Please check the examination details below before entering your candidate information

Candidate surname	Other names

Centre Number | Candidate Number

Pearson Edexcel Level 1/Level 2 GCSE (9–1)

Friday 7 June 2024

Afternoon (Time: 1 hour 45 minutes)

Paper reference **1BI0/2F**

Biology

PAPER 2

Foundation Tier

You must have:
Ruler, calculator

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*

Information

- The total mark for this paper is 100.
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*
- In questions marked with an **asterisk** (*), marks will be awarded for your ability to structure your answer logically, showing how points that you make are related or follow on from each other where appropriate.

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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P 7 5 5 0 4 A 0 1 3 2

Pearson

Answer ALL questions. Write your answers in the spaces provided.

Some questions must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

1 Scientists use microscopes to study cells.

Figure 1 shows a light microscope.

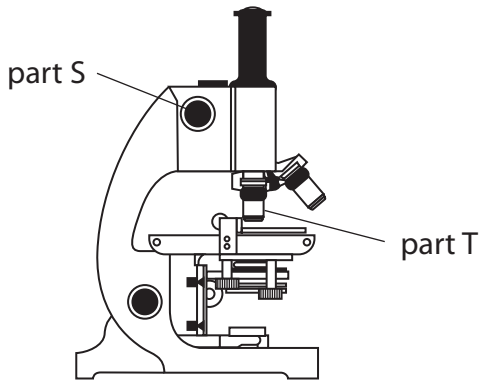


Figure 1

(a) Draw **one** straight line from each part of the microscope to its function.

(2)

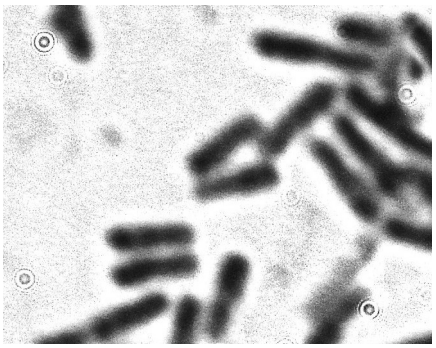
part of microscope	function
	to stain the cells
part S	to focus the image so that it is clear
	to magnify the image
part T	to hold the slide in place
	to provide light to see the image

(b) Figure 2 shows two photographs of bacteria.

Photograph A was taken through a light microscope.

Photograph B was taken using an electron microscope.

Photograph A



Photograph B

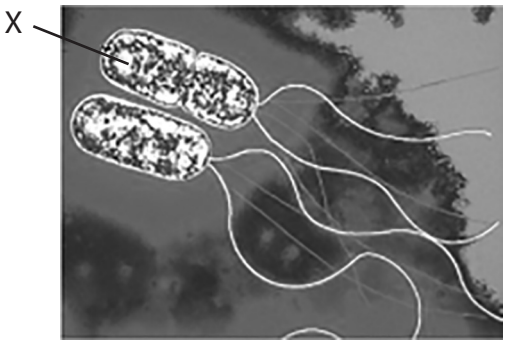


Figure 2

(i) Draw, in the box, the bacterial cell labelled X.

Label **one** part of the bacterial cell on your diagram.

(3)

(ii) State **one** advantage of using a light microscope and **one** advantage of using an electron microscope to study these bacterial cells.

(2)

A light microscope .....

.....

.....

An electron microscope .....

.....

.....

(Total for Question 1 = 7 marks)

2 Plants need light for photosynthesis.

(a) Part of the photosynthesis equation is shown below.

reactant A + water ⟶ glucose + product B

Which row in the table shows reactant A and product B?

(1)

		reactant A	product B
☒	**A**	carbon dioxide	light
☒	**B**	light	oxygen
☒	**C**	oxygen	carbon dioxide
☒	**D**	carbon dioxide	oxygen

(b) Name the green chemical in chloroplasts that absorbs light.

(1)

.....

(c) (i) Plan an experiment to investigate if plants grow faster when they receive more light.
Use the equipment shown in Figure 3.

