AQA GCSE Biology | 8461

SPECIFICATION POINT 4.2.3.1

Plant tissues

Past-paper questions

Tier	**Foundation**
Question groups	**18**
Available paper years	**2008–2023**

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.

4.2.3.1 Plant tissues

Question 01

June 2008 | BLY3F | Original Q7 | Legacy

7 A group of students looked at stomata on four different species of plants, **A**, **B**, **C** and **D**. They estimated the number of stomata per cm^2 on the upper and lower surfaces of the leaves of the four species.

Their results are shown in the table.

Plant species	Estimated number of stomata per cm^2 of leaf surface	
	Upper surface of leaf	Lower surface of leaf
A	4000	28 000
B	0	800
C	8500	15 000
D	8000	26 000

7 (a) Which plant species probably lives in a dry region? ☐

Explain the reason for your answer.

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(3 marks)

7 (b) All four species have more stomata on the lower surface of their leaves than on the upper surface.

Suggest how this could help the plants to survive better.

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(2 marks)

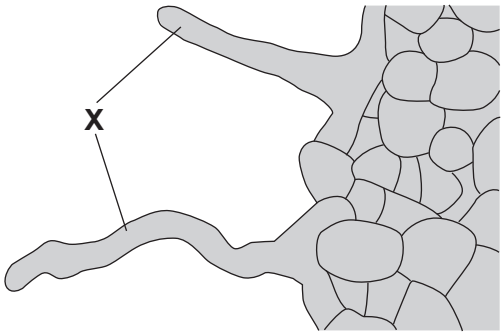
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4.2.3.1 Plant tissues

Question 02

June 2010 | BLY3F | Original Q1 | Legacy

1 The diagram shows part of a plant root. A large number of structures like the ones labelled **X** grow out of the surface of the root.



1 (a) (i) What is the name of structure **X**?

Draw a ring around **one** answer.

root hair **stoma** **villus**

(1 mark)

1 (a) (ii) Name **two** substances which structure **X** absorbs from the soil.

1 .....

2 .....

(2 marks)

4.2.3.1 Plant tissues

Question 02 · continued

1 (b) The substances in (a)(ii) are transported from the roots to the leaves.
Carbon dioxide also enters the leaves.

Draw a ring round the correct answer to complete each sentence.

1 (b) (i) Carbon dioxide enters leaves through

alveoli.

stomata.

villi.

(1 mark)

1 (b) (ii) Carbon dioxide enters leaf cells by

active transport.

diffusion.

reabsorption.

(1 mark)

5

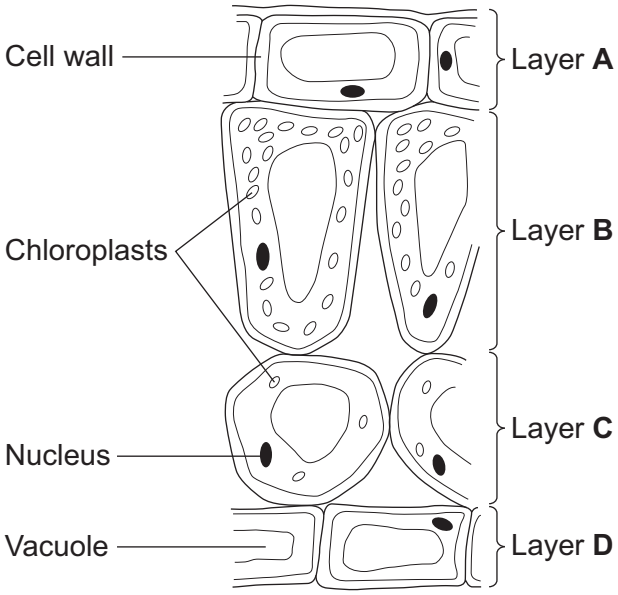
4.2.3.1 Plant tissues

Question 03

June 2011 | BLY2F | Original Q1 | Legacy

1 Leaves are made from layers of cells.

The diagram shows a section through part of a leaf.



1 (a) (i) Which word in the table describes layer **A**?

Tick (✓) **one** box.

Layer A	Tick (✓)
Tissue	
Organ	
Cell	

(1 mark)

1 (a) (ii) Which word describes a whole leaf?

Draw a ring around **one** answer.

organ **tissue** **organism**

(1 mark)

4.2.3.1 Plant tissues

Question 03 · continued

1 (b) (i) Which **two** layers of cells, **A**, **B**, **C** and **D**, can photosynthesise?

Use information from the diagram to help you.

Tick (✓) **two** boxes.

Layer **A** ☐

Layer **B** ☐

Layer **C** ☐

Layer **D** ☐

(2 marks)

1 (b) (ii) Give **one** reason for your answer.

.....

.....

(1 mark)

1 (c) List **X** gives the names of two parts of a cell.
List **Y** gives information about parts of a cell.

Draw **one** line between each part of the cell in list **X** and information about it in list **Y**.

List X **Part of a cell**	**List Y** **Information**
Vacuole	Controls the passage of substances into the cell
Nucleus	Contains the cell sap
	Controls the activities of the whole cell

(2 marks)

7

4.2.3.1 Plant tissues

Question 04

June 2011 | BLY2F | Original Q9 | Legacy

9 Cells contain a solution of salts and sugars.

A student is investigating how cells change when they are put into water.

9 (a) The student:

- looks at a plant cell using a microscope
- adds water to the cell.

The plant cell swells up.

Explain why, as fully as you can.

.....

.....

.....

.....

.....

.....

(3 marks)

9 (b) When **animal** cells are put in water, they swell up, and then burst.
When **plant** cells are put in water, they swell up, but do **not** burst.

How does the structure of plant cells prevent them from bursting?

.....

.....

(1 mark)

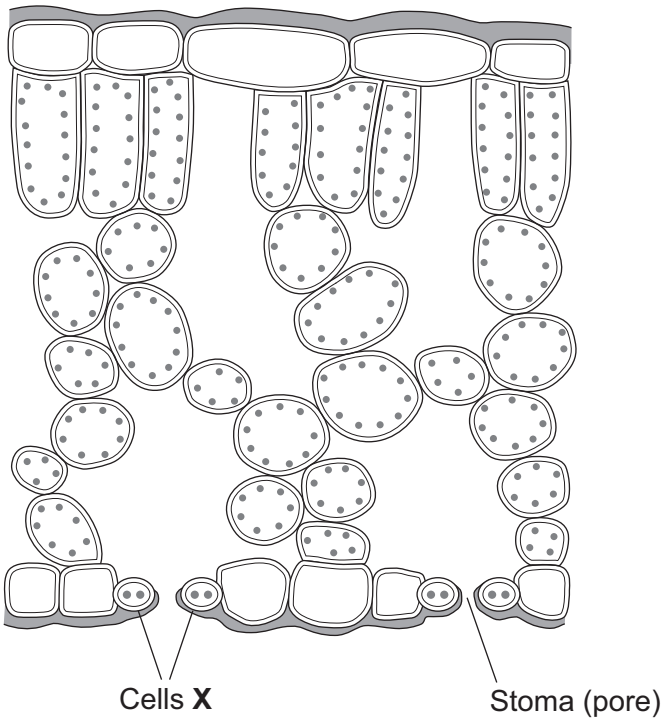
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4.2.3.1 Plant tissues

Question 05

June 2011 | BLY3F | Original Q2 | Legacy

2 The diagram shows a section through a plant leaf.



2 (a) The cells labelled **X** surround a stoma (pore).

Draw a ring around the correct answer to complete the sentence.

Cells **X** are called

- alveoli.
- guard cells.
- villi.

