

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

**1SC0/2BH**

**Combined Science**

**PAPER 4**

**Higher 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 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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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 centrifuge can be used to separate the different parts of human blood.

Figure 1 shows blood separated into different parts.

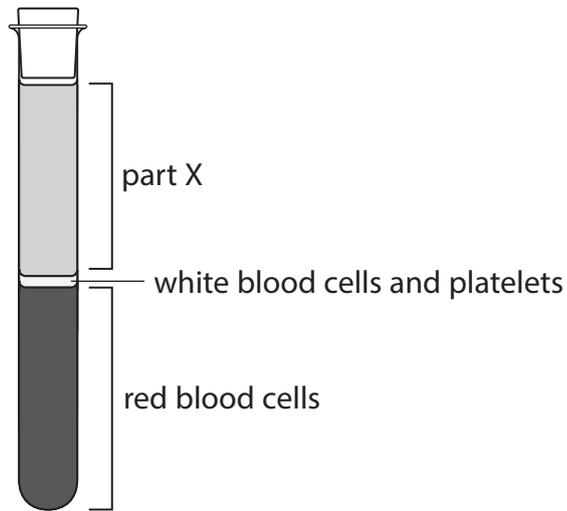


Figure 1

(a) (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 .....



(b) (i) When a person donates blood,  $470\text{ cm}^3$  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  $470\text{ cm}^3$  of donated blood.  
Give your answer to the nearest whole number.

(3)

.....  $\text{cm}^3$

(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 .....

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2 .....

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**(Total for Question 1 = 9 marks)**

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2 (a) Figure 2 shows a root hair cell from a plant.

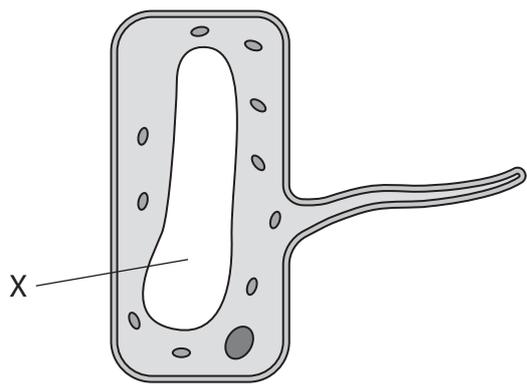


Figure 2

(i) Name the part labelled X. (1)

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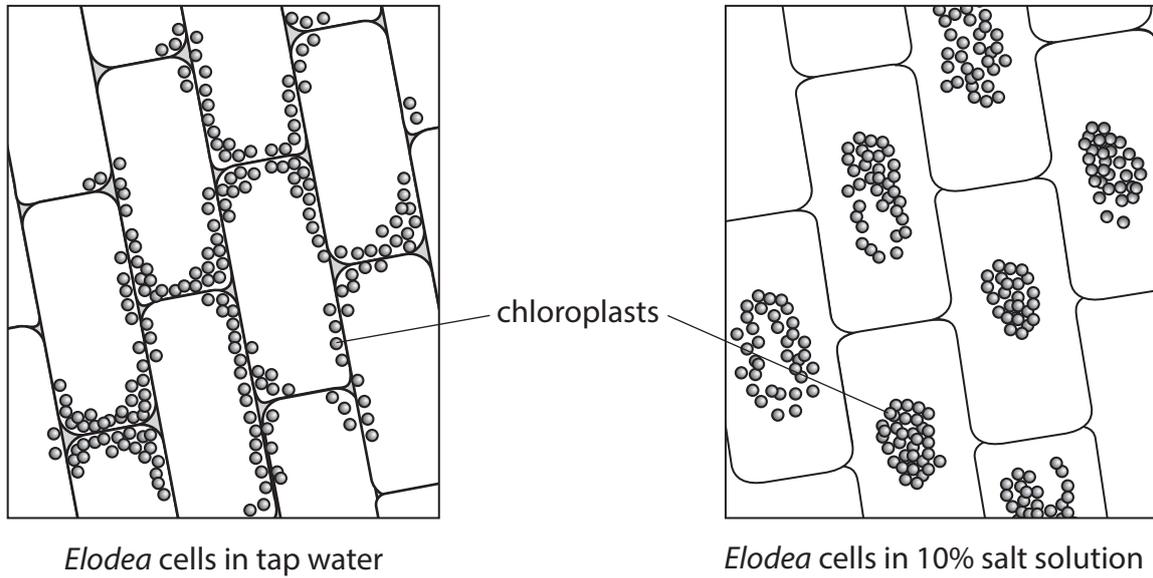
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(b) A student studied the water plant *Elodea*.

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

Figure 3 shows *Elodea* cells in tap water and in a 10% salt solution.



**Figure 3**

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

(2)

1 .....

2 .....



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(ii) Explain why placing the *Elodea* cells in the 10% salt solution causes the changes seen in Figure 3.

(3)

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**(Total for Question 2 = 10 marks)**

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3 (a) A scientist decided to study the variety of living organisms in a garden.

(i) The scientist wanted to use a random sampling technique.

Devise a plan the scientist could use to randomly sample the number of plant species in the garden.

