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)

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

P 6 9 4 7 7 A 0 1 2 0

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.

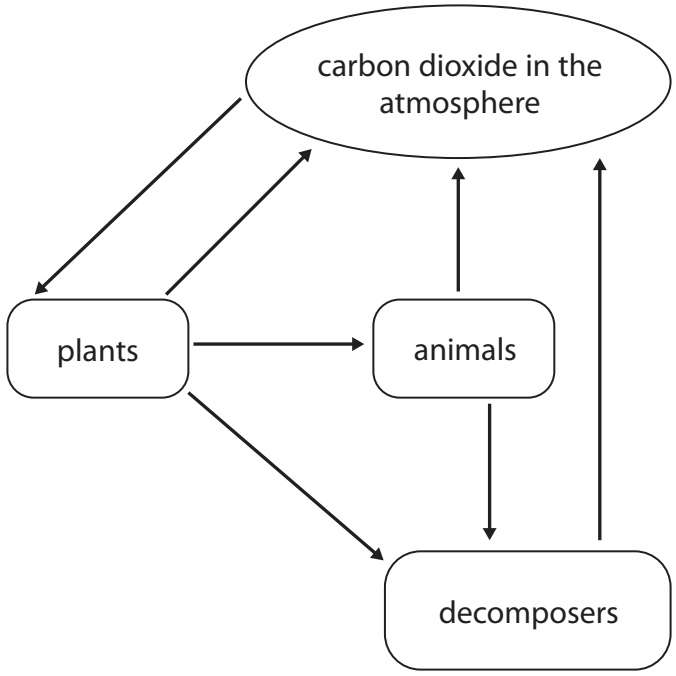


Figure 1

(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 .....

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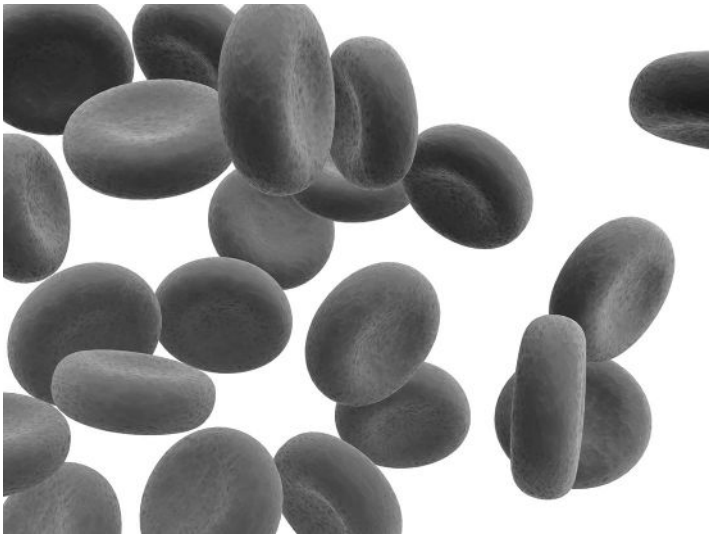
2 (a) Blood contains red blood cells, white blood cells, plasma and platelets.

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

(2)

part of the blood	**function**
	produces oestrogen
plasma	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

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(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** 1 000

☒ **D** 10 000

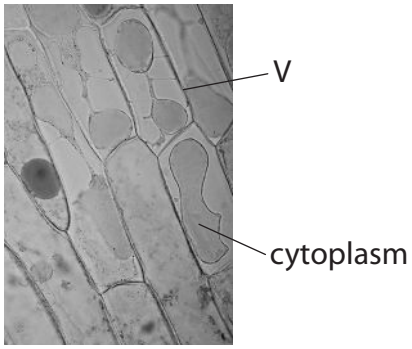
(Total for Question 2 = 8 marks)

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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)

