

Please check the examination details below before entering your candidate information

Candidate surname					Other names				
Centre Number					Candidate Number				

Pearson Edexcel International GCSE (9–1)

Monday 9 June 2025

Morning (Time: 1 hour 10 minutes) **Paper reference 4WSD2/1B**

Science (Double Award) (Modular)

Biology

UNIT 2: 4WSD2

PAPER: 1B

You must have:
Calculator, ruler

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- If pencil is used for diagrams/sketches/graphs it must be dark (HB or B).
- **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.*
- Show all the steps in the calculations and state the units where required.

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.*

Advice

- Read each question carefully before you start to answer it.
- Write your answers neatly and in good English.
- Try to answer every question.
- Check your answers if you have time at the end.

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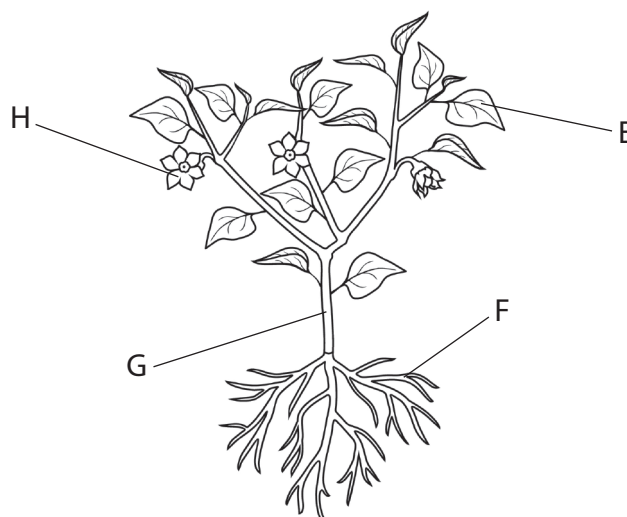


Answer ALL questions.

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 This question is about transport systems in plants.

The diagram shows a plant with some structures labelled.



(Source: © Kazakova Maryia/Shutterstock)

- (a) Which label shows where water enters the plant?

(1)

- ☐ A E
☐ B F
☐ C G
☐ D H

- (b) In a plant, most water is transported in the xylem.

Some water is also transported in the phloem.

State one other substance that is transported in the phloem.

(1)

- (c) State two differences between the structure of the xylem and the structure of the phloem.

(2)

1

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2

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- (d) A cut celery stalk will take up a salt solution and transport the solution through the xylem to the leaves.

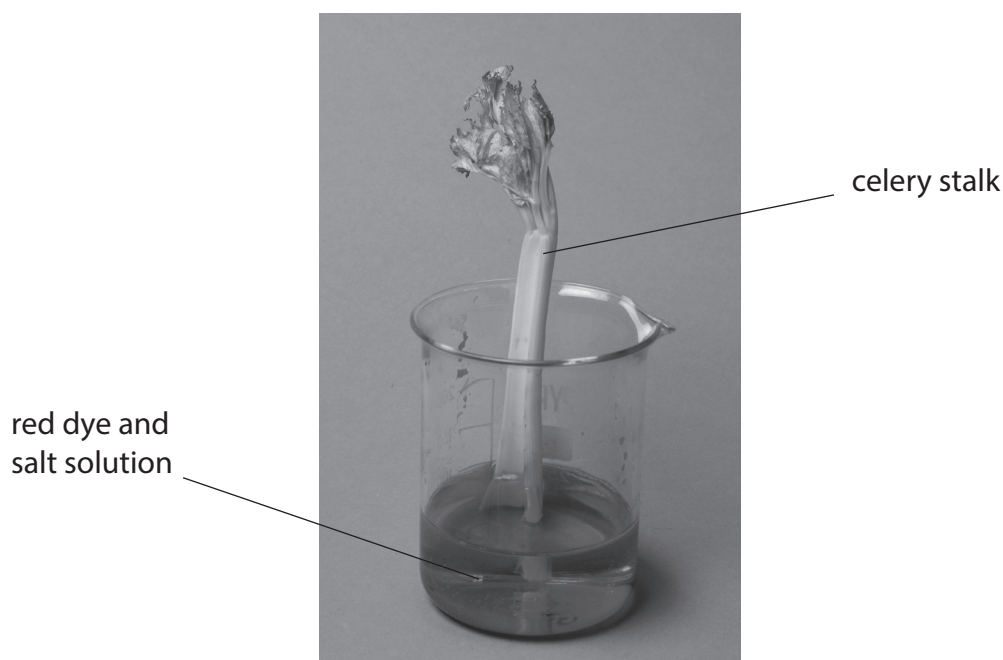
A student investigates if the concentration of salt affects the rate of transport through the xylem.

