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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)

Friday 08 November 2024

Morning (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/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.
- 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 (a) The information in the box gives structures or hormones involved in reproduction.

cervix	FSH	ovary	oviduct	ovum
oxytocin	progesterone	uterus	vagina	vulva

The table lists some of the functions of these structures and hormones.

Complete the table by giving the missing information.

(6)

Function	Name of structure or hormone
transfers ova to uterus	
contracts during birth	
releases ova	
dilates to allow birth	
maintains uterus lining during pregnancy	
causes contractions during birth	

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(b) There are various methods of birth control.

(i) Complete the table by giving an example of each method.

(3)

Method of birth control	Example
barrier	
natural	
hormonal	

(ii) Name one other method of birth control not given in the table.

(1)

.....

(Total for Question 1 = 10 marks)

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2 (a) Describe what is meant by a balanced diet.

(2)

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(b) A label on a pack of four slices of roast beef gives information about how much of each dietary component is present in the meat.

It also gives the percentage of the recommended daily amount for each dietary component.

Table 1 and table 2 give these values.

Energy in kJ	Fat in g	Sugars in g	Salt in g
470	2.4	less than 0.4	0.6

Table 1

Percentage of recommended daily amount (%)			
energy	**fat**	**sugars**	**salt**
4.0	4.0	less than 1.0	12.0

Table 2

(i) Name another dietary component that could be listed on the pack of meat.

(1)

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(ii) Using data from the tables, calculate the mass of fat, in g, that is needed to achieve the recommended daily amount.

(3)

mass = ... g

(iii) Calculate the number of slices of meat a person would need to eat to supply a recommended daily energy intake of 11 800 kJ.

(2)

number of slices = ...

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(iv) When meat is rubbed on a piece of paper it leaves a greasy mark due to the presence of fat in the meat.

Describe another test to show the presence of fat in the meat.

(5)

(Total for Question 2 = 13 marks)

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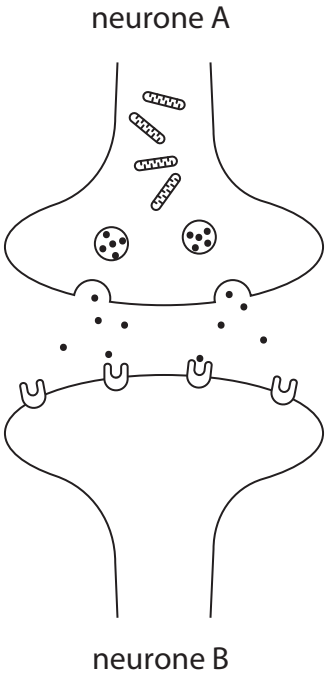
3 (a) The diagram shows the gap between two neurones, A and B.



(i) Name this gap.

(1)

(ii) Draw an arrow on the diagram to show the direction of travel of an impulse.

(1)

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(iii) Describe how a nerve impulse travels from one side of the gap to the other.

(6)

(iv) Explain why an impulse can only travel in one direction across the gap.

(3)

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(b) Some people take the illegal drug known as cocaine.

State two dangers of taking cocaine.

(2)

1 .....

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2 .....

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(Total for Question 3 = 13 marks)

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4 Read the passage below.

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

When looking at data, it is clear that people in lower income countries are more likely to die from infectious diseases (approximately 240 per 100 000) than non-infectious diseases (approximately 180 per 100 000). Infectious diseases such as diarrhoea and malaria can be easily eliminated or treated. It is also possible to vaccinate against diseases such as TB. These diseases are uncommon in higher income countries because of preventative medicine.

The only common diseases present in both higher and lower income countries are respiratory tract infections. These infections are usually influenza, pneumonia and bronchitis. Whilst influenza is a viral infection, the other infections are usually bacterial and can be treated. Many people at risk in the higher income countries are encouraged to get preventative treatment. These are often provided free of charge for the elderly who are most at risk and those who work in indoor spaces such as schools, offices and hospitals. The effect on mortality in lower income countries is more than two times as great as in higher income countries.