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

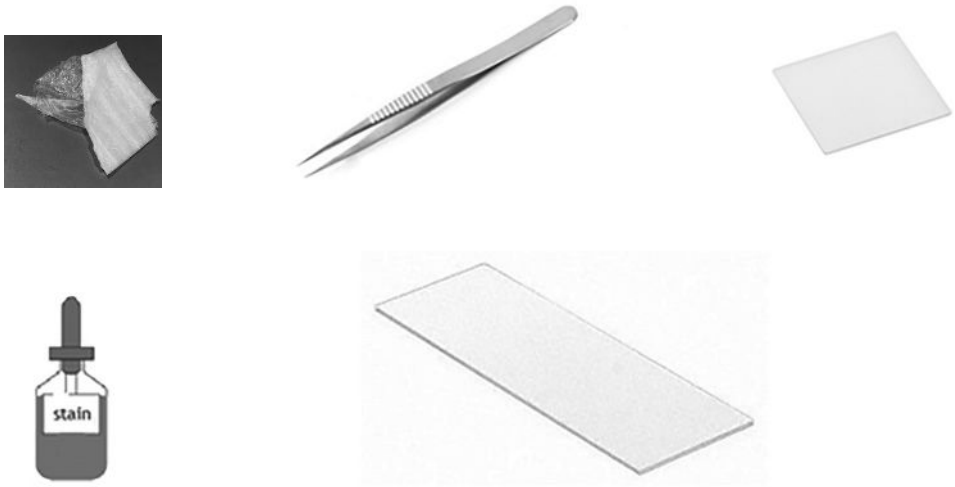


Figure 4

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.

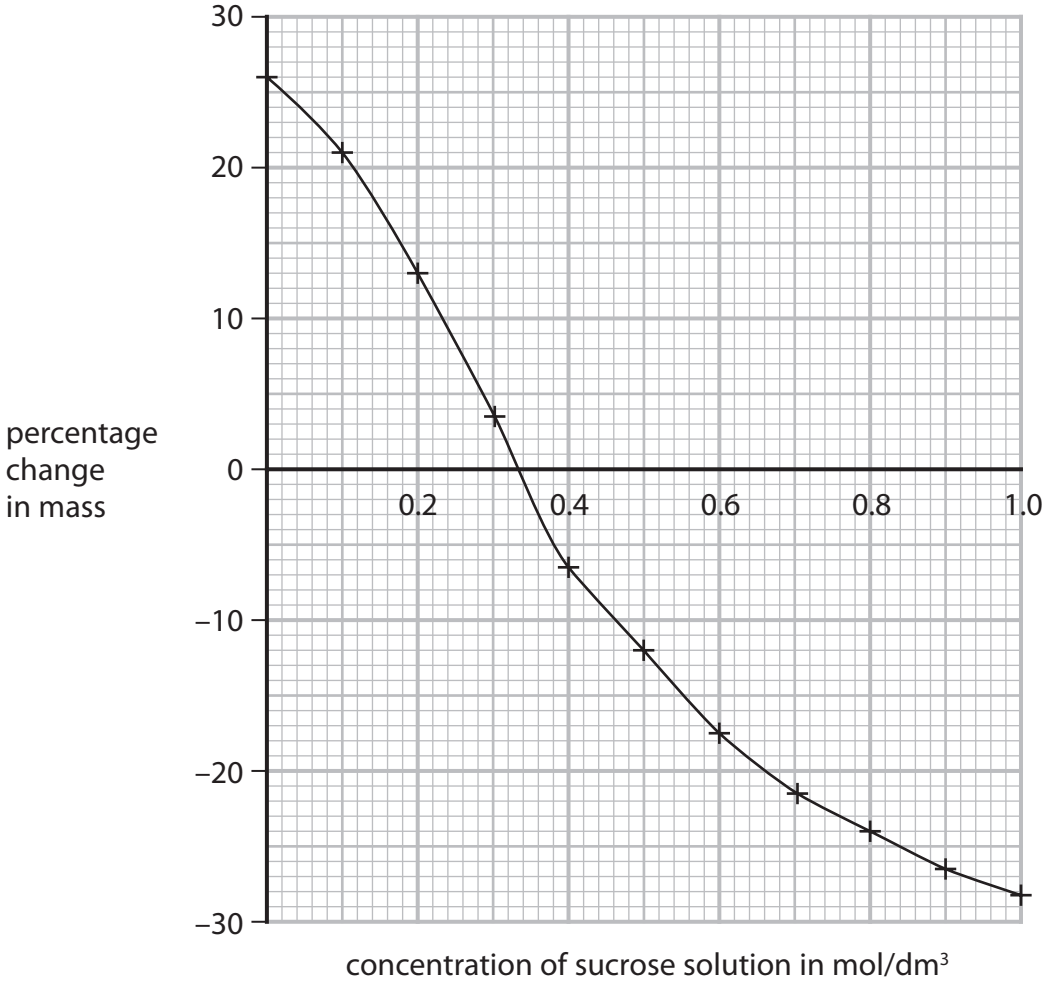


Figure 5

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

(2)

1 .....

