PEARSON EDEXCEL GCSE BIOLOGY (HIGHER) · 1BI0

BIOLOGY



EXAM QUESTION PACK

TOPIC 6: PLANT STRUCTURES AND THEIR FUNCTIONS (PACK 1)

SCORE	PERCENTAGE
/58	%

STEMUP

These questions belong to Pearson Edexcel, not to us.

The examination questions, mark schemes and examiner comments in this pack were written and published by Pearson Edexcel. They are past assessment materials, reproduced here so that students can revise from them.

What we do not own

STEMUP is not affiliated with Pearson Edexcel and does not own, and makes no claim to own, any of the question, mark scheme or examiner report material in this pack. Pearson Edexcel has not endorsed, approved or been involved in the production of it. Pearson Edexcel and the qualification titles used here belong to their respective owners and appear for identification only.

Where to find the originals

Pearson Edexcel publishes its past papers, mark schemes and examiner reports. Always check the current specification at qualifications.pearson.com before you revise, because content and wording can change between series.

If you hold the rights to any material in this pack and would like it amended or removed, contact admin@stemup.co.uk and we will act on it.

Q1.

Figure 15 shows the results of this investigation.

seedling in test tube	length at the start in mm	length after 7 days in mm
1	4	11
2	6	17
3	5	26

Figure 15

(i) Explain why there are differences in the change in the lengths of the seedlings.

(2)

.....

.....

.....

.....

(ii) Explain how nitrate ions were absorbed by the seedling in test tube 3.

(3)

.....

.....

.....

.....

.....

.....

(Total for question = 5 marks)

Q2.

Figure 2 shows the leaves and flowers of water lily plants (*Nymphaea odorata*) on a lake.



© Oleksandr Shymanskyi/123RF

Figure 2

Water lilies have stomata on the upper surface of the leaves.

Explain why water lilies have no stomata on the lower surface of the leaves.

.....

.....

.....

.....

.....

(Total for question = 2 marks)

Q3.

Auxins are plant hormones.

* Fruit ripening is one use of plant hormones.

Describe the other uses of plant hormones in crop production.

(6)

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Q4.

A gardener decided to kill the dandelion plants growing in his lawn.

The gardener set up a trial to see which concentration of weed killer would kill the most dandelions and be most economical.

He counted the number of dandelion plants in six 1 m^2 areas of the lawn.

He made six different concentrations of weed killer solution.

He applied the solutions to each of the six different areas.

After two weeks, he counted the number of dandelion plants in each area.

The results are shown in Figure 12.

concentration of weed killer solution (%)	number of dandelion plants in 1 m²	
	before applying weed killer	two weeks after applying weed killer
0	9	9
20	9	9
40	7	5
60	8	2
80	8	0

Figure 12

(i) Give **one** variable the gardener should control when completing this trial.

(1)

.....

.....

(ii) State and explain the conclusions the gardener can make based on his trial.

(3)

.....

.....

.....

.....

.....

.....

.....

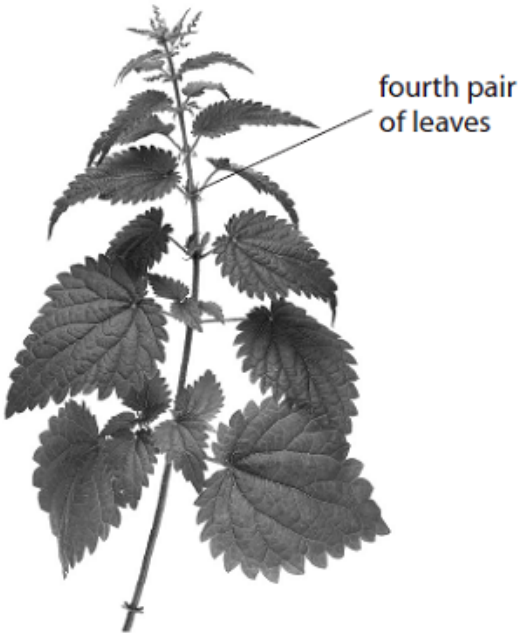
(Total for question = 4 marks)

Q5.