The greatest killers in higher income countries are heart disease and stroke. These two diseases kill approximately twice as many people per 100 000 as in lower income countries. These are often seen as lifestyle diseases. When we compare the number of deaths caused by non-infectious diseases, in higher income countries there are 445 deaths per 100 000 and in lower income countries there are 185 deaths per 100 000. There are also more cases of other diseases such as dementia and cancers in higher income countries.

(a) State one way the infectious diseases diarrhoea and malaria can be prevented (lines 3 and 4).

(2)

diarrhoea

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malaria

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(b) (i) State how pneumonia and bronchitis can be treated (lines 8 to 10).

(1)

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(ii) Give one reason why elderly people and people who work in indoor spaces are at risk from respiratory tract infections. (lines 12 and 13).

(2)

elderly people

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.....

.....

indoor spaces

.....

.....

.....

(c) (i) Give two factors that may contribute to lifestyle diseases (line 18).

(2)

1 .....

.....

2 .....

.....

(ii) In a higher income country of 5 000 000 people, calculate the number of people who will have non-infectious diseases (lines 20 and 21).

Give your answer to three significant figures.

(3)

number of people = ...

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(iii) Calculate the ratio of the number of people with non-infectious diseases in a higher income country to the number of people with non-infectious diseases in a lower income country (lines 20 and 21).

Give your answer in the form n : 1

(3)

ratio = ... : .....

(iv) Suggest why there are more cases of dementia and cancers in higher income countries (lines 21 and 22).

(2)

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(Total for Question 4 = 15 marks)

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5 (a) (i) Describe what is meant by the term **mutation**.

(2)

(ii) Explain how a mutation can produce a change in the characteristics of an organism.

(3)

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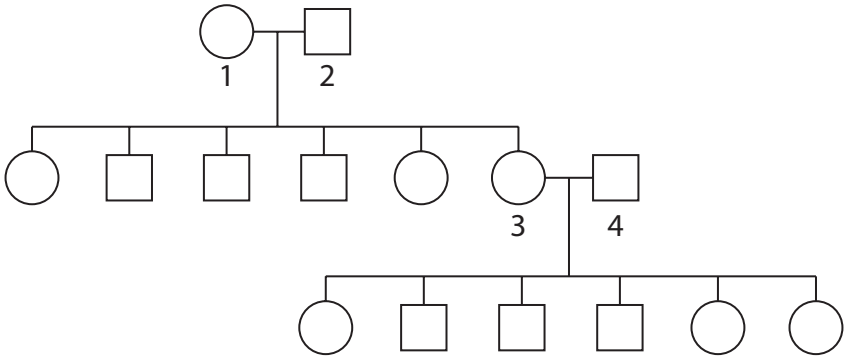
(b) (i) The condition known as hairy ears is thought to be caused by a mutation of an allele on the Y chromosome.

Explain how the genetics of this sex-linked condition differ from the genetics of haemophilia.

(2)

(ii) The diagram is a family pedigree showing the inheritance of the hairy ears mutation.



Person 1 is a female without the condition and person 2 is a male with the condition.

State the genotype of person 1 and the genotype of person 2.

Use H to represent the allele for hairy ears.

(2)

person 1

person 2

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(iii) Neither person 3 nor person 4 has the condition.

Explain why the probability of their next child being a girl without hairy ears is 50%.

(3)

(Total for Question 5 = 12 marks)

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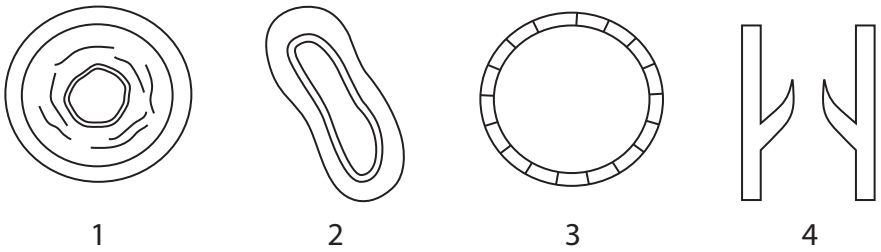
6 (a) The diagram shows different sections through various blood vessels.



