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)

Monday 9 June 2025

Morning (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 the question 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 ▶

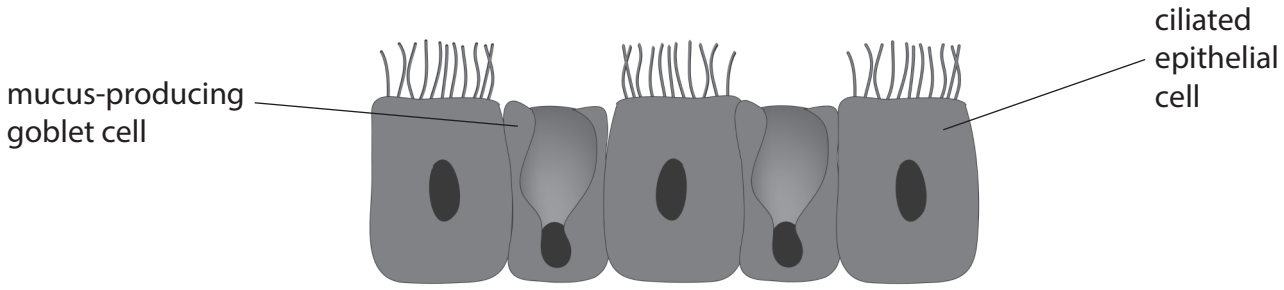
P 7 9 1 7 1 R A 0 1 2 0

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 a diagram of mucus-producing goblet cells and ciliated epithelial cells in the airways of the lungs.



(Source: © K.K.T Madhusanka/Shutterstock)

Figure 1

Describe how pathogens are removed from the airways by ciliated epithelial cells.

(2)

(b) During a race, athletes respire aerobically and anaerobically.

Figure 2 shows an athlete after a race.

(Source: © voronaman/Shutterstock)

Figure 2

Explain how aerobic respiration provides energy for running.

(2)

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(c) The rate of respiration of maggots was investigated using the equipment shown in Figure 3.

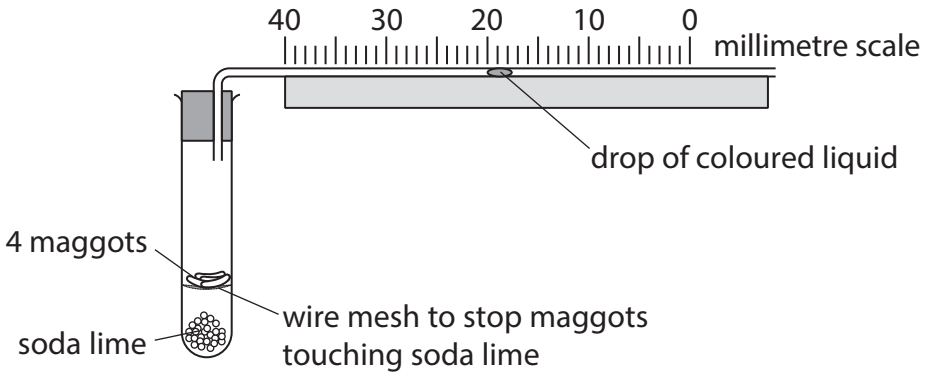

Figure 3

(i) State the reason why the soda lime is placed in the test tube.

(1)

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.....

(ii) The drop of liquid in Figure 3 is at 20 mm.

The drop of coloured liquid moved at a mean rate of 2 mm per minute.

Draw, on Figure 4, the new position of the bubble after the five minutes.

(1)

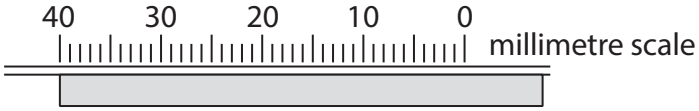

Figure 4

(iii) The investigation was repeated with two maggots.

Explain how the movement of the drop of coloured liquid would be affected if the investigation was repeated using fewer maggots.

(2)

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(iv) State **one** way this investigation can be improved to obtain more reliable results.