.....

2 .....

.....

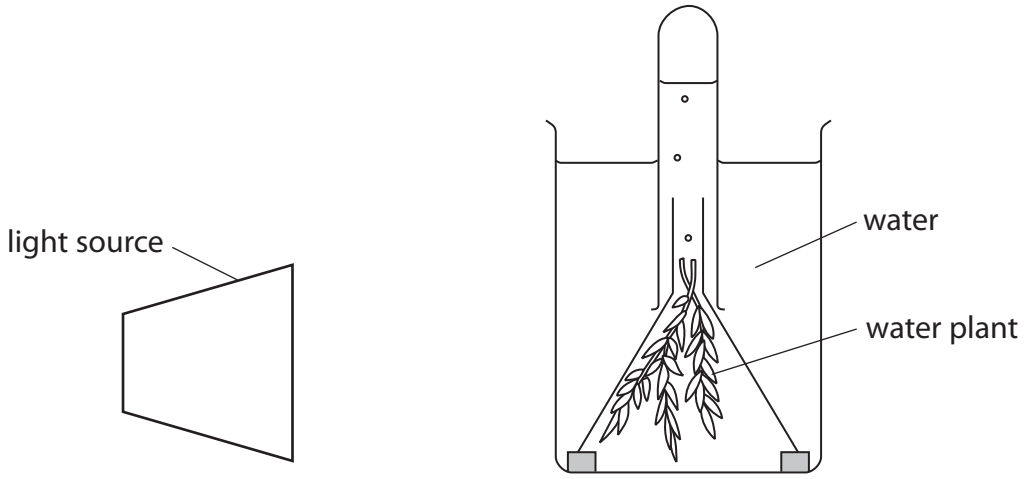
(Total for Question 3 = 9 marks)

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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

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(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)

(b) Increased nitrates can cause eutrophication in lakes.

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

(3)

(Total for Question 4 = 11 marks)

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

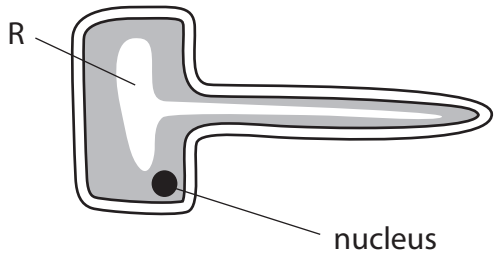


Figure 8

(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.