(1 mark)

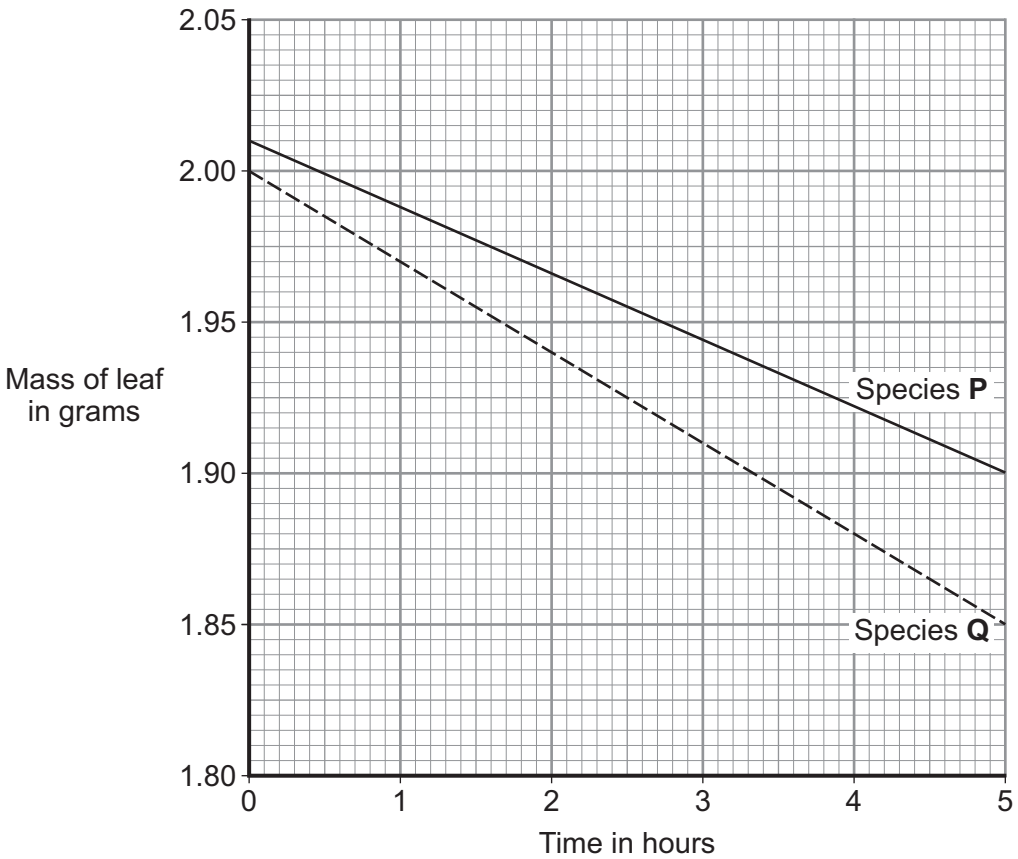
Question 2 continues on the next page

4.2.3.1 Plant tissues

Question 05 · continued

2 (b) Water vapour is lost from leaves. Water loss causes a leaf to lose mass.

The graph shows how the masses of leaves from two plant species, **P** and **Q**, changed over several hours. Both leaves were kept in the same conditions.



2 (b) (i) What was the mass of the leaf of species **Q** at 0 hours? ..... grams

(1 mark)

2 (b) (ii) What was the difference between the mass of the leaf of species **P** and the mass of the leaf of species **Q** after 5 hours?

..... grams

(1 mark)

2 (b) (iii) The leaf of species **Q** lost water at a faster rate than the leaf of species **P**.

Suggest **one** reason why.

.....

.....

(1 mark)

4.2.3.1 Plant tissues

Question 05 · continued

2 (b) (iv) Which weather conditions would cause the greatest rate of loss of mass for both species **P** and species **Q**?

Tick (✓) **one** box in the table.

Weather conditions		Tick (✓)
Still air or wind	**Temperature in °C**	
Wind	30	
Still air	30	
Wind	20	

(1 mark)

2 (c) Draw a ring around the correct answer to complete the sentence.

In very hot, dry conditions, the stomata close.

This is to prevent

anaerobic respiration.

breathing.

wilting.

(1 mark)

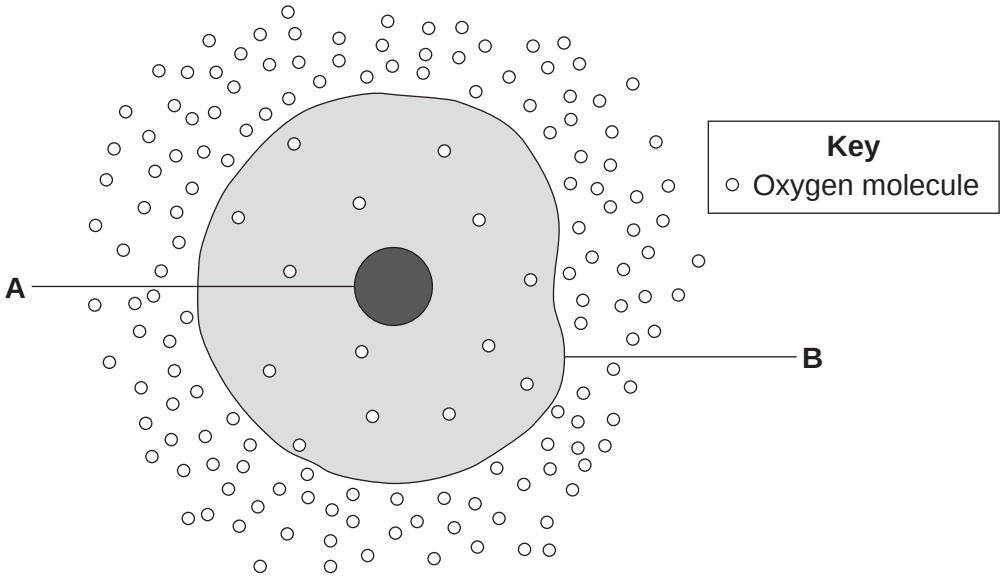
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4.2.3.1 Plant tissues

Question 06

January 2013 | BL2FP | Original Q1 | Legacy

1 The diagram shows a cell.



1 (a) (i) Use words from the box to name the structures labelled **A** and **B**.

cell membrane	chloroplast	cytoplasm	nucleus

A .....

B .....

(2 marks)

1 (a) (ii) The cell in the diagram is an animal cell.

How can you tell it is an animal cell and **not** a plant cell?

Give **two** reasons.

1 .....

.....

2 .....

.....

(2 marks)

4.2.3.1 Plant tissues

Question 06 · continued

1 (b) Oxygen will diffuse into the cell in the diagram.

Why?

Use information from the diagram.

.....

.....

(1 mark)

1 (c) The cell shown in the diagram is usually found with similar cells.

Draw a ring around the correct answer to complete the sentence.

Scientists call a group of similar cells

- an organ.
- a system.
- a tissue.

(1 mark)

6

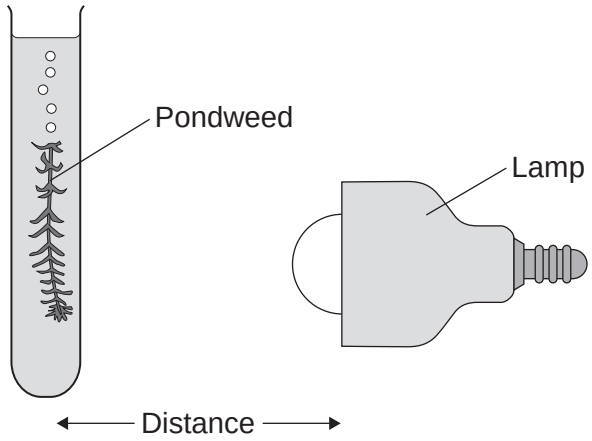
4.2.3.1 Plant tissues

Question 07

7 Some students investigated the effect of light intensity on the rate of photosynthesis.

They used the apparatus shown in **Diagram 1**.