(3)

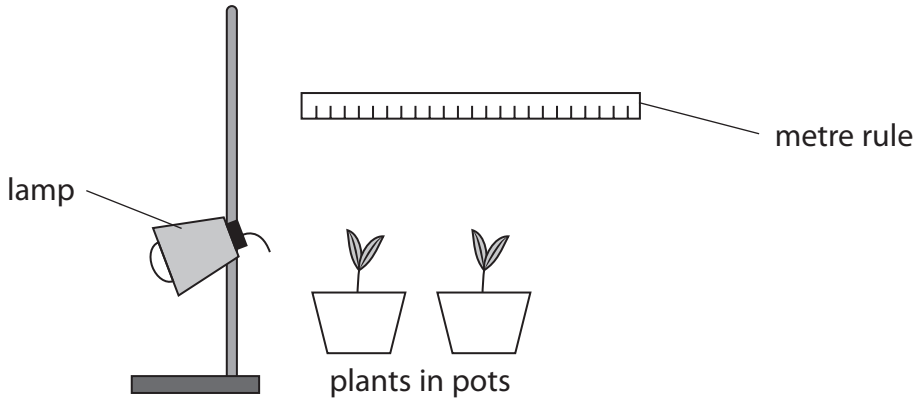


Figure 3

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(ii) State **one** factor that you would keep the same in this experiment.

(1)

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(iii) A plant was kept at a very high temperature of 60 °C.

Explain the effect of this temperature on photosynthesis.

(2)

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(Total for Question 2 = 8 marks)

3 Figure 4 shows a food chain in an oak woodland.

oak tree → aphids → ladybirds → robins

Figure 4

(a) State what the arrows in the food chain represent.

(1)

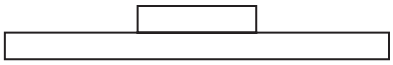
.....

.....

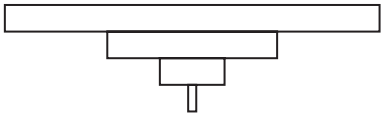
(b) Which diagram represents the pyramid of biomass for this food chain?

(1)

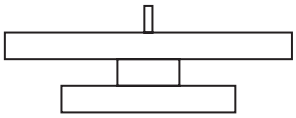
☒ **A**



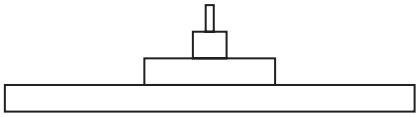
☒ **B**



☒ **C**



☒ **D**



(c) A robin in this woodland eats 6 g of food in a day.

The robin uses 15% of this food for growth.

Calculate the mass of food that is used for growth.

(2)

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(d) Temperatures in England have increased over the last 20 years.

(i) State **two** human activities that have caused this temperature increase.

(2)

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2 .....

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(ii) One new species of moth is now able to live in England because of the increased temperatures.

This moth feeds on oak leaves.

Explain how these moths may affect the number of aphids in the food chain shown in Figure 4.

(2)

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(Total for Question 3 = 8 marks)

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4 Endocrine glands produce hormones.

(a) Draw **two** crosses on Figure 5 to show the position of the ovaries.

(1)

Figure 5

(b) Progesterone is produced in the ovaries.

State **one** effect of progesterone on the uterus lining.

(1)

.....

.....

(c) Insulin is a hormone that controls blood glucose concentration.

(i) Which endocrine gland produces insulin?

(1)

- ☒ **A** thyroid
- ☒ **B** pancreas
- ☒ **C** adrenal
- ☒ **D** pituitary

(ii) State how insulin is transported from its endocrine gland to its target organs.

(1)

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(iii) Name the main target organ for insulin.

(1)

.....

(d) People with type 1 diabetes cannot produce insulin.

Figure 6 shows the blood glucose concentration for a person with type 1 diabetes.

