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 18 May 2023

Afternoon (Time: 1 hour 45 minutes)

Paper reference **4HB1/01R**

Human Biology

UNIT: 4HB1
PAPER: 01R

You must have:
Ruler
Candidates may use a 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.*

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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P 7 2 5 8 6 A 0 1 2 0

Pearson

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 (a) The box lists some parts of the eye and the ear.

auditory nerve	ciliary body	cochlea	iris	lens	optic nerve
ossicles	pupil	retina	semi-circular canals	tympanum	

Complete the table using words from the box to give the missing information.

(6)

Description	Part
contains light-sensitive cells	
membrane that transfers vibrations to middle ear	
transmits impulses from the retina to the brain	
helps the body to balance	
contains muscle tissue that controls light entering the eye	
converts vibrations into nerve impulses	

(b) Explain what is meant by the blind spot in the eye.

(2)

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(Total for Question 1 = 8 marks)

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2 The skeleton contains joints.

(a) Describe what is meant by the term **joint**.

(2)

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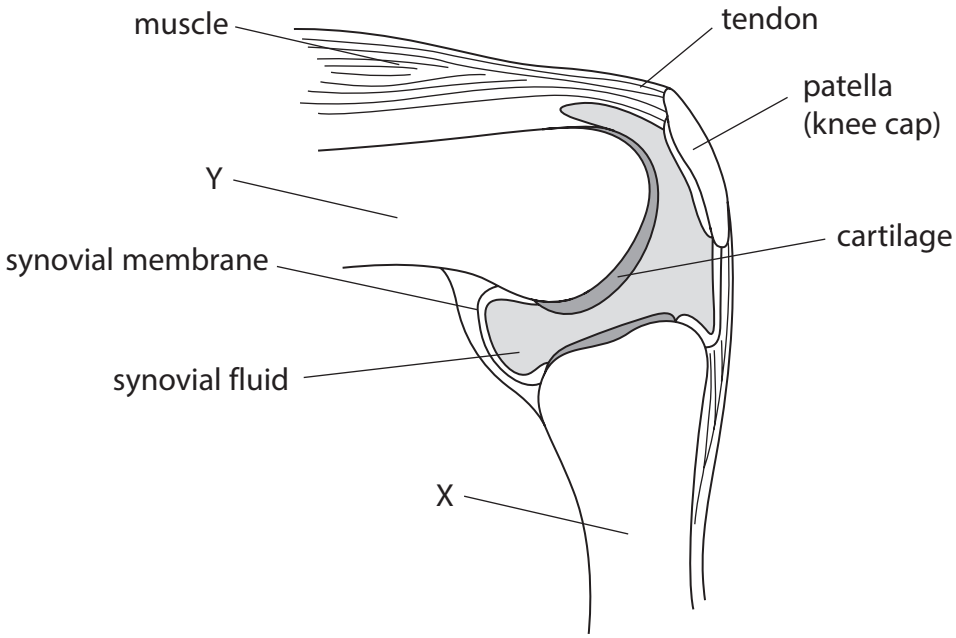
(b) The diagram shows a knee joint.



(i) Identify bone X and bone Y.

(2)

X .....

Y .....

(ii) Give the functions of tendons and cartilage.

(4)

tendons

.....

.....

cartilage

.....

.....

(iii) Give two structures, not shown on the diagram, that would be necessary for the joint to fully function.

(2)

1 .....

2 .....

(Total for Question 2 = 10 marks)