Diagram 1



The students:

- placed the lamp 10 cm from the pondweed
- counted the number of bubbles of gas released from the pondweed in 1 minute
- repeated this for different distances between the lamp and the pondweed.

7 (a) The lamp gives out heat as well as light.

What could the students do to make sure that heat from the lamp did **not** affect the rate of photosynthesis?

.....

.....

(1 mark)

4.2.3.1 Plant tissues

Question 07 · continued

7 (b) The table shows the students' results.

Distance in cm	Number of bubbles per minute
10	84
15	84
20	76
40	52
50	26

7 (b) (i) At distances between 15cm and 50cm, light was a limiting factor for photosynthesis.

What evidence is there for this in the table?

.....

.....

(1 mark)

7 (b) (ii) Give **one** factor that could have limited the rate of photosynthesis when the distance was between 10cm and 15cm.

.....

(1 mark)

Question 7 continues on the next page

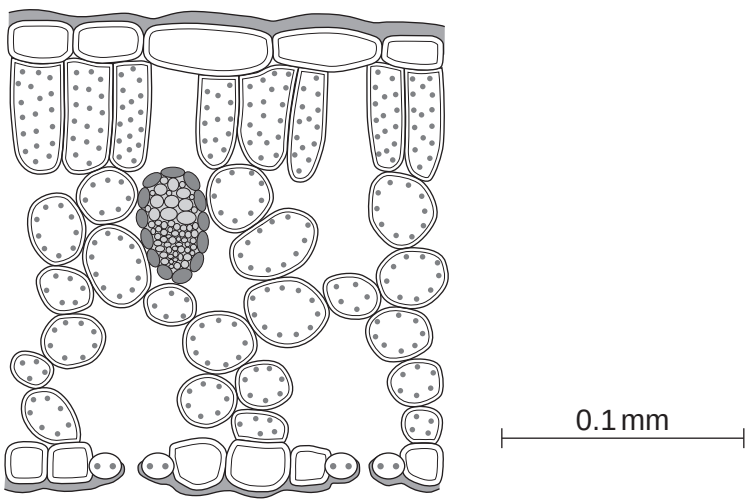
4.2.3.1 Plant tissues

Question 07 · continued

7 (c) *In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.*

Diagram 2 shows a section through a plant leaf.

Diagram 2



Describe the structure of the leaf and the functions of the tissues in the leaf.

You should use the names of the tissues in your answer.

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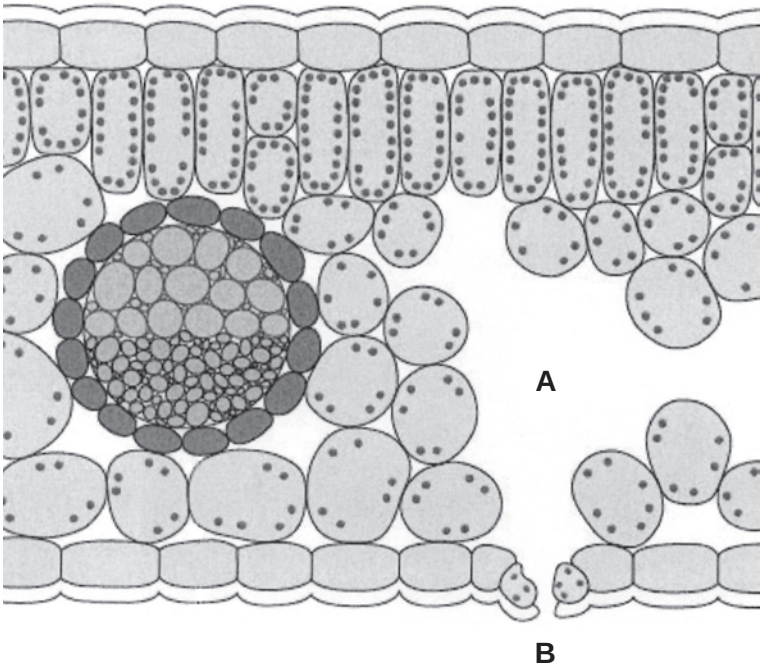
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4.2.3.1 Plant tissues

Question 08

June 2013 | BL2FP | Original Q7 | Legacy

7 The diagram shows a section through a plant leaf.



7 (a) Use words from the box to name **two** tissues in the leaf that transport substances around the plant.

epidermis	**mesophyll**	**phloem**	**xylem**

..... and .....

(1 mark)

7 (b) Gases *diffuse* between the leaf and the surrounding air.

7 (b) (i) What is *diffusion*?

.....

.....

.....

.....

(2 marks)

7 (b) (ii) Name **one** gas that will diffuse from point **A** to point **B** on the diagram on a sunny day.

.....

(1 mark)

4

4.2.3.1 Plant tissues

Question 09

June 2014 | BL3FP | Original Q4 | Legacy

4 Substances are transported through plants.

4 (a) Use the correct answer from the box to complete each sentence.

capillary	**guard cells**	**phloem**
stomata	**transpiration**	**xylem**

4 (a) (i) Water is transported from the roots to the stem of a plant

in the ..... .

[1 mark]

4 (a) (ii) Dissolved sugars are transported through the plant

in the ..... .

[1 mark]

4 (a) (iii) Movement of water through the plant is called the

..... stream.

[1 mark]

4 (a) (iv) Water vapour moves out of the plant through pores

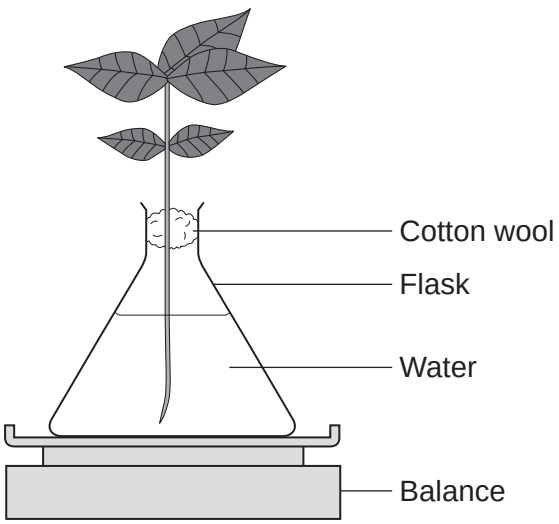
called ..... .

[1 mark]

4 (b) Students investigated the effect of different conditions on water loss from leaves.

The apparatus is shown in **Figure 6**.

Figure 6



4.2.3.1 Plant tissues

Question 09 · continued

The students set up four flasks, **A**, **B**, **C** and **D**.

The students:

- used the same size plant shoot in each flask
- recorded the mass of the flask and plant shoot at the start of each experiment
- left each flask and plant shoot in different conditions
- recorded the mass of each flask and plant shoot after 2 hours.

Table 2 shows the conditions that flasks **A**, **B**, **C** and **D** were left in for 2 hours.

Table 2

Flask	Temperature in °C	Fan or no fan
A	20	No fan
B	20	Fan
C	35	No fan
D	35	Fan

4 (b) (i) Suggest why the students used cotton wool in each flask.

[1 mark]

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.....

4 (b) (ii) The use of the same size of plant shoot made the investigation a fair test.

Explain why.

