Write your name here

Surname	Other names

Pearson Edexcel
International GCSE

Centre Number	Candidate Number

Human Biology

Unit: 4HB0
Paper: 01

Wednesday 10 January 2018 – Afternoon
Time: 2 hours

Paper Reference
4HB0/01

You must have:
Ruler

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.*
- Show all the steps in any calculations and state the units.
- 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 ☒.

Information

- The total mark for this paper is 120.
- 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.

Turn over ▶

P 5 3 2 9 3 A 0 1 2 8

Pearson

Answer ALL questions.

1 For each of the questions (a) to (j), choose an answer **A**, **B**, **C** or **D** and put a cross in the box ☒. Mark only one answer for each question. If you change your mind about an answer, put a line through the box ~~☒~~ and mark your new answer with a cross ☒.

(a) Many antibiotics can not be used in the treatment of malaria.

What is the reason for this?

(1)

☐ **A** malaria is not an infectious disease

☐ **B** malaria is caused by a protozoan organism

☐ **C** malaria is transmitted by mosquitoes

☐ **D** malaria occurs in tropical regions

(b) In human DNA, 30% of the bases are adenine (A).

What percentage of bases are guanine (G)?

(1)

☐ **A** 20%

☐ **B** 30%

☐ **C** 40%

☐ **D** 70%

(c) What is the role of ADH (anti-diuretic hormone)?

(1)

☐ **A** ADH increases the amount of glucose reabsorbed into the blood

☐ **B** ADH decreases the amount of glucose reabsorbed into the blood

☐ **C** ADH increases the amount of water reabsorbed into the blood

☐ **D** ADH decreases the amount of water reabsorbed into the blood

(d) Which of these is a greenhouse gas?

(1)

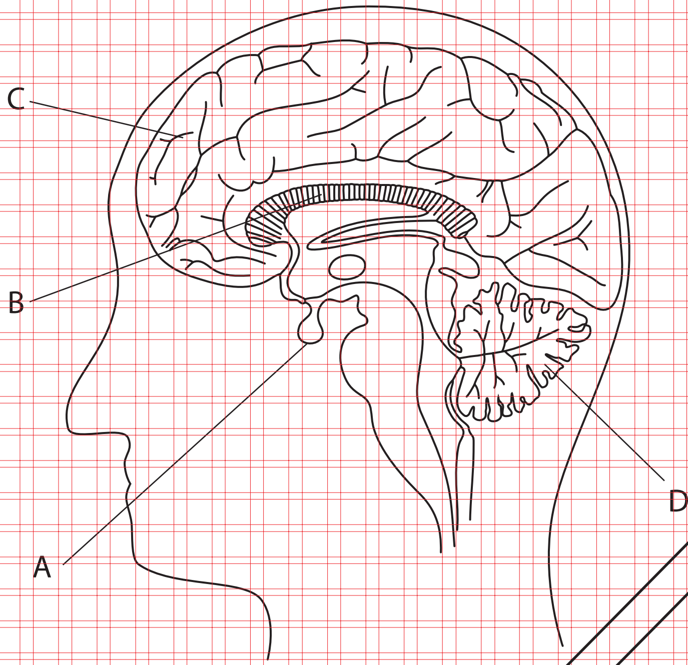
☐ **A** nitrogen

☐ **B** sulfur dioxide

☐ **C** water vapour

☐ **D** oxygen

(e) The diagram shows a section through the human brain.



Which part is an endocrine gland?

(1)

☒ **A**

☒ **B**

☒ **C**

☒ **D**

(f) The amount of light entering the eye is controlled by the radial and circular muscles of the iris.

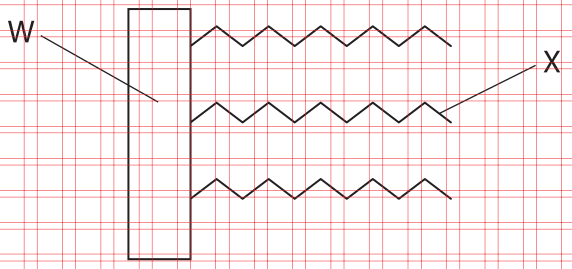
Which row of the table shows the action of these muscles when bright light enters the eye?