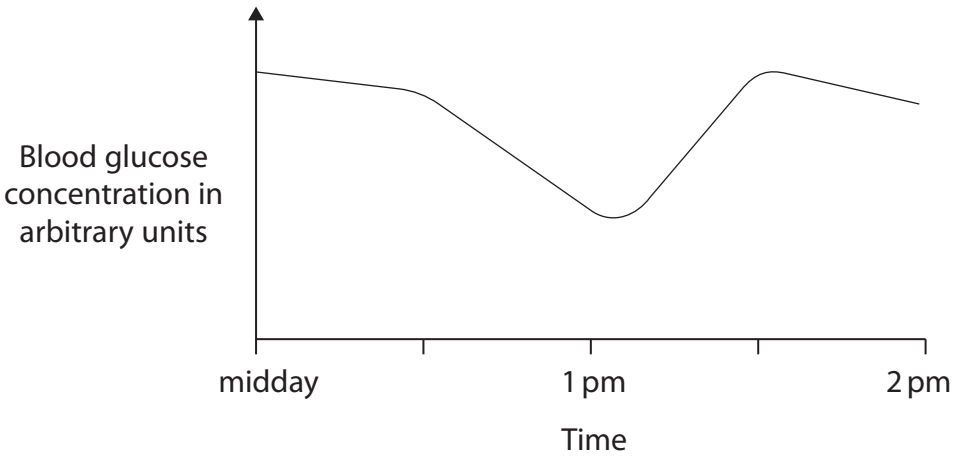

Figure 6

(i) Describe the trend from midday to 1 pm.

(2)

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(ii) State what a person with type 1 diabetes could have done to cause the change in the blood glucose concentration from 1.05 pm to 1.30 pm.

(1)

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(e) People with type 2 diabetes have cells that do not respond to insulin.

State **two** ways that people with type 2 diabetes can control their blood glucose concentration.

(2)

1 .....

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2 .....

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(Total for Question 4 = 10 marks)

5 Figure 7 shows the structure of a leaf.

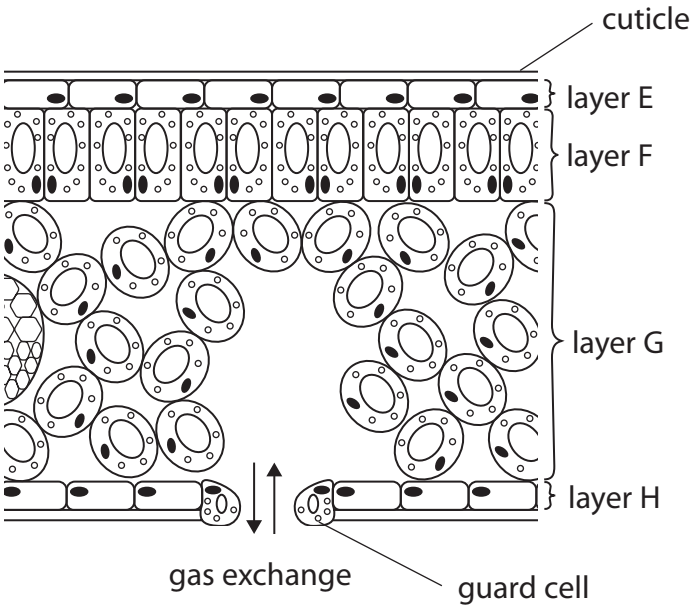

Figure 7

(a) (i) Which layer has the highest number of chloroplasts per cell?

(1)

- ☒ **A** layer E
- ☒ **B** layer F
- ☒ **C** layer G
- ☒ **D** layer H

(ii) When iodine solution was put onto these cells, small parts of the cells became blue-black.

Name the substance stored in the parts of the cells that turned blue-black.

(1)

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(iii) State how the guard cells control the amount of gas exchange that occurs through the stomata.

(1)

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(b) A scientist measured the thickness of the cuticle from the leaves of plants growing in soil that had a different percentage of water content.

The scientist measured six plants at each percentage of water content.

Figure 8 shows the results.

water content of soil (%)	thickness of the cuticle in μm						mean thickness of cuticle in μm
	plant 1	plant 2	plant 3	plant 4	plant 5	plant 6	
5	13.8	12.3	11.4	10.6	11.7	13.2	12.2
10	11.1	8.8	10.0	8.9	7.0	8.2	9.0
15	7.2	7.1	6.9	5.4	5.9	6.1	?
20	3.6	4.0	3.6	4.2	3.9	4.3	3.9

Figure 8

(i) Calculate the mean thickness of cuticle for the plants growing in soil containing 15% water.