[2 marks]

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Question 4 continues on the next page

4.2.3.1 Plant tissues

Question 09 · continued

4 (b) (iii) **Table 3** shows the students' results.

Table 3

Flask	Conditions		Mass at the start in grams	Mass after 2 hours in grams	Mass of water lost in 2 hours in grams
	Temperature in °C	Fan or no fan			
A	20	No fan	150.0	148.1	1.9
B	20	Fan	152.0	148.5	3.5
C	35	No fan	149.0	145.9	3.1
D	35	Fan	150.0	145.5	

What mass of water was lost by the plant shoot in flask **D**?

[1 mark]

.....

.....

..... grams

4 (b) (iv) Suggest what conclusion can be made about the effect of temperature on water loss from the plant shoot.

[1 mark]

.....

.....

.....

4 (b) (v) Suggest what conclusion can be made about the effect of the fan on water loss from the plant shoot.

[1 mark]

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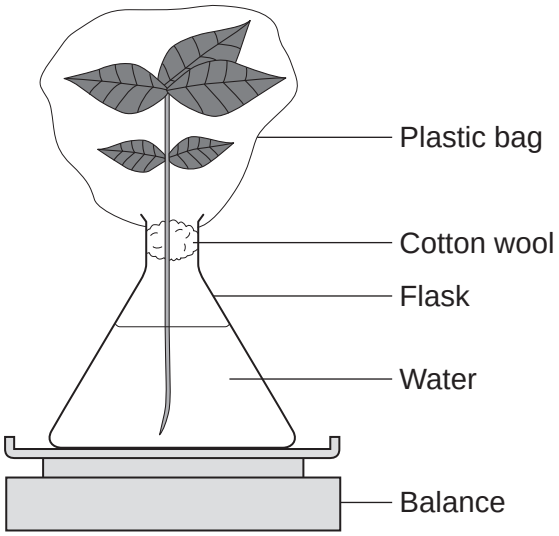
4.2.3.1 Plant tissues

Question 09 · continued

4 (c) The students carried out another experiment at 20 °C, with no fan.

The students used the apparatus in **Figure 7**.

Figure 7



In this experiment, the students:

- recorded the mass of the flask and plant shoot before tying the plastic bag around the plant shoot
- removed the bag after 2 hours and recorded the mass again.

4 (c) (i) What mass of water would be lost from the plant shoot in 2 hours?

Draw a ring around the correct answer.

[1 mark]

0.3 g **1.9 g** **3.9 g**

4 (c) (ii) Give a reason for your answer to part **(c)(i)**.

[1 mark]

.....

.....

.....

12

4.2.3.1 Plant tissues

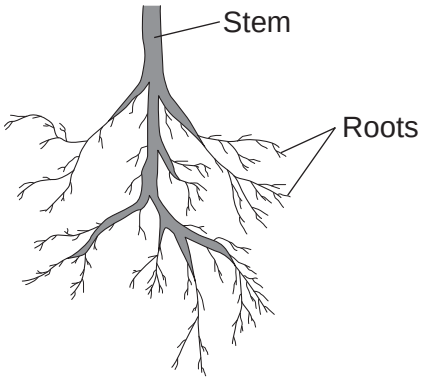
Question 10

June 2015 | BL3FP | Original Q5 | Legacy

5 Plants need different substances to survive.

Figure 4 shows the roots of a plant.

Figure 4



5 (a) (i) Mineral ions are absorbed through the roots.

Name **one** other substance absorbed through the roots.

[1 mark]

.....

5 (a) (ii) The plant in **Figure 4** has a higher concentration of mineral ions in the cells of its roots than the concentration of mineral ions in the soil.

Which **two** statements correctly describe the absorption of mineral ions into the plant's roots?

[2 marks]

Tick (✓) **two** boxes.

The mineral ions are absorbed by active transport. ☐

The mineral ions are absorbed by diffusion. ☐

The mineral ions are absorbed down the concentration gradient. ☐

The absorption of mineral ions needs energy. ☐

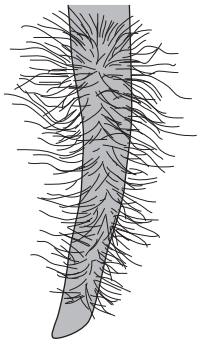
4.2.3.1 Plant tissues

Question 10 · continued

5 (a) (iii) The plant in **Figure 4** has roots adapted for absorption.

Figure 5 shows a magnified part of a root from **Figure 4**.

Figure 5



Describe how the root in **Figure 5** is adapted for absorption.

[2 marks]

.....

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5 (b) The leaves of plants have stomata.

What is the function of the stomata?

[1 mark]

.....

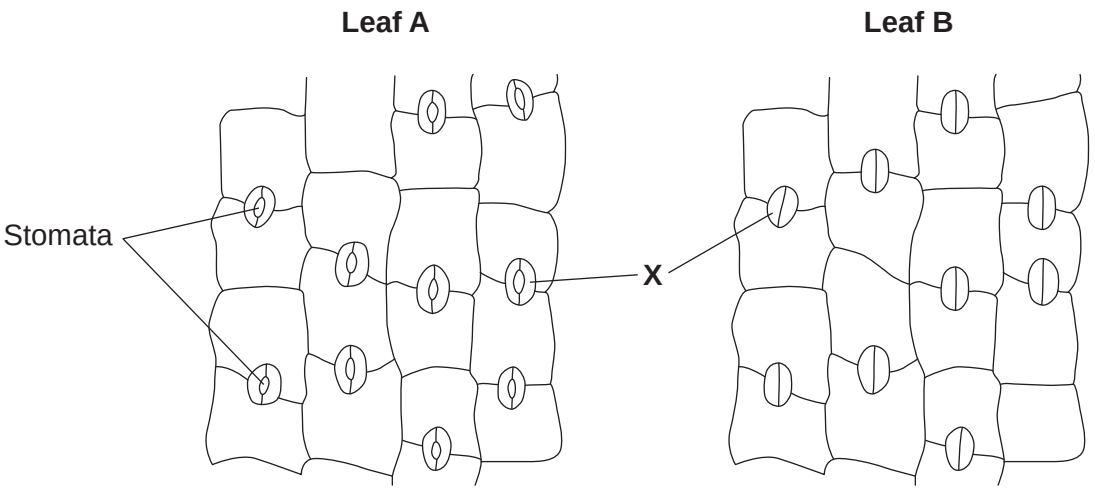
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Question 5 continues on the next page

Question 10 · continued

5 (c) **Figure 6** shows the underside of two leaves, **A** and **B**, taken from a plant in a man's house.

Figure 6



5 (c) (i) In **Figure 6**, the cells labelled **X** control the size of the stomata.

What is the name of the cells labelled **X**?

[1 mark]

Tick (✓) **one** box.

Guard cells ☐

Phloem cells ☐

Xylem cells ☐

5 (c) (ii) Describe how the appearance of the stomata in leaf **B** is different from the appearance of the stomata in leaf **A**.

[1 mark]

.....

.....

5 (c) (iii) The man forgets to water the plant.

What might happen to the plant in the next few days if the stomata stay the same as shown in leaf **A** in **Figure 6**?

[1 mark]

.....

.....

9

4.2.3.1 Plant tissues

Question 11

June 2017 | BL2FP | Original Q1 | Legacy

1 Green plants make their own food.

1 (a) (i) What is the name of the process that plants use to make food?

[1 mark]

Draw a ring around the correct answer.

digestion **growth** **photosynthesis** **respiration**

1 (a) (ii) Plants need energy to make food.

Where does this energy come from?

[1 mark]

Draw a ring around the correct answer.