(1)

	Radial muscles	Circular muscles
☒ **A**	relax	relax
☒ **B**	relax	contract
☒ **C**	contract	relax
☒ **D**	contract	contract

(g) The diagram shows a fat molecule.

W and X are components of the fat molecule.

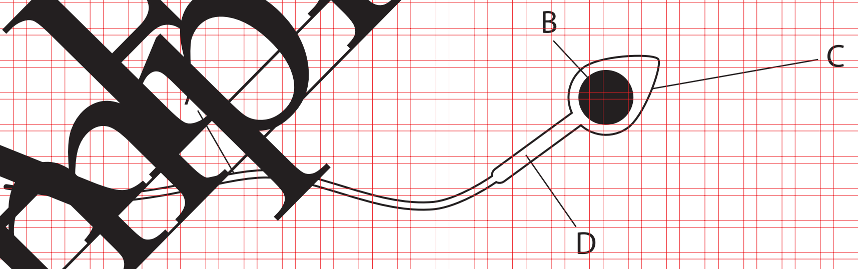


Which row of the table gives the correct names for components W and X?

(1)

		Component W	Component X
☒	**A**	glycerol	amino acid
☒	**B**	amino acid	fatty acid
☒	**C**	fatty acid	glycerol
☒	**D**	glycerol	fatty acid

(h) The diagram shows a sperm cell.



Which part controls the activities of the sperm cell?

(1)

☒ **A**

☒ **B**

☒ **C**

☒ **D**

(i) Why do white blood cells collect at the site of a wound?

(1)

☒ **A** to clot blood

☒ **B** to produce pus

☒ **C** to destroy bacteria

☒ **D** to form a scab

(j) Poor night vision is caused by a deficiency of

(1)

☒ **A** vitamin A

☒ **B** vitamin B

☒ **C** vitamin C

☒ **D** vitamin D

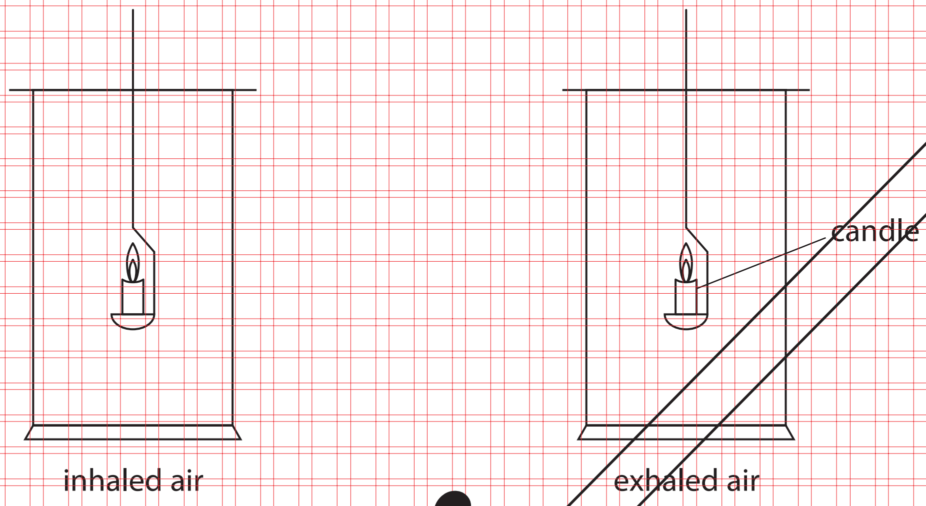
(Total for Question 1 = 10 marks)

2 A student investigates the composition of inhaled air and exhaled air.

He collects a jar of inhaled air (air from the room) and a jar of exhaled air.

He then lowers a burning candle into each jar, as shown in the diagram.

Oxygen is required for the candle to burn.



The student records the amount of time that each candle burns in the jar.

The table shows his results.

Type of air	**Time in seconds**
inhaled	15
exhaled	5

(a) Explain the difference between the composition of inhaled and exhaled air that causes these results.