A student investigated the width of leaves on nettle plants growing in two areas next to a woodland.

Figure 5a shows a nettle plant and Figure 5b shows a map of the woodland showing area A and area B.

The woodland caused area A to be in the shade.



(Source: © Alila Medical Media/Shutterstock)

Figure 5a

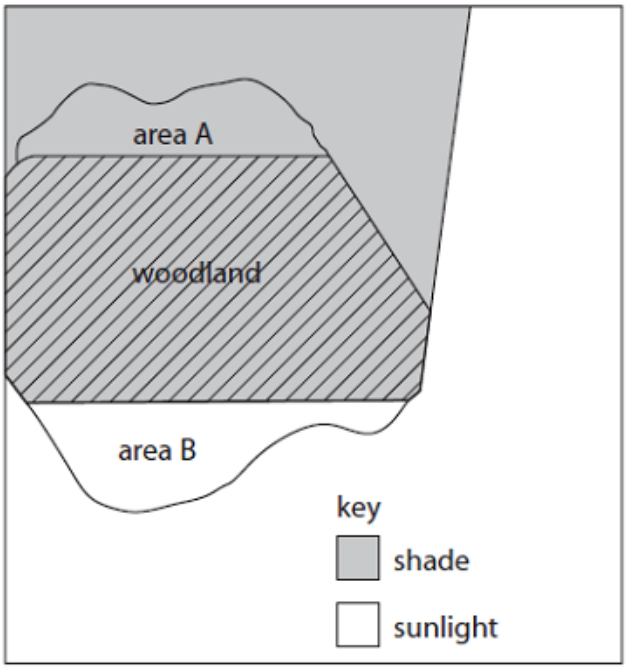


Figure 5b

The student measured the maximum width of leaves on five plants from each area.

The student always measured one leaf from the fourth pair of leaves.

Give **one** reason why the student always measured a leaf from the fourth pair of leaves.

(1)

.....

.....

(Total for question = 1 mark)

Q6.

A scientist investigated the role of gibberellins in seed germination.

The scientist placed 20 cress seeds on agar jelly containing gibberellins.

The scientist counted the number of seeds that had germinated after 5 days.

Figure 10 shows the results.

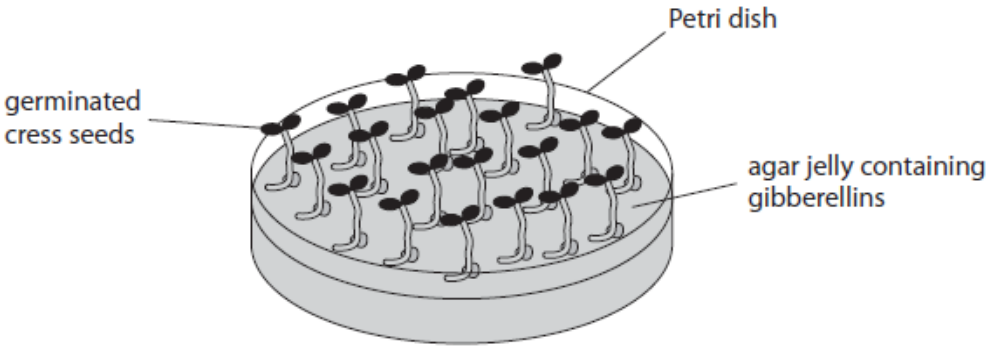


Figure 10

(i) After germination, roots grow downwards and shoots grow upwards.

Which row of the table is correct for the growth response shown by roots and shoots?

(1)

	growth response of root	growth response of shoot
☒ A	positive gravitropism	positive gravitropism
☒ B	positive gravitropism	positive phototropism
☒ C	positive phototropism	positive gravitropism
☒ D	positive phototropism	positive phototropism

(ii) Explain how auxins can cause a plant root that is growing horizontally to grow downwards.

(3)

.....

.....

.....

.....

.....

.....

(Total for question = 4 marks)

Q7.

Genetic engineering can be used to produce plants that are resistant to herbicide.

