AQA – Photosynthesis – GCSE Biology

1. May/2020/Paper_1F/No.7

This question is about photosynthesis.

0 7 . 1 Complete the word equation for photosynthesis.

[2 marks]

_____ + _____ → _____ + oxygen

0 7 . 2 Describe how energy for the photosynthesis reaction is gained by plants.

[2 marks]

Students investigated the effect of temperature on the rate of photosynthesis.

The students shone light from a lamp onto pondweed and measured the volume of oxygen produced per hour.

Table 3 shows the results.

Table 3

Temperature in °C	Rate of photosynthesis in cm^3/hour			
	Test 1	Test 2	Test 3	Mean
20	18.5	19.3	19.5	**X**
25	32.6	34.1	32.9	33.2
30	41.9	45.2	44.9	44.0
35	38.6	39.8	44.0	40.8
40	23.1	20.5	22.4	22.0
45	1.9	14.2	2.2	2.1

0 7 . 3 Calculate mean value **X**.

[2 marks]

X = _____ cm^3/hour

The students identified one anomalous result in **Table 3**.

0 7 . 4 Draw a ring around the anomalous result in **Table 3**.

[1 mark]

0 7 . 5 Suggest **one** possible cause of the anomalous result.

[1 mark]

0 7 . 6 How did the students deal with the anomalous result?

[1 mark]

0 7 . 7 Give **one** factor the students should have kept constant in this investigation.

[1 mark]

Table 3 is repeated below.

Table 3

Temperature in °C	Rate of photosynthesis in cm^3/hour			
	Test 1	**Test 2**	**Test 3**	**Mean**
20	18.5	19.3	19.5	**X**
25	32.6	34.1	32.9	33.2
30	41.9	45.2	44.9	44.0
35	38.6	39.8	44.0	40.8
40	23.1	20.5	22.4	22.0
45	1.9	14.2	2.2	2.1

0 7 . 8 Why did the rate of photosynthesis decrease from 35 °C to 45 °C?

[1 mark]

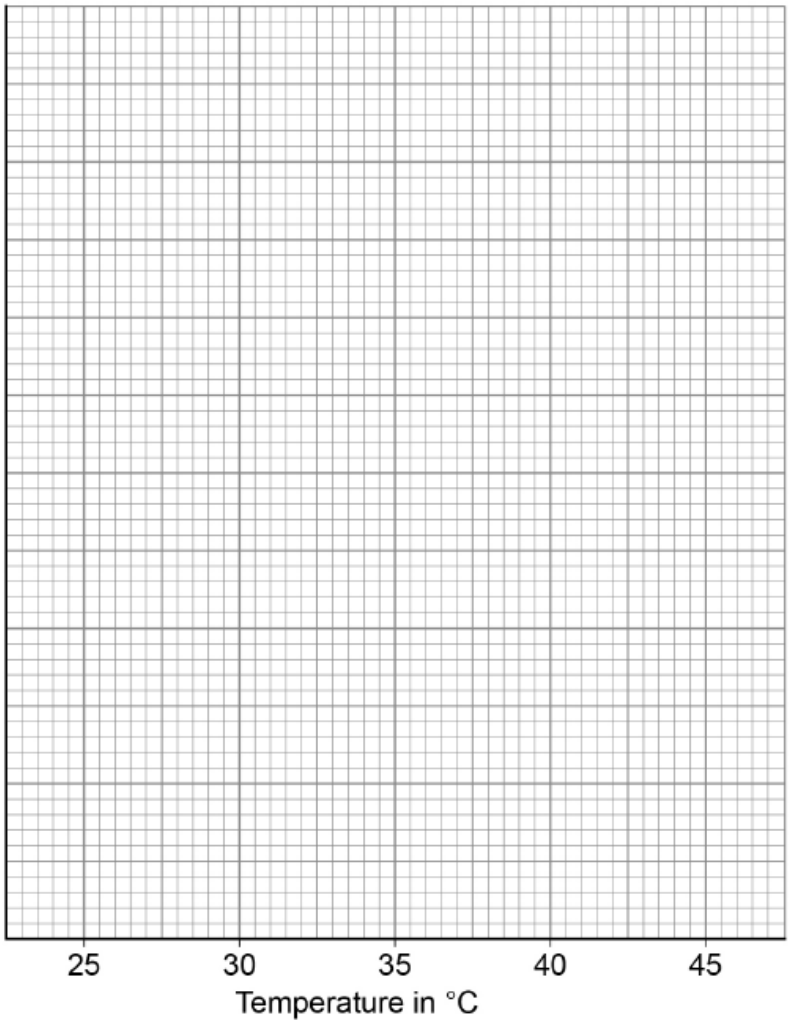
0 7 . 9 Complete **Figure 10** using data from **Table 3**.