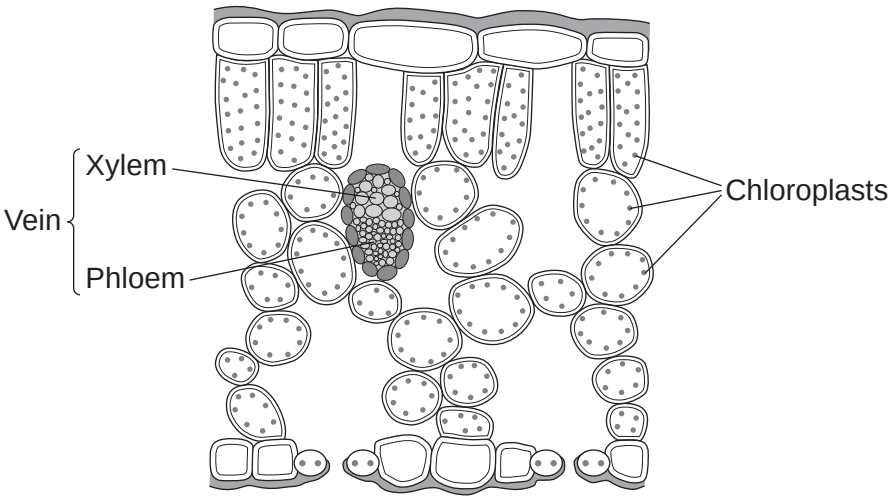
light **oxygen** **soil** **water**

1 (b) In plants, most of the food is made by the leaves.

Figure 1 shows a section through a plant leaf.

In the leaf, many of the cells contain chloroplasts.

Figure 1



1 (b) (i) Chloroplasts contain a green substance.

Name this green substance.

[1 mark]

_____

4.2.3.1 Plant tissues

Question 11 · continued

1 (b) (ii) How does this green substance help chloroplasts to make food?

[1 mark]

_____

_____

1 (b) (iii) What is the function of the vein shown in **Figure 1**?

[1 mark]

_____

_____

1 (b) (iv) Plants make glucose.

Name **two** substances a plant must take in to make glucose.

[2 marks]

1 _____

2 _____

7

4.2.3.1 Plant tissues

Question 12

June 2017 | BL3FP | Original Q2 | Legacy

2 Substances travel from the soil into plant roots by different processes.

2 (a) One of these processes is osmosis.

What is the definition of osmosis?

[1 mark]

Tick (✓) **one** box.

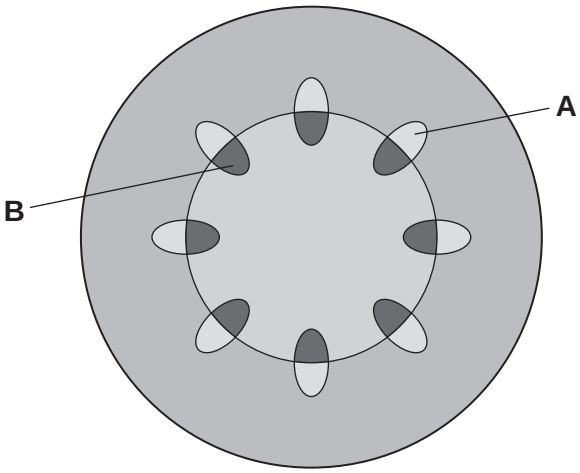
The movement of water from a concentrated solution to a more dilute solution through a partially permeable membrane. ☐

The movement of water from a dilute solution to a more concentrated solution through a partially permeable membrane. ☐

The movement of water through a partially permeable membrane using energy. ☐

2 (b) **Figure 2** shows a cross-section through a plant stem.

Figure 2



Parts **A** and **B** in **Figure 2** contain tubes that transport materials in plants.

A student collected fluid from parts **A** and **B**.

The fluid from **A** contained a lot of sugar.

The fluid from **B** contained a lot of mineral ions.

Question 12 · continued

What are the names of parts **A** and **B** in **Figure 2**?

[2 marks]

Use the correct answers from the box.

guard cells	**phloem**	**stomata**	**storage organ**	**xylem**

A _____

B _____

2 (c) In plants water moves from the roots, up through the stem and out of the leaves.

What is the name of this movement of water?

[1 mark]

Complete the sentence.

The _____ stream.

Question 2 continues on the next page

4.2.3.1 Plant tissues

Question 12 · continued

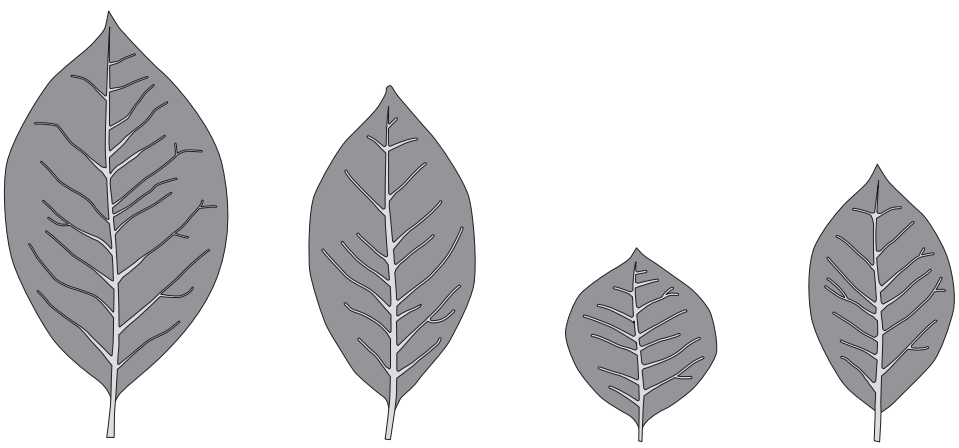
2 (d) The student investigated the rate of water loss from leaves.

The student:

- took four leaves, **A**, **B**, **C** and **D**, from the same plant
- measured the mass of each leaf
- kept the leaves in the same room for 3 hours
- measured the mass of each leaf again.

Figure 3 shows the four leaves she used.

Figure 3



2 (d) (i) How could the student calculate the mass of water lost for each leaf?

[1 mark]

Tick (✓) **one** box.

mass after ÷ mass before ☐

mass after × mass before ☐

mass before + mass after ☐

mass before – mass after ☐

4.2.3.1 Plant tissues

Question 12 · continued

2 (d) (ii) Suggest which leaf, **A**, **B**, **C** or **D**, lost the most water.

Give a reason for your answer.

[2 marks]

Leaf _____

Reason _____

_____

2 (d) (iii) The student changed the conditions in the room.

Suggest **two** conditions that would increase the rate of water loss from the leaves.

[2 marks]

1 _____

2 _____

9

4.2.3.1 Plant tissues

Question 13

June 2018 | 8461/1F | Original Q2

0 2 Plants are made up of cells, tissues and organs.