One herbicide works by preventing the activity of an enzyme.

Some bacteria have a form of this enzyme that is not affected by the herbicide.

(a) Suggest how genetic engineering can be used to produce plants resistant to this herbicide.

(3)

.....

.....

.....

.....

.....

.....

(b) This herbicide is sprayed onto the leaves of plants.

Suggest which vessel could transport the herbicide from the leaf to other parts of the plant.

(1)

.....

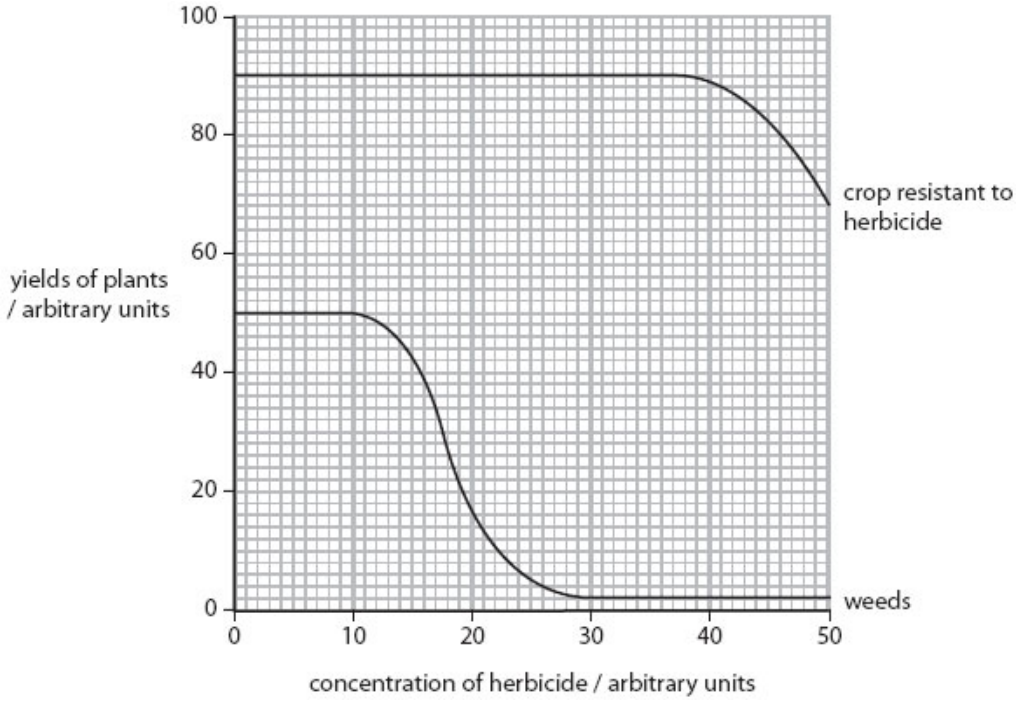
(c) Fields of crops have weeds growing in them.

In an investigation, crops resistant to a herbicide were grown in different fields.

The crops were sprayed with different concentrations of the herbicide.

The mass of the crops and weeds were recorded.

The graph shows the results of this investigation.



(i) Describe the effects of the herbicide on the yield of weeds.

(2)

.....

.....

.....

.....

(ii) Complete the sentence by putting a cross (☒) in the box next to your answer.

The most appropriate concentration of herbicide to use is

(1)

☒ **A** 10 arbitrary units

☒ **B** 30 arbitrary units

☒ **C** 40 arbitrary units

☒ **D** 50 arbitrary units

(d) The table shows the number of species of weeds resistant to this herbicide from 1996 to 2004.

	Year				
	1996	**1998**	**2000**	**2002**	**2004**
Number of	1	2	3	5	8

species of weeds resistant to this herbicide					

(i) Describe the trend shown in the data.

(1)

.....

.....

(ii) Suggest reasons for this trend.

(2)

.....

.....

.....

.....

(Total for Question is 10 marks)

Q8.

How is sucrose transported from the leaves to other parts of the plant?