(2)

....

....

....

....

(b) (i) State three other differences between inhaled and exhaled air.

(3)

1 ....

2 ....

3 ....

(ii) Describe an experiment to demonstrate one of these differences.

(3)

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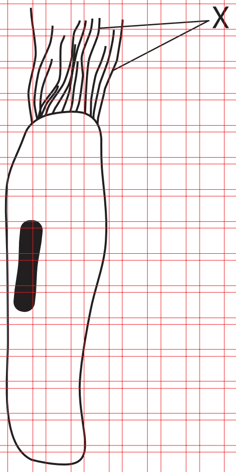
....

(c) The diagram shows a cell that is part of the breathing system.



(i) State the name of the structures labelled X.

(1)

....

(ii) Label three other structures shown in the diagram.

(3)

(iii) Where is this cell located in the breathing system?

(1)

....

(iv) A person smokes a lot of cigarettes for many years.

Draw a labelled diagram of the likely appearance of the cell in this person.

(2)

(Total for Question 2 = 15 marks)

3 The passage is about controlling body temperature.

Use words or numbers from the box to complete the passage.

Each word or number may be used once, more than once or not at all.

(8)

biceps	enzymes	erector	neutral	heat
homeostasis	hypothalamus	negative	pituitary	
positive	skin	sugars	sweat	triceps
vasoconstriction	vasodilation	37 °C	98 °C	20 °C

The internal environment of the body is usually kept constant. This is

called .... The human body temperature is kept constant

at .... This allows .... to work

at their optimum rate. If the core body temperature decreases, then this is detected by

the .... This causes .... in blood

vessels supplying the skin. It also causes .... muscles in the skin to

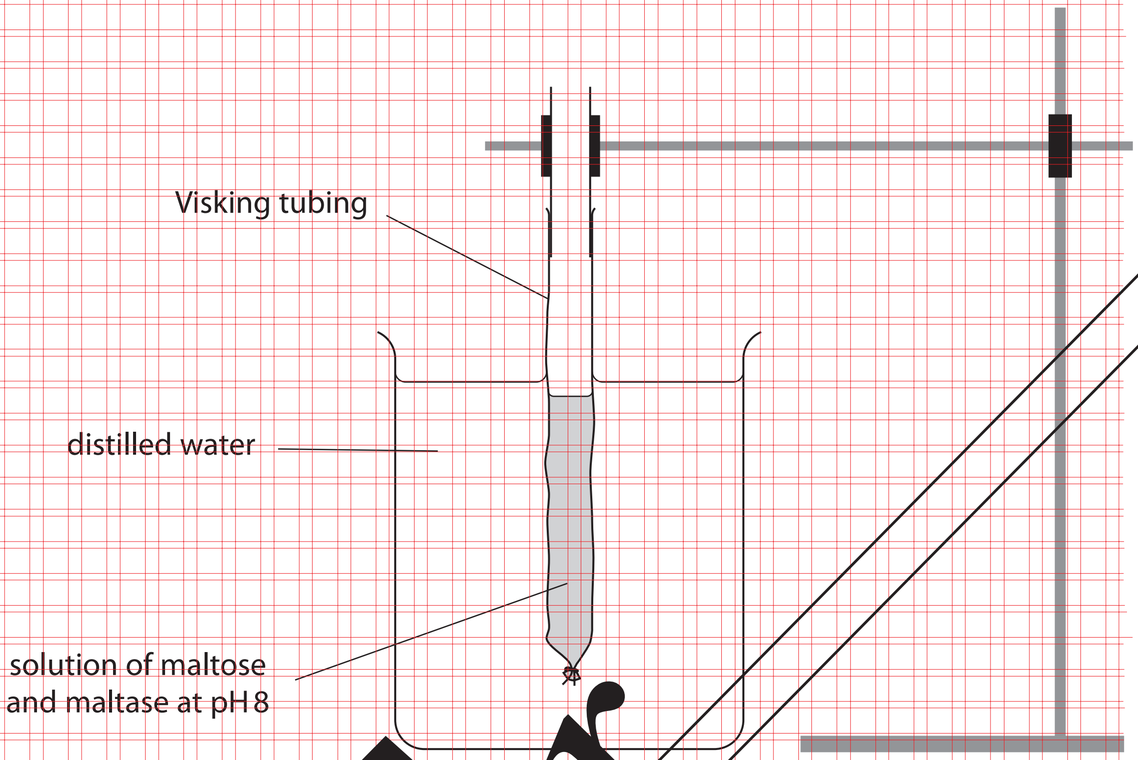
contract and raise hairs. Less .... is released from glands in the skin.