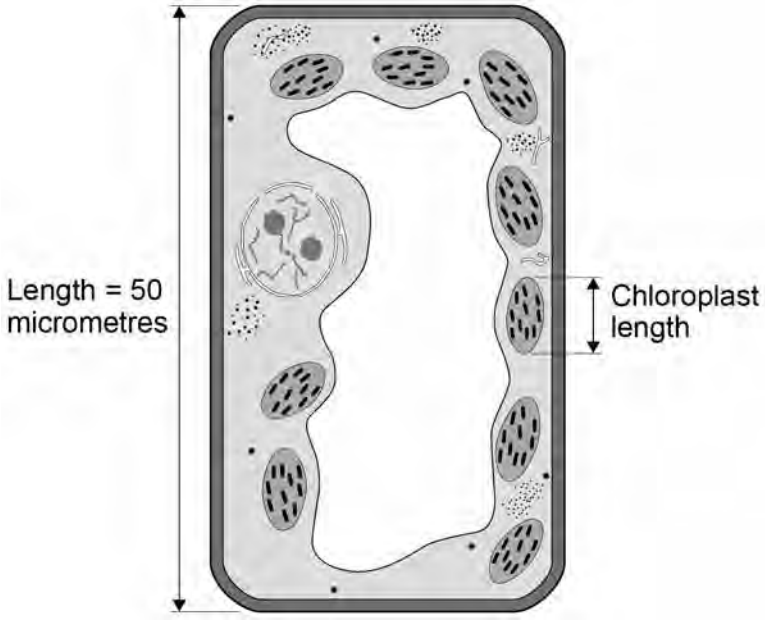
0 2 . 1 Draw **one** line from each level of organisation to the correct plant part.

[2 marks]

Level of organisation	Plant part
	Leaf
Organ	Root hair
	Spongy mesophyll
Tissue	Vacuole
	Xylem cell

Figure 3 shows a plant cell drawn to scale.

Figure 3



4.2.3.1 Plant tissues

Question 13 · continued

0 2 . 2 Where in a plant would the cell in **Figure 3** be found?

[1 mark]

Tick **one** box.

- Epidermis ☐
- Palisade mesophyll ☐
- Phloem ☐
- Xylem ☐

0 2 . 3 Calculate the length of the chloroplast labelled in **Figure 3**.

[2 marks]

Length = _____ micrometres

0 2 . 4 Cells in plant roots do **not** photosynthesise.

Give **one** reason why.

[1 mark]

Question 13 · continued

0 2 . 5 As a plant grows, new root hair cells are formed from unspecialised cells.

How does an unspecialised cell become a new root hair cell?

[1 mark]

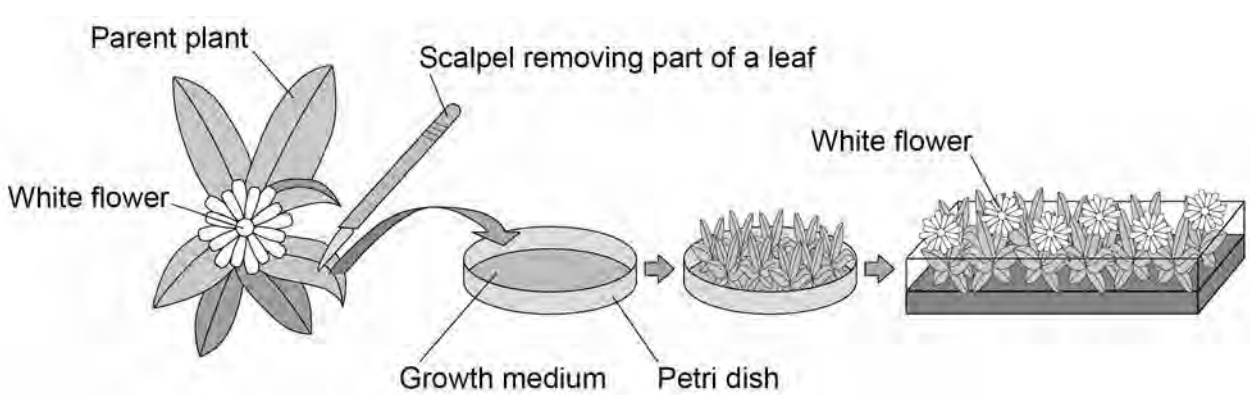
Tick **one** box.

- Differentiation ☐
- Metabolism ☐
- Transpiration ☐
- Transport ☐

Scientists can clone plants using tissue culture.

Figure 4 shows the process of tissue culture.

Figure 4



4.2.3.1 Plant tissues

Question 13 · continued

0 2 . 6 Why might scientists want to clone plants?

[1 mark]

Tick **one** box.

- To create new species of plants. ☐
- To introduce variation into plants. ☐
- To protect endangered plants from extinction. ☐
- To reduce disease resistance in plants. ☐

0 2 . 7 What is the advantage of cloning plants using tissue culture?

[1 mark]

Tick **one** box.

- No special equipment is needed. ☐
- Plants can be produced quickly. ☐
- The flowers are all different colours. ☐
- The offspring are all genetically different. ☐

0 2 . 8 The growth medium in **Figure 4** helps the plants to grow.

Name **one** substance in the growth medium.

[1 mark]

_____

_____

10

4.2.3.1 Plant tissues

Question 14

June 2019 | 8461/1F | Original Q3

0 3 This question is about leaves.

0 3 . 1 Complete the sentences.

Choose answers from the box.

[3 marks]

epidermis	**phloem**	**palisade mesophyll**
waxy cuticle	**xylem**	

The layer of cells lining the upper surface and lower surface of a leaf is the _____.

The part of the leaf where most photosynthesis occurs is the _____.

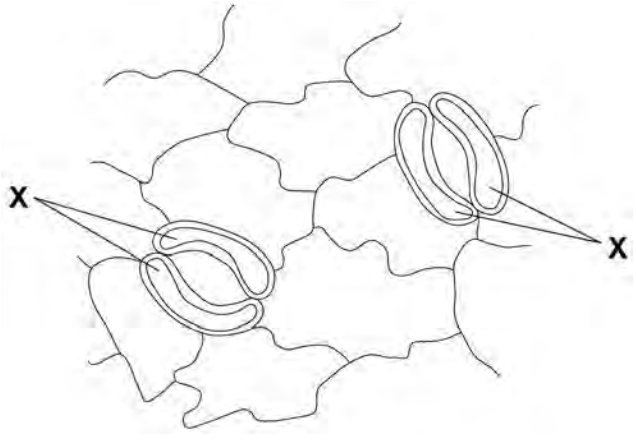
Water is transported to the leaf in the _____.

Water is lost through small openings on the lower surface of plant leaves.

These small openings are called stomata.

Figure 5 shows two stomata on the lower surface of a leaf.

Figure 5



4.2.3.1 Plant tissues

Question 14 · continued

June 2019 | 8461/1F | Original Q3

0 3 . 2 The cells labelled **X** control the width of the stomata.

What are the cells labelled **X**?

[1 mark]

Tick (✓) **one** box.

- Guard cells ☐
- Mesophyll cells ☐
- Root hair cells ☐
- Stem cells ☐

0 3 . 3 What is the function of the stomata?

[1 mark]

Tick (✓) **one** box.

- To allow light into the leaf ☐
- To let carbon dioxide into the leaf ☐
- To let sugars out of the leaf ☐
- To protect the leaf from pathogens ☐

0 3 . 4 How is water lost from a leaf?

[1 mark]

Tick (✓) **one** box.