(1)

☒ **A** by osmosis through the phloem

☒ **B** by osmosis through the xylem

☒ **C** by translocation through the phloem

☒ **D** by translocation through the xylem

(Total for question = 1 mark)

Q9.

A student wanted to investigate the effect of light on the growth of cress seedlings.

The student had three pots of seedlings grown in different conditions.

Pot A was placed in a window with light from one direction only.

Pot B was placed in a cupboard with no light.

Pot C was placed with light from above.

Figure 8 shows the seedlings at the end of the investigation.

(a) (i) Label the pots of cress seedlings A, B and C.

(2)



(Source: Nigel Cattlin/Science Photo Library)

Figure 8

(ii) What is the response shown by the cress seedlings in Pot A?

(1)

☒ **A** negative gravitropism

☒ **B** negative phototropism

☒ **C** positive gravitropism

☒ **D** positive phototropism

(iii) State the plant hormone that causes the cress seedlings to grow towards the light.

(1)

.....

.....

(b) The student wanted to find out where the hormone that caused the response to directional light was found.

The student had two growing plant shoots and placed them both in a window with light coming from one direction.

Describe a method the student could use to show that the hormone was found in the tip of the plant shoot.

(2)

.....

.....

.....

.....

(Total for question = 6 marks)

Q10.

Figure 1 shows a cross section of a leaf.

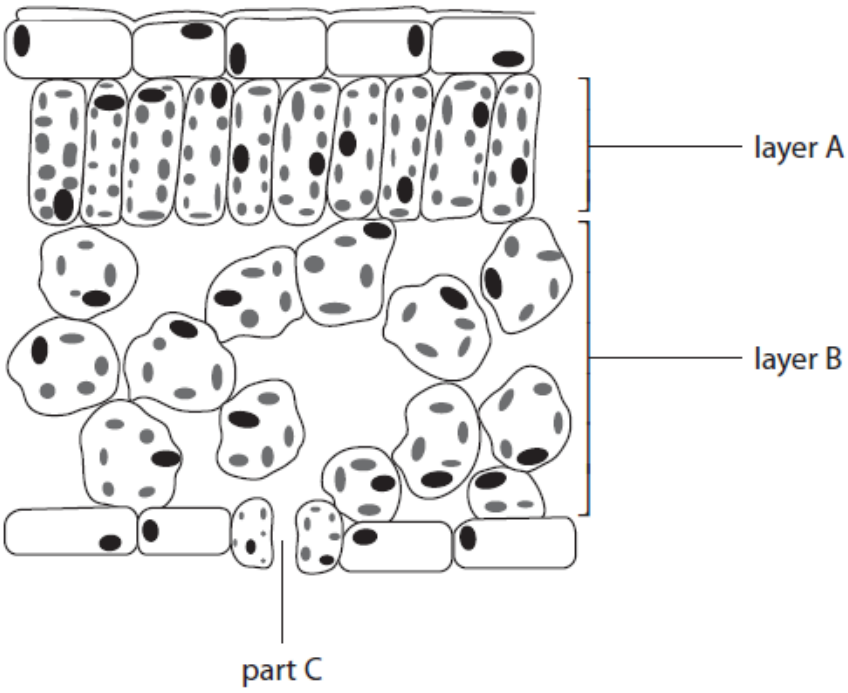


Figure 1

(i) What is the name of layer A?

(1)

- ☒ **A** spongy mesophyll
- ☒ **B** palisade mesophyll
- ☒ **C** upper epidermis
- ☒ **D** waxy cuticle

(ii) Explain the function of the spaces between the cells in layer B.

(2)

.....

.....

.....

.....

(iii) Explain the function of part C in Figure 1.

(2)

.....

.....

.....

.....

.....

(Total for question = 5 marks)

Q11.

Answer the questions with a cross in the boxes you think are correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

Commercial growers can use plant hormones to artificially ripen fruit and produce seedless fruit.

(i) Which is the name of the plant hormone used in fruit ripening?

(1)

☒ **A** auxin

☒ **B** gibberellin

☒ **C** sucrose

☒ **D** ethene

(ii) Which plant hormone can commercial growers spray fruit with to produce seedless fruit?