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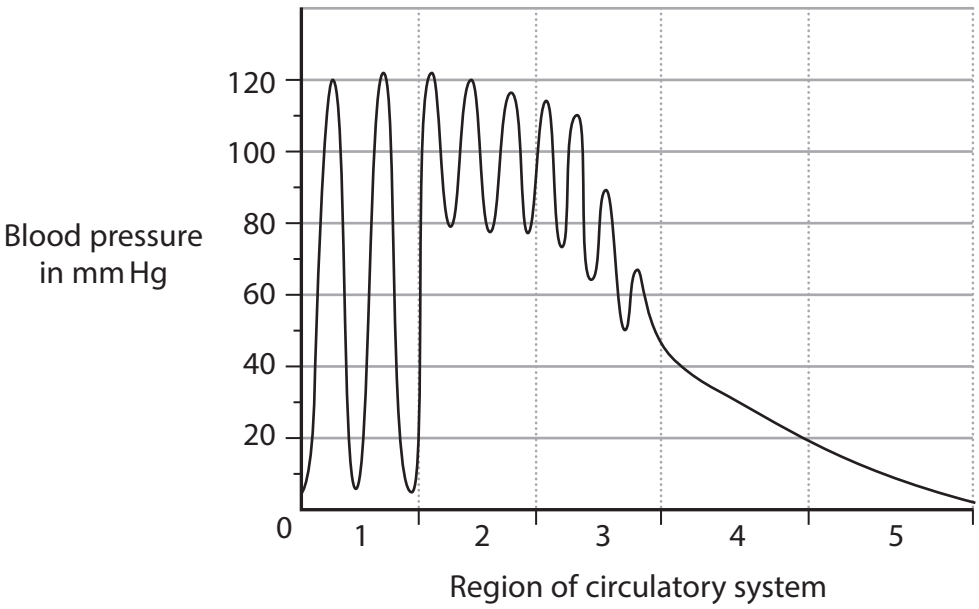
3 The graph shows how blood pressure varies in different regions of the circulatory system.



(a) (i) Estimate the difference between the maximum blood pressure and minimum blood pressure in region 1.

(2)

difference in blood pressure = ... mm Hg

(ii) Which part of the circulatory system is represented by region 2?

(1)

- ☒ **A** arteries
- ☒ **B** capillaries
- ☒ **C** heart
- ☒ **D** veins

(iii) Which part of the circulatory system is represented by region 5?

(1)

- ☒ **A** arteries
- ☒ **B** capillaries
- ☒ **C** heart
- ☒ **D** veins

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(b) Explain why blood pressure varies in region 1.

(5)

(c) Explain why the blood pressure changes in region 4.

(4)

(Total for Question 3 = 13 marks)

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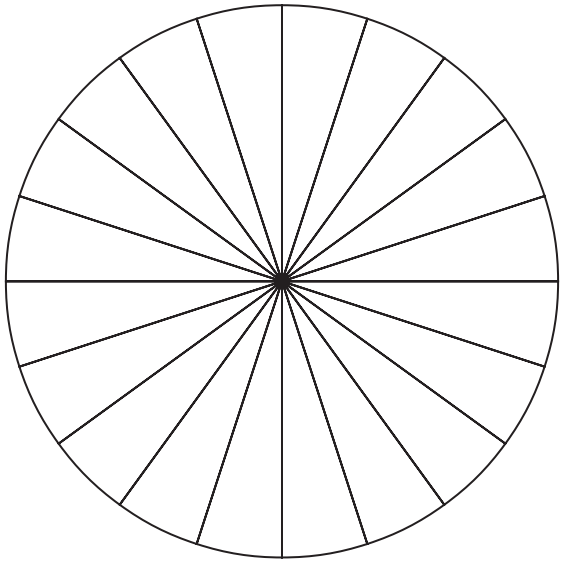
4 The table shows the percentage composition of the diets of two 10 year-old girls.

One girl lives in Area A and the other girl lives in Area B.

Component	Percentage (%) composition of diet	
	Area A	Area B
cereals	75.0	15.0
fruit and vegetables	15.0	37.5
eggs, fish and meat	2.5	27.5
milk, cheese and butter	7.5	20.0

(a) Complete the pie chart to show the diet of the girl in Area B.

(4)



(b) Explain what is meant by a balanced diet.

(2)

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(c) Calculate the ratio of the percentage composition of cereals in the diet of the girl in Area A compared with the diet of the girl in Area B.

Give your answer in the form n : 1

(2)

ratio = ...

(d) Discuss the effects that the percentage composition given for eggs, fish and meat in the diet may have on the growth of the two girls.

(5)

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(Total for Question 4 = 13 marks)

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5 A student uses this method to investigate the effect of exercise on the production of sweat.

- place a person in a room which has a temperature of 20 °C
- ask the person to remain inactive for 5 minutes
- measure the amount of sweat produced by a 25 cm^2 area of skin
- ask the person to exercise and measure the amount of sweat produced
- ask the person to rest for 10 minutes

Repeat the method at room temperatures of 22 °C, 24 °C, 26 °C, 28 °C and 30 °C

(a) (i) Explain why the person rests for 10 minutes before the method is repeated.

(2)

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.....

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.....

(ii) State three variables that should be controlled.

(3)

1 .....

.....

2 .....

.....

3 .....

.....