The control of body temperature works by the process of ....

feedback.

(Total for Question 3 = 8 marks)

4 A student uses Visking tubing to represent part of the alimentary canal. She sets up the apparatus shown in the diagram.



(a) Explain which part of the alimentary canal the Visking tubing represents.

(4)

(b) The student leaves the apparatus for four hours.

After four hours, she tests the distilled water for the presence of glucose.

(i) Describe a safe method of testing for glucose.
(4)

(ii) Explain why the distilled water now gives a positive result for glucose after four hours.
(3)

(c) Explain how the visking tubing differs from the human alimentary canal.
(4)

(Total for Question 4 = 15 marks)

5 (a) During the menstrual cycle, the concentrations of oestrogen and progesterone in the blood vary.

The table shows these variations.

Day of menstrual cycle	Oestrogen concentration in arbitrary units	Progesterone concentration in arbitrary units
2	4	1
4	6	1
6	8	1
8	12	1
10	16	1
12	10	1
14	6	3
16	6	5
18	8	6
20	10	6
22	12	6
24	12	5
26	11	4
[illegible]	7	2

Plot the data on the grid and join the points with straight lines.

(5)

(i) Name the process in the menstrual cycle that occurs between days 1 and 4.

(1)

....

(ii) Name the process in the menstrual cycle that occurs between days 10 and 14.

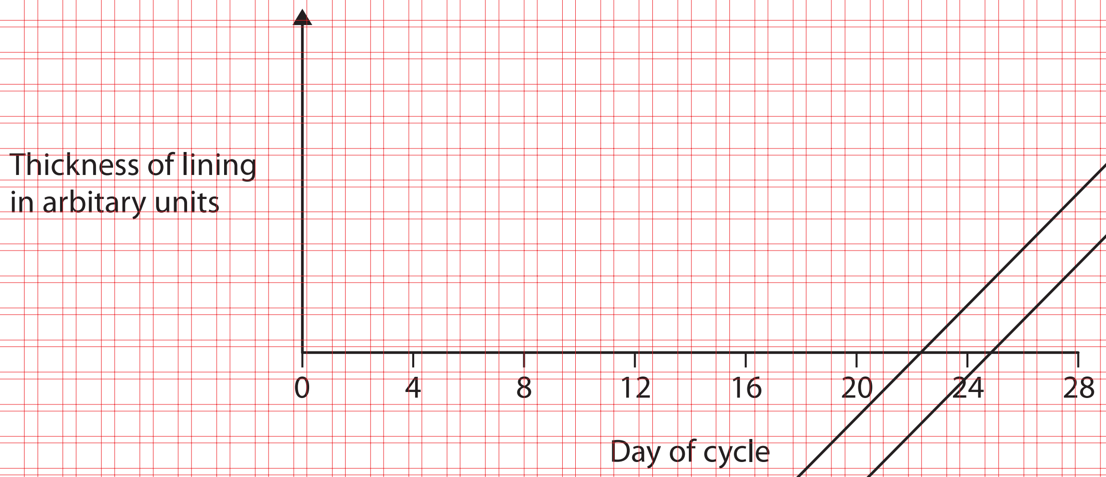
(1)

....

(c) The lining of the uterus (endometrium) changes in thickness during the menstrual cycle.

(i) Draw a line on the chart to show the changes in the thickness of the lining during the 28-day cycle.

(3)



(ii) Explain why the thickness of the lining needs to change during the 28-day cycle.