(1)

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(Total for Question 1 = 9 marks)

2 (a) In 2018, all the plants were removed from the soil in a 1000 m^2 area.

A wall was built around this area to keep people out.

In 2019, three species of plants were recorded growing in this area.

Two of these species were indigenous.

(i) State what is meant by the term 'indigenous'.

(1)

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(ii) Name **one** piece of equipment that could be used to sample the number of indigenous plants in this area.

(1)

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(b) The area was surveyed every year and the number of plants of each species (A to H) was estimated.

Figure 5 shows the results.

	estimated number of each plant species found in the survey							
year	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**
2018	—	—	—	—	—	—	—	—
2019	491	23	66	—	—	—	—	—
2020	664	48	186	1	8	—	—	—
2021	470	25	283	3	6	7	1	—
2022	120	41	354	7	4	11	7	—
2023	44	39	421	21	6	11	9	8

Figure 5

(i) State the trend shown by the data in Figure 5 for plant species C from 2019 to 2023.

(1)

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(ii) A scientist suggested that the decrease in the number of plants of species B in 2021 was caused by competition from one of the other species of plant.

Which species is most likely to have out-competed species B in 2021?

(1)

- ☒ **A** species A
- ☒ **B** species C
- ☒ **C** species D
- ☒ **D** species H

(iii) Explain **one** way that this species could have out-competed species B.

(2)

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(iv) Give **one** way that species H could have moved into the area.

(1)

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(c) Plants also need water to grow.

Explain how water is absorbed into the plant.

(2)

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(Total for Question 2 = 9 marks)

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3 (a) A teacher was demonstrating a process to students.

The teacher had a beaker of water and added five drops of food colouring to the beaker.

The time it took for the food colouring to spread evenly through the water was recorded.

Figure 6 shows this process.

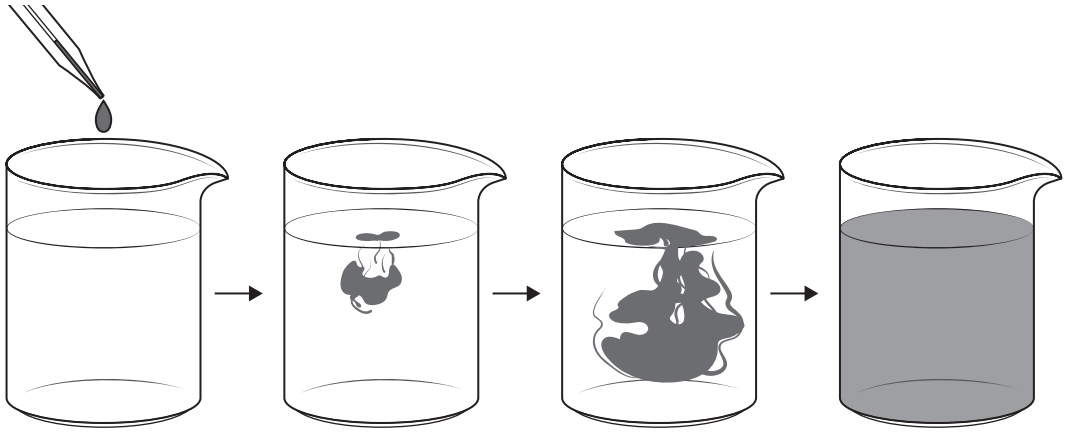

Figure 6

(i) State the process being demonstrated.

(1)

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(ii) A student asked if different food colourings spread evenly in the same amount of time.

Give **two** variables that would need to be controlled if the investigation was repeated with different food colourings.

(2)

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2 .....

