AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 4.2.3.2

Plant organ system

Past-paper questions

Tier	**Higher**
Question groups	**3**
Available paper years	**2019–2023**

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.

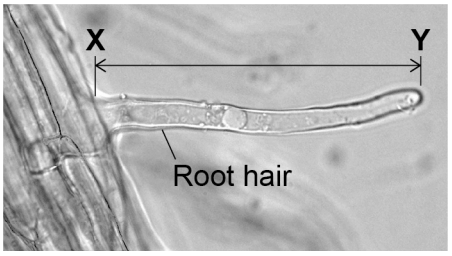
4.2.3.2 Plant organ system

Question 01

June 2019 | 8464/B/1H | Original Q5

0 5 **Figure 8** shows a root hair viewed using a microscope.

Figure 8



0 5 . 1 The root hair was viewed at a magnification of ×50

The image length of the root hair **X**–**Y** is 43 mm

Calculate the real length of the root hair in micrometres (μm).

[4 marks]

Real length = _____ μm

4.2.3.2 Plant organ system

Question 01 · continued

0 5 . 2 A microscope has a ×5 eyepiece lens.

Describe how to use this microscope to observe a prepared slide of root hair cells at a magnification of ×50

[4 marks]

Question 5 continues on the next page

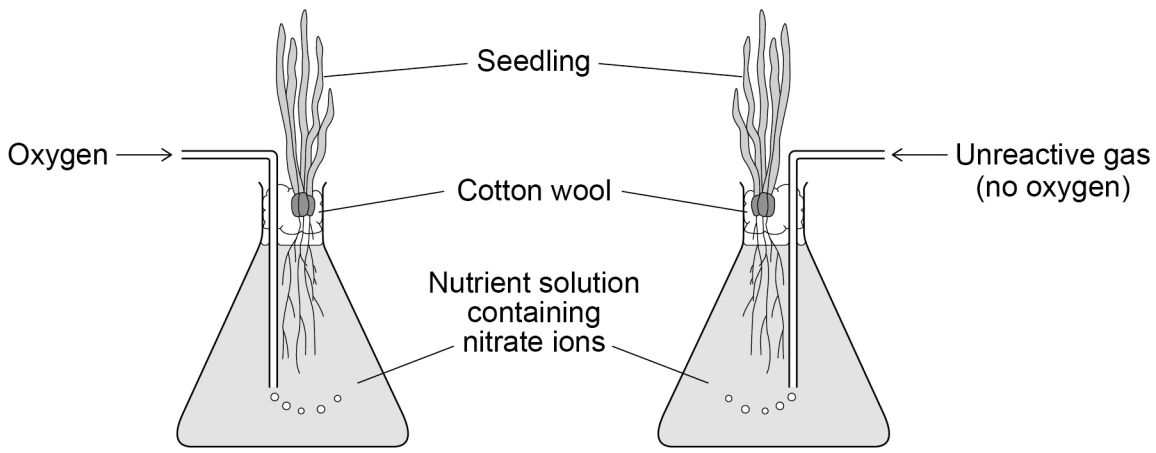
Question 01 · continued

Root hair cells absorb water and mineral ions from the soil.

A scientist investigated the rate of nitrate ion uptake by two seedlings.

Figure 9 shows how the investigation was set up.

Figure 9



The scientist determined the mass of nitrate ions absorbed by each seedling every 30 minutes for 4 hours.

Table 5 shows the results.

Table 5

Time in hours	Total mass of nitrate ions absorbed by seedling in arbitrary units	
	With oxygen added	With no oxygen added
0	0	0
0.5	100	60
1.0	145	95
1.5	170	105
2.0	195	115
2.5	215	120
3.0	235	125
3.5	250	130
4.0	265	130

4.2.3.2 Plant organ system

Question 01 · continued

0 5 . 3 Describe the changes in the rate of absorption of nitrate ions for the seedling with **no** oxygen added.

Use information from **Table 5**.

[3 marks]

0 5 . 4 Explain what the results in **Table 5** show about how nitrate ions are absorbed.

[4 marks]

Question 5 continues on the next page

4.2.3.2 Plant organ system

Question 01 · continued

0 5 . 5 Nitrate ions are essential for plants to grow.

Describe how nitrate ions are used in a plant to help the plant grow.

