AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 4.2.3.1

Plant tissues

Past-paper questions

Tier	**Foundation**
Question groups	**2**
Available paper years	**2022–2025**

Using this booklet

1. Answer the questions in order and show your working.
2. Original question numbers and marks are retained.
3. Print at actual size (100%) for measuring questions.
4. Use the companion answer booklet to check your work.

Name: _____ **Date:** _____

Whole questions are retained for context, so some parts assess other specification points. Current and legacy sources are labelled. Continue on extra paper if needed.

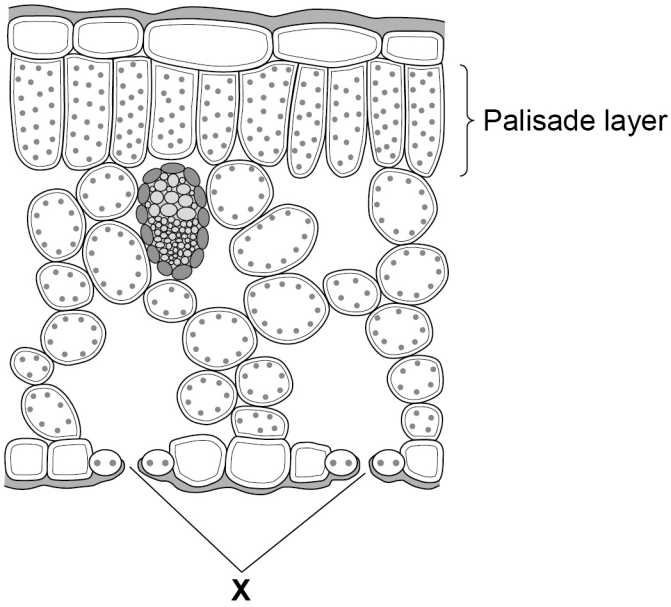
4.2.3.1 Plant tissues

Question 01

June 2022 | 8464/B/1F | Original Q2

0 2 **Figure 2** shows a section through a leaf.

Figure 2



0 2 . 1 Give **one** way that the palisade layer is adapted for photosynthesis.

[1 mark]

0 2 . 2 Gases pass into and out of the leaf through small pores in the surface of the leaf.

What are the small pores labelled **X** called?

[1 mark]

Tick (✓) **one** box.

Guard cells ☐

Stomata ☐

Xylem vessels ☐

Question 01 · continued

0 2 . 3 A student viewed a section of a leaf using a microscope.

The student measured the length of one of the palisade cells.

The cell image measured 28 mm in length when viewed at a magnification of ×400

Calculate the real length of the palisade cell in millimetres (mm).

Use the equation:

$$\text{real length} = \frac{\text{image length}}{\text{magnification}}$$

[3 marks]

Real length = _____ mm

Convert the real length of the cell from millimetres to micrometres (μm).

1 mm = 1000 μm

Real length = _____ μm

0 2 . 4 Carbon dioxide can move into and out of cells.

What is the process by which carbon dioxide can move into and out of cells?

[1 mark]

Tick (✓) **one** box.

