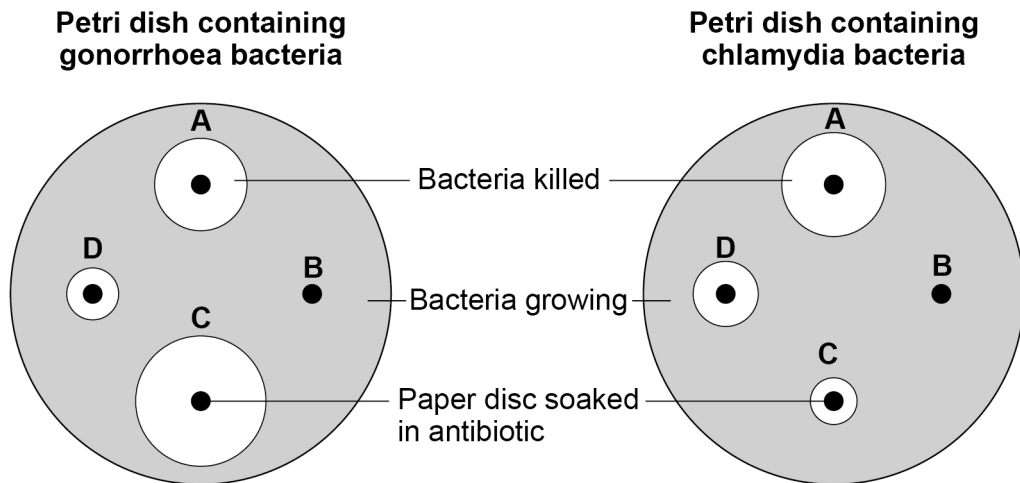
Turn over ►



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 ☐



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]

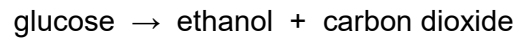
Turn over ►



0 3

Anaerobic respiration in yeast is called fermentation.

The equation for fermentation is:

**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.

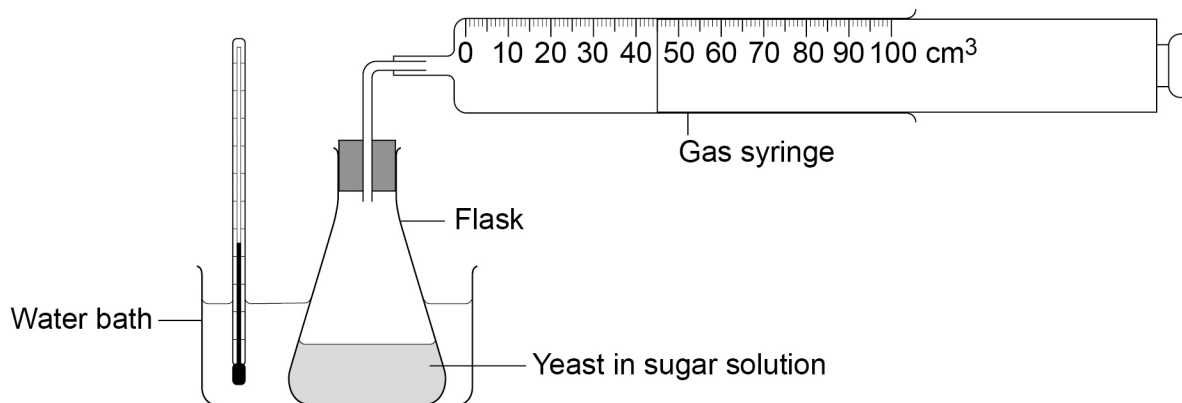
[2 marks]



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 = _____ cm³

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

☐

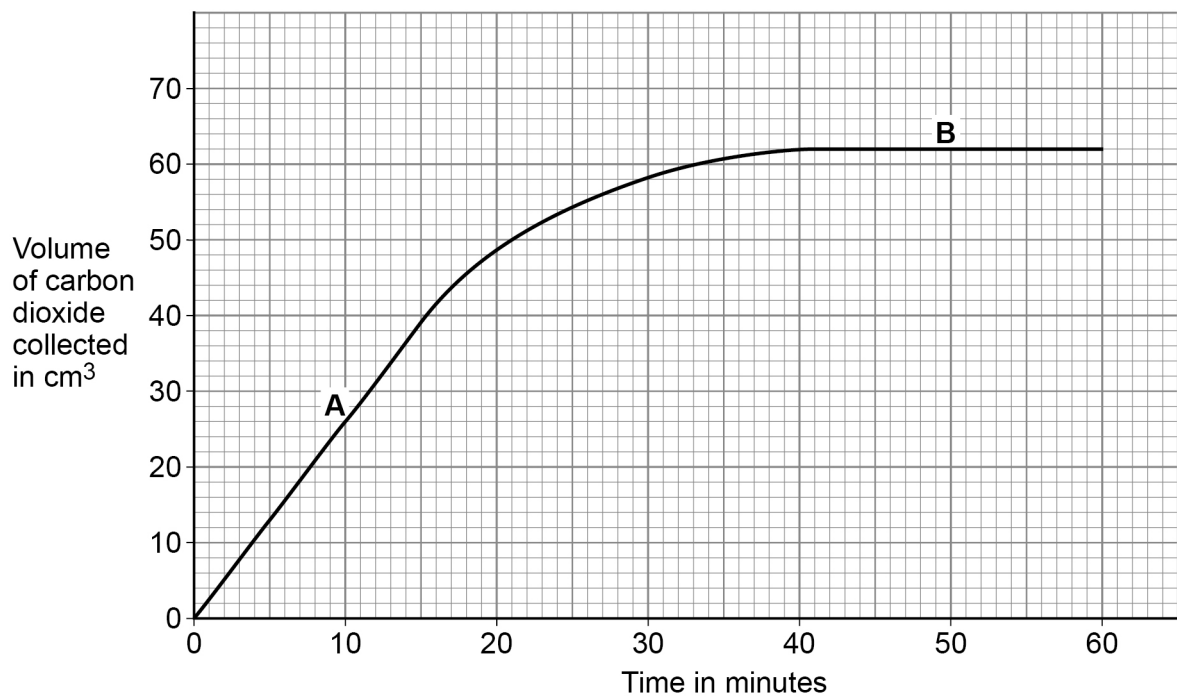
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Figure 4 shows the results.

