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)

Wednesday 4 June 2025

Afternoon (Time: 1 hour 45 minutes)

Paper reference **4HB1/02**

Human Biology

UNIT: 4HB1

Paper: 02

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/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.
- 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.

1 (a) The words in the box give the names of some of the parts of the male and female reproductive systems.

epididymis	ovary	oviduct	seminal vesicle
testes	uterus	urethra	vagina
vulva			

Complete the table by giving the name of the part that matches the description.

(7)

Description	Name of part
duct that carries urine and sperm	
produces sperm	
where fertilised ovum is implanted	
produces the fluid part of semen	
where sperm is deposited during intercourse	
where fertilisation happens	
releases ova	

(b) Oxytocin and LH (luteinising hormone) are two hormones found in females.

(i) Describe the functions of oxytocin.

(3)

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(ii) Describe the functions of LH.

(2)

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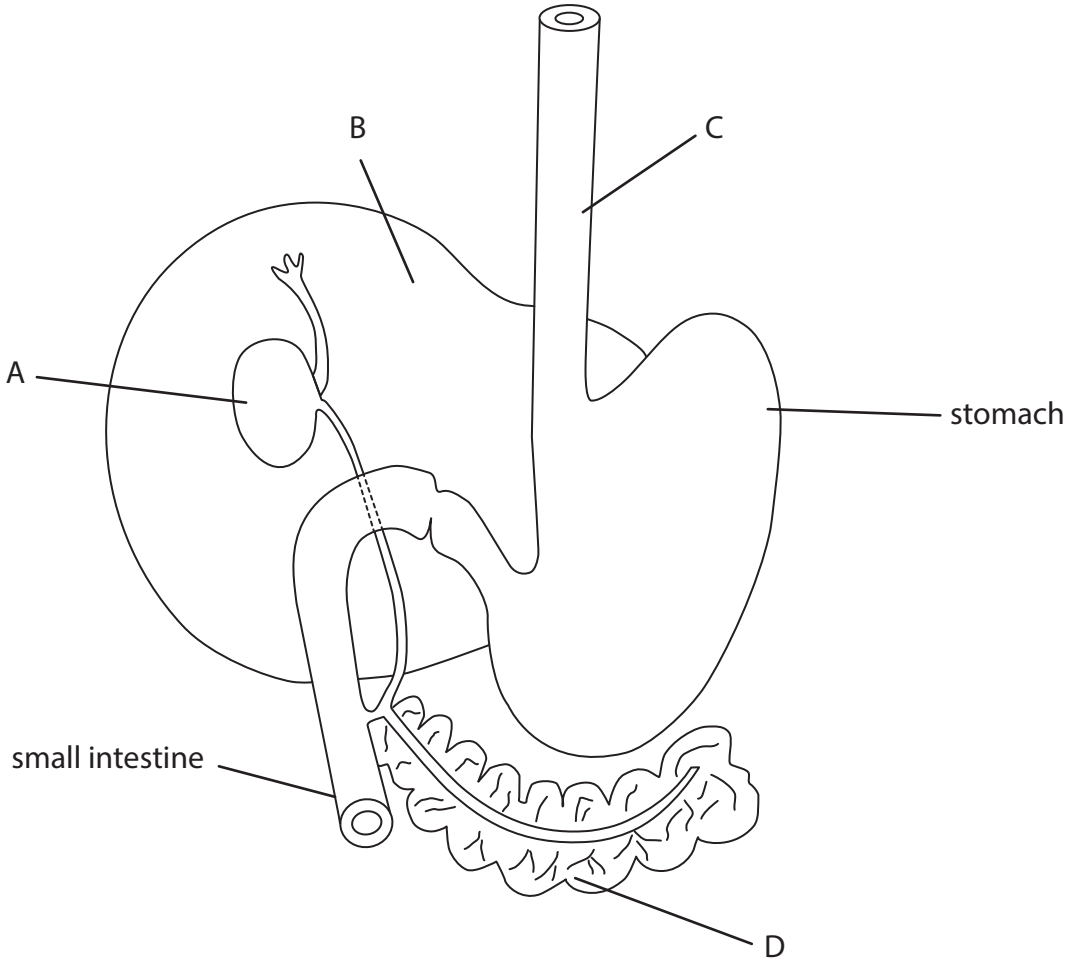
(Total for Question 1 = 12 marks)

2 The diagram shows structures involved in digestion.



(a) (i) Identify the structures labelled A, B, C and D.

(4)

A .....

B .....

C .....

D .....

(ii) Name the fluid stored in structure A.

(1)

.....

(iii) Explain the function of the fluid stored in structure A in digestion.

(3)

(b) (i) Describe the role of structure D in digestion.

(4)

(ii) Name two substances secreted by structure D that are not involved in digestion.

(2)

1 .....

2 .....