(1)

☒ **A** auxin

☒ **B** gibberellin

☒ **C** sucrose

☒ **D** ethene

(Total for question = 2 marks)

Q12.

Answer the questions with a cross in the boxes you think are correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

Figure 2 shows the leaves and flowers of water lily plants (*Nymphaea odorata*) on a lake.



© Oleksandr Shymanskyi/123RF

Figure 2

(i) The white petals of the water lily flowers cannot photosynthesise.

Which structure in leaf cells is the site of photosynthesis?

(1)

☒ **A** nucleus

☒ **B** vacuole

☒ **C** mitochondrion

☒ **D** chloroplast

(ii) Glucose is made by photosynthesis.

Glucose is converted to another sugar to be transported in the plant.

What is the name of this sugar?

(1)

☒ **A** glycerol

☒ **B** ribose

☒ **C** sucrose

☒ **D** starch

(iii) Describe how this sugar is transported from the leaves to the flowers of the water lily.

(2)

.....

.....

.....

.....

.....

(Total for question = 4 marks)

Q13.

A gardener investigated the ability of four types of compost to hold water.

50cm^3 of water was added to each type of compost.

Figure 6 shows the volume of water retained by four different types of compost.

type of compost	A	B	C	D
mass of compost /g	500	500	1000	1000
volume of water retained / cm^3	15	29	45	34
total mass of compost after water was added /g cm^{-3}	515	529	1045	1034

Figure 6

(i) Calculate the percentage change in mass for compost B.

(2)

..... %

(ii) Explain which compost would be best to use for a pot containing strawberry plants to be grown during a hot summer.

(2)

.....

.....

.....

.....

(iii) State **one** way to improve this investigation in order to compare the results without having to calculate the percentage change in mass.

(1)

.....

.....

(Total for question = 5 marks)

Q14.

A student is growing algae to make algal balls to investigate how light intensity affects photosynthesis.

A small culture of algae is added to a large bottle of distilled water.

Air is then bubbled through and the bottle is placed in front of a light source.

After 4 weeks, enough algae have grown for the student to make algal balls.

Figure 6 shows the apparatus used.



By permission of 'Science and Plants for Schools' – http://www.saps.org.uk/

Figure 6

(i) Why is air bubbled through the distilled water containing the algae?

(1)

☒ **A** to provide oxygen for photosynthesis

☒ **B** to provide carbon dioxide for photosynthesis

☒ **C** to provide carbon dioxide for respiration

☒ **D** to provide nitrogen for respiration

(ii) Which part of an algal cell absorbs light energy to make glucose?

(1)

☒ **A** the ribosome in the chloroplast

☒ **B** the chlorophyll in the vacuole

☒ **C** the chlorophyll in the chloroplast

☒ **D** the ribosome in the nucleus

(Total for question = 2 marks)

Q15.

A scientist investigated how the flow of air affected the rate of transpiration in a plant.

A fan was used to change the flow of air.

The volume of water taken up by the plant was measured.

Figure 3 shows the results of this investigation.

