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)

Thursday 8 May 2025

Afternoon (Time: 1 hour 45 minutes)

Paper reference **4HB1/01**

Human Biology

UNIT: 4HB1

Paper: 01

You must have:
Ruler
Calculator

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 any calculations and state the units.

Information

- The total mark for this paper is 90.
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*
- Candidates may use a calculator.

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.

Turn over ▶

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Answer ALL questions.

1 The sentences below are about muscles and movement of the arm.

Complete the sentences by using words from the box.

(6)

antagonistic	ball and socket	biceps	cartilage
complementary	fixed	hinge	ligament
tendons	triceps		

To cause the movement of a joint, muscles work in pairs, known as

..... pairs of muscles.

The elbow is a type of synovial joint known as a ..... joint.

This joint allows the forearm to be raised when the .....

muscle contracts, and to be straightened when the ..... muscle contracts.

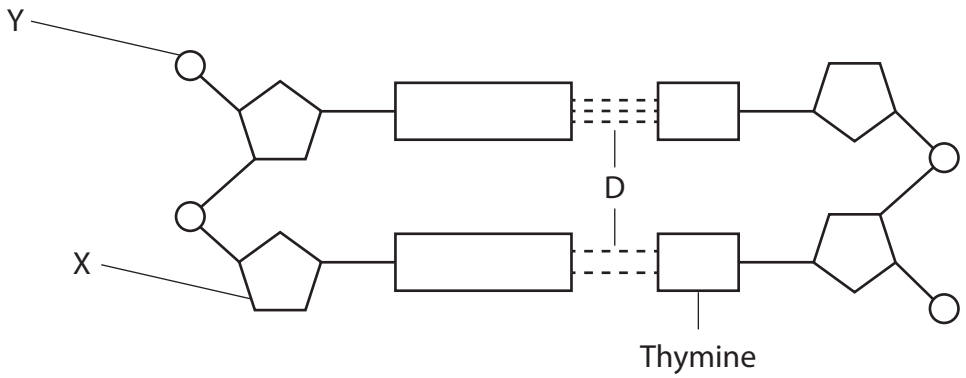
Both of these muscles are connected to bones by ..... .

Smooth movement of the joint is possible because of the presence of

..... covering the ends of the bones.

(Total for Question 1 = 6 marks)

2 The diagram shows part of a molecule of nucleic acid.



(a) (i) Name the parts labelled X and Y.

(2)

X .....

Y .....

(ii) Name the type of nucleic acid shown in the diagram.

(1)

.....

(iii) Use information from the diagram to justify your answer to part (ii).

(3)

.....

.....

.....

.....

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.....

(iv) State where this nucleic acid is found in a human cell.

(1)

.....

(b) (i) State what is labelled D in the diagram.

(1)

.....

(ii) Describe the importance of D in maintaining the structure of the nucleic acid.

(3)