- By evaporation ☐
- By respiration ☐
- By translocation ☐

4.2.3.1 Plant tissues

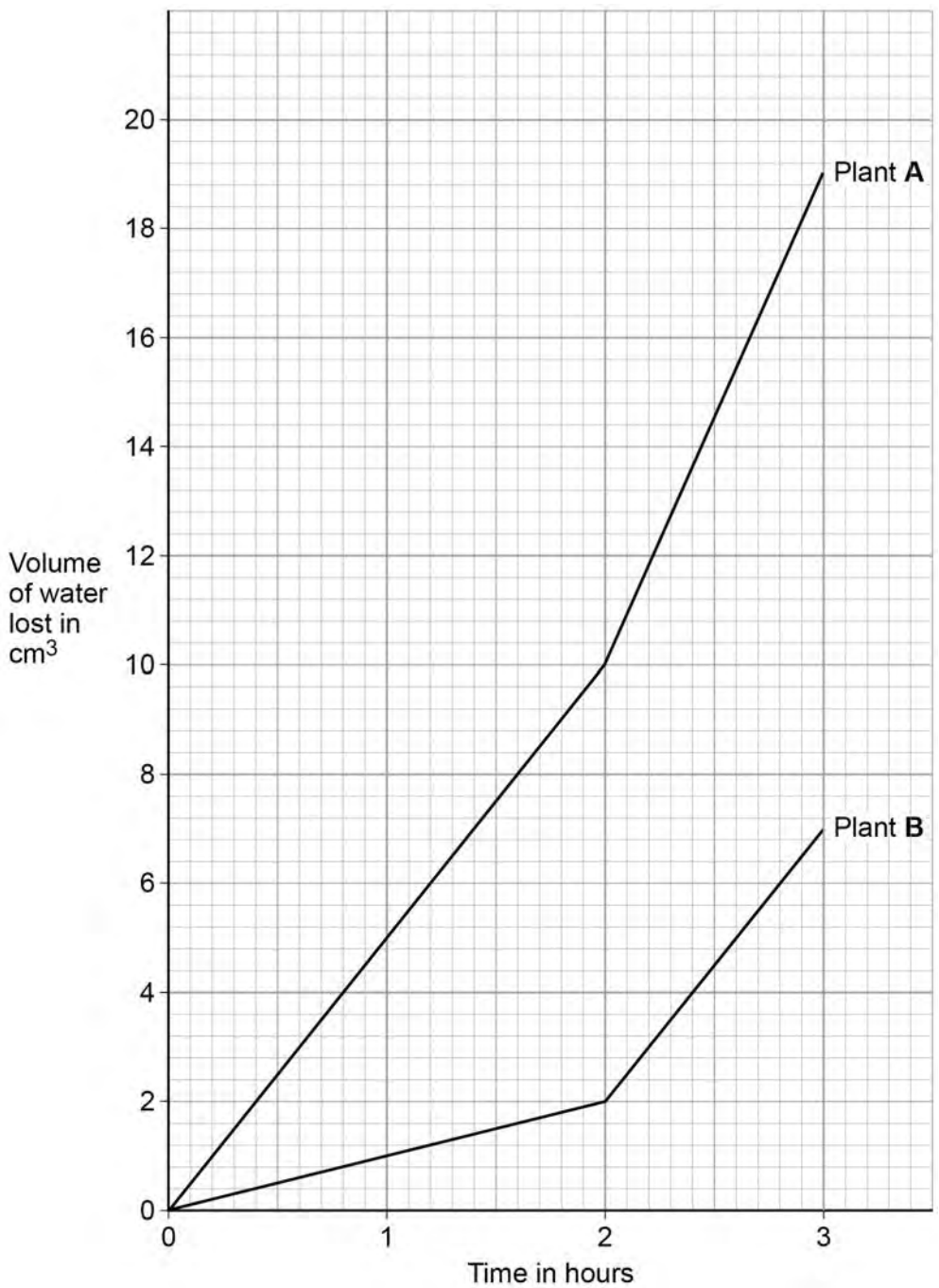
Question 14 · continued

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

The plants were different species.

Figure 6 shows the student's results.

Figure 6



4.2.3.1 Plant tissues

Question 14 · continued

0 3 . 5 Calculate the difference in the volume of water lost by plant **A** compared to plant **B** in the first hour.

[2 marks]

Difference in volume = _____ cm^3

0 3 . 6 What could cause plant **A** to lose water at a faster rate than plant **B**?

[1 mark]

Tick (✓) **one** box.

Plant **A** has fewer stomata per leaf. ☐

Plant **A** is smaller. ☐

Plant **A** has more leaves. ☐

Plant **A** has smaller leaves. ☐

0 3 . 7 After the first 2 hours, both plants were moved to a new room.

Suggest **one** reason why both plants lost water at a faster rate in the new room.

[1 mark]

Question 3 continues on the next page

4.2.3.1 Plant tissues

Question 14 · continued

0 3 . 8 Some plants have adaptations to stop them from being eaten by animals.

Figure 7 shows part of a holly plant.

Figure 7



Describe **one** way the holly plant is adapted to stop it being eaten by animals.

[1 mark]

11

4.2.3.1 Plant tissues

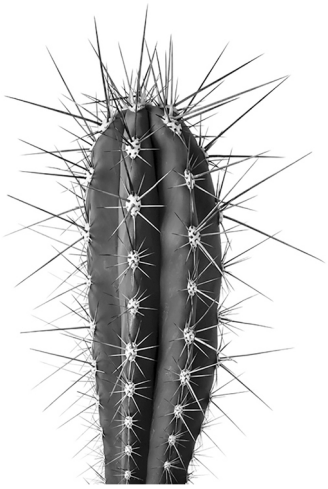
Question 15

November 2021 | 8461/1F | Original Q3

0 3 A cactus is a plant that lives in a dry environment.

Figure 6 shows part of a cactus plant.

Figure 6



0 3 . 1 Give **one** adaptation shown in **Figure 6** that helps to prevent the cactus from being eaten by animals.

[1 mark]

0 3 . 2 A plant may produce poisons that make animals unwell.

What is this type of defence mechanism?

[1 mark]

Tick (✓) **one** box.

Chemical ☐

Mechanical ☐

Physical ☐

0 3 . 3 Some desert plants only grow leaves after it has rained.

As soon as the soil dries out, the leaves fall off.

How could the leaves falling off the plant be an advantage to a plant that lives in a dry environment?

[1 mark]

Tick (✓) **one** box.

- The plant is less likely to reproduce. ☐
- The plant will not lose as much water. ☐
- The plant will photosynthesise faster. ☐

The stem of a cactus is green.

0 3 . 4 What causes the green colour in the stem?

[1 mark]

_____

0 3 . 5 What is the advantage to the cactus of having a green stem?

[1 mark]

_____

_____

Question 3 continues on the next page

4.2.3.1 Plant tissues

Question 15 · continued

The stem of a cactus contains many different tissues.

0 3 . 6 What name is given to a group of tissues working together?

[1 mark]

Tick (✓) **one** box.

Organ ☐

Organism ☐

Organ system ☐

0 3 . 7 Name **one** substance transported through the xylem in the stem of the cactus.

[1 mark]

_____

0 3 . 8 Name the tissue that transports dissolved sugars through the stem of the cactus.

[1 mark]

_____

8

4.2.3.1 Plant tissues

Question 16

June 2022 | 8461/1F | Original Q5

0 5 . 1 Plants take up water from the soil through their roots.

Some of the water is used for photosynthesis.

Complete the word equation for photosynthesis.

Choose answers from the box.

[2 marks]

fat	**glucose**	**nitrogen**	**oxygen**	**protein**

carbon dioxide + water → _____ + _____

0 5 . 2 Water and dissolved substances are transported through a plant.

Complete the sentences.

Choose answers from the box.

[3 marks]

epidermis	**guard cells**	**palisade cells**
phloem	**stomata**	**xylem**

Water moves from the roots to the leaves in the _____.

Water is lost from leaves through pores called _____.

Dissolved sugars are transported in the _____.

Question 5 continues on the next page

4.2.3.1 Plant tissues

Question 16 · continued

Table 3 shows the rate of transpiration in four different plant species.

Table 3

Plant species	Rate of transpiration in arbitrary units
A	310
B	254
C	87
D	192

0 5 . 3 Calculate how many times greater the rate of transpiration of species **A** is than the rate of transpiration of species **B**.

Give your answer to 2 significant figures.