- Active transport ☐
- Diffusion ☐
- Osmosis ☐

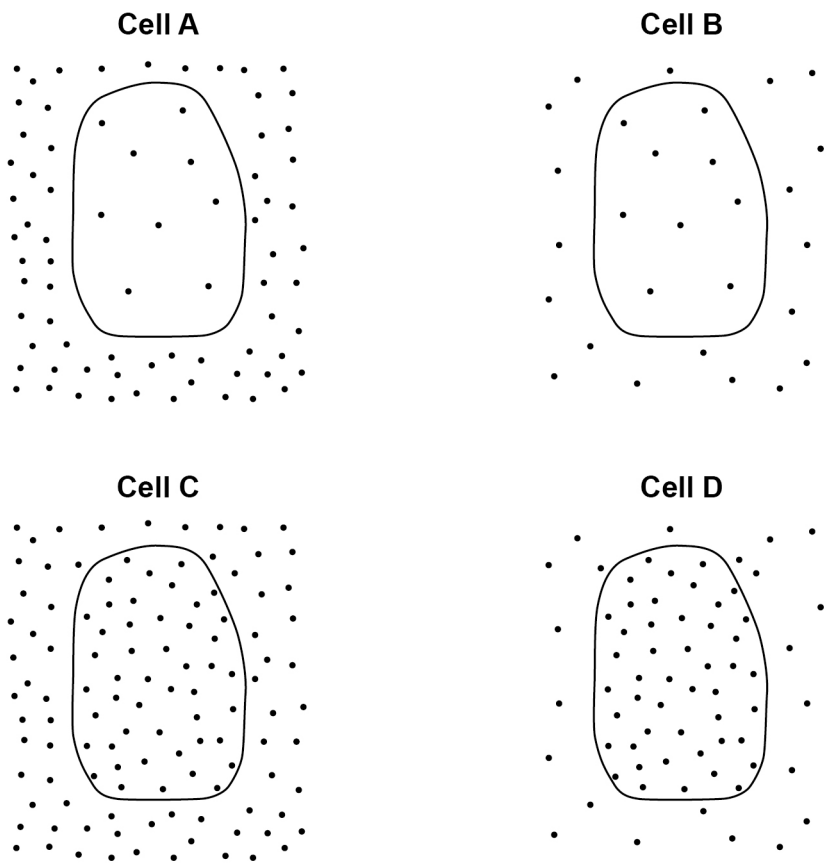
4.2.3.1 Plant tissues

Question 01 · continued

Figure 3 shows a diagram of four cells.

Each cell is surrounded by carbon dioxide molecules.

Figure 3



0 2 . 5 Which cell will carbon dioxide move into at the fastest rate?

Give a reason for your answer.

[2 marks]

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

Reason _____

_____

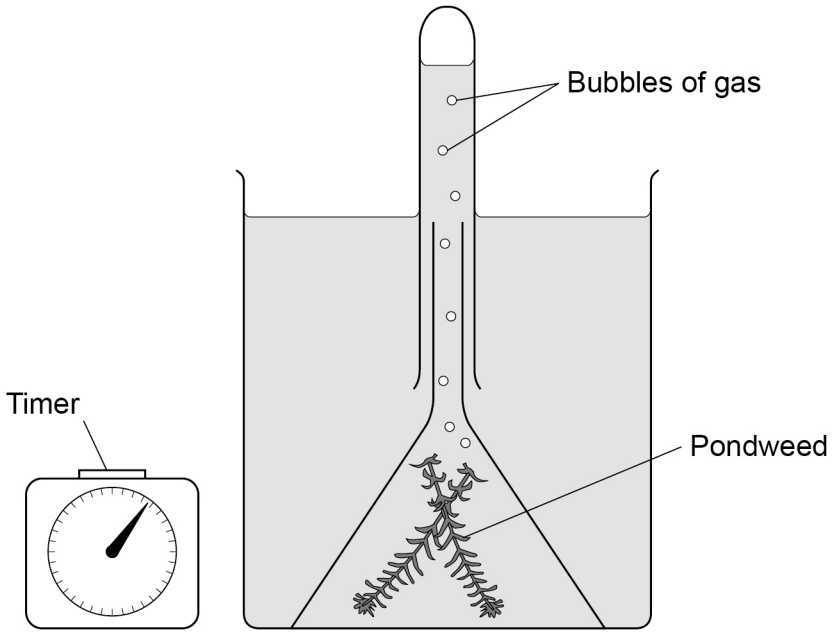
4.2.3.1 Plant tissues

Question 01 · continued

A student investigated the effect of different colours of light on the rate of photosynthesis.

Figure 4 shows some of the apparatus the student used.

Figure 4



The student placed the apparatus in blue light, then in green light and then in red light.

The student measured the rate of photosynthesis in each colour of light.

0 2 . 6 What **two** measurements should the student make to calculate the **rate** of photosynthesis?

[2 marks]

1 _____

2 _____

Question 2 continues on the next page

4.2.3.1 Plant tissues

Question 01 · continued

0 2 . 7 Give **two** variables the student should keep the same in this investigation.

[2 marks]

1 _____

_____

2 _____

_____

Table 2 shows the results.