(3)

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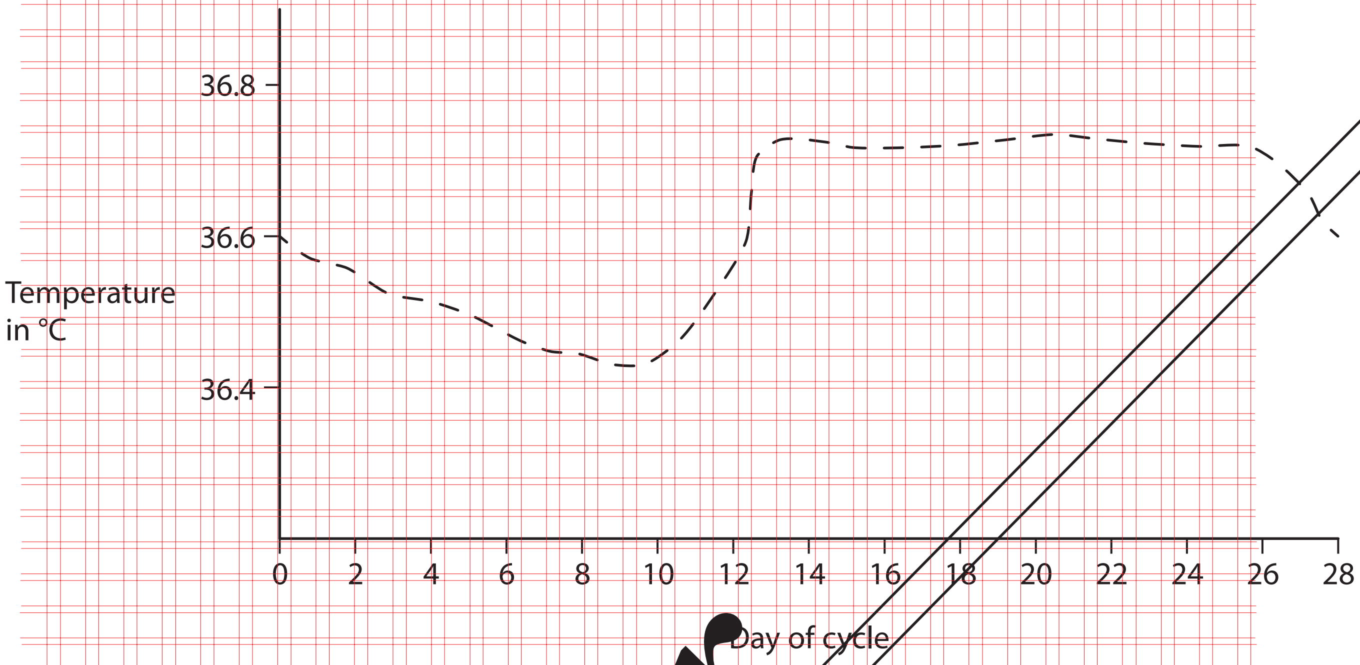
(d) The body temperature of a female varies during the 28-day cycle.

The chart shows these variations in temperature.



Suggest how a female can use information about her body temperature to increase her chances of becoming pregnant.

(3)

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(Total for Question 5 = 16 marks)

6 A student wants to investigate the amount of energy in different foods.

She plans to burn samples of different foods, each with the same mass.

Name six pieces of equipment that she would need for her investigation.

(6)

1 ....

2 ....

3 ....

4 ....

5 ....

6 ....

(Total for Question 6 = 6 marks)

7 (a) A red blood cell leaves the heart from the left ventricle, travels around the body and returns to the left atrium.
As the red blood cell travels around the body, it passes through the liver.

The red blood cell also passes through these vessels.