This is the student's method.

- place a cut stalk of celery in a beaker containing salt solution
- add red dye to the salt solution
- place the beaker containing the celery near a window
- measure the time taken for the red colour to reach the leaves of the celery

Repeat this method using different concentrations of salt solution.

The photograph shows the student's equipment.



(Source: © Pearson Asset Library)

- (i) State the independent variable in this investigation.

(1)

(ii) Give three variables the student should control to obtain valid results.

(3)

1

2

3

(Total for Question 1 = 8 marks)

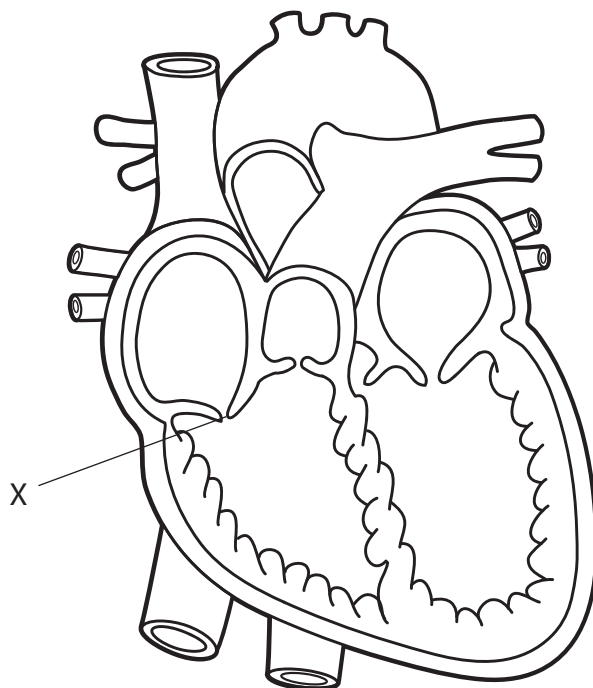
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2 The diagram shows the structure of a heart.



(Source: © Pearson Asset Library)

(a) (i) State the function of structure X.

(1)

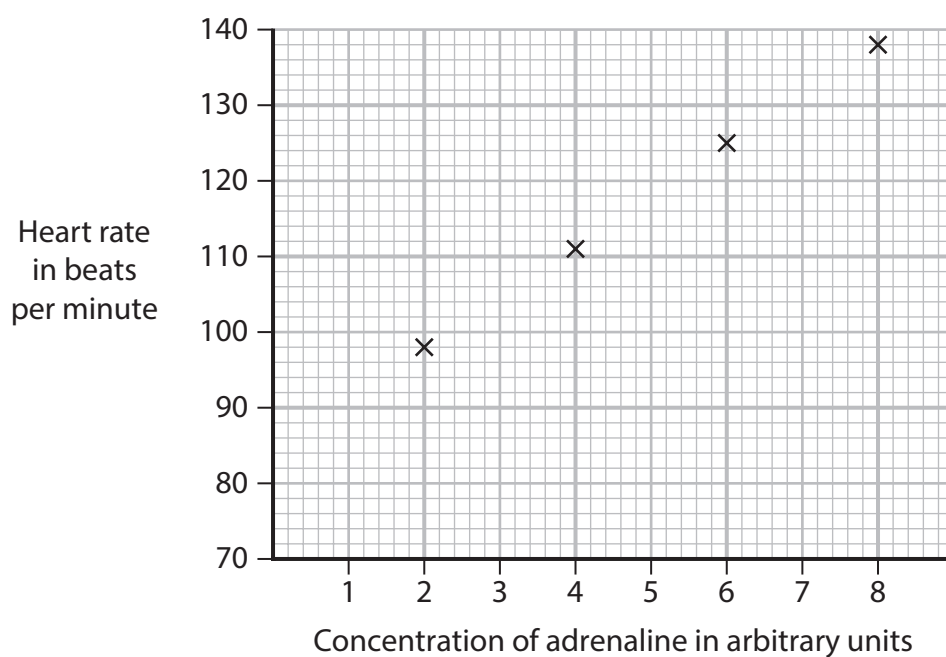
(ii) Which is the correct order of chambers the blood passes through after entering the heart from the vena cava?