Table 2

Colour of light	Rate of photosynthesis in arbitrary units
Blue	9
Green	1
Red	8

4.2.3.1 Plant tissues

Question 01 · continued

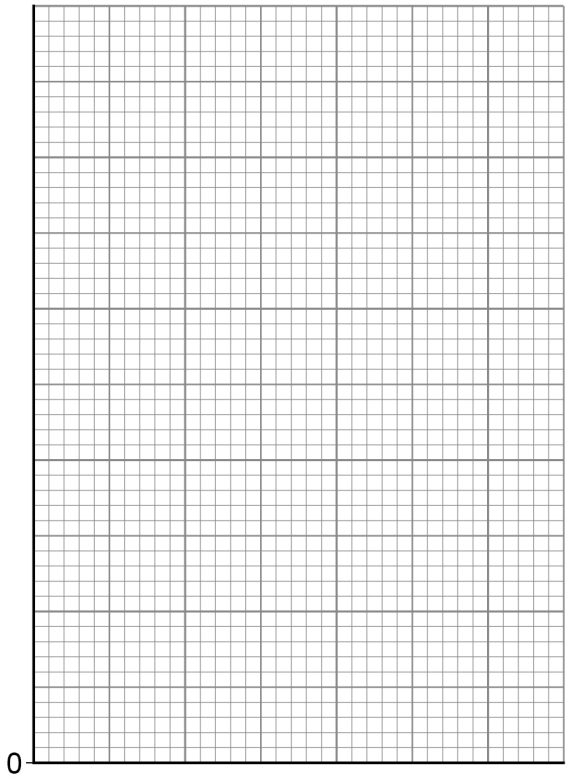
0 2 . 8 Complete **Figure 5**.

You should:

- label the y-axis
- use a suitable scale
- plot the data from **Table 2** as a bar chart
- label each bar.

[4 marks]

Figure 5



0 2 . 9 Look at **Table 2**.

What colour of light should be used to grow plants in a greenhouse?

[1 mark]

Tick (✓) **one** box.

Blue ☐ Green ☐ Red ☐

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4.2.3.1 Plant tissues

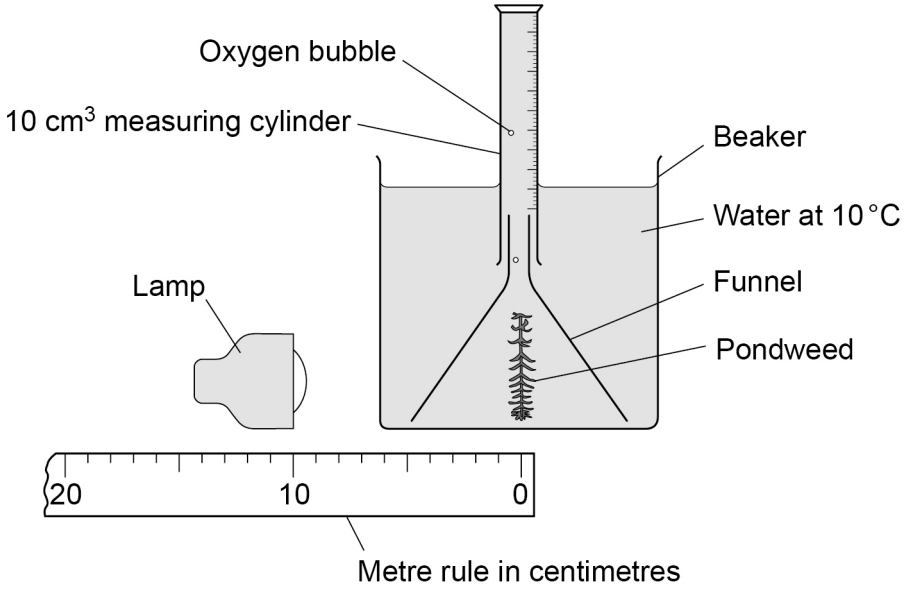
Question 02

0 2 Photosynthesis is important for plant growth.

A student used pondweed to investigate photosynthesis.

Figure 3 shows the apparatus 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 1 hour, record the volume of oxygen collected in the measuring cylinder.
4. Repeat steps 1 to 3 a further four times, placing the lamp at different distances from the pondweed.

0 2 . 1 What are **two** control variables the student should use in the investigation?

[2 marks]

Tick (✓) **two** boxes.

- The distance of the lamp from the pondweed. ☐
- The length of the pondweed. ☐
- The size of the beaker. ☐
- The temperature of the water. ☐
- The volume of oxygen collected. ☐

Table 2 shows the results.

