

Please check the examination details below before entering your candidate information

Candidate surname

Other names

Centre Number

Candidate Number

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

Time 1 hour 10 minutes

Paper
reference

1SC0/2BF

Combined Science

PAPER 4

Foundation Tier

You must have:

Calculator, ruler

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.*
- Calculators may be used.
- Any diagrams may NOT be accurately drawn, unless otherwise indicated.
- You must **show all your working out** with **your answer clearly identified** at the **end of your solution**.

Information

- The total mark for this paper is 60.
- 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 the 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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Q:1/e2



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 (a) Figure 1 shows part of the carbon cycle.

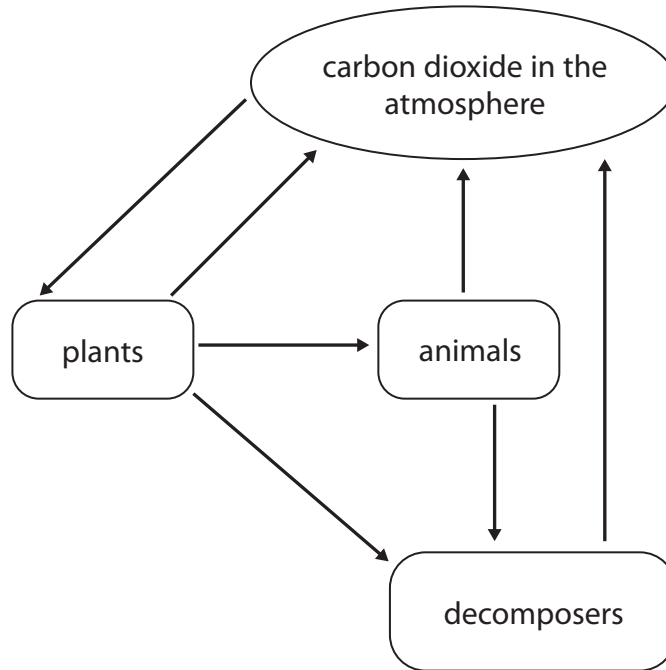


Figure 1

(i) Name the process that transfers carbon from plants to animals.

(1)

(ii) Use words from the box to complete the sentences.

(2)

| | | |
|----------------|---------------|---------------|
| digestion | translocation | osmosis |
| photosynthesis | respiration | transpiration |

Plants use carbon dioxide from the atmosphere for

Animals release carbon dioxide and energy during



(iii) Which of these can be a decomposer?

(1)

- A mammal
- B producer
- C microorganism
- D tree

(b) The water cycle is the movement of water through an ecosystem.

Which process is used to obtain freshwater from seawater?

(1)

- A excretion
- B precipitation
- C sterilisation
- D desalination

(c) Water from rivers can be filtered and then treated with chemicals to make it suitable for drinking.

(i) Give **one** reason why water is filtered.

(1)

(ii) Give **one** reason why water is treated with chemicals.

(1)

(Total for Question 1 = 7 marks)

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2 (a) Blood contains red blood cells, white blood cells, plasma and platelets.

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

(2)

| part of the blood | function |
|-------------------|-------------------------------------|
| plasma | produces oestrogen |
| | transports dissolved urea |
| | contains haemoglobin |
| red blood cell | produces antibodies |
| | surrounds and digests foreign cells |

Figure 2 shows some red blood cells.



(Source: © SciePro/Shutterstock)

Figure 2



(ii) State **two** features that can be seen in the red blood cells in Figure 2.

(2)

1

2

(b) Lymphocytes are white blood cells that produce large amounts of protein.

(i) Which organelle is needed to produce large amounts of protein?

(1)

- A ribosome
- B vacuole
- C chloroplast
- D flagellum

A small lymphocyte has a diameter of 10 μm (micrometres).

A microscope magnifies this lymphocyte 400 times.

(ii) Calculate the diameter of the image of the lymphocyte seen using this microscope.

(2)

image size μm

(iii) How many micrometres are in 1 mm (millimetre)?

