

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 10 minutes)

Paper reference **1SC0/2BF**

Combined Science

PAPER 4

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 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 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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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.

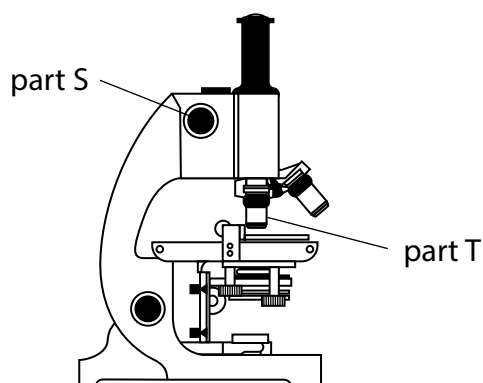


Figure 1

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

(2)

part of microscope

function

	<div>●</div> <div>to stain the cells</div>
<div>part S</div> <div>●</div>	<div>●</div> <div>to focus the image so that it is clear</div>
	<div>●</div> <div>to magnify the image</div>
<div>part T</div> <div>●</div>	<div>●</div> <div>to hold the slide in place</div>
	<div>●</div> <div>to provide light to see the image</div>

(b) Figure 2 shows two photographs of bacteria.

Photograph A was taken through a light microscope.

Photograph B was taken using an electron microscope.

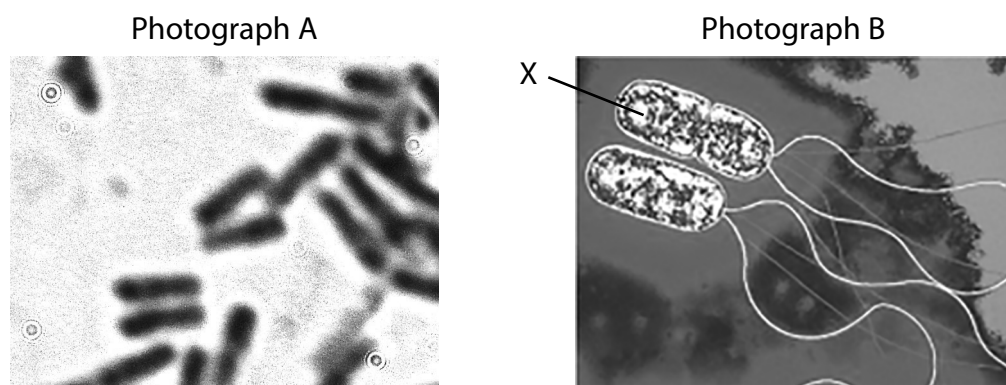
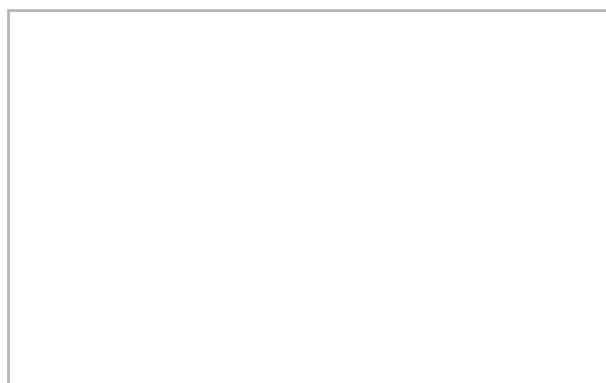


Figure 2

(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)

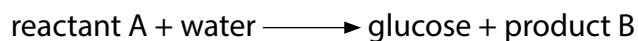
A light microscope

An electron microscope

(Total for Question 1 = 7 marks)

2 Plants need light for photosynthesis.

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



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)