Table 2

Distance of the lamp from the pondweed in cm	Volume of oxygen in cm^3
10	
20	1.0
30	0.4
40	0.2
50	0.0

0 2 . 2 Describe the trend shown in **Table 2**.

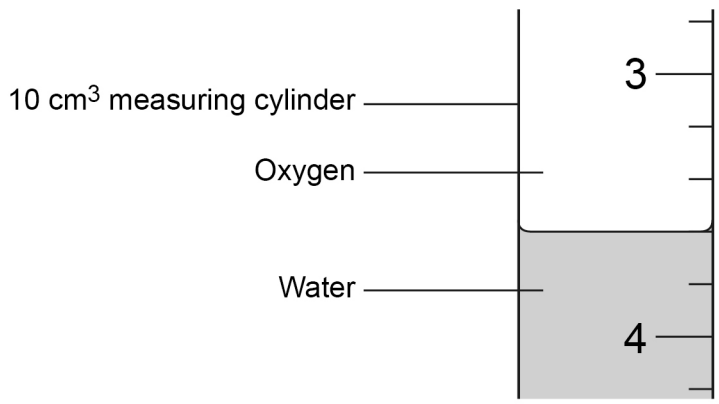
[1 mark]

4.2.3.1 Plant tissues

Question 02 · continued

0 2 . 3 **Figure 4** shows the volume of oxygen when the lamp was 10 cm from the pondweed.

Figure 4



What volume of oxygen is shown in **Figure 4**?

[1 mark]

Volume = _____ cm^3

0 2 . 4 The student repeated the investigation using a measuring cylinder with smaller intervals of 0.1 cm^3.

What did using smaller intervals improve?

[1 mark]

Tick (✓) **one** box.

Accuracy ☐

Repeatability ☐

Reproducibility ☐

0 2 . 5 The student did the investigation at 10 °C.

The student repeated the investigation at 20 °C.

Complete the sentence.

Choose the answer from the box.

[2 marks]

smaller	**the same**	**greater**

Compared to the results at 10 °C, the volumes of oxygen collected

in one hour at 20 °C would be _____.

Give a reason for your answer.

_____

_____

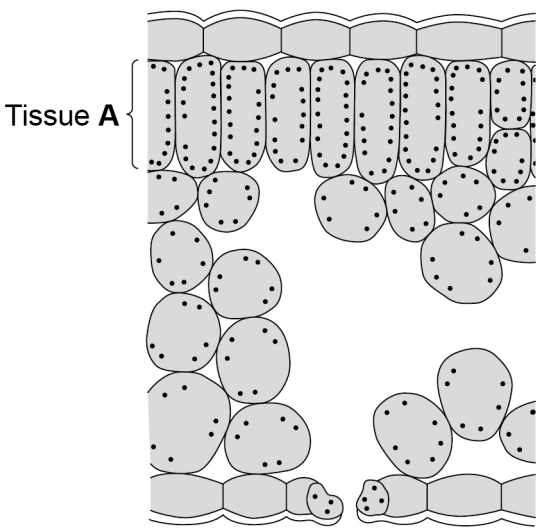
4.2.3.1 Plant tissues

Question 02 · continued

Photosynthesis is important for apple trees.

Figure 5 shows a section through the leaf of an apple tree.

Figure 5



0 2 . 6 What is tissue **A**?

[1 mark]

Tick (✓) **one** box.

Epidermis ☐

Palisade mesophyll ☐

Spongy mesophyll ☐

0 2 . 7 The cells in tissue **A** contain chloroplasts.

What is the name of the green chemical in chloroplasts?

[1 mark]

_____

4.2.3.1 Plant tissues

Question 02 · continued

Apple scab is a disease of apple trees.

Apple scab is caused by a fungus.

Figure 6 shows a leaf from an apple tree infected with apple scab fungus.

Figure 6



0 2 . 8 How could the fungal infection be removed from the tree?

[1 mark]

Tick (✓) **one** box.

Destroy the affected leaves. ☐

Spray the affected leaves with antibiotics. ☐

Use an antitoxin on the affected leaves. ☐

Question 2 continues on the next page

4.2.3.1 Plant tissues

Question 02 · continued

0 2 . 9 Infection with apple scab fungus decreases the number of chloroplasts in the leaves.

Explain why apple trees with apple scab fungus produce smaller apples than apple trees that are **not** infected.

[3 marks]

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