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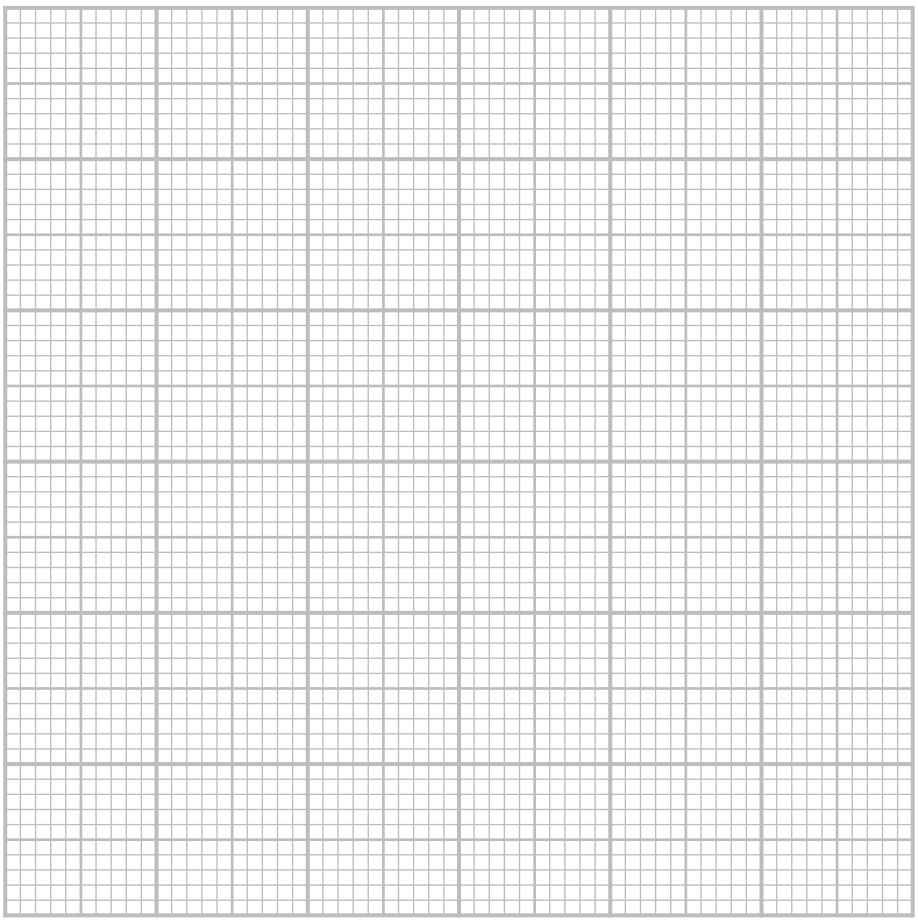
(b) The teacher repeated this process with water at different temperatures.
Figure 7 shows the results of this experiment.

water temperature in °C	time taken for food colouring to spread evenly through the water in seconds
20	116
25	101
30	75
35	52
40	33

Figure 7

(i) Draw a line graph to show the results in Figure 7.

(4)



(ii) Explain why the time taken decreased.

(2)

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(Total for Question 3 = 9 marks)

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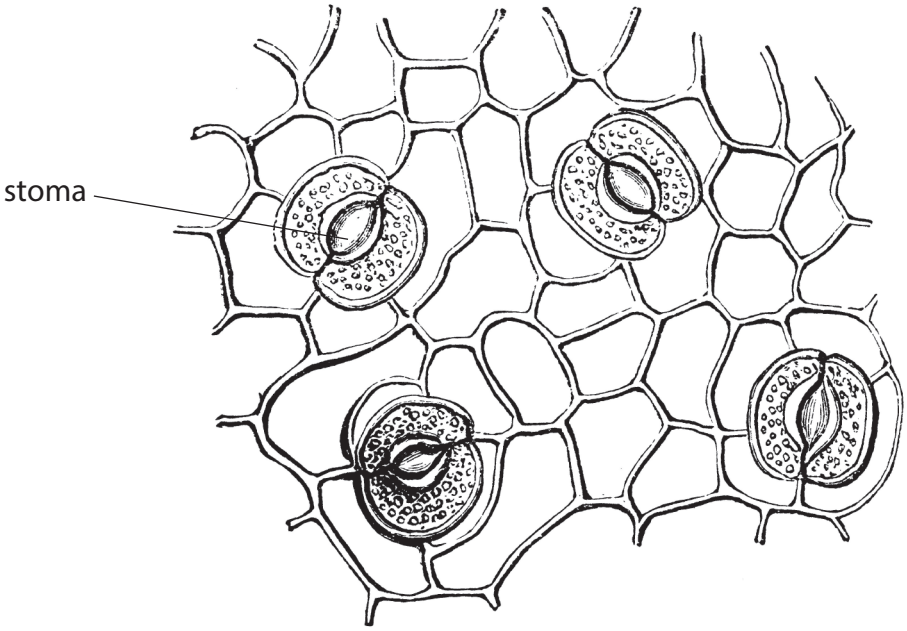
4 Figure 8 shows the lower epidermis of a leaf, with a stoma labelled.