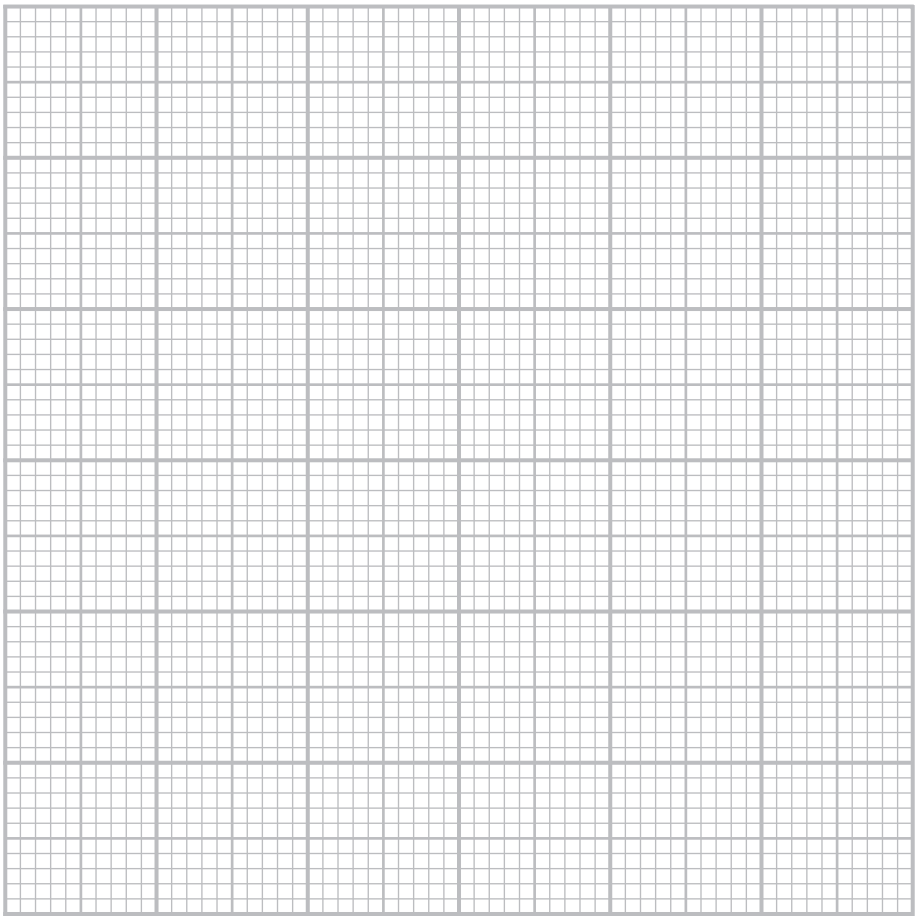
(b) The table shows the student's results.

Room temperature in °C	Amount of sweat produced by 25 cm^2 area of skin in arbitrary units	
	While inactive	During exercise
20	1	2
22	2	6
24	2	8
26	2	11
28	3	14
30	4	22

(i) Plot line graphs of the student's results.

Join the points with straight lines.

(6)



(ii) Explain the differences between the two sets of results.

(5)

(Total for Question 5 = 16 marks)

6 The lining of the inside of the cheek is made of squamous epithelial cells.

(a) Draw a labelled diagram to show a cheek cell when seen using a light microscope.

(4)

(b) Describe how a sample of cheek cells would be prepared to view using a light microscope.

(3)

(c) State three differences between a cheek cell and a cell from the lining of the trachea.

(3)

1 .....

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2 .....

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3 .....

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(Total for Question 6 = 10 marks)

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7 The four blood groups that occur in humans are group A, group B, group AB and group O.

There are three blood group alleles: I^A, I^B and I^O.

I^O is recessive to both I^A and I^B.

I^A and I^B are co-dominant to each other.

(a) (i) Explain what is meant by the term **co-dominant**.

(2)

(ii) State the possible genotypes of a person with blood group B.