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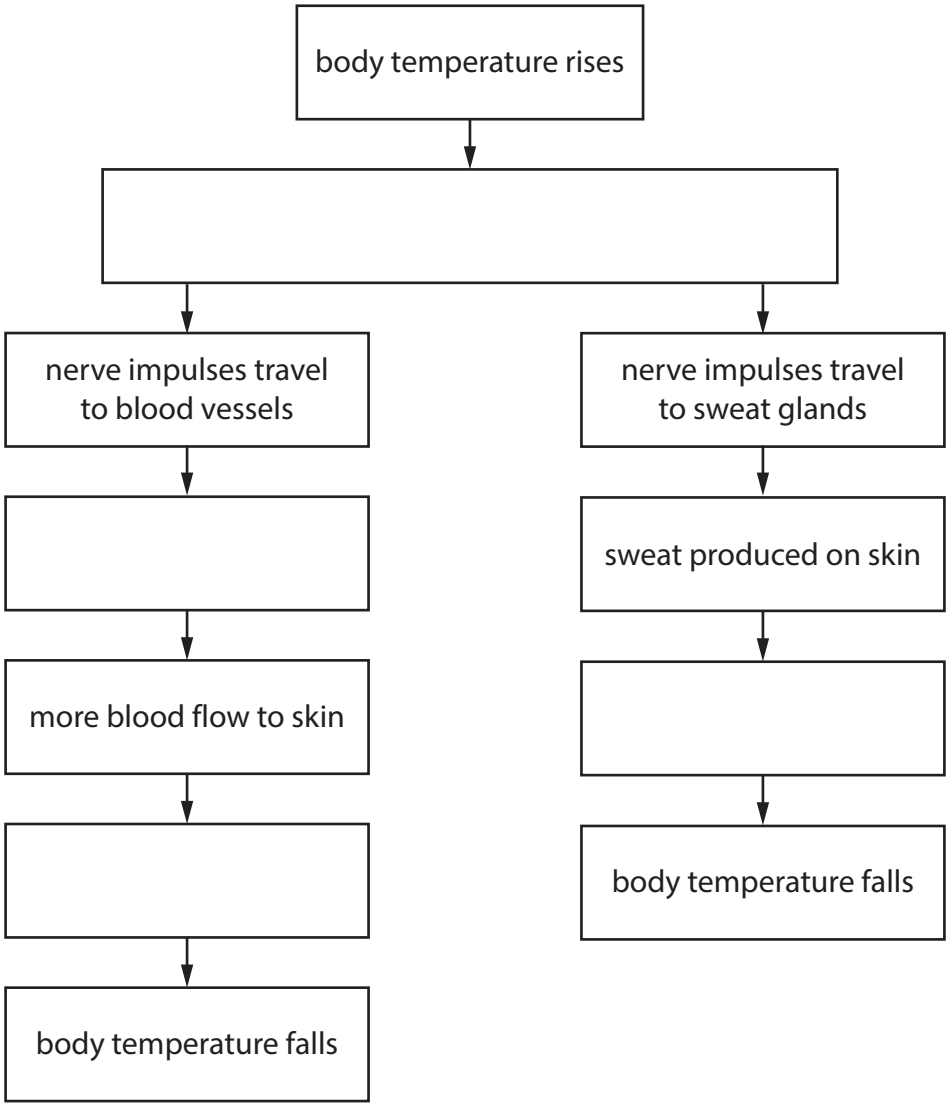
(Total for Question 2 = 11 marks)

3 The control of body temperature is achieved by a process known as homeostasis.

(a) Explain what is meant by homeostasis.

(4)

(b) The diagram shows some of the reactions of the body to an increase in temperature.



Complete the diagram by putting in a suitable word or sentence in each of the blank boxes.

(6)

(c) Explain why it is important that body temperature should not become too high.

(4)

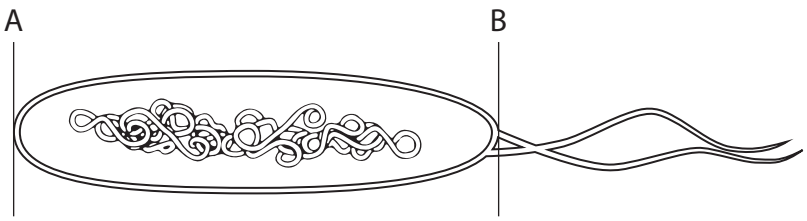
(Total for Question 3 = 14 marks)

4 (a) State what is meant by the term **pathogen**.

(1)

.....

(b) The diagram shows a pathogenic bacterium.



(i) Label **three** structures shown on the diagram.

(3)

(ii) The actual length of the bacterium between points A and B is 2.0 µm.

Calculate the magnification of the diagram.

[1 mm = 1000 µm]

(3)

magnification = × .....

(c) The effectiveness of a vaccine in preventing disease was studied over six months.