(1)

- A 10
- B 100
- C 1000
- D 10000

(Total for Question 2 = 8 marks)

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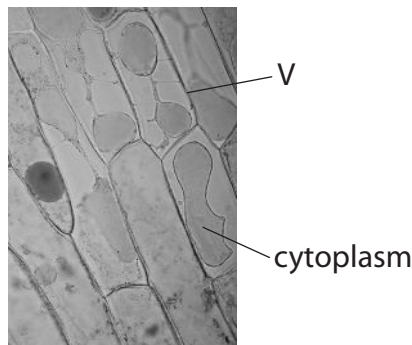
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- 3 (a) Figure 3 shows some onion cells that have been soaked in a concentrated salt solution.



(Source: © Rattiya Thongdumhyu/Shutterstock)

Figure 3

- (i) The cells in Figure 3 have been stained.

Give **one** reason why the cells have been stained.

(1)

- (ii) Which is the name of the structure labelled V?

(1)

- A chloroplast
- B vacuole
- C nucleus
- D cell wall

- (iii) The salt solution outside the cell has a higher concentration than the solution inside the cell.

Explain why the cytoplasm shrinks away from the sides of the cell when the cells are in salt solution.

(2)

(b) Figure 4 shows the equipment used to prepare a microscope slide of onion cells.

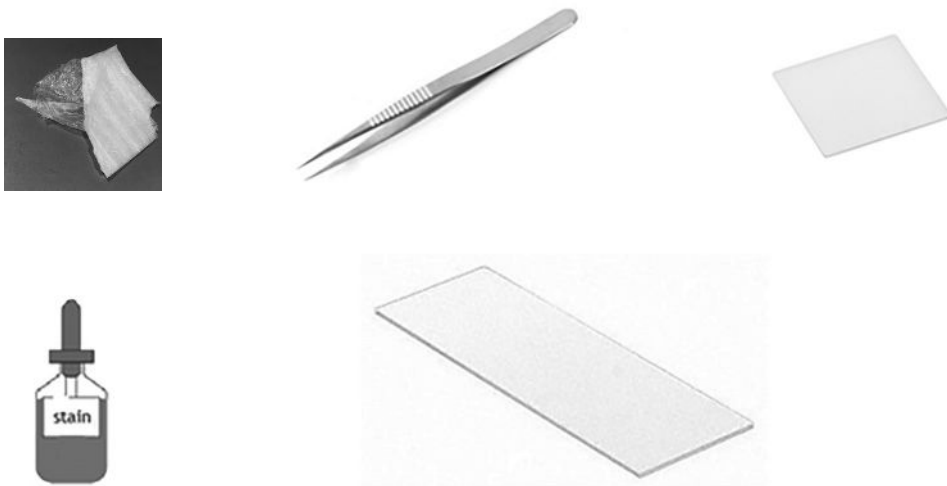


Figure 4

Describe how this equipment could be used to prepare a slide of onion cells to view under a microscope.

(3)

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(c) A student investigated the percentage change in mass of potato cylinders placed in sucrose solutions of different concentrations.

Figure 5 shows the results of the student's investigation.