You should:

- label the y-axis
- use a suitable scale for the y-axis
- plot the mean data from **Table 3** for temperatures from 25 °C to 45 °C
- draw a line of best fit.

[5 marks]

Figure 10



2. May/2020/Paper_1H/No.1

0 1 This question is about photosynthesis.

0 1 . 1 Complete the word equation for photosynthesis.

[2 marks]

_____ + _____ → _____ + oxygen

0 1 . 2 Describe how energy for the photosynthesis reaction is gained by plants.

[2 marks]

Students investigated the effect of temperature on the rate of photosynthesis.

The students shone light from a lamp onto pondweed and measured the volume of oxygen produced per hour.

Table 1 shows the results.

Table 1

Temperature in °C	Rate of photosynthesis in cm^3/hour			
	Test 1	Test 2	Test 3	Mean
20	18.5	19.3	19.5	**X**
25	32.6	34.1	32.9	33.2
30	41.9	45.2	44.9	44.0
35	38.6	39.8	44.0	40.8
40	23.1	20.5	22.4	22.0
45	1.9	14.2	2.2	2.1

0 1 . 3 Calculate mean value **X**.

[2 marks]

X = _____ cm^3/hour

The students identified one anomalous result in **Table 1**.

0 1 . 4 Draw a ring around the anomalous result in **Table 1**.

[1 mark]

0 1 . 5 Suggest **one** possible cause of the anomalous result.

[1 mark]

0 1 . 6 How did the students deal with the anomalous result?

[1 mark]

0 1 . 7 Give **one** factor the students should have kept constant in this investigation.

[1 mark]

Table 1 is repeated below.

Table 1

Temperature in °C	Rate of photosynthesis in cm^3/hour			
	Test 1	**Test 2**	**Test 3**	**Mean**
20	18.5	19.3	19.5	**X**
25	32.6	34.1	32.9	33.2
30	41.9	45.2	44.9	44.0
35	38.6	39.8	44.0	40.8
40	23.1	20.5	22.4	22.0
45	1.9	14.2	2.2	2.1

0 1 . 8 Why did the rate of photosynthesis decrease from 35 °C to 45 °C?

[1 mark]