(Source: © Quagga Media/Alamy Stock Photo)

Figure 8

(a) (i) State the number of guard cells shown in Figure 8.

(1)

.....

(ii) State **one** gas that leaves the stomata and **one** gas that enters the stomata during daylight.

(2)

gas leaving stomata

.....

gas entering stomata

.....

(iii) State why the stomata close.

(1)

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(b) A student wanted to view the cross-section of a leaf on a prepared slide.

Describe how a light microscope would be used to observe this slide.

(3)

(c) Sugars are transported from the leaves to the rest of the plant.

Explain how sugars are moved through the plant.

(2)

(Total for Question 4 = 9 marks)

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5 (a) Figure 9 is a diagram of the human heart.

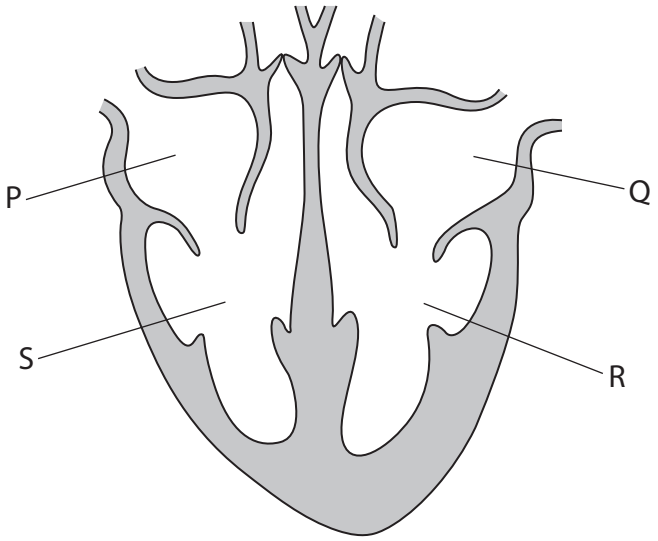

Figure 9

(i) Which chambers of the heart contain only oxygenated blood?

(1)

☒ **A** chamber P and chamber Q

☒ **B** chamber S and chamber R

☒ **C** chamber P and chamber S

☒ **D** chamber Q and chamber R

(ii) The heart has a valve called the bicuspid valve between chamber Q and chamber R.

Explain the role of this valve.

(2)

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(b) Explain why heart rate increases during exercise.

(3)

(c) (i) Every person has a maximum heart rate.

Figure 10 shows how different types of activity affect a person's heart rate and the type of respiration they are using during that activity.

	walking	**jogging**	**cross-country running**	**running fast (sprinting)**
percentage of maximum heart rate	50%	65%	75%	90%
type of respiration	aerobic	aerobic	aerobic and anaerobic	aerobic and anaerobic

Figure 10

A person had a maximum heart rate of 190 beats per minute.
Calculate the heart rate of this person when they are jogging.

Give your answer to 3 significant figures.

(3)

..... beats per minute

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(ii) Erythrocytes (red blood cells) transport oxygen to respiring cells.

Explain how erythrocytes (red blood cells) are adapted to carry and release oxygen.

(3)

(Total for Question 5 = 12 marks)

6 (a) The menopause occurs when the menstrual cycle stops.