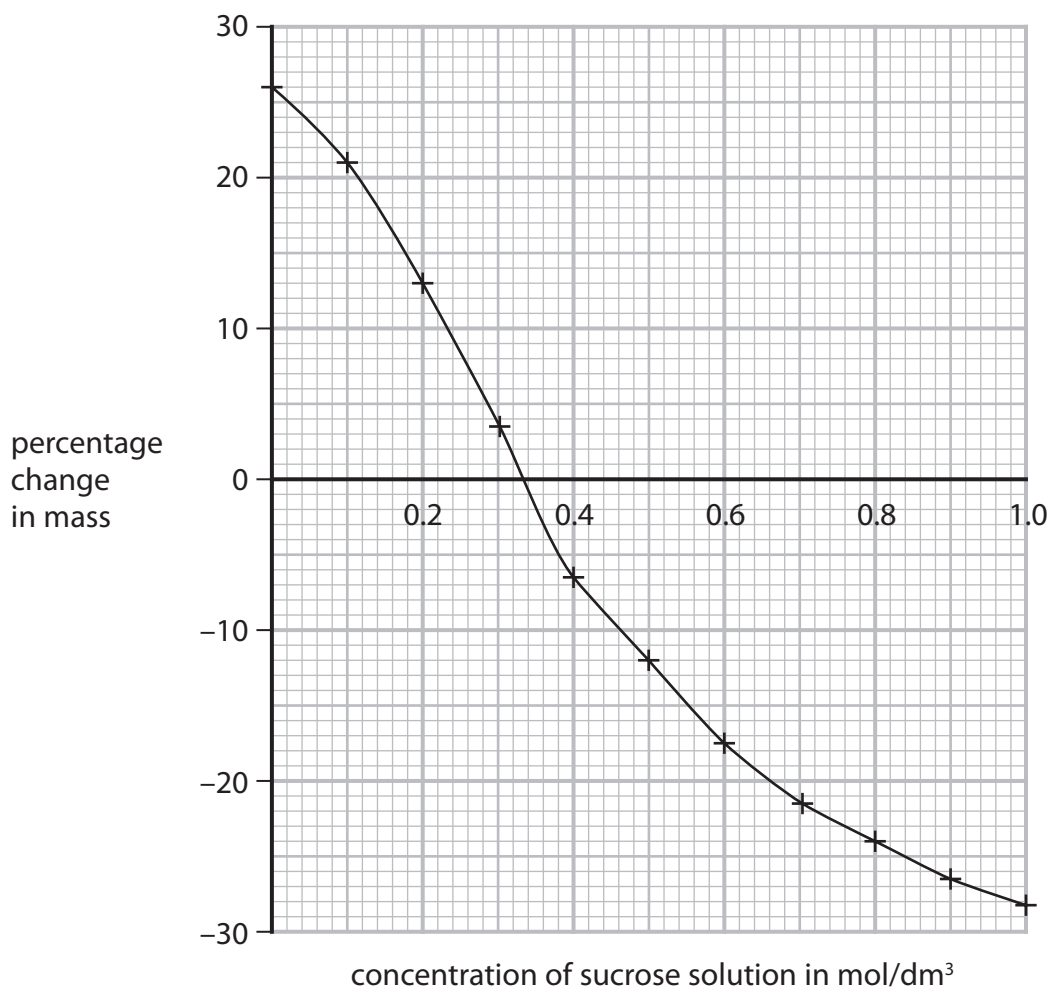


Figure 5

State **two** conclusions that can be made from these results.

(2)

1

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(Total for Question 3 = 9 marks)



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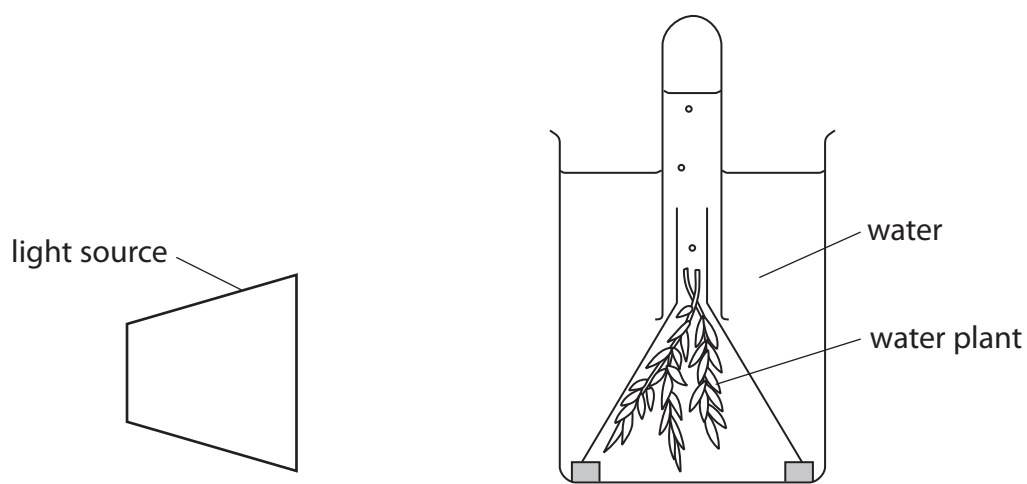


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4 (a) Figure 6 shows a method of investigating the rate of photosynthesis in a water plant.