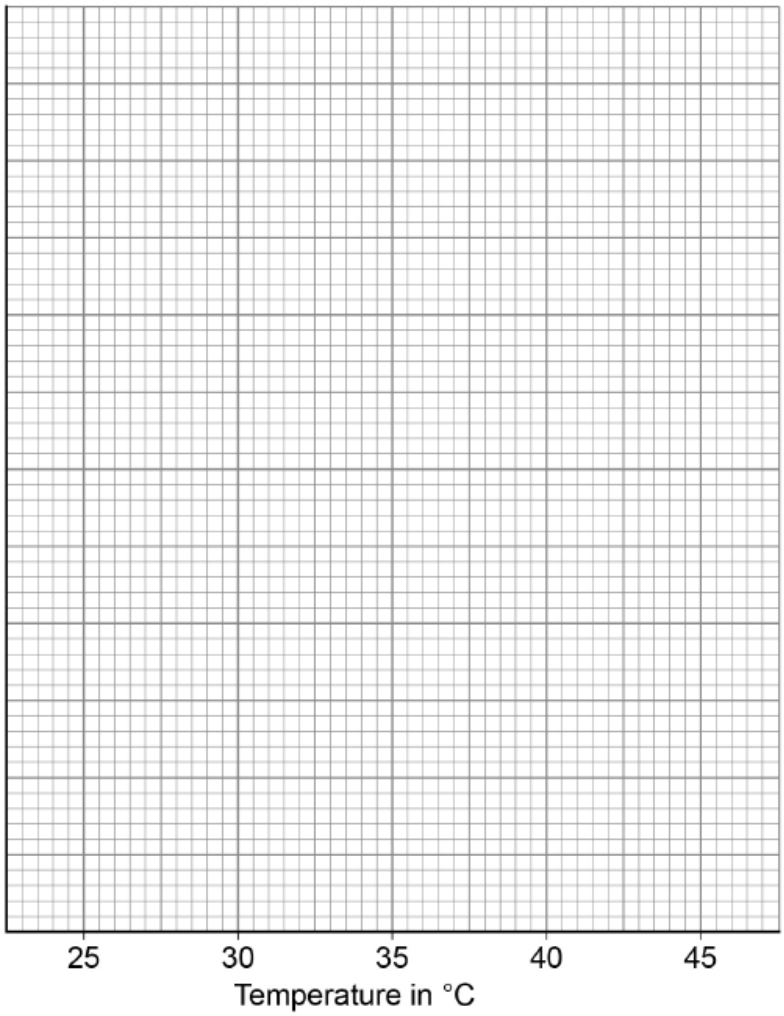
0 1 . 9 Complete **Figure 1** using data from **Table 1**.

You should:

- label the y-axis
- use a suitable scale for the y-axis
- plot the mean data from **Table 1** for temperatures from 25 °C to 45 °C
- draw a line of best fit.

[5 marks]

Figure 1



3. May/2019/Paper_1F/No.9

This question is about photosynthesis.

0 9 . 1 Complete the word equation for photosynthesis:

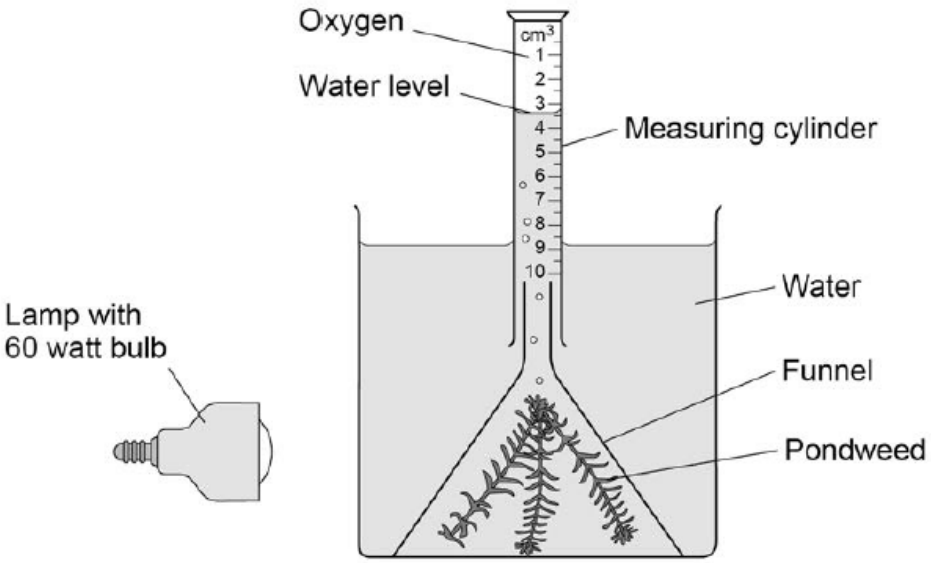
[2 marks]

_____ + _____ ⟶ _____ + oxygen

A student investigated photosynthesis using pondweed.

Figure 14 shows the apparatus the student used.

Figure 14



This is the method used.

1. Set up the apparatus as shown in **Figure 14**.
2. Switch on the lamp.
3. After 20 minutes, record the volume of oxygen collected in the measuring cylinder.
4. Repeat steps 1–3 using bulbs of different power output.

0 9 . 2 What was the independent variable in the investigation?

[1 mark]

Tick (✓) **one** box.