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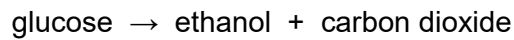
Figure 4



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****A**Carbon dioxide is
not being produced**B**Carbon dioxide production is
fastestCarbon dioxide production is
slowing down**Question 3 continues on the next page****Turn over ►**

The equation for fermentation is repeated here.



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

_____ → _____

13



Turn over for the next question

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Turn over ►



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

☐

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 ►

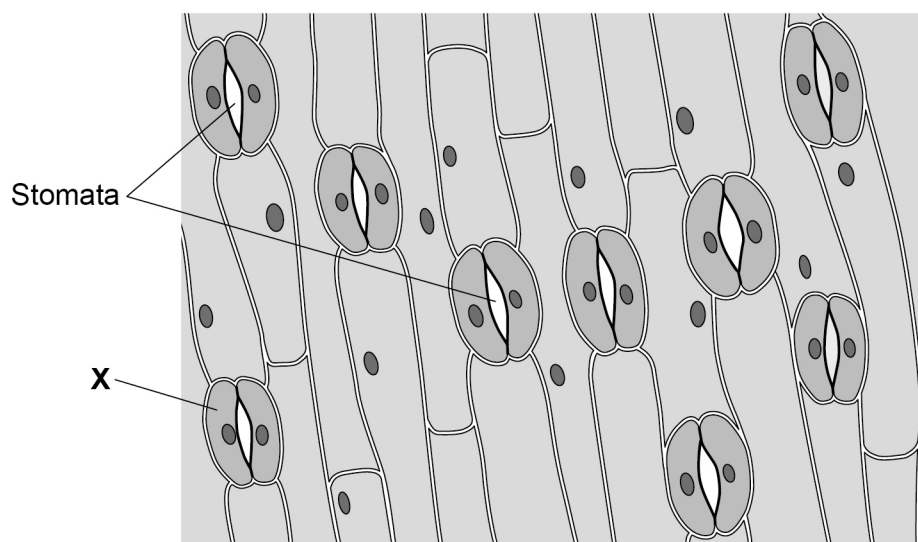


Stomata are openings on the surface of a leaf.

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

☐


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 mm².

Calculate the number of stomata per mm² 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 mm² = _____

Question 4 continues on the next page

Turn over ►



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 = _____



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]

Turn over for the next question

13

Turn over ►



0 5

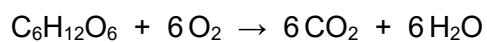
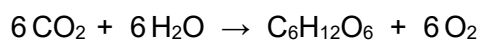
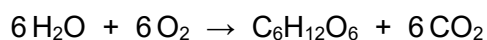
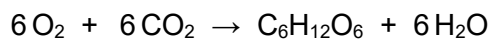
Plants absorb light for photosynthesis.