(Source: © ghrzuzudu/Shutterstock)

Figure 6

(i) What are the products of photosynthesis?

(1)

- A carbon dioxide and water
- B water and glucose
- C glucose and oxygen
- D oxygen and carbon dioxide



- (ii) The rate of photosynthesis can be measured by counting the number of bubbles of gas produced in one minute.

Figure 7 shows some results from this investigation in different light intensities.

Light intensity was changed by moving the lamp towards or away from the water plant.

| light intensity in arbitrary units | rate of photosynthesis in bubbles per minute |
|------------------------------------|--|
| 25 | 19 |
| 31 | 43 |
| 39 | 46 |
| 50 | 95 |
| 69 | 125 |
| 100 | 222 |

Figure 7

Describe the effect of light intensity on the rate of photosynthesis. Use information from Figure 7 to help you.

(2)

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- (iii) The bubbles are different sizes and can be difficult to count.

Describe how the quality of the results from this investigation could be improved.

(2)

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(iv) Describe how this investigation could be changed to find the effect of temperature on the rate of photosynthesis.

(3)

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(b) Increased nitrates can cause eutrophication in lakes.

Explain how eutrophication will affect the fish living in the lakes.

(3)

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(Total for Question 4 = 11 marks)

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5 (a) Figure 8 shows a diagram of a plant root hair cell.

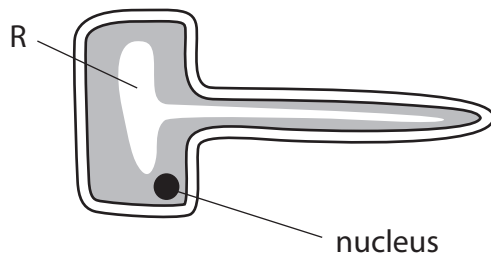


Figure 8

(i) Name the part labelled R.

(1)

(ii) Explain **one** adaptation of a root hair cell that increases the absorption of water and mineral ions.

(2)

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(b) Figure 9 shows xylem and phloem from the stem of a plant.