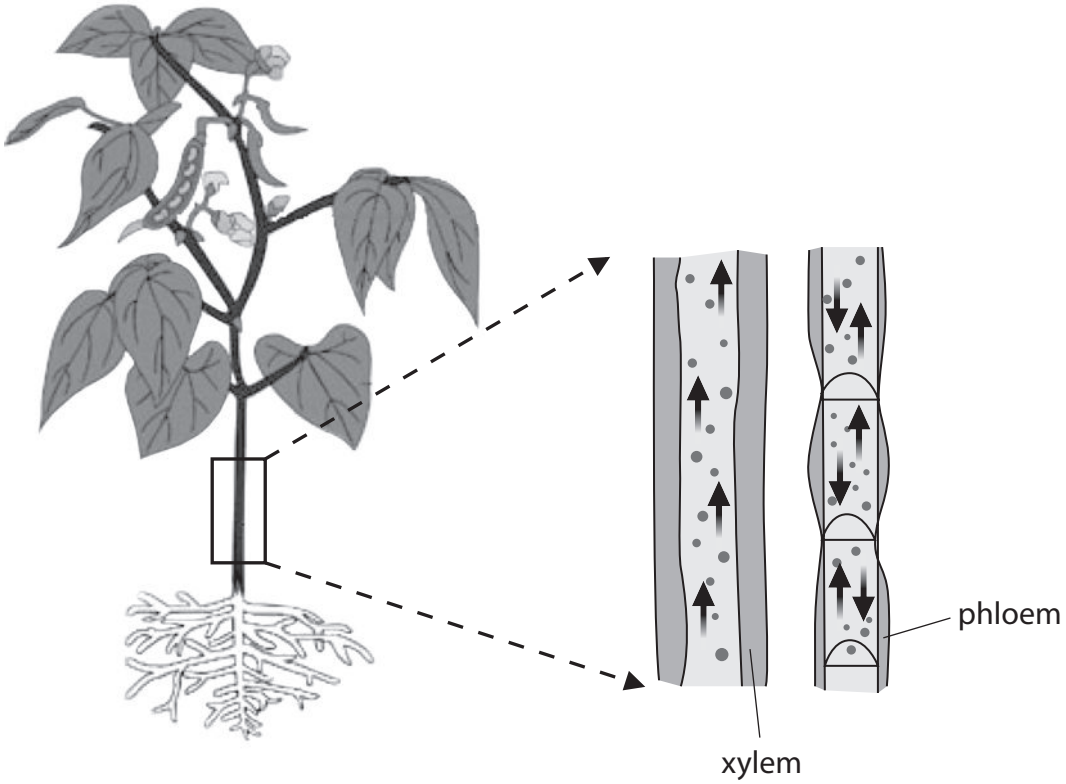


Figure 9

(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)

1 .....

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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.

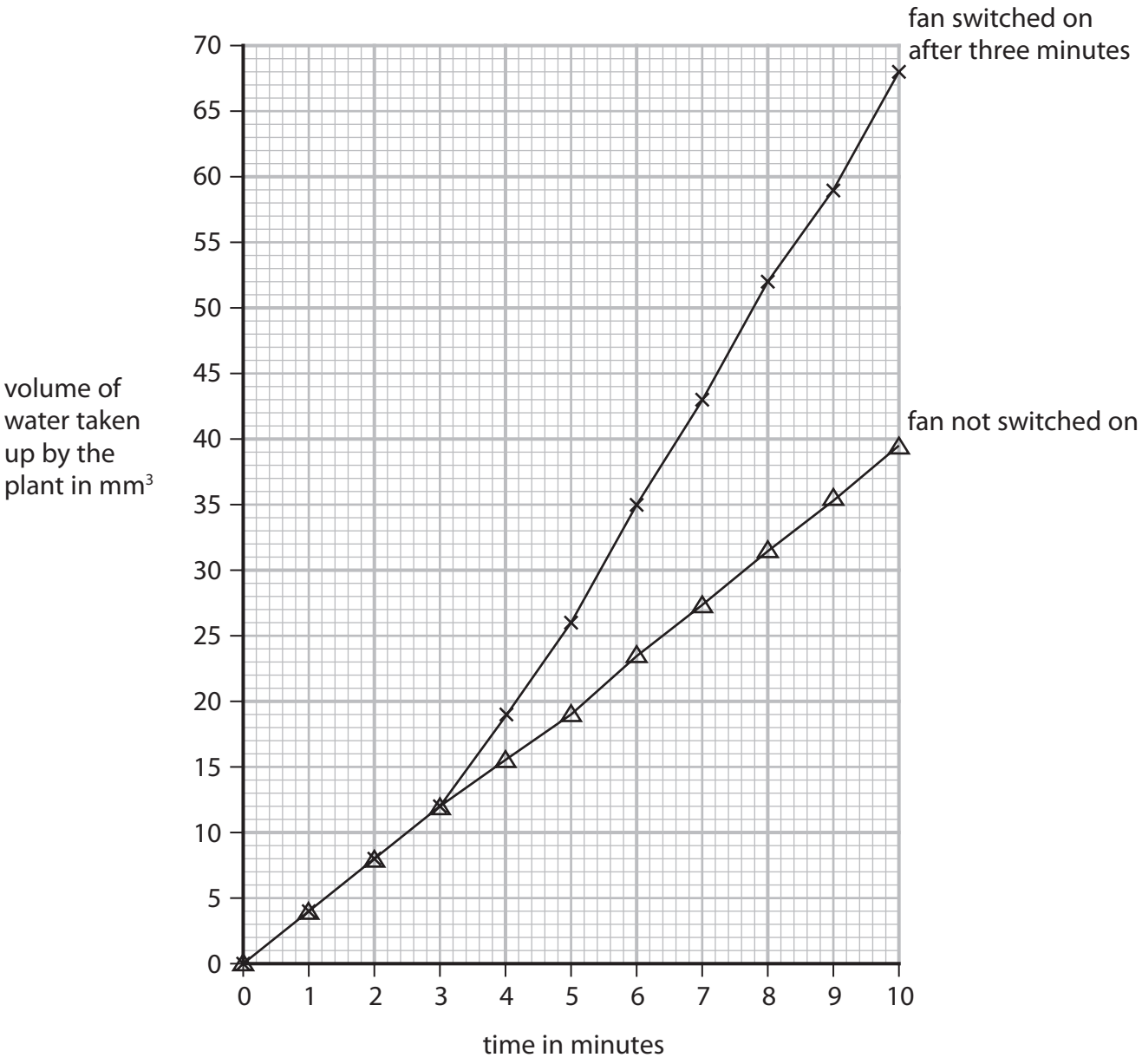


Figure 10

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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)