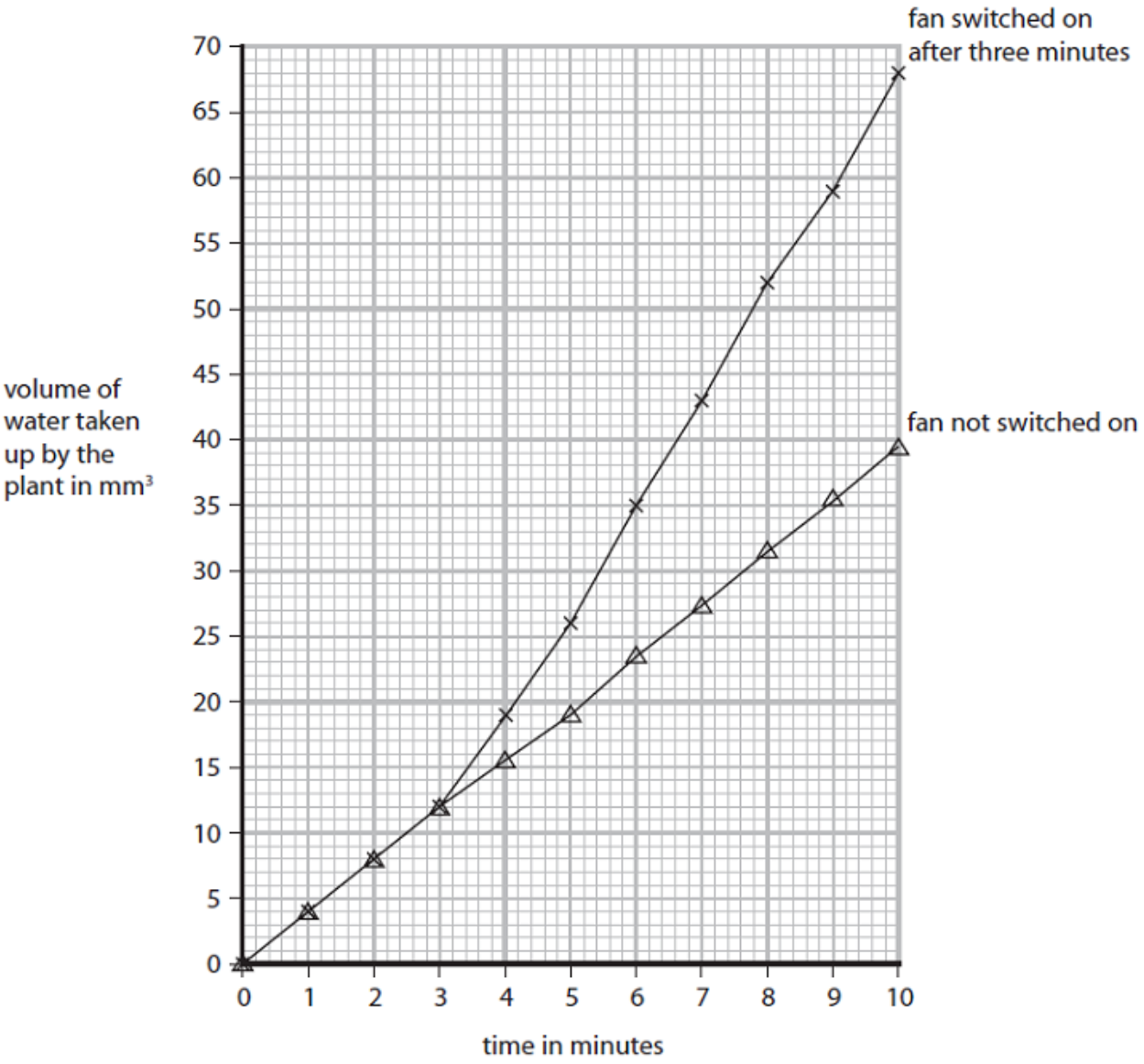


Figure 3

(i) Explain why switching on the fan caused a change in the volume of water taken up by the plant.

(3)

.....

.....

.....

.....

.....

.....

(ii) Give **one** reason why the volume of water taken up by the plant was also measured when the fan was not switched on.

(1)

.....

.....

(iii) Calculate the rate of water uptake from 8 minutes to 10 minutes when the fan was switched on.

Use the equation

$$\text{rate of water uptake} = \frac{\text{volume of water taken up}}{\text{time taken}}$$

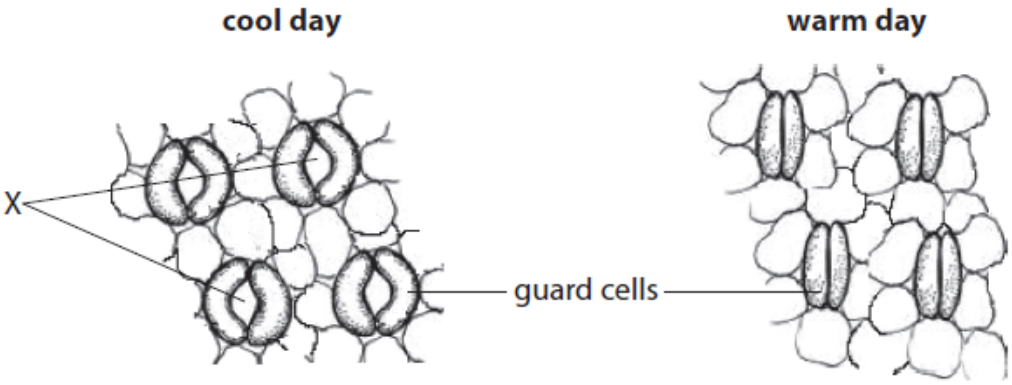
(2)