Power output of bulb ☐

Rate of photosynthesis ☐

Time to collect oxygen ☐

Volume of oxygen collected ☐

0 9 . 3 Suggest **two** ways the method could be improved so the results would be more valid.

[2 marks]

1 _____

_____

2 _____

_____

Table 9 shows the student's results.

Table 9

Power output of bulb in watts	Volume of oxygen collected in 20 minutes in cm^3	Rate of photosynthesis in cm^3/hour
60	0.5	1.5
100	0.8	2.4
150	1.1	**X**
200	1.2	3.6
250	1.2	3.6

0 9 . 4 Calculate value **X** in **Table 9**.

[1 mark]

X = _____ cm^3/hour

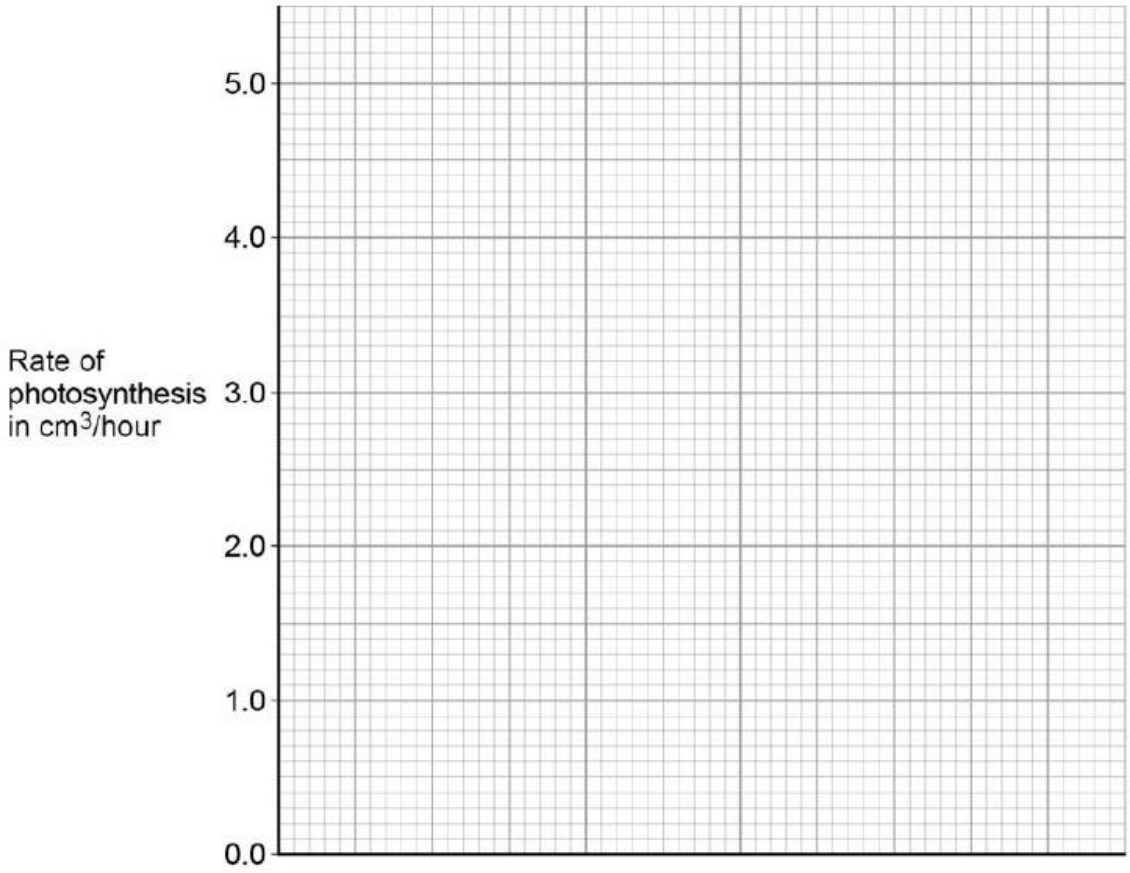
0 9 . 5 Complete **Figure 15**.