Figure 11 shows the hormone concentrations in the blood before the menopause and after the menopause.

hormone	mean hormone concentration before the menopause	mean hormone concentration after the menopause
oestrogen	33 pg/mL	23 pg/mL
progesterone	11 ng/mL	0.4 ng/mL
testosterone	35 ng/dL	16 ng/dL

Figure 11

(i) Compare and contrast the hormone concentrations before and after the menopause.

(3)

(ii) Explain the roles of FSH and LH in the menstrual cycle.

(3)

*(b) Figure 12 shows the blood glucose concentrations for a person who has type 2 diabetes and a person who does not have type 2 diabetes.

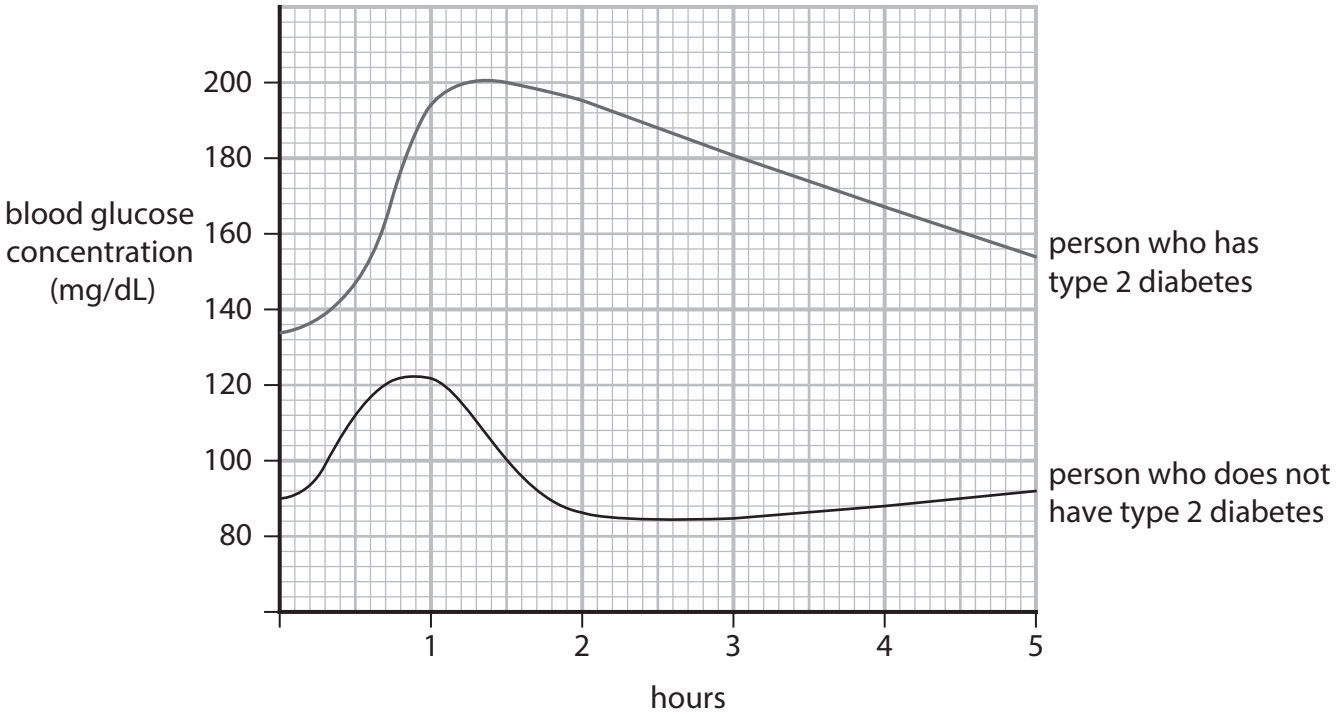

Figure 12

Explain how glucose concentrations are controlled for a person with type 2 diabetes and a person who does not have type 2 diabetes.

Include information from Figure 12 in your answer.

(6)

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(Total for Question 6 = 12 marks)

TOTAL FOR PAPER = 60 MARKS

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