Give your answer to one decimal place.

(3)

..... μm

(ii) Explain why the thickness of the cuticle is different when a plant is grown in soil with a higher water content.

(2)

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(iii) State **one** other way that the leaves of plants are adapted to help plants grow in soil with low water content.

(1)

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(Total for Question 5 = 9 marks)

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6 In humans, gas exchange occurs in the alveoli of the lungs.

Figure 9 shows the structure of an alveolus and its blood supply.

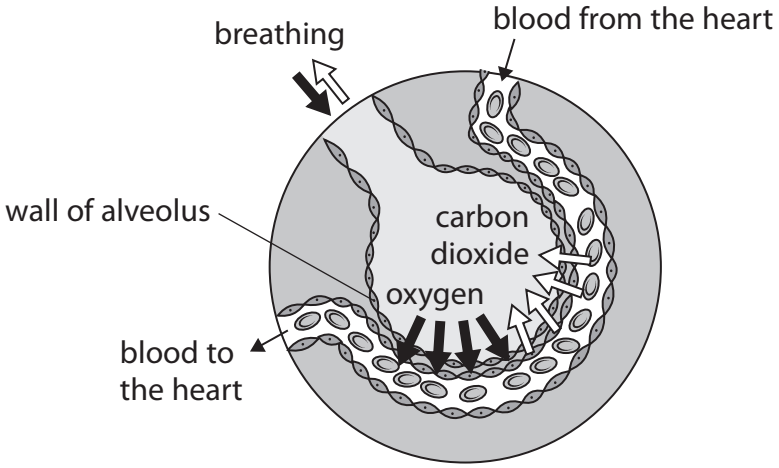

Figure 9

(a) Which process moves carbon dioxide from the blood into the alveolus?

(1)

- ☒ **A** diffusion
- ☒ **B** osmosis
- ☒ **C** active transport
- ☒ **D** transpiration

(b) State **one** adaptation of an alveolus that increases the rate of gas exchange.

(1)

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(c) Describe how blood is moved from the heart to the lungs.

(2)

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(d) Figure 10 shows the heart rate of a person before, during and after exercise.

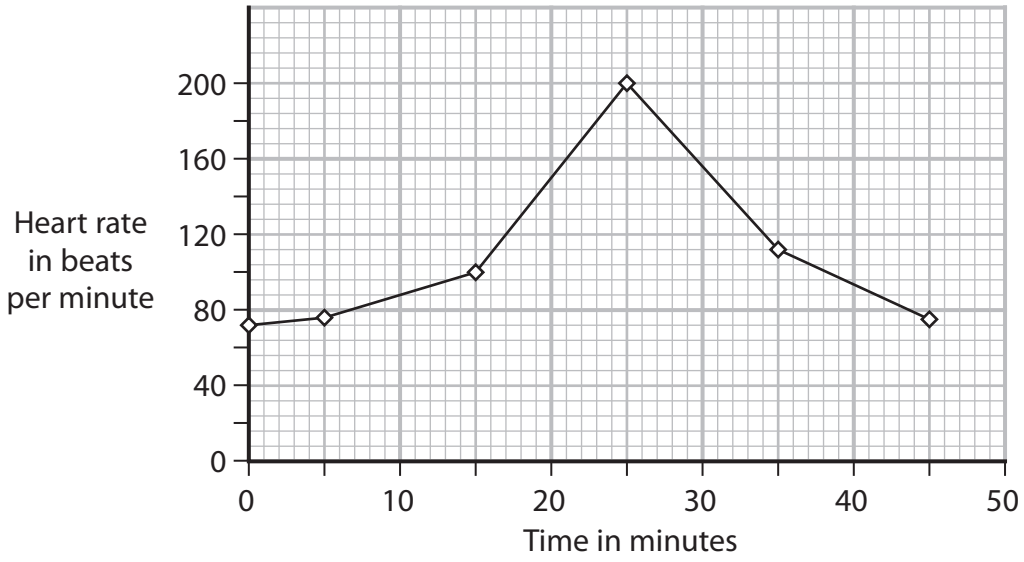

Figure 10

(i) Describe the trend shown in Figure 10.