[4 marks]

You should:

- label the x-axis
- use a suitable scale
- plot the data from **Table 9** and your answer to Question **09.4**
- draw a line of best fit.

Figure 15



0 9 . 6 Determine the expected rate of photosynthesis with a bulb of power output 75 watts.

Use **Figure 15**.

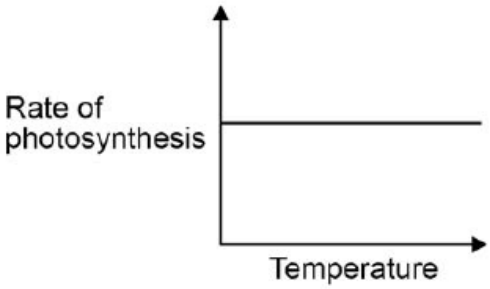
[1 mark]

Rate of photosynthesis at 75 watts = _____ cm^3/hour

0 9 . 7 Which graph shows the effect of temperature on the rate of photosynthesis?

[1 mark]

Tick (✓) **one** box.



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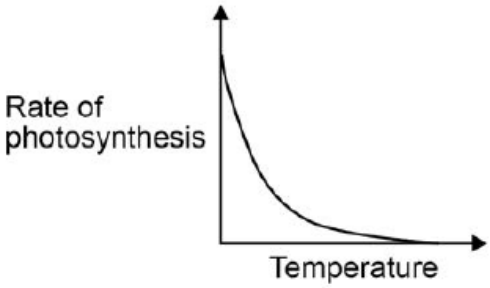

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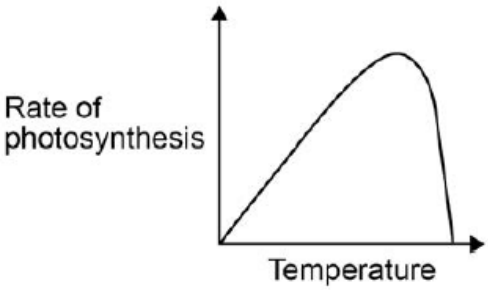

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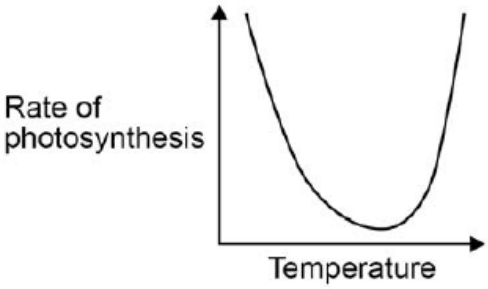

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4. May/2019/Paper_1H/No.3

This question is about photosynthesis.

0 3 . 1 Complete the word equation for photosynthesis:

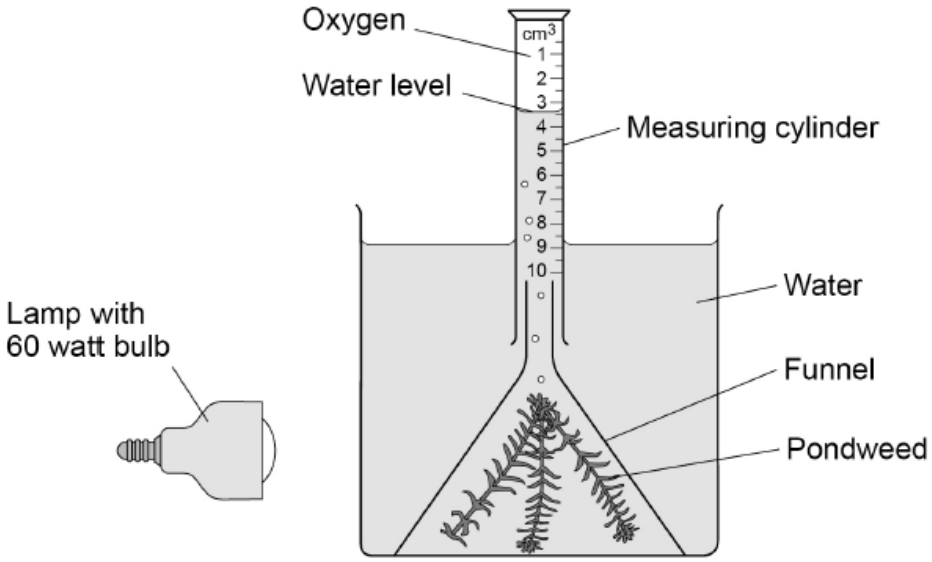
[2 marks]

_____ + _____ ⟶ _____ + oxygen

A student investigated photosynthesis using pondweed.