(1)

- ☐ **A** left atrium → left ventricle → right atrium → right ventricle
- ☐ **B** left atrium → right atrium → right ventricle → left ventricle
- ☐ **C** right atrium → left atrium → left ventricle → right ventricle
- ☐ **D** right atrium → right ventricle → left atrium → left ventricle

(b) Adrenaline is a hormone released into the blood to prepare the body for action.

The graph shows how the concentration of adrenaline in the blood affects a person's heart rate.



(i) Draw a line of best fit.

(1)

(ii) Using the graph, determine the heart rate at 5 arbitrary units of adrenaline.

(1)

heart rate = beats per minute

(c) Adrenaline also affects the blood glucose level.

(i) Explain how adrenaline affects the blood glucose level.

(3)

(ii) Explain how this change in blood glucose level helps to prepare the body for action.

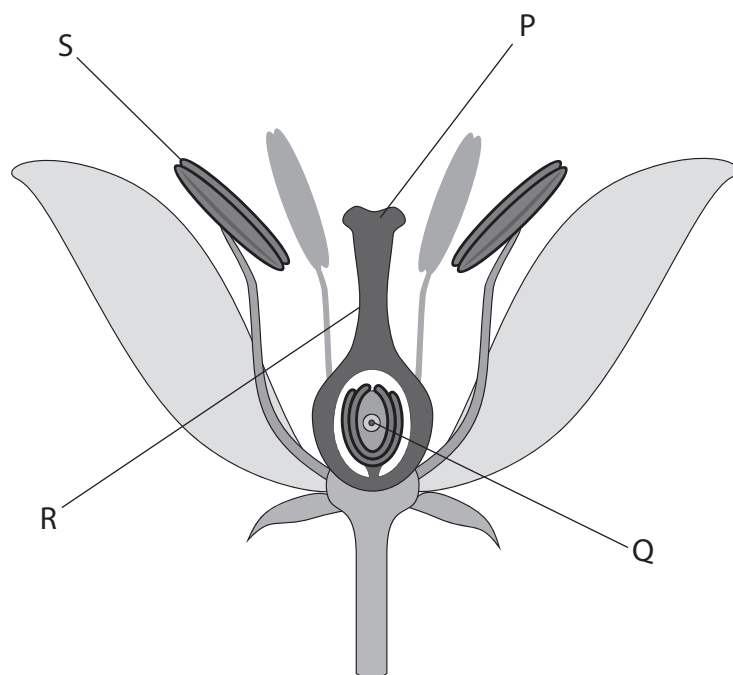
(2)

(Total for Question 2 = 9 marks)



3 Plants can use both sexual and asexual reproduction.

(a) The diagram shows some structures in a flowering plant that uses sexual reproduction.



(Source: © Pearson Asset Library)

(i) Which of these structures contains female sex cells?

(1)

- ☒ A P
- ☒ B Q
- ☒ C R
- ☒ D S

(ii) Name the structure that produces pollen grains.

(1)

(iii) State two ways that the flowers of wind-pollinated plants are different from the flowers of insect-pollinated plants.

(2)

1

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2

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(iv) After pollination, a pollen tube forms.