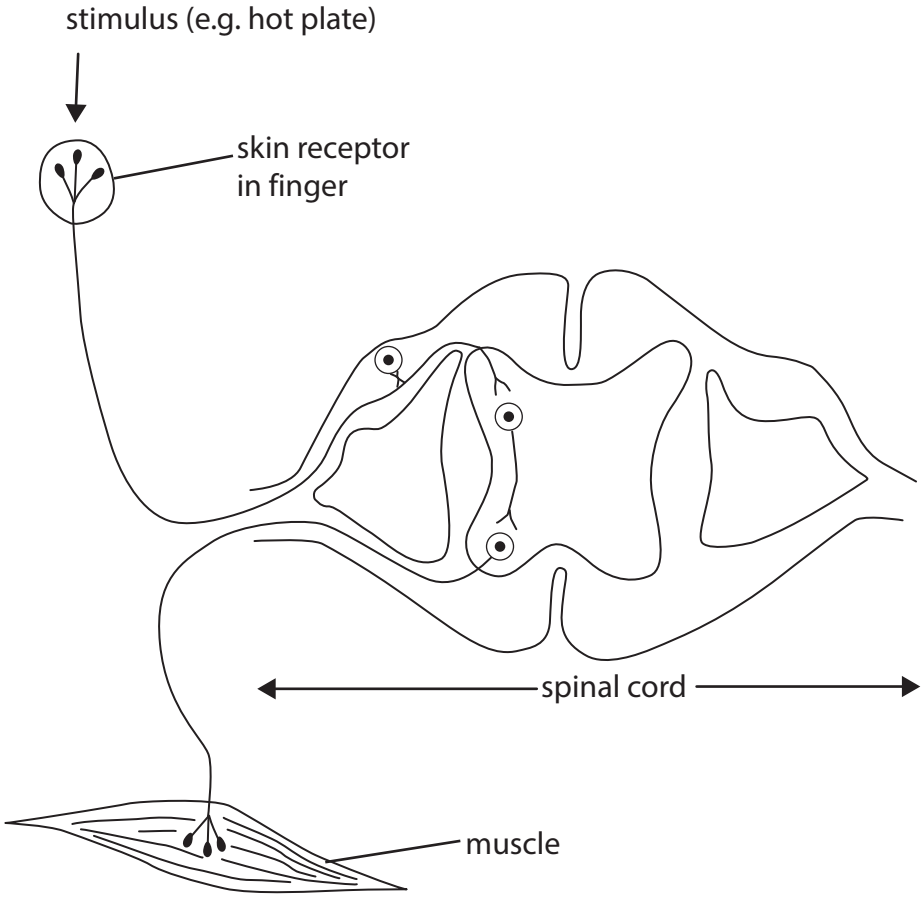
(Total for Question 2 = 14 marks)

3 (a) Describe the meaning of the term **reflex action**.

(3)

(b) The diagram shows a reflex arc.

The reflex arc contains three types of neurone.



(i) Use labels to identify each type of neurone in the diagram.

(3)

(ii) Draw an arrow on the diagram to show the direction of an impulse as it travels through the reflex arc.

(1)

(iii) State which structure in a reflex arc prevents the impulse travelling in the wrong direction.

(1)

.....

(Total for Question 3 = 8 marks)

4 A student investigates the effect of different concentrations of sugar solution on the mass of cylinders made from potato.

This is the student's method.

- push a cork borer into different parts of a potato
- remove five cylinders of potato
- wrap each cylinder in a piece of filter paper
- remove from the filter paper and find the mass of each cylinder
- place one cylinder into distilled water
- place each of the other cylinders into different concentrations of sugar solution
- remove the cylinders after two hours and wrap in filter paper
- remove from the filter paper and find the new mass

These are the student's results.

1.00 au = −7 %	1.50 au = −10 %	0.00 au (distilled water) = +8 %
	0.25 au = +4 %	0.50 au = −1 %

The student's results are given as the percentage change in mass of the cylinder and the concentration of sugar is given in arbitrary units (au).

(a) (i) Draw a table to display the results.

(4)

(ii) Determine the median value for sugar concentration.

(1)

median value = ...

(iii) The original mass of the potato cylinder placed into the sugar solution, of concentration 0.25 au, was 7.0 g.

Calculate the mass of the cylinder after two hours.

Give your answer to two significant figures.

(3)

mass of cylinder = ... g

(b) Use the student's results to estimate the concentration of sugar solution that would produce no change in the mass of the potato cylinder.

You should include details of how you obtained your answer.

(4)

concentration of sugar solution = ... au

(c) (i) Explain why filter paper was wrapped around the potato cylinders at the beginning and end of the investigation.

(2)

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.....

.....

.....

(ii) The student kept the potato cylinders in the liquid for two hours.

State two other factors that should be kept constant during this investigation.

(2)

1 .....

.....

2 .....

.....

(Total for Question 4 = 16 marks)

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5 Read the passage below.