Figure 3 shows the apparatus the student used.

Figure 3



This is the method used.

1. Set up the apparatus as shown in **Figure 3**.
2. Switch on the lamp.
3. After 20 minutes, record the volume of oxygen collected in the measuring cylinder.
4. Repeat steps 1–3 using bulbs of different power output.

0 3 . 2 What was the independent variable in the investigation?

[1 mark]

Tick (✓) **one** box.

Power output of bulb ☐

Rate of photosynthesis ☐

Time to collect oxygen ☐

Volume of oxygen collected ☐

0 3 . 3 Suggest **two** ways the method could be improved so the results would be more valid.

[2 marks]

1 _____

_____

2 _____

_____

Table 3 shows the student's results.

Table 3

Power output of bulb in watts	Volume of oxygen collected in 20 minutes in cm^3	Rate of photosynthesis in cm^3/hour
60	0.5	1.5
100	0.8	2.4
150	1.1	**X**
200	1.2	3.6
250	1.2	3.6

0 3 . 4 Calculate value **X** in **Table 3**.

[1 mark]

_____

_____

X = _____ cm^3/hour

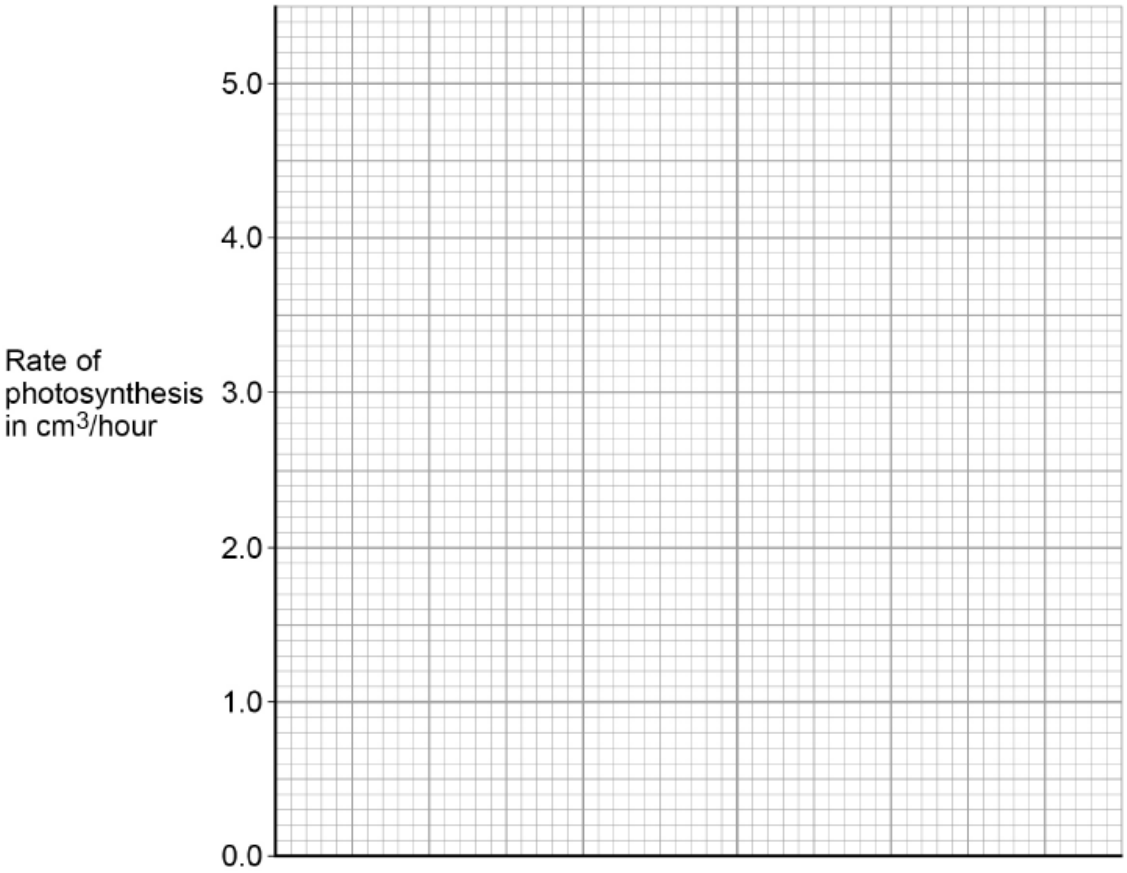
0 3 . 5 Complete **Figure 4**.