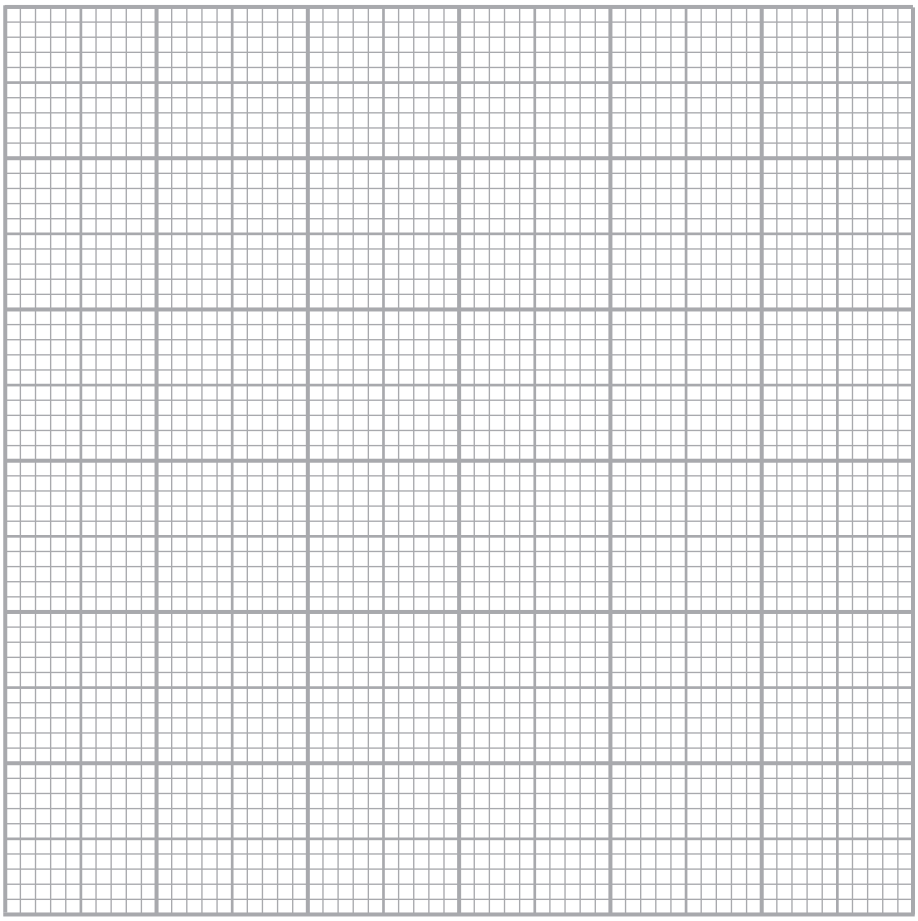
Two different groups of people were used. One group of people were aged between 45 and 64 years and the second group were aged over 65 years.

The results are shown in the table.

	Percentage effectiveness against disease (%)	
Time since vaccination in months	**45 to 64 years**	**over 65 years**
1	90	80
2	85	78
3	80	75
4	68	58
5	60	50
6	50	40

(i) Plot a graph of the results. Join the points with straight lines.

(5)



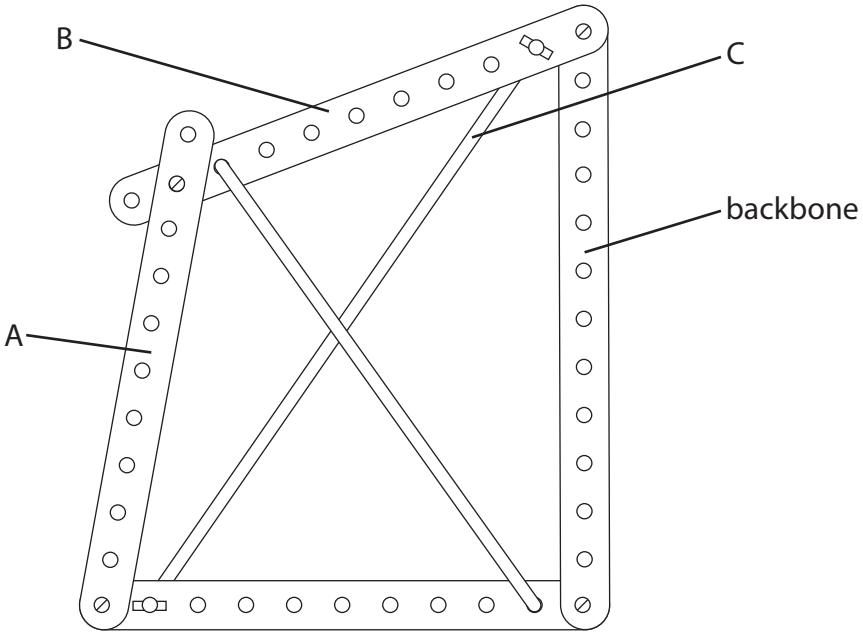
(ii) Describe the trends shown by this graph.