(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

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

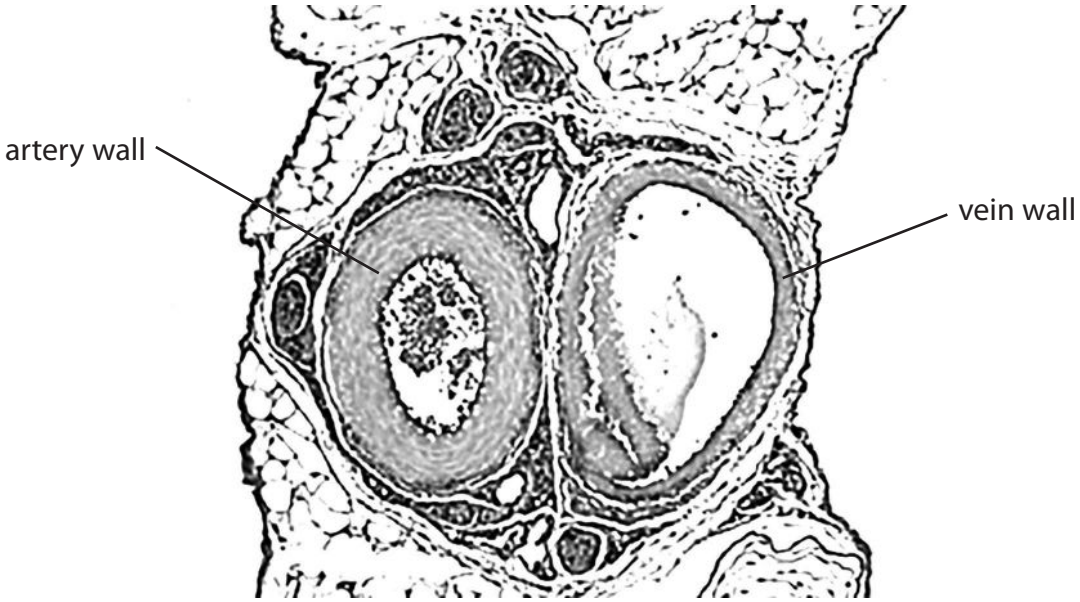
(2)

..... mm^3 per minute

(Total for Question 5 = 12 marks)

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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.

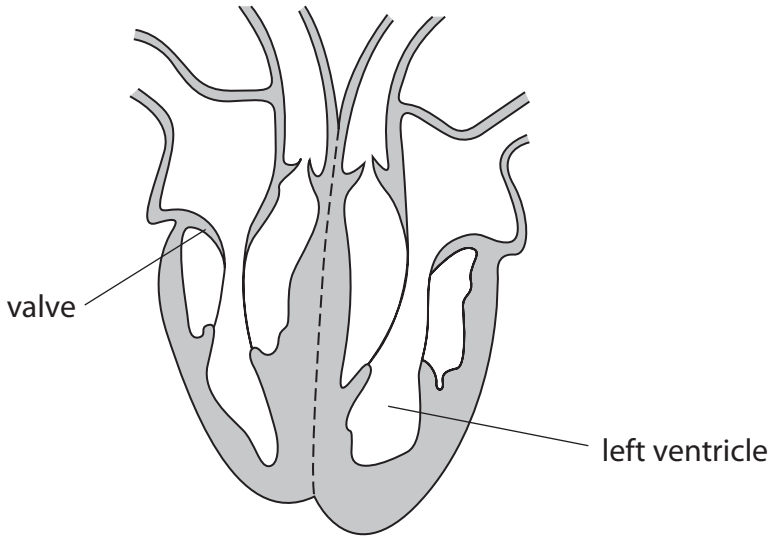


Figure 12

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

(6)

(Total for Question 6 = 13 marks)

TOTAL FOR PAPER = 60 MARKS

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