P	aorta
Q	hepatic vein
R	hepatic artery
S	pulmonary artery
T	pulmonary vein
U	vena cava

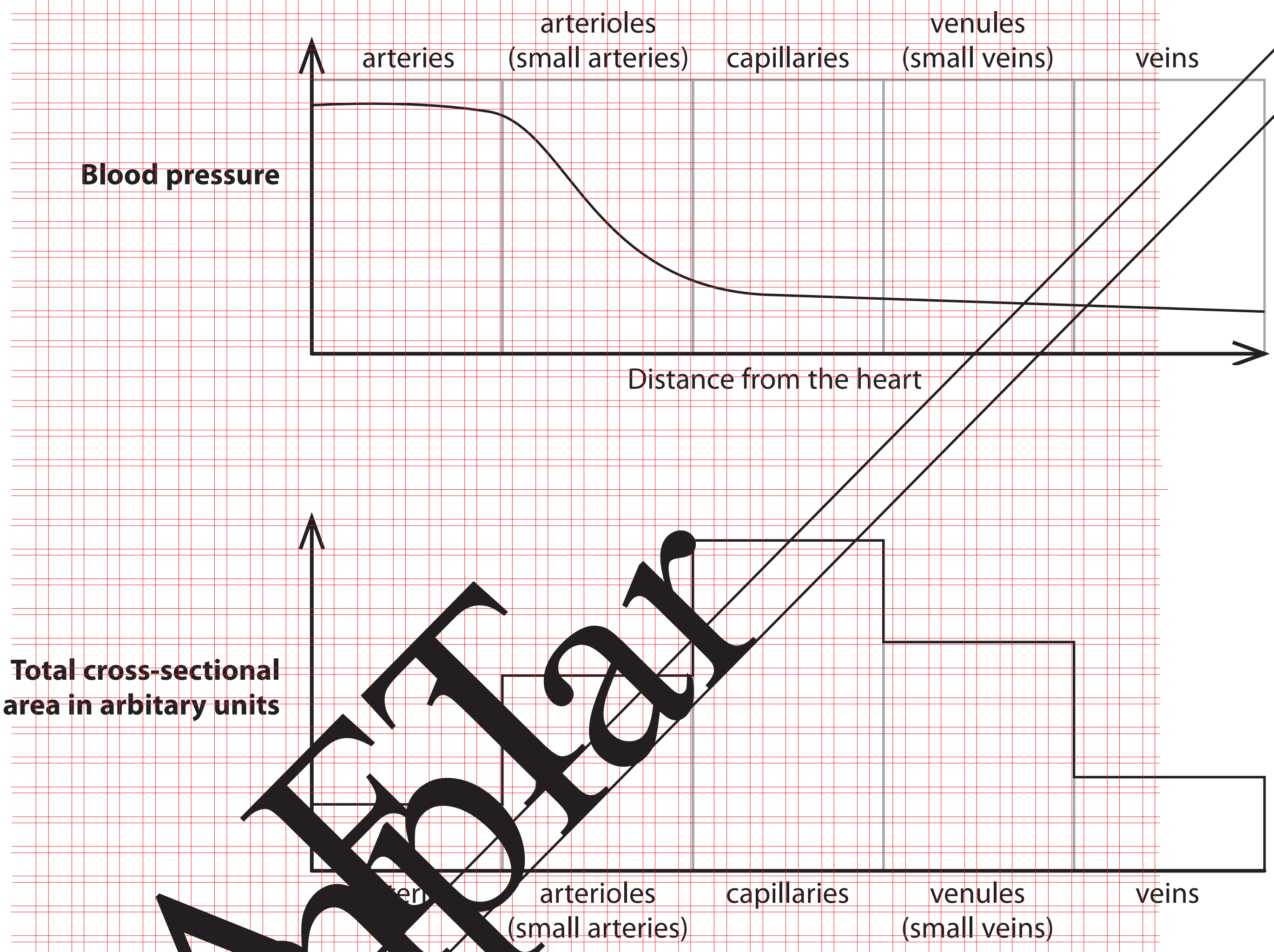
Write one letter in each box to show the correct order in which the red blood cell passes through these vessels.

One has been done for you.

(3)

left ventricle → ☐ → ☐ → Q → ☐ → ☐ → ☐ → left atrium

(b) The charts show the variation in blood pressure and the total cross-sectional area of the five types of blood vessel in the human body.



(i) Which type of blood vessel carries blood at the highest pressure?

(1)

(ii) Suggest why the drop in blood pressure is greater in the arterioles than in the capillaries.