(3)

(Total for Question 4 = 15 marks)

5 (a) The diagram shows a model that can be used to demonstrate the process of breathing.

The part that represents the backbone has been labelled.



(i) State which parts of the breathing system are represented by A, B and C.

(3)

A .....

B .....

C .....

(ii) State three other structures, not shown in the diagram, that are needed for breathing in the body.

(3)

1 .....

2 .....

3 .....

(iii) Describe how the structures present in the thorax are used to allow a person to inhale.

(6)

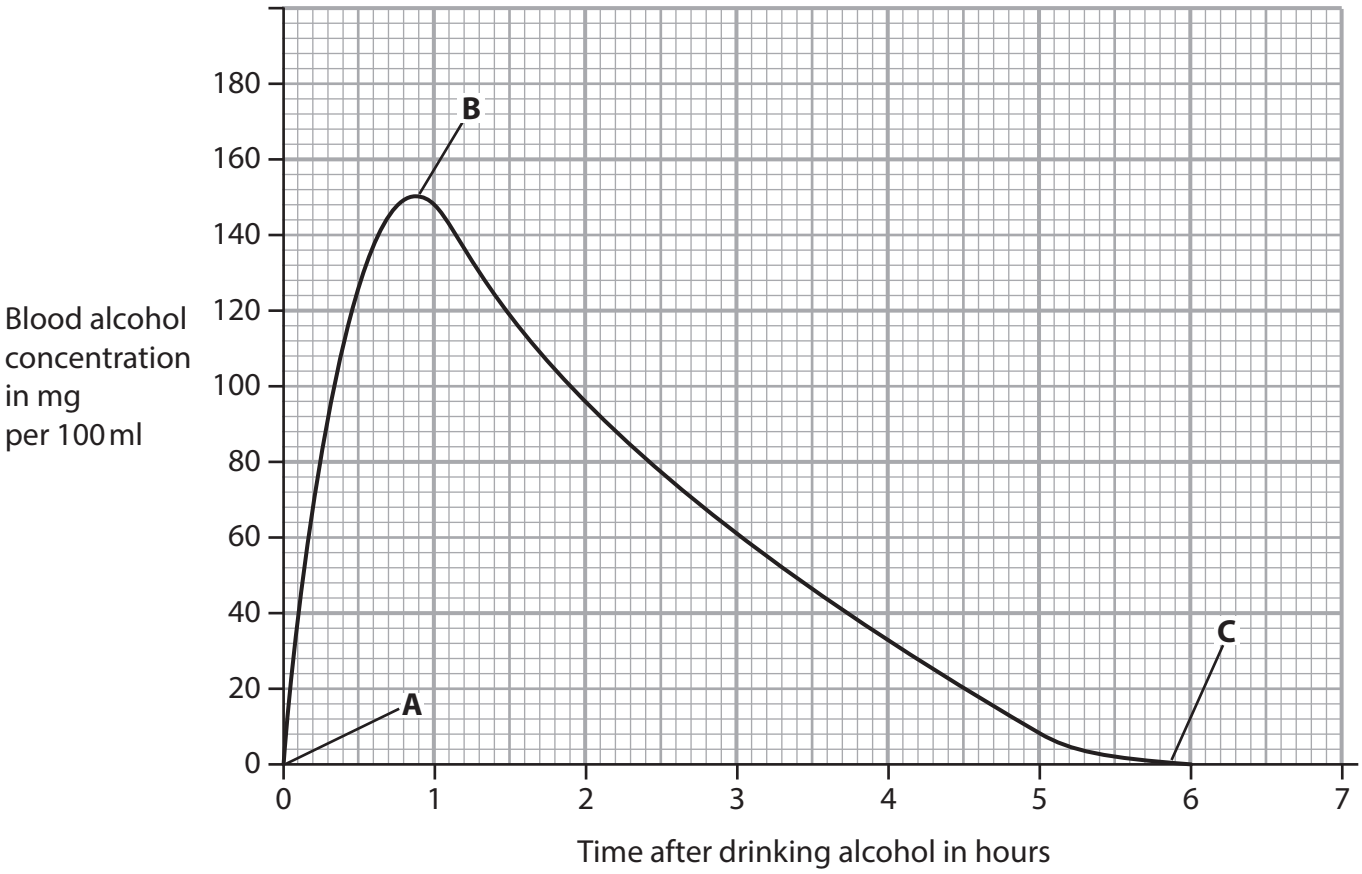
(b) Give the balanced chemical symbol equation for the process of aerobic respiration.