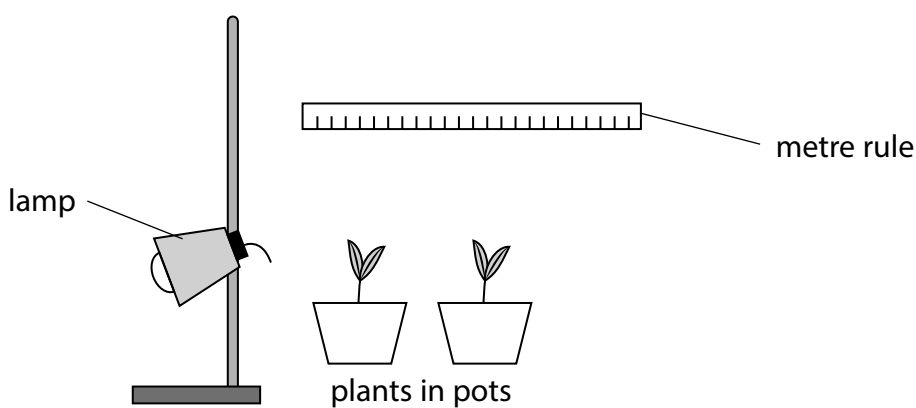


Figure 3

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

(1)

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

Explain the effect of this temperature on photosynthesis.

(2)

(Total for Question 2 = 8 marks)

3 Endocrine glands produce hormones.

(a) Draw **two** crosses on Figure 4 to show the position of the ovaries.

(1)

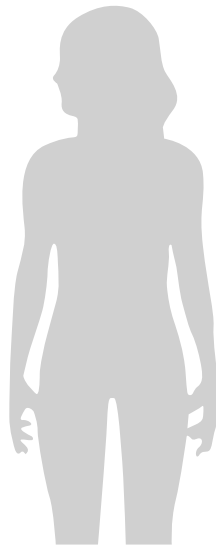


Figure 4

(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)

(iii) Name the main target organ for insulin.

(1)

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

Figure 5 shows the blood glucose concentration for a person with type 1 diabetes.

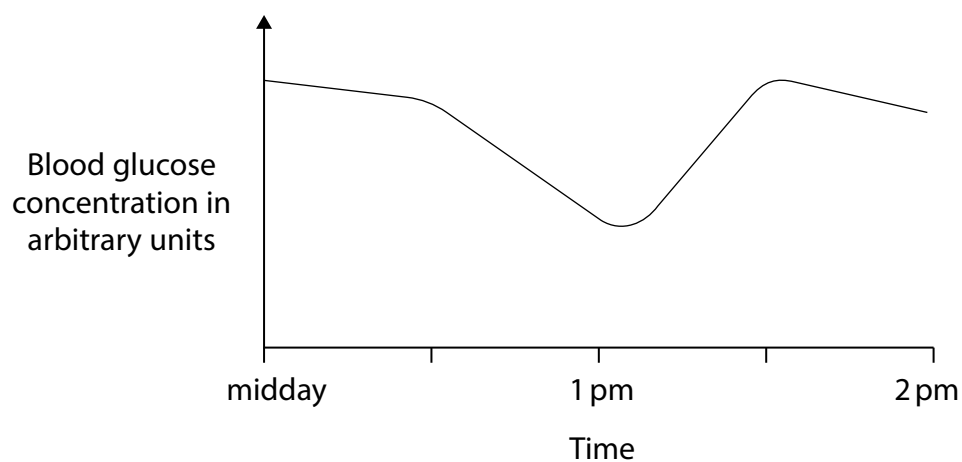


Figure 5

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

(2)

(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)

(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

2

(Total for Question 3 = 10 marks)

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

Figure 6 shows the structure of an alveolus and its blood supply.

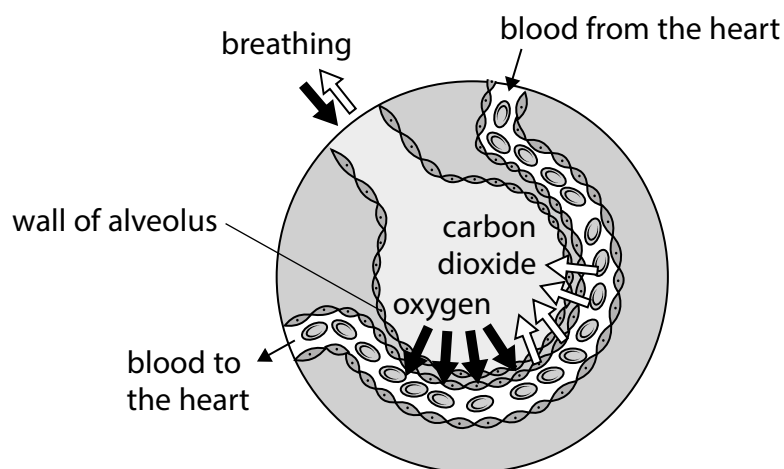


Figure 6

- (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)