..... mm^3 per minute

(Total for question = 6 marks)

Q16.

The diagrams show the underside of a leaf of a cowslip plant on a cool day and on a warm day.



(i) Complete the sentence by putting a cross (☒) in the box next to your answer.

The parts of the leaf labelled **X** are

(1)

☐ **A** stomata

☐ **B** phloem vessels

☐ **C** xylem vessels

☐ **D** chloroplasts

(ii) Complete the following sentence.

(1)

Carbon dioxide moves into the leaves through the parts labelled **X** by

the process of ..... .

(iii) Explain how changes to the guard cells on the warm day help the plant to survive.

(2)

.....

.....

.....

.....

.....

Q17.

A student measured the rate of photosynthesis using algal balls in a laboratory. The tube of algal balls was kept at a temperature of 25 °C and was moved to different distances from a light source.

The results of this investigation showed that the rate of photosynthesis is

(1)

☒ **A** directly proportional to the distance from a light source

☒ **B** inversely proportional to light intensity

☒ **C** directly proportional to temperature

☒ **D** inversely proportional to the distance from a light source

(Total for question = 1 mark)

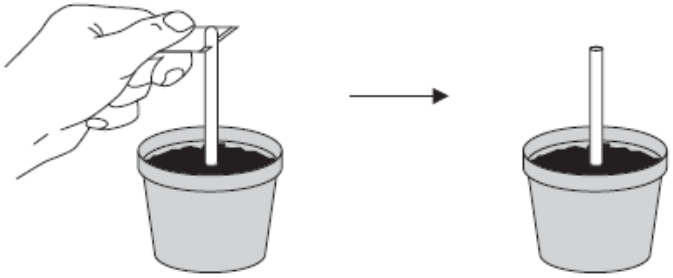
Q18.

Figure 18 shows an investigation into the growth of plant shoots.

Experiment 1:

The tip of a shoot was removed from the plant.

There was no growth in the shoot after 3 days.



Experiment 2:

The tip of a shoot was cut off and then placed back onto the shoot.

The shoot had grown 6 mm after 3 days.

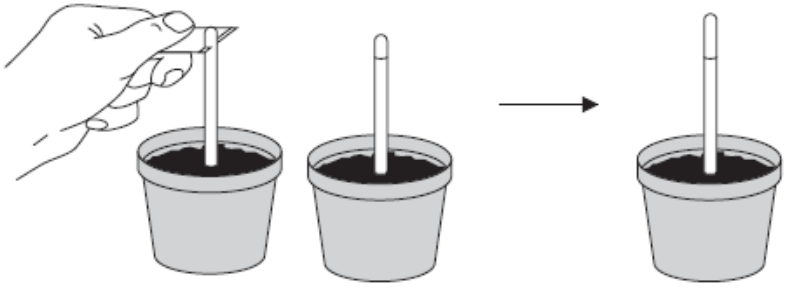


Figure 18

(i) Give **one** variable that must have been controlled for the plant shoot to grow vertically, as shown in experiment 2.

(1)

.....

.....

(ii) State **one** conclusion that could be made based on these two experiments.

(1)

.....

.....

(iii) Which plant hormone causes growth in the plant shoot?

(1)

☒ **A** auxin

☒ **B** ethene

☒ **C** gibberellin

☒ **D** chlorophyll

(iv) Explain **one** way that this investigation could be improved.

(2)

.....

.....

