Write your name here

Surname	Other names

Pearson Edexcel International GCSE

Centre Number | | | | | |

Candidate Number | | | | |

Human Biology

Unit: 4HB0
Paper: 02

Friday 15 January 2016 – Morning
Time: 1 hour

Paper Reference
4HB0/02

You must have:
Ruler
Calculator

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 60.
- 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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