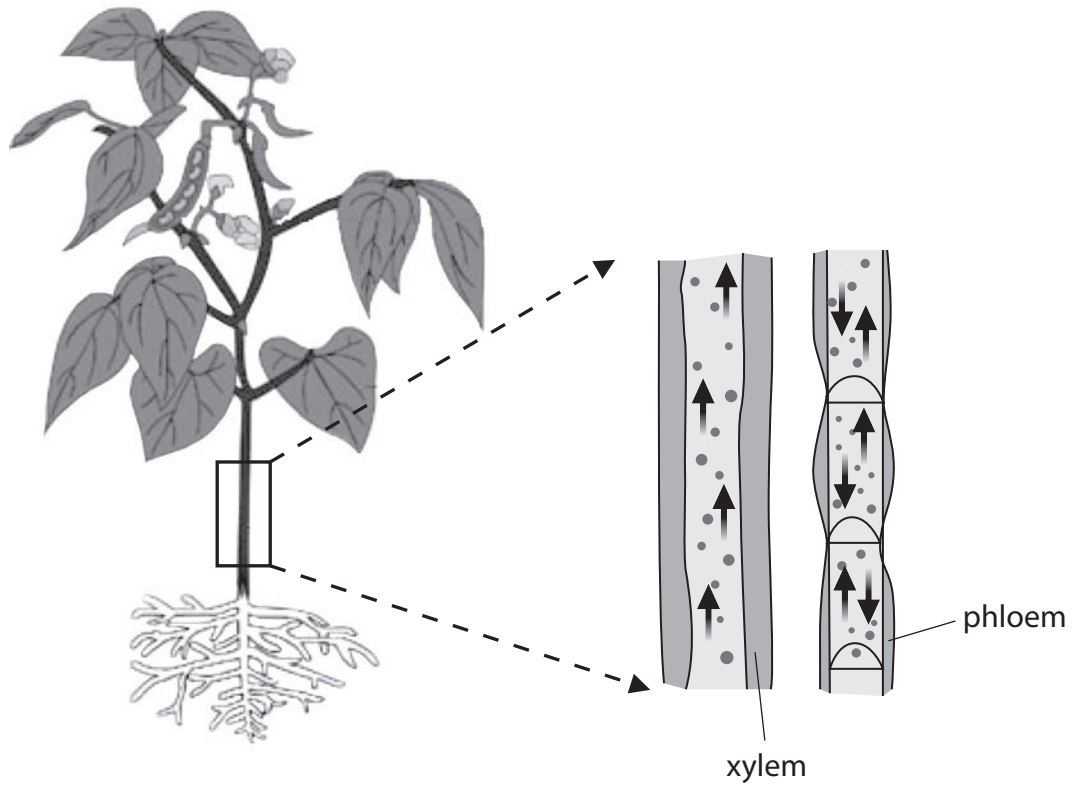


Figure 9

(i) Living cells in phloem use energy to transport sucrose.

Which organelles release energy in living cells?

(1)

- A vacuoles
- B mitochondria
- C nuclei
- D ribosomes

(ii) Describe **two** features of the structure of xylem vessels that can be seen in Figure 9.

(2)

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(c) 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 10 shows the results of this investigation.