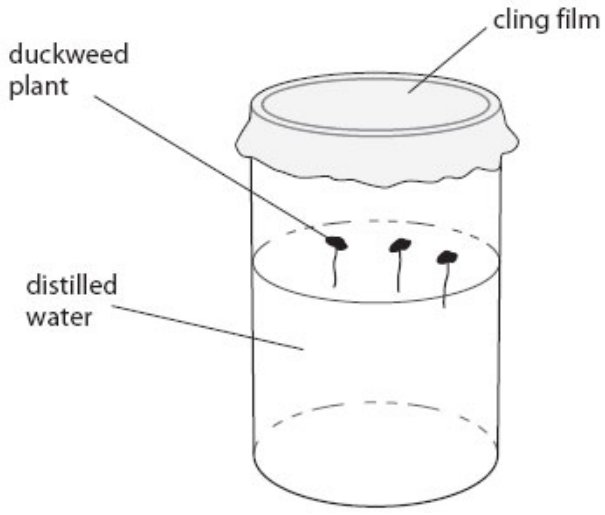
.....

.....

(Total for question = 5 marks)

Q19.

The diagram shows three duckweed plants in a beaker of distilled water.



(i) Explain how the water moves into these plants.

(3)

.....

.....

.....

.....

.....

.....

(ii) Salt was added to the water in the beaker to form a salt solution.

Explain how the salt solution would affect the movement of water into and out of the plant.

(2)

.....

.....

.....

.....

(iii) Complete the sentence by putting a cross (☒) in the box next to your answer.

When the concentration of mineral ions in the soil is greater than in the root hair cell, mineral ions are transported into the root hair cells by

(1)

☒ **A** diffusion

☒ **B** osmosis

☒ **C** respiration

☒ **D** transpiration

Q20.

Figure 7 shows the average size of stomata in a leaf during one day.

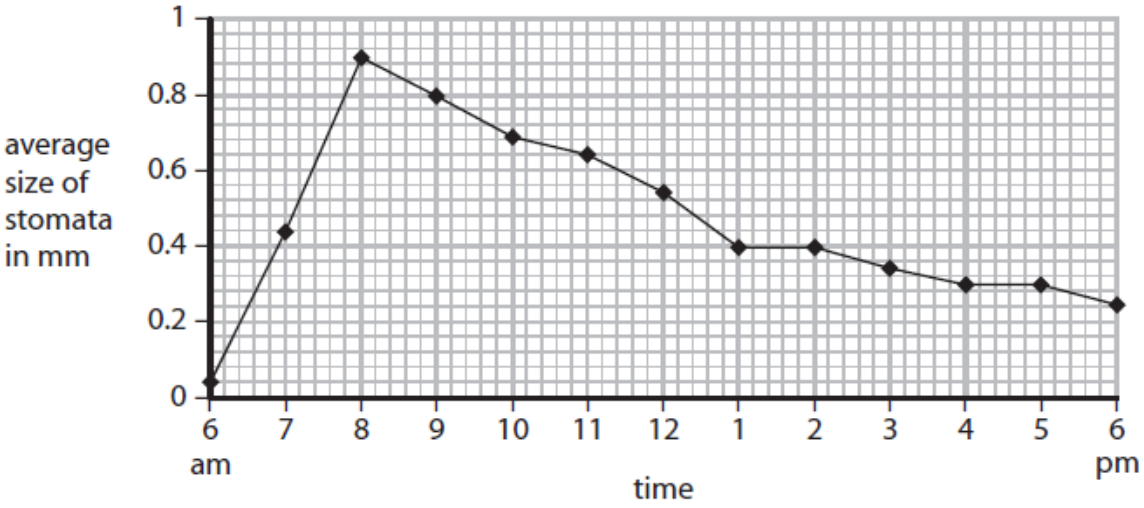


Figure 7

(i) Name the cells that change the size of stomata.

(1)

.....

(ii) Describe the trend shown in Figure 7.

(2)

.....

.....

.....

.....

(iii) The temperature increased from 8 am to 1 pm.

Explain why this affected the size of the stomata.

(2)

.....

.....

.....

.....

(Total for question = 5 marks)