0 5

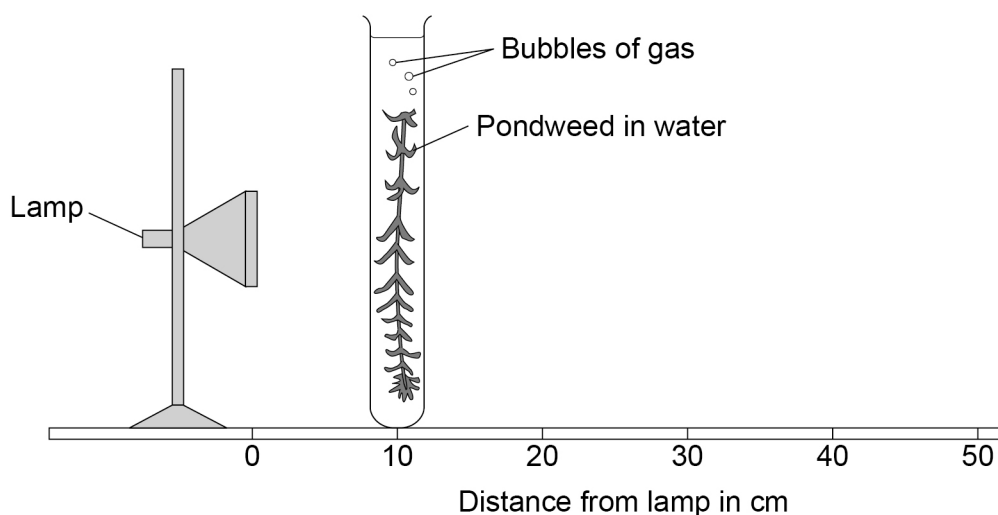
1

Which is the equation for photosynthesis?

[1 mark]

Tick (✓) **one** box.☐☐☐☐

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

☐

Question 5 continues on the next page

Turn over ►



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



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]

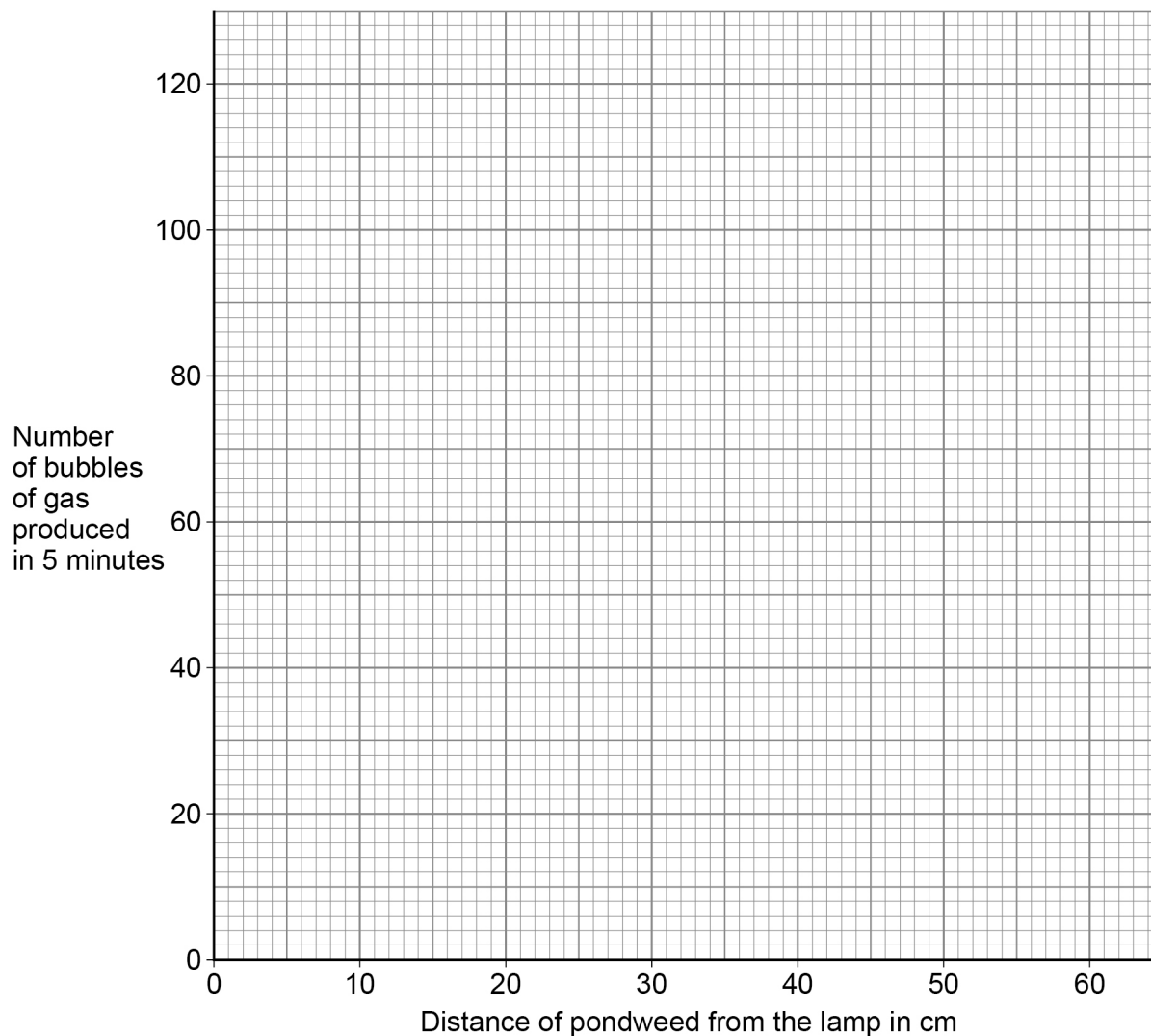


0 5 . 8 Plot the data from **Table 2** on **Figure 7**.

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 ►



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

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

END OF QUESTIONS

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6



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