Use the information in the passage and your own knowledge to answer the questions that follow.

Losartan belongs to a group of drugs known as angiotensin-II receptor antagonists. The body produces angiotensin-II, which is a substance that binds to receptors in blood vessels, causing them to narrow. This causes an increase in blood pressure. Losartan prevents angiotensin-II binding to these receptors, lowering blood pressure.

If high blood pressure is left untreated, a decrease in kidney function can result in proteinuria. This is a condition that causes high levels of protein to be found in a person's urine. People with high blood pressure and a resultant thickening of the left ventricle can be treated with Losartan to reduce the risk of stroke.

People with high blood pressure should not take Losartan if their liver is not functioning properly. Women who are pregnant or who are breast feeding should not take Losartan.

(a) Describe how the action of Losartan differs from the action of an ACE inhibitor. (lines 4 and 5)

(4)

(b) Explain how the structure of a named type of blood vessel allows angiotensin-II to increase blood pressure. (lines 2 to 5)

(4)

(c) Explain why proteinuria is a sign of problems with kidney function. (lines 6 to 8)

(2)

(d) Suggest why high blood pressure causes the left ventricle to become thickened. (lines 8 to 9)

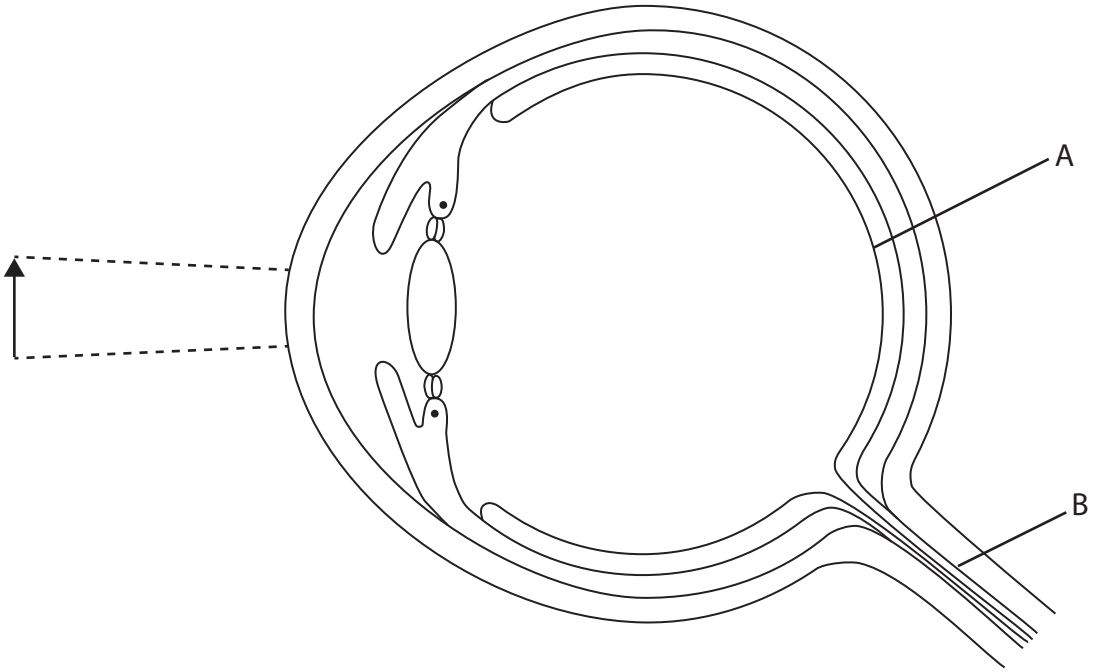
(2)

(e) Explain why people who have high blood pressure are advised not to take Losartan if their liver is not functioning properly. (lines 10 to 11)

(2)

(Total for Question 5 = 14 marks)

6 The diagram shows a section through the eye.



(a) (i) Describe the functions of structures A and B.

(4)

A .....

.....

.....

.....

B .....

.....

.....

.....

(ii) Complete the diagram to show how an image of the arrow is formed at the back of the eye.

(4)

(b) Describe a simple experiment to show that stereoscopic vision would help a person to catch a ball thrown towards them.

(4)

(c) Describe what is meant by the term **astigmatism**.

(2)

(Total for Question 6 = 14 marks)

7 (a) Two children, M and N, are born to two sets of parents.

Child M has blood group O and child N has blood group A.

The blood groups of the two sets of parents are given in the table.

	Blood group	
	mother	**father**
1st set of parents	AB	O
2nd set of parents	B	B

(i) Explain which child belongs to which set of parents.

(4)

(ii) Calculate the probability that the next child produced by the 2nd set of parents will have blood group B.

Include a genetic diagram in your answer.

(3)

probability = ...

(b) Describe how to prepare a sample of blood to be observed using a light microscope.

(5)

(Total for Question 7 = 12 marks)

TOTAL FOR PAPER = 90 MARKS

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