(2)

(iii) Which type of blood vessel allows the exchange of substances between the blood and the body tissues?

(1)

(iv) Explain two features of this type of blood vessel that make it suitable for the exchange of substances.

Use information from the charts to help your answer.

(4)

(v) Name two waste substances that pass from the body tissues into the blood.

(2)

1 ....

2 ....

(Total for Question 7 = 13 marks)

8 This question is about blood groups.

There are four main blood groups.

- group A
- group B
- group AB
- group O

(a) Sometimes a person needs to receive a blood transfusion.

(i) Explain why it is important for a person who receives a blood transfusion to be given the correct blood group.

(2)

....

....

....

....

(ii) The blood group of a person determines who they can donate blood to and who they can receive blood from.

Complete the table by giving the missing information.

Some of the table has been completed for you.

(6)

Blood group of person	**Can donate blood to people of blood group**	**Can receive blood from people of blood group**
A		
[illegible]		B and O
AB	AB	
O		

(b) The inheritance of blood groups is controlled by three alleles, I^A, I^B and I^O.

Alleles I^A and I^B are codominant.

Allele I^O is recessive to alleles I^A and I^B.

(i) State what is meant by the term **codominant**.

(2)

....

....

....

....

(ii) State all of the possible genotypes for blood groups AB, B and O.

(4)

AB ....

B ....

O ....

(iii) A mother who is heterozygous for blood group A and a father who is heterozygous for blood group B have a baby.

Draw a genetic diagram to show the possible phenotypes for this child.

(4)

(iv) These parents then produce identical twins.

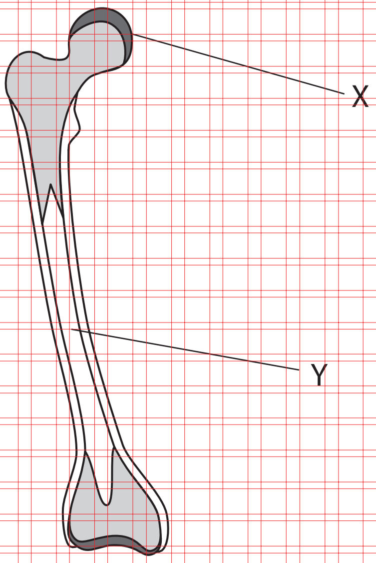
What is the probability that both twins will be blood group AB?

Give a reason for your answer.

(2)

(Total for Question 8 = 20 marks)

9 The diagram shows a section through a bone.



(a) Name the structures labelled X and Y.

(2)

X ....

Y ....

(b) Using only information from the diagram, explain why this bone could be the femur (thigh bone).

(3)

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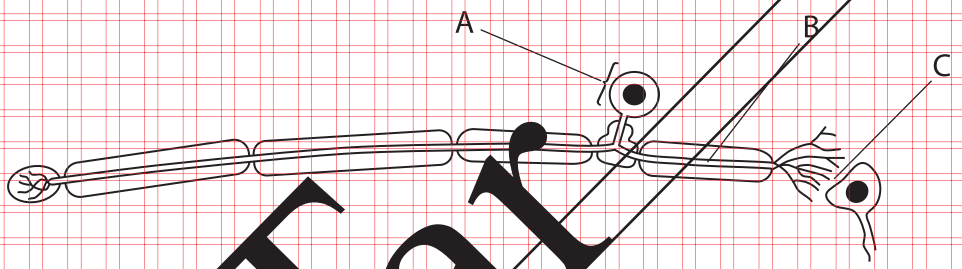
(Total for Question 9 = 5 marks)

10 (a) Complete the table to compare nervous coordination with hormonal coordination.

(6)

	Nervous coordination	**Hormonal coordination**
Type of message		
Route of transfer		
Speed of transfer		

(b) The diagram shows a sensory nerve cell.



(i) Name the structures labelled A and B.

(2)

A ....

B ....

(ii) Describe the function of a sensory nerve cell.

(2)

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(iii) Explain how an impulse is transferred across gap C.

(2)

....

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....

(Total for Question 10 = 12 marks)

TOTAL FOR PAPER = 120 MARKS

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