Explain the function of the pollen tube.

(2)

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(b) Some plants reproduce using asexual reproduction.

(i) State the type of cell division used in asexual reproduction.

(1)

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- (ii) Explain one advantage and one disadvantage of asexual reproduction for a plant.

(4)

advantage

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disadvantage

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(Total for Question 3 = 11 marks)

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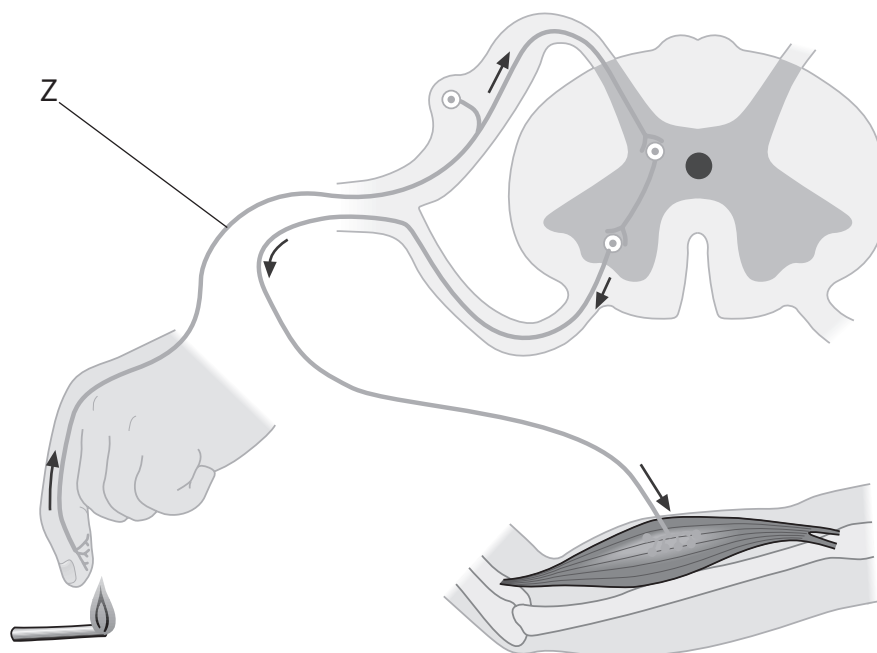
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4 All organisms respond to stimuli.

(a) The diagram shows a reflex arc.



(Source: © Pearson Asset Library)

Which of these is labelled Z in the reflex arc?

(1)

- ☐ A effector
- ☐ B motor neurone
- ☐ C receptor
- ☐ D sensory neurone

(b) Describe how an impulse passes from one neurone to another.

(3)



(c) The eye contains light receptors.

(i) The pupil of the eye becomes smaller in response to bright light.

This is an example of a reflex action.

Explain why it is an advantage for this response to happen as a reflex.

(2)

(ii) Describe the changes that occur in the eye when focusing on a more distant object.

(4)

(Total for Question 4 = 10 marks)

5 Sewage in rivers can affect aquatic life.

Diagram 1 shows the location of a sewage outlet in a section of river.