Use data from Figure 10 to support your answer.

(2)

(ii) Explain the trend shown in Figure 10 from 5 minutes to 25 minutes.

(2)

(iii) The stroke volume is the volume of blood pumped during one beat of the heart.

At 25 minutes the stroke volume was 0.13 dm^3.

Calculate the cardiac output of the heart of this person at 25 minutes.

Use the equation

cardiac output = stroke volume × heart rate

(3)

..... dm^3 per minute

(Total for Question 6 = 11 marks)

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7 Figure 11 shows the structure of a kidney nephron.

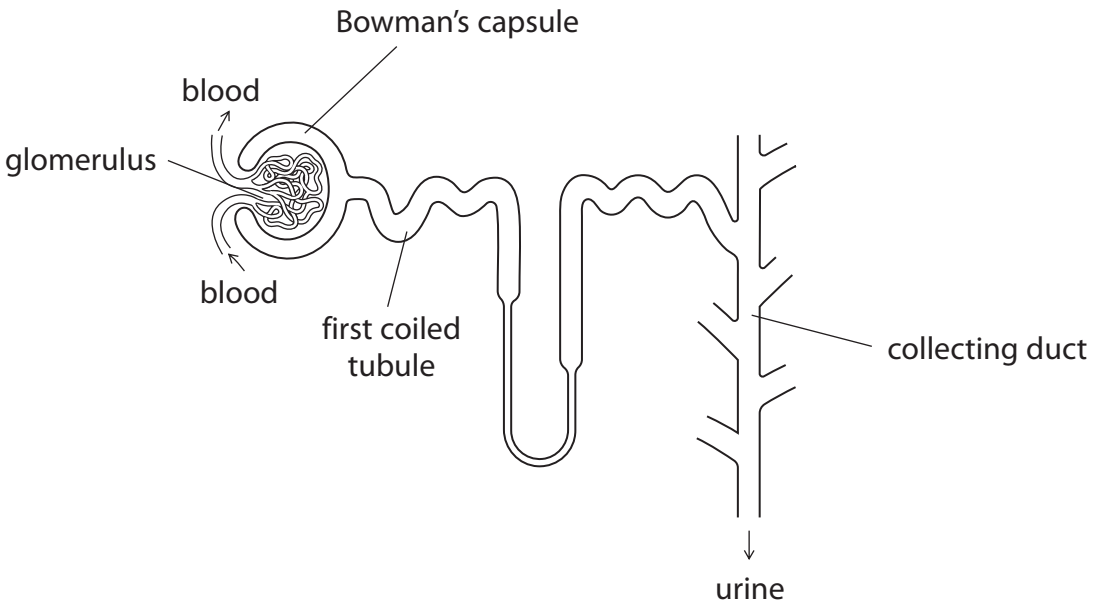

Figure 11

(a) Small soluble substances including glucose are forced out through small holes in the glomerulus into the Bowman's capsule.

Which term describes this process?

(1)

- ☒ **A** diffusion
- ☒ **B** osmosis
- ☒ **C** filtration
- ☒ **D** absorption

(b) Explain why red blood cells do not move from blood in the glomerulus into the Bowman's capsule.

(2)

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(c) (i) Describe what happens in the collecting duct to make the urine more concentrated.

(2)

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.....

(ii) State where urine is stored before it leaves the body.

(1)

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*(d) Describe how you would use laboratory tests to show if a food contains glucose (a reducing sugar) and protein.

Include in your answer:

- how you would prepare the sample of food
- how you would use Benedict's solution and Biuret solution
- the results you would expect.

(6)

(Total for Question 7 = 12 marks)

8 (a) The heart pumps blood.

Explain why the wall of the left ventricle of the heart is thicker than the wall of the right ventricle of the heart.