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

(2)

(d) Figure 7 shows the heart rate of a person before, during and after exercise.

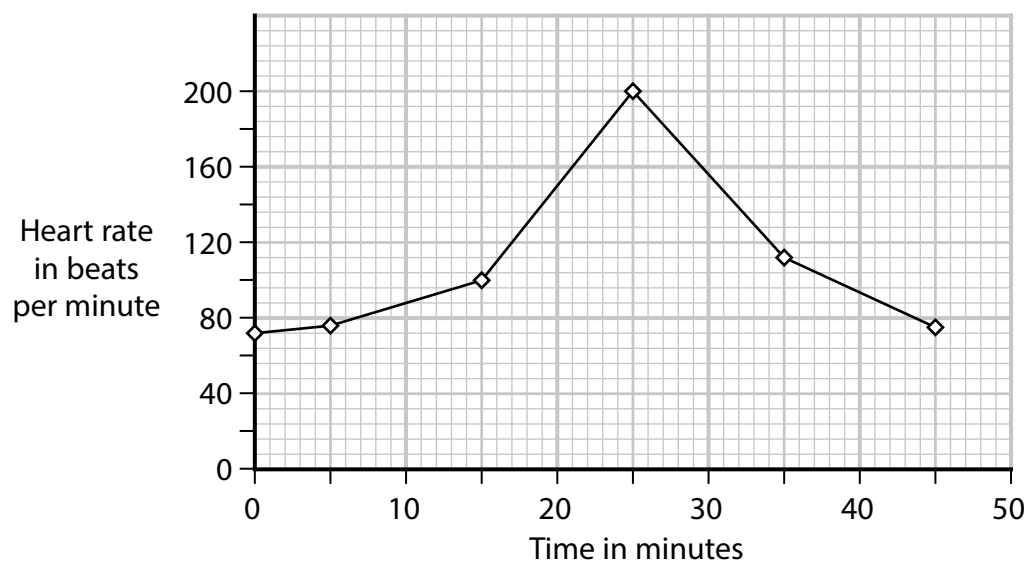


Figure 7

(i) Describe the trend shown in Figure 7.

Use data from Figure 7 to support your answer.

(2)

(ii) Explain the trend shown in Figure 7 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

$$\text{cardiac output} = \text{stroke volume} \times \text{heart rate} \quad (3)$$

dm^3 per minute

(Total for Question 4 = 11 marks)

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5 (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)

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

Figure 8 shows blood separated into different parts.

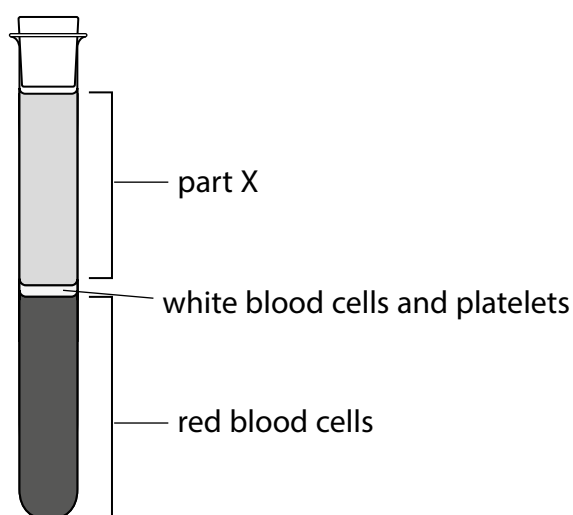


Figure 8

(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)