[3 marks]

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4.2.3.2 Plant organ system

Question 02

November 2021 | 8464/B/1H | Original Q6

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]

Question 6 continues on the next page

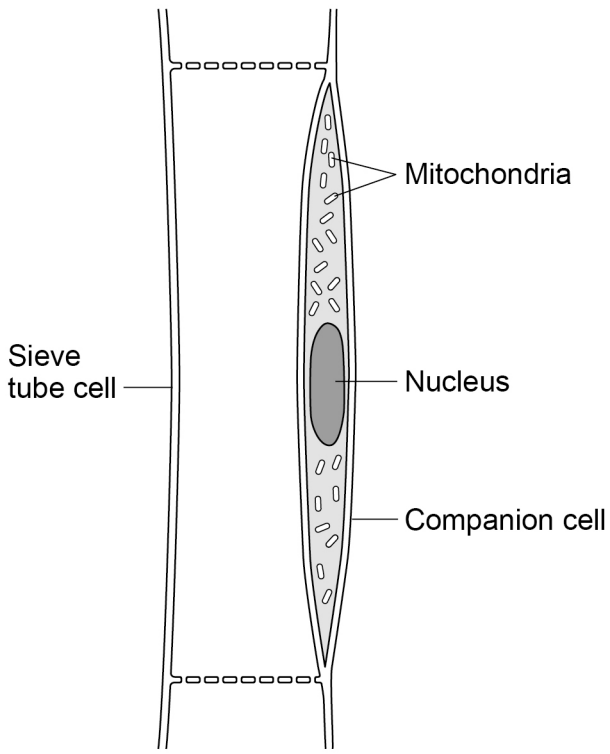
4.2.3.2 Plant organ system

Question 02 · continued

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]

4.2.3.2 Plant organ system

Question 02 · continued

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]

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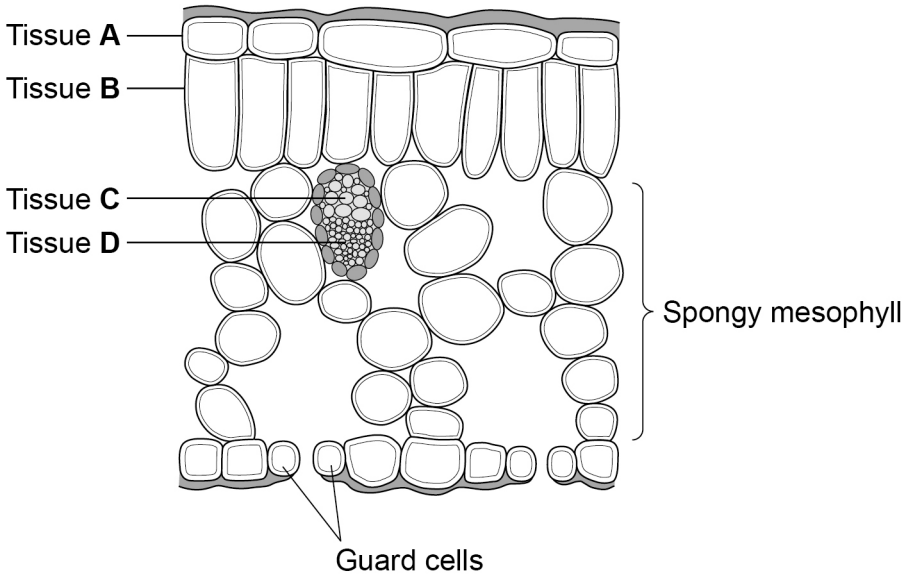
4.2.3.2 Plant organ system

Question 03

0 4 A leaf is a plant organ.

Figure 4 shows tissues in a leaf.

Figure 4



0 4 . 1 Which tissue is the epidermis?

[1 mark]

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

4.2.3.2 Plant organ system

Question 03 · continued

0 4 . 2 Explain how the spongy mesophyll is adapted for its function.

Use **Figure 4**.

[3 marks]

0 4 . 3 The xylem is adapted to transport water through a plant.

Explain **one** way that xylem is adapted for its function.

[2 marks]

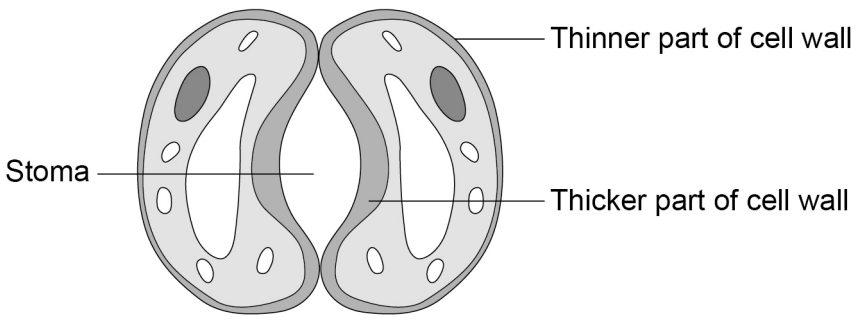
Question 4 continues on the next page

4.2.3.2 Plant organ system

Question 03 · continued

0 4 . 4 **Figure 5** shows a pair of guard cells around a stoma.

Figure 5



During the day, glucose is made in the guard cells.

Describe how an increase in glucose concentration in the guard cells causes the stoma to open.

[2 marks]

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