(2)

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(b) A centrifuge can be used to separate the different parts of human blood.

Figure 12 shows blood separated into different parts.

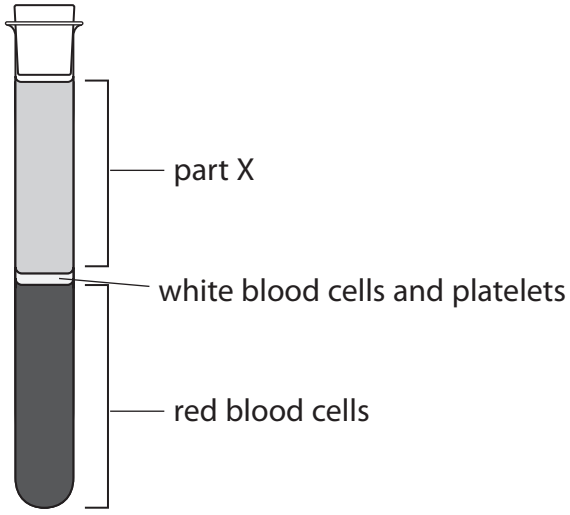

Figure 12

(i) Name part X.

(1)

.....

(ii) Which substance, needed for cellular respiration, is carried by red blood cells?

(1)

☒ **A** carbon dioxide

☒ **B** urea

☒ **C** amino acids

☒ **D** oxygen

(iii) Name **two** types of white blood cell.

(2)

1 .....

2 .....

(c) (i) When a person donates blood, 470 cm^3 of blood is removed from their body.

Red blood cells make up 44% by volume of the blood.

Calculate the volume of red blood cells in 470 cm^3 of donated blood.

Give your answer to the nearest whole number.

(3)

..... cm^3

(ii) Before donating blood, a person has a small blood sample taken to check that the blood is healthy.

State **two** precautions a doctor should take when collecting this sample.

(2)

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2 .....

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(Total for Question 8 = 11 marks)

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9 (a) Figure 13 shows a root hair cell from a plant.

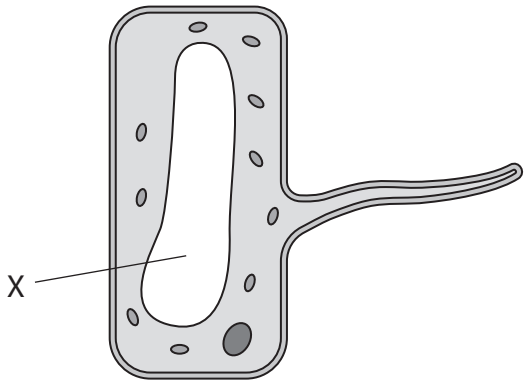

Figure 13

(i) Name the part labelled X.

(1)

.....

(ii) State **one** way that the structure of the root hair cell increases the volume of substances it absorbs.

(1)

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.....

(iii) Explain why root hair cells do not contain chloroplasts.

(3)

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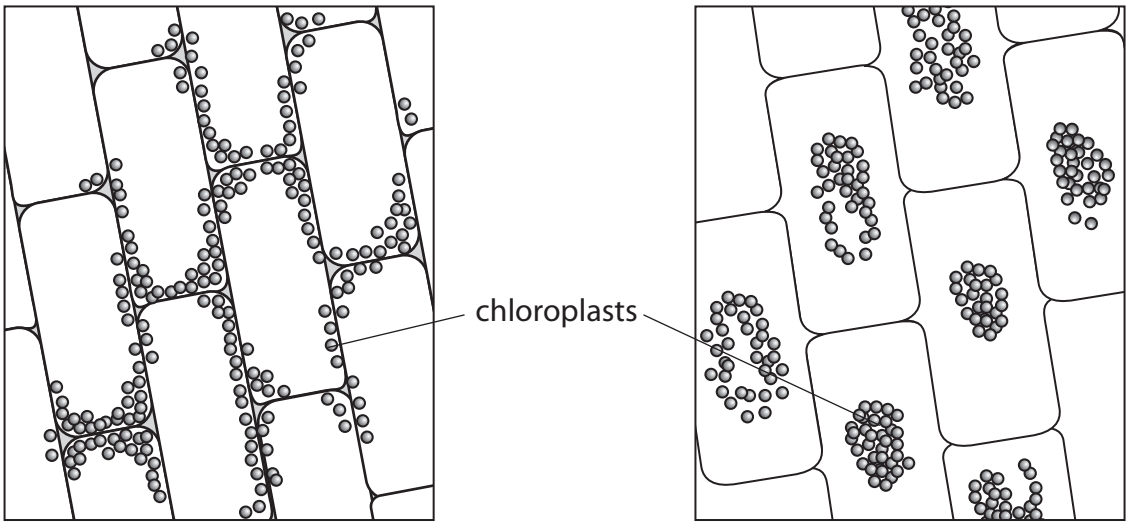
(b) A student studied the water plant *Elodea*.