[3 marks]

Number of times greater (2 significant figures) = _____

Question 16 · continued

0 5 . 4 Which factor could cause species **A** to have a higher rate of transpiration than species **B**?

[1 mark]

Tick (✓) **one** box.

Each flower of species **A** has more petals. ☐

Each leaf of species **A** has more stomata. ☐

Each plant of species **A** has shorter roots. ☐

0 5 . 5 Which environmental change would cause an increase in the rate of transpiration?

[1 mark]

Tick (✓) **one** box.

Decreased light intensity ☐

Decreased wind speed ☐

Increased humidity ☐

Increased temperature ☐

0 5 . 6 Which plant species in **Table 3** is most likely to live in a dry desert?

[1 mark]

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

Question 5 continues on the next page

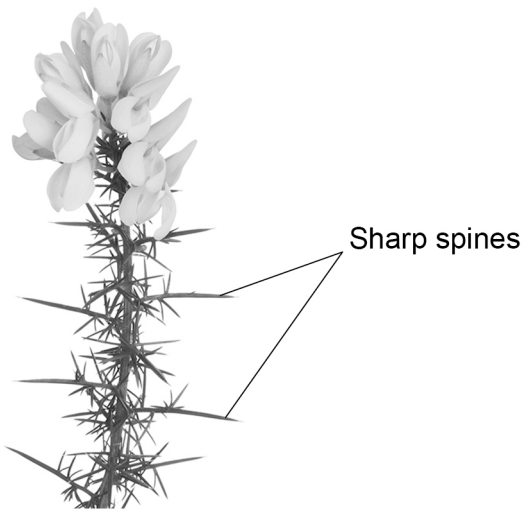
4.2.3.1 Plant tissues

Question 16 · continued

0 5 . 7 Some plants have adaptations that help them survive.

Figure 6 shows part of a gorse plant.

Figure 6



How will the sharp spines help the gorse plant survive?

[1 mark]

4.2.3.1 Plant tissues

Question 16 · continued

0 5 . 8 Animals also have adaptations to help them survive.

Figure 7 shows two insects.

Figure 7



Hornet **Hornet Moth**

Hornets are insects that sting other animals and cause pain.

Hornet moths do **not** sting other animals.

Explain why animals avoid eating the **hornet moth**.

[2 marks]

14

4.2.3.1 Plant tissues

Question 17

June 2023 | 8461/1F | Original Q1

0 1 Plants are made of cells, tissues and organs.

0 1 . 1 Which part of a plant is the largest?

[1 mark]

Tick (✓) **one** box.

A guard cell ☐

A leaf ☐

A root hair ☐

Students investigated the effect of concentration of salt solution on the mass of pieces of potato.

This is the method used.

1. Cut two pieces of potato to the same size.
2. Record the mass of each piece of potato.
3. Place one piece of potato into a beaker containing a dilute salt solution.
4. Place the other piece of potato into a beaker containing a concentrated salt solution.
5. After 20 minutes, remove each piece of potato from its solution.
6. Record the change in mass of each piece of potato.
7. Repeat steps 1 to 6 two more times.

Table 1 shows the results.

Table 1

Solution	Change in mass of piece of potato in grams			
	Test 1	Test 2	Test 3	Mean
Dilute salt solution	1.1	1.1	1.4	**X**
Concentrated salt solution	–7.2	–6.8	–32.4	–7.0

4.2.3.1 Plant tissues

Question 17 · continued

0 1 . 2 Calculate mean value **X** in **Table 1**.

[2 marks]

X = _____ grams

There is an anomalous result for the concentrated salt solution in **Table 1**.

0 1 . 3 Draw a ring around the anomalous result in **Table 1**.

[1 mark]

0 1 . 4 What did the students do with the anomalous result when calculating the mean in **Table 1**?

[1 mark]

0 1 . 5 What name is given to a variable that is kept the same during an investigation?

[1 mark]

Tick (✓) **one** box.

- Control variable ☐
- Dependent variable ☐
- Independent variable ☐

Question 1 continues on the next page

Question 17 · continued

0 1 . 6 One variable the students kept the same during the investigation was the size of the pieces of potato.

Which other variable did the students keep the same?

[1 mark]

Tick (✓) **one** box.

Change in mass of pieces of potato ☐

Concentration of salt solution ☐

Time in the salt solution ☐

0 1 . 7 The pieces of potato in the concentrated salt solution decreased in mass.

Complete the sentence.

Choose the answer from the box.

[1 mark]

excretion	**osmosis**	**respiration**

Water moved out of the potato by the process of _____.

4.2.3.1 Plant tissues

Question 17 · continued

0 1 . 8 The potato cells have a partially permeable membrane.

Which particles can pass through a partially permeable membrane?

[1 mark]

Tick (✓) **one** box.

No particles ☐

Some particles ☐

All particles ☐

0 1 . 9 How could the students improve their investigation?

[1 mark]

Tick (✓) **one** box.

Boil the pieces of potato at the start. ☐

Leave the skin on some pieces of potato. ☐

Use more concentrations of salt solution. ☐

10

4.2.3.1 Plant tissues

Question 18

June 2023 | 8461/1F | Original Q6

0 6 A root is a plant organ.

Plant roots contain many different types of tissue.

0 6 . 1 What is a tissue?

[1 mark]

0 6 . 2 Tissue in the tip of a plant root contains stem cells.

Stem cells can differentiate into any type of cell.

Name the type of tissue in plants that contains stem cells.

[1 mark]

In the past many drugs were extracted from plants.

0 6 . 3 Aspirin is a painkiller.

Which plant does aspirin originate from?

[1 mark]

Question 6 continues on the next page

4.2.3.1 Plant tissues

Question 18 · continued

Scientists have extracted chemical **A** from the deadly nightshade plant.

Chemical **A** can be used as a painkiller.

Table 5 shows information about where chemical **A** is found.

Table 5

Part of deadly nightshade plant	Mass of chemical A in 100 g of plant tissue in grams
Roots	1.3
Leaves	1.2
Berries	0.7

0 6 . 4 The scientists usually extract chemical **A** from the berries of the deadly nightshade plant.

Suggest **one** reason why berries are used instead of leaves or roots.

[1 mark]

4.2.3.1 Plant tissues

Question 18 · continued

A deadly nightshade plant has chlorosis (yellow leaves).

The mass of chemical **A** found in the **leaves** of the plant is 60% of the mass shown in **Table 5**.

0 6 . 5 Calculate the mass of chemical **A** in 200 g of the **leaves** with chlorosis.

Give your answer in mg.

[4 marks]

Mass of chemical **A** = _____ mg

0 6 . 6 Suggest **one** reason why the leaves of the deadly nightshade plant have chlorosis.

[1 mark]

Question 6 continues on the next page

4.2.3.1 Plant tissues

Question 18 · continued

Chemical **A** has **not** been tested in large-scale clinical trials in the UK.

0 6 . 7 It is important for drugs to be tested in clinical trials before the drugs are approved for use by the public.

Give **two** reasons why.

[2 marks]

1 _____

_____

2 _____

_____

There are many online reports making claims about the effects of chemical **A**.

Some of these reports are biased.

0 6 . 8 Suggest **one** reason why a report making claims about the effects of chemical **A** may be biased.

[1 mark]

_____

_____

4.2.3.1 Plant tissues

Question 18 · continued

0 6 . 9 How can scientists be sure that claims about new drugs are valid?

[1 mark]

Tick (✓) **one** box.

- Advertise the claims on social media. ☐
- Ask an international company to produce the drug. ☐
- Have the claims peer reviewed. ☐
- Publish the claims in a newspaper. ☐

13

Turn over for the next question