(3)

..... + ... → ..... + ... + ...

(Total for Question 5 = 15 marks)

6 The graph shows the changes in blood alcohol concentration of a person who drinks alcohol.



(a) (i) Explain the shape of the graph between points A and B.

(2)

(ii) Explain the shape of the graph between points B and C.

(3)

(b) In the United Kingdom the legal limit to drive is less than 80 mg per 100 ml of alcohol in the blood.

(i) The person shown in the graph drinks alcohol and the alcohol level in the blood goes above the legal limit to drive.

Determine how many hours after drinking alcohol it would be legal for the person shown in the graph to drive.

(1)

(ii) Explain why it is against the law to drive with high levels of alcohol in the blood.

(4)

(c) Alcohol reduces the production of ADH.

Explain the effect on the urine produced by a person drinking alcohol.

(5)

(Total for Question 6 = 15 marks)

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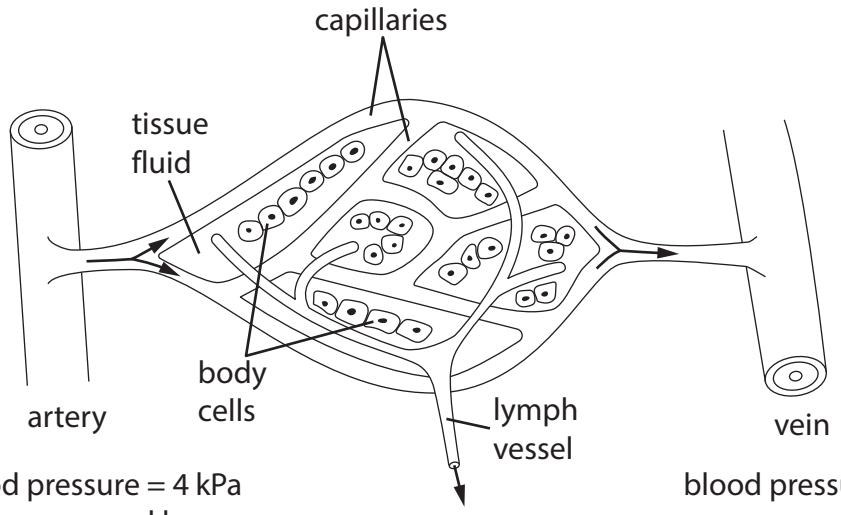
7 The diagram shows a capillary network.



(a) (i) Explain the change in blood pressure from the artery to the vein.

(2)

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.....

.....

.....

(ii) Explain why the pressure caused by the plasma proteins does not change.

(2)

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(b) Describe how a sample of plasma could be tested for the presence of proteins.

(4)

(c) Tissue fluid is formed by the movement of molecules from the blood. This occurs in the capillary network.

Use data from the diagram to determine the direction of movement of fluid between the capillaries and tissue fluid at the artery end and at the vein end of the capillary network.

(4)

(d) A condition known as leaky capillary syndrome occurs in some people. When this occurs, much more of the fluid from the capillary passes out into the tissue fluid.

Suggest what effect leaky capillary syndrome would have on the circulatory system.

(2)

.....

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.....

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(Total for Question 7 = 14 marks)

TOTAL FOR PAPER = 90 MARKS