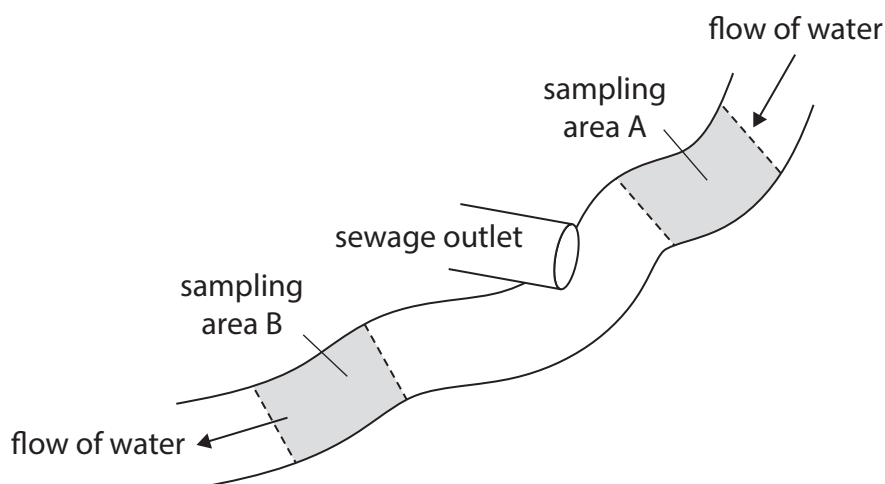


Diagram 1

A student investigates the effect of sewage on three different organisms living in the river.

This is the student's method.

- select a shallow section of river in sampling area A
- place a net in the water
- kick the riverbed in front of the net to dislodge sediment
- count the number of each type of organism caught in the net

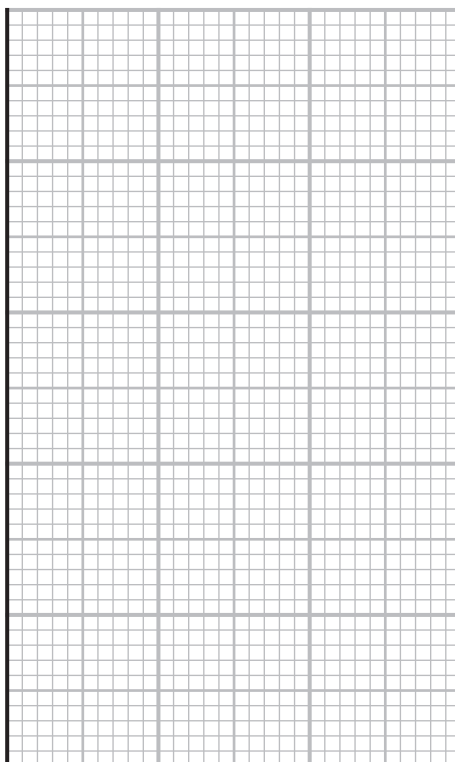
The student repeats this method in sampling area B.

The table shows the student's results.

Organism name	Number of organisms counted	
	sampling area A	sampling area B
mayfly nymphs	29	0
water striders	19	18
bloodworms	7	49

- (a) (i) Plot a bar chart to show the student's results.

(4)



- (ii) Calculate the percentage increase in the total number of organisms counted in sampling area B compared with sampling area A.

(2)

percentage increase = %

(b) Diagram 2 shows some information about the organisms that were sampled.



Mayfly nymphs survive best in freshwater with a high-oxygen level. They live in the sediment at the bottom of rivers.

(Source: © ZawarM356/
Shutterstock)



Water striders are sensitive to toxic metals in water.
Water striders live on the surface of rivers.

(Source: © Maximillian
cabinet/Shutterstock)



Bloodworms can survive in low-oxygen environments.
Bloodworms live in the sediment at the bottom of rivers.

(Source: © schankz/
Shutterstock)

Diagram 2

The student concludes that the sewage outlet causes the difference between the populations of each of the three organisms in sampling areas A and B.

Comment on the student's conclusion.

Use information from the student's investigation and diagram 2 to support your answer.

(5)

(Total for Question 5 = 11 marks)

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6 Aphids are common pests found all over the world.

Photograph 1 shows a colony of aphids on a plant.



(Source: © LFRabanedo/Shutterstock)

Photograph 1

Pests can affect crop yields.

(a) Explain one way animal pests can reduce crop yields.

(2)

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(b) Ladybirds are insects that are predators of aphids.

Photograph 2 shows a ladybird feeding on aphids.



(Source: © mehmetkrc/Shutterstock)

Photograph 2

Predatory species such as ladybirds can be used as a form of biological pest control.

Discuss the use of biological pest control using predatory species rather than chemical pesticides.

(6)

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- (c) Explain how genetic modification could be used to make the cells of a crop plant produce pesticide.

(3)

(Total for Question 6 = 11 marks)

TOTAL FOR PAPER = 60 MARKS



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