[4 marks]

You should:

- label the x-axis
- use a suitable scale
- plot the data from **Table 3** and your answer to Question **03.4**
- draw a line of best fit.

Figure 4



0 3 . 6 Determine the expected rate of photosynthesis with a bulb of power output 75 watts.

Use **Figure 4**.

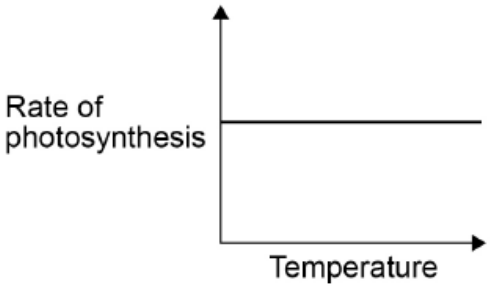
[1 mark]

Rate of photosynthesis at 75 watts = _____ cm^3/hour

0 3 . 7 Which graph shows the effect of temperature on the rate of photosynthesis?

[1 mark]

Tick (✓) **one** box.



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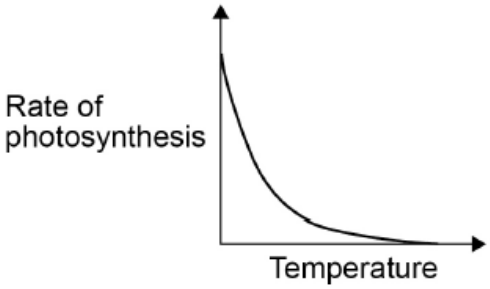

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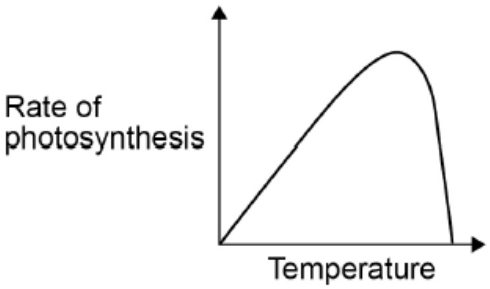

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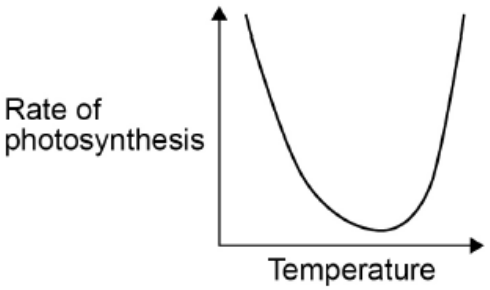

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5. May/2019/Paper_1H/No.4

Water moves from a plant to the atmosphere through the leaves.

0 4 . 1 How is the volume of water lost from the leaves controlled?

[1 mark]

0 4 . 2 Describe the transport of water through a plant from the roots to the atmosphere.