(3)

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(ii) The scientist also measured abiotic factors in the garden.

The pH of the soil was measured using a pH meter.

Describe how **three** other abiotic factors could be measured in the garden.

(3)

1 .....

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2 .....

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3 .....

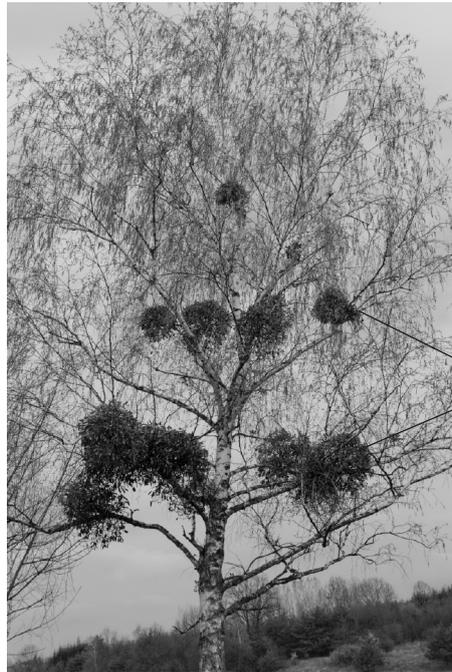
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(iii) Mistletoe is a parasite that grows on some trees.

Figure 4 shows a tree with mistletoe growing on it.



mistletoe

(Source: © NagyDodo/Shutterstock)

**Figure 4**

Describe the feeding relationship between the mistletoe and the tree.

(2)

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(b) Nitrate fertilisers are used in the garden.

Explain why nitrate fertilisers are used in gardens.

(2)

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**(Total for Question 3 = 10 marks)**

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4 A student investigated the effect of glucose concentration on the rate of anaerobic respiration in yeast.

(a) The student used five concentrations of glucose: 5%, 10%, 15%, 20% and 25%.

A teaspoon of dried yeast was added to 20 cm<sup>3</sup> of the 5% glucose concentration in a measuring cylinder.

A drop of washing up liquid was added and the mixture was stirred.

A reaction occurred and bubbles collected as foam on the surface of the mixture.

The height of the foam was measured after five minutes.

This method was repeated for each concentration of glucose.

(i) Describe how to set up a control for this investigation.

(2)

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(ii) State how the scientist could improve this investigation to increase the rate of the reaction.

(1)

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(b) The results of this investigation are shown in Figure 5.

glucose concentration (%)	height of foam after 5 mins in mm
5	2
10	5
15	3
20	9
25	11

**Figure 5**

(i) The student thought one of the results was anomalous.

Explain which of these results is anomalous.

(2)

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(ii) Explain why the height of the foam was greatest for the 25 % glucose concentration.

(3)

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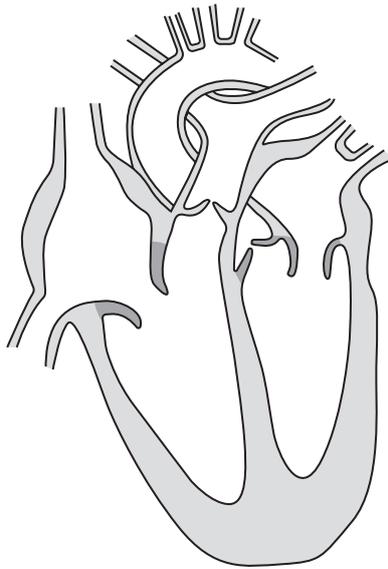
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**(Total for Question 4 = 8 marks)**



5 (a) Figure 6 shows a human heart.



**Figure 6**

- (i) Draw arrows on Figure 6 to show the direction of blood flow through the left side of the heart. (2)
- (ii) Name the main blood vessel that carries deoxygenated blood into the heart. (1)
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- (b) Figure 7 shows the heart rate and stroke volume of a person when at rest and when doing exercise.

level of activity	heart rate in beats per minute	stroke volume in $\text{cm}^3$
at rest	68	72
during exercise	112	124

**Figure 7**

- (i) Calculate the difference in cardiac output when at rest and when doing exercise.

Give your answer to 3 significant figures and include units in your answer.

(4)

answer .....

- (ii) Explain why the cardiac output needs to increase during exercise.

(4)

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**(Total for Question 5 = 11 marks)**



6 (a) The female contraceptive pill contains hormones to prevent pregnancy.

(i) Which hormones are in the female combined contraceptive pill? (1)

- A FSH and oestrogen
- B oestrogen and progesterone
- C progesterone and LH
- D LH and FSH

(ii) Explain how the hormones in contraceptive pills prevent ovulation. (3)

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(iii) Explain how a barrier method of contraception prevents pregnancy. (2)

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\*(b) Hormones can be used as part of assisted reproductive technology.

Explain how assisted reproductive technology (ART) can be used to increase the chances of a woman becoming pregnant.

(6)

Area with horizontal dotted lines for writing the answer.

**(Total for Question 6 = 12 marks)**

**TOTAL FOR PAPER = 60 MARKS**



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