(2)

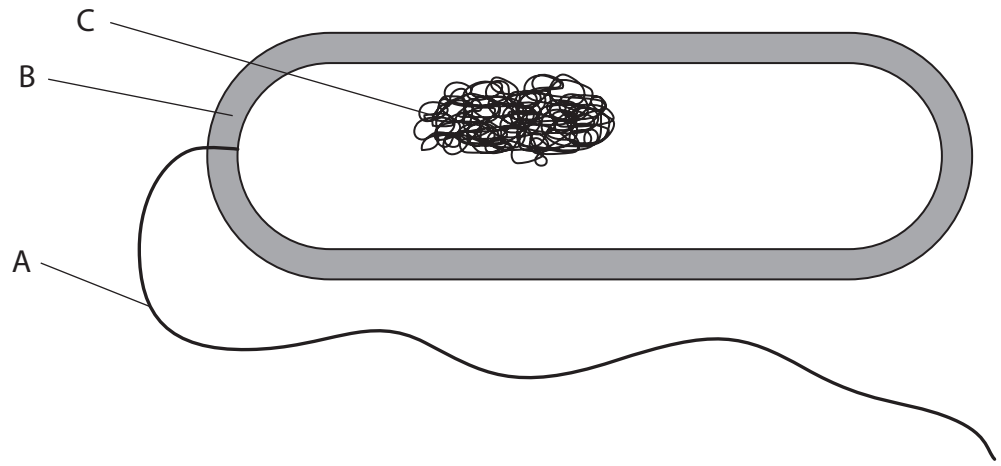
(b) Haemophilia is a sex-linked condition that prevents the blood clotting.

Explain why males are more likely to be affected by haemophilia than females.

(4)

(Total for Question 7 = 8 marks)

8 The diagram shows a bacterial cell.



(a) (i) Name the parts labelled A, B and C.

(3)

A .....

B .....

C .....

(ii) Some types of bacteria cause disease.

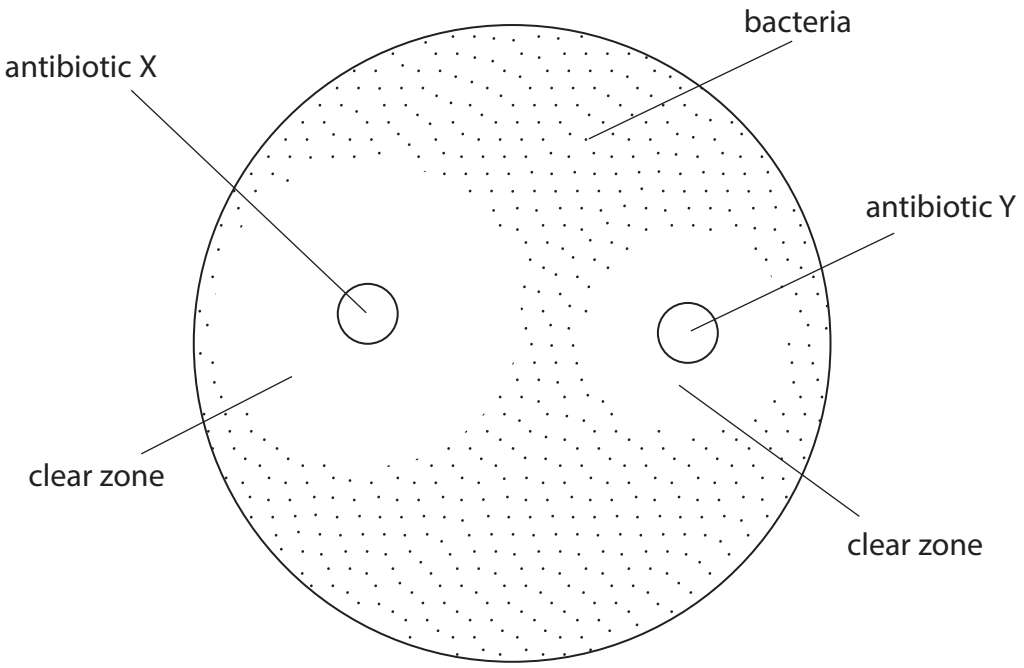
Give the name of organisms that cause disease.

(1)

.....

(b) A student uses this method to investigate whether antibiotic X is more effective than antibiotic Y.

- grow bacteria on nutrient agar in a Petri dish
- soak one disc of filter paper in antibiotic X and another disc in antibiotic Y
- place each disc on the agar in the Petri dish
- seal the Petri dish and leave for three days



(i) Describe what is meant by the term **antibiotic**.

(2)

(ii) Explain which antibiotic, X or Y, is more effective against the bacteria in the Petri dish.

(3)

(iii) Explain a suitable control that could be used in this investigation.

(3)

(Total for Question 8 = 12 marks)

TOTAL FOR PAPER = 90 MARKS

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