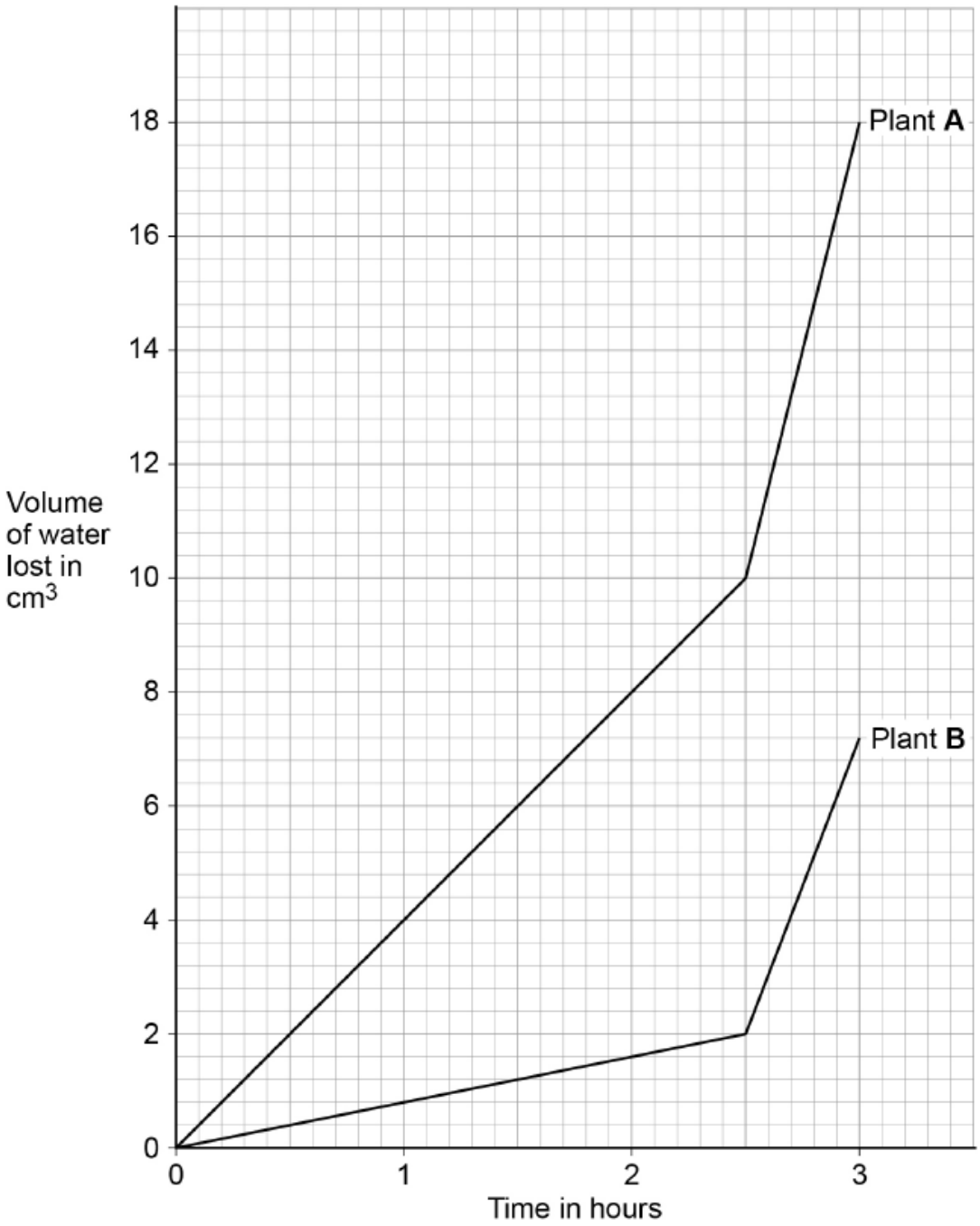
[3 marks]

A student investigated the volume of water lost from two plants of different species.

Both plants were kept together.

Figure 5 shows the student's results.

Figure 5



0 4 . 3 Suggest **one** reason for the difference in the rate of water loss from the two plants in the first 2.5 hours.

[1 mark]

Both plants were moved to a different place at 2.5 hours.

0 4 . 4 Calculate the rate of water loss per hour in plant **B** from 2.5 hours to 3 hours.

Give your answer to **2** significant figures.

[3 marks]

Rate of water loss = _____ cm^3/hour

0 4 . 5 Suggest **two** reasons why the rate of water loss in both plants changed after 2.5 hours.

[2 marks]

1 _____

2 _____