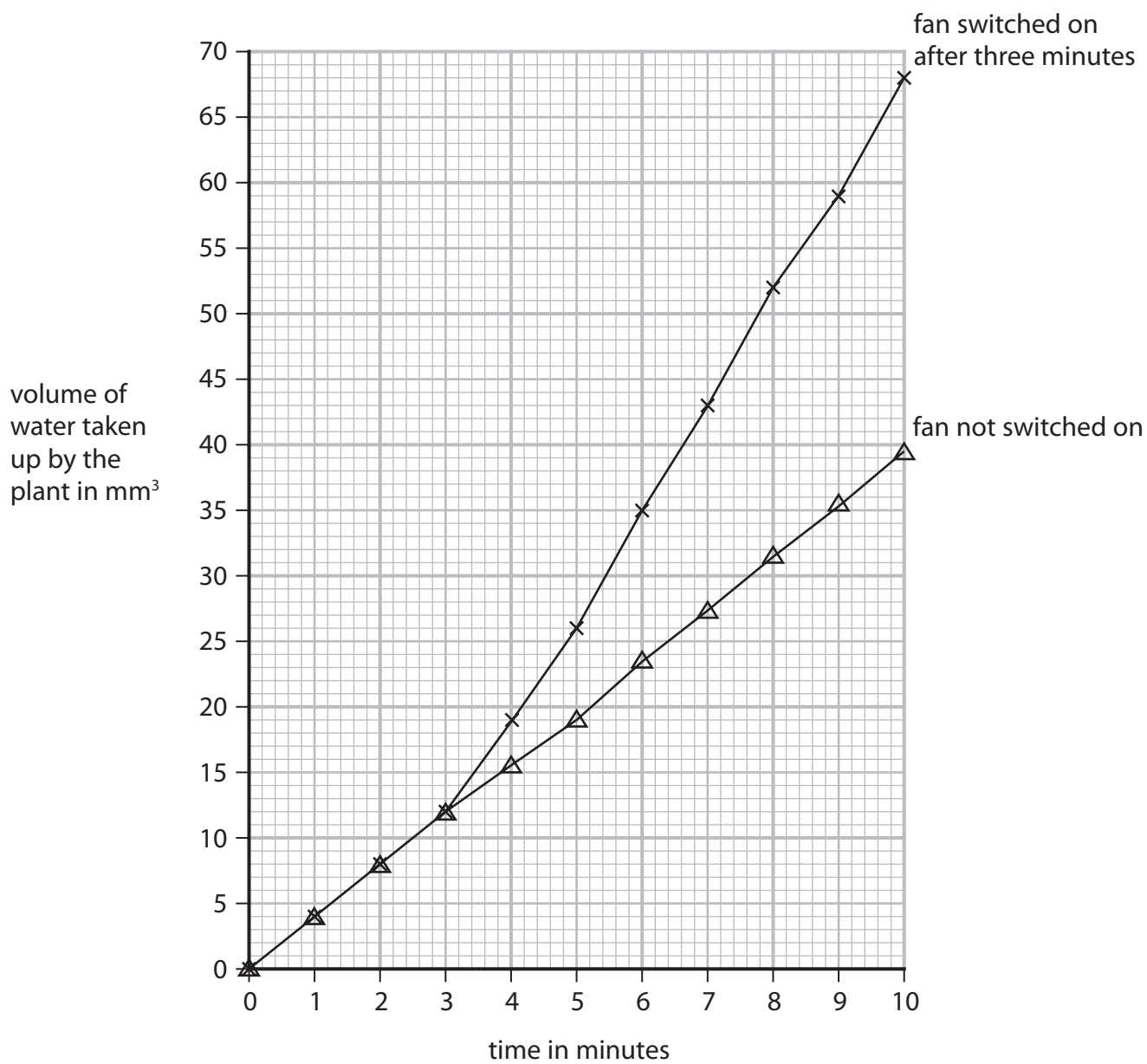


Figure 10



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

(3)

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(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)

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(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)

..... mm³ per minute

(Total for Question 5 = 12 marks)



6 (a) Figure 11 shows a cross-section of an artery and a vein.



(Source: © The University of Kansas Medical Center)

Figure 11

(i) Explain **one** difference between the artery wall and the vein wall shown in Figure 11.

(2)

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(ii) Name **one** structure that is found in veins but not found in arteries.

(1)

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(b) A human body has 5 dm^3 of blood.

At rest 20% of the blood travels to the muscles.

During exercise 60% of the blood travels to the muscles.

(i) Calculate the volume of blood travelling to the muscles during exercise. (2)

..... dm^3

(ii) Explain **one** reason why there is an increase in blood flow to muscles during exercise. (2)

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*(c) Figure 12 shows the structure of the human heart.

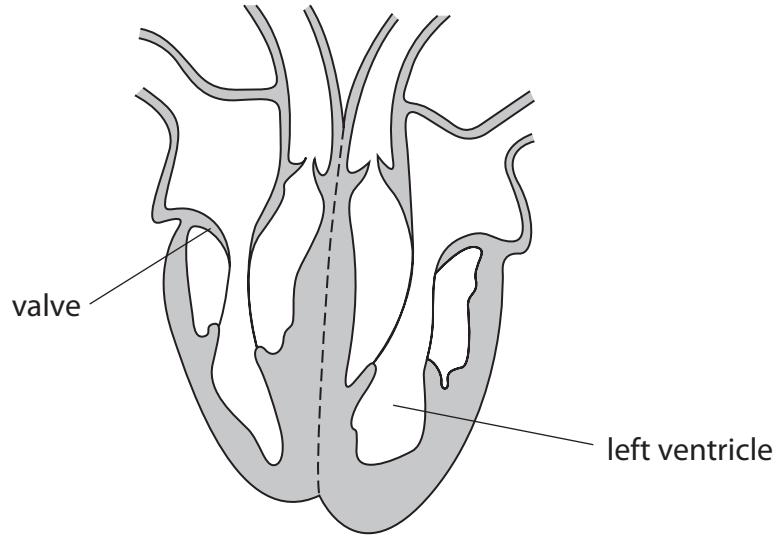


Figure 12

Explain how the structure of the heart is related to its function.

(6)

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(Total for Question 6 = 13 marks)

TOTAL FOR PAPER = 60 MARKS