1 2 3 4

Not to scale

(i) Identify each type of blood vessel.

(4)

blood vessel 1

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blood vessel 2

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blood vessel 3

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blood vessel 4

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(ii) State one reason for your choice for each blood vessel.

(4)

blood vessel 1

blood vessel 2

blood vessel 3

blood vessel 4

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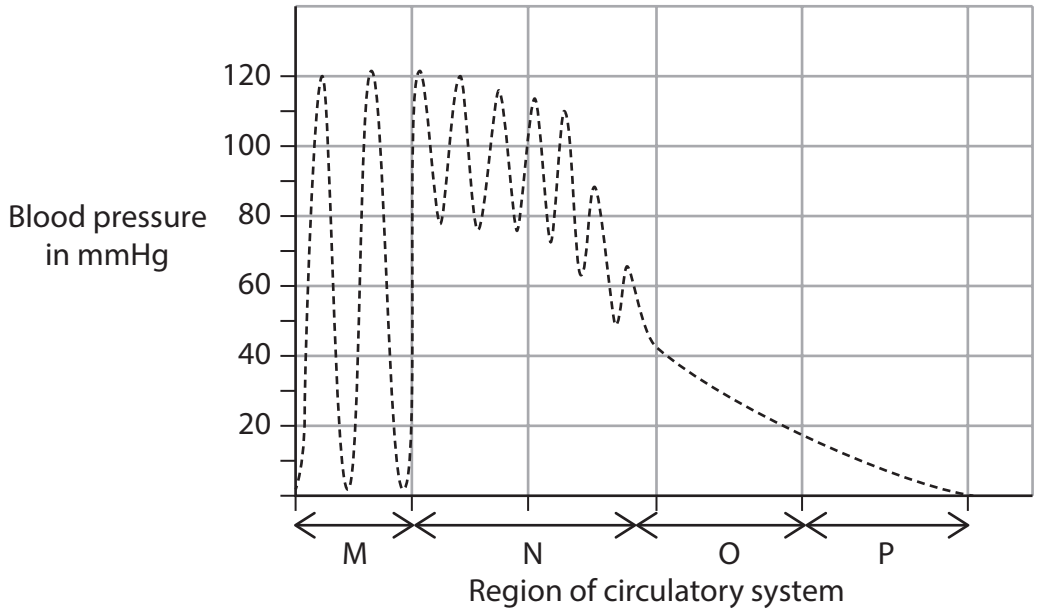
(b) The graph shows changes in blood pressure in four regions of the circulatory system labelled M, N, O and P.



Identify each region, M, N, O and P, of the circulatory system.

(4)

M .....

N .....

O .....

P .....

(Total for Question 6 = 12 marks)

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7 Six students investigate the activity of an enzyme found in the alimentary canal.

This enzyme digests a cloudy suspension into a clear solution.

The results of the investigation are shown in the table.

Student	Volume of enzyme solution in cm^3	Temperature in °C	pH	Volume of cloudy suspension in cm^3	Time tubes left in minutes	Appearance at end of investigation
1	5	37	2	10	9	cloudy
2	5	37	2	10	20	clear
3	5	37	4	10	35	clear
4	5	37	4	10	20	cloudy
5	5	37	6	10	8	cloudy
6	5	37	6	10	40	cloudy

(a) Explain why the investigation was carried out at 37 °C.

(2)

(b) Explain which property of the enzyme the students are investigating.

(2)

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(c) Comment on the results of the investigation.

In your answer include ideas of validity and accuracy.

(4)

(d) Describe a control experiment that the students could have carried out.

(3)

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(e) State a possible conclusion that the students could make from the results of this investigation.

(2)

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(f) Explain where this enzyme is likely to be found in the alimentary canal.

(2)

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(Total for Question 7 = 15 marks)

TOTAL FOR PAPER = 90 MARKS

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