1

2

(Total for Question 5 = 11 marks)

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

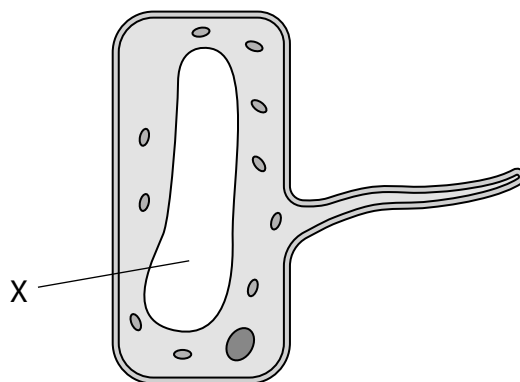


Figure 9

- (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)
- (iii) Explain why root hair cells do not contain chloroplasts. (3)

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

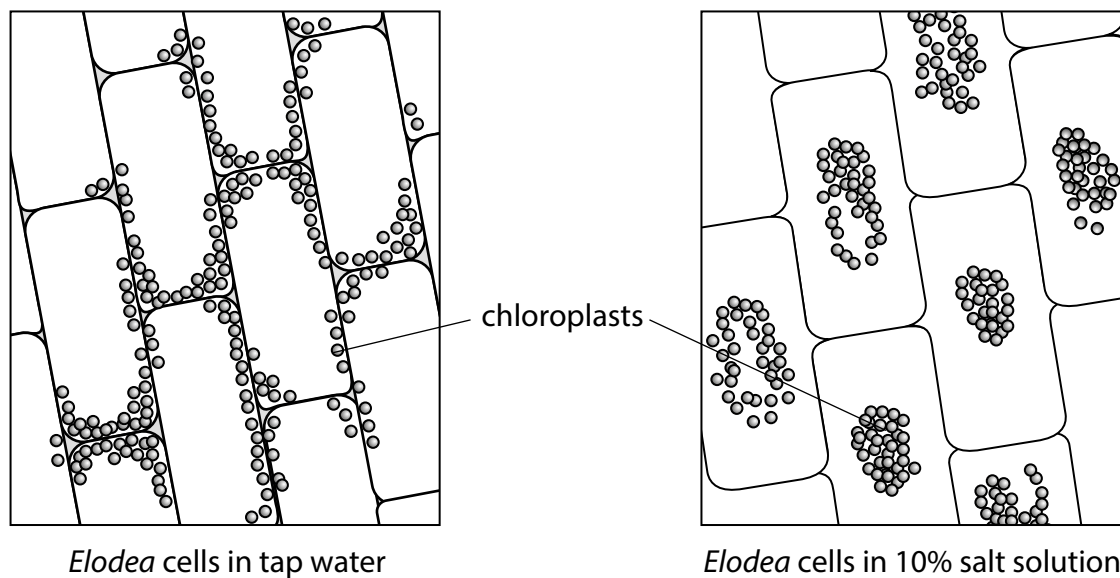


Figure 10

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

(2)

1

2

*(c) The arrows in Figure 11 show the direction of water movement through a tree.

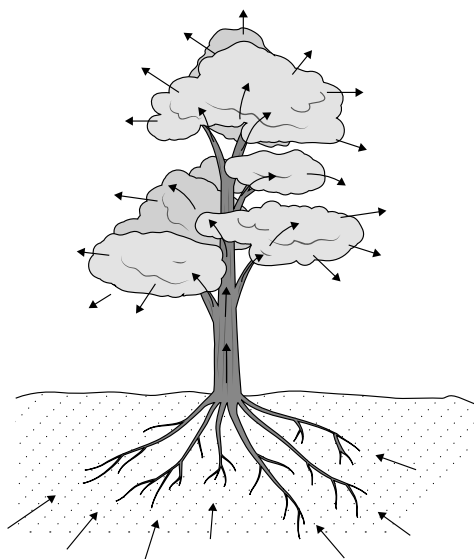


Figure 11

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

(6)

(Total for Question 6 = 13 marks)

TOTAL FOR PAPER = 60 MARKS

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