The student used a light microscope to observe the cells of the plant in tap water and in a 10% salt solution.

Figure 14 shows *Elodea* cells in tap water and in a 10% salt solution.



Elodea cells in tap water

Elodea cells in 10% salt solution

Figure 14

Describe **two** ways that the *Elodea* cells in the 10% salt solution are different from the *Elodea* cells in tap water.

(2)

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2 .....

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*(c) The arrows in Figure 15 show the direction of water movement through a tree.

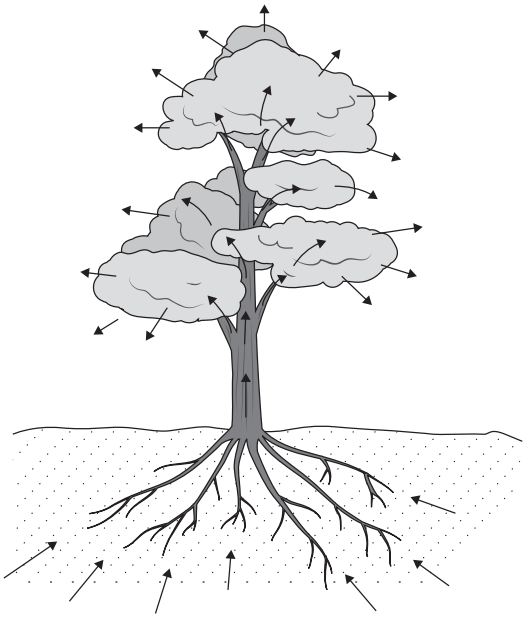

Figure 15

Explain how water is moved from the soil, through the plant and into the air.

(6)

(Total for Question 9 = 13 marks)

10 A student investigated the decomposition of two different types of leaf.

The student placed 200 grams of holly leaves in a net bag.

The student placed 200 grams of oak leaves in another net bag.

The bags were left in a classroom.

The mass of the leaves in each bag was recorded every 10 days for 50 days.

(a) State **two** variables that would need to be controlled in this investigation.

(2)

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2 .....

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(b) The results of this investigation are shown in Figure 16.

time in days	mass of leaves in grams	
	holly	oak
0	200	200
10	191	181
20	176	154
30	159	122
40	147	96
50	120	70

Figure 16

(i) Calculate the rate of decomposition of holly leaves from 0 to 50 days.

(2)

..... grams per day

(ii) Compare the trends shown in the data for holly leaves and oak leaves.

(2)

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(c) Explain why it is important for the environment that dead leaves are decomposed.

(2)

(d) Name **one** type of organism that decomposes leaves.

(1)

(e) Leaves are eaten by snails.

1 600 grams of leaves and 10 snails were kept in a container for one month.

A scientist measured the mass of the leaves and the mass of the snails at the start and end of one month.

Figure 17 shows the results.

	mass in grams	
	at start of month	**at end of month**
leaves	1 600	400
snails	200	320

Figure 17

Explain why the change in mass of the leaves is not the same as the change in mass of the snails.

(2)

(Total for Question 10 = 11 marks)

TOTAL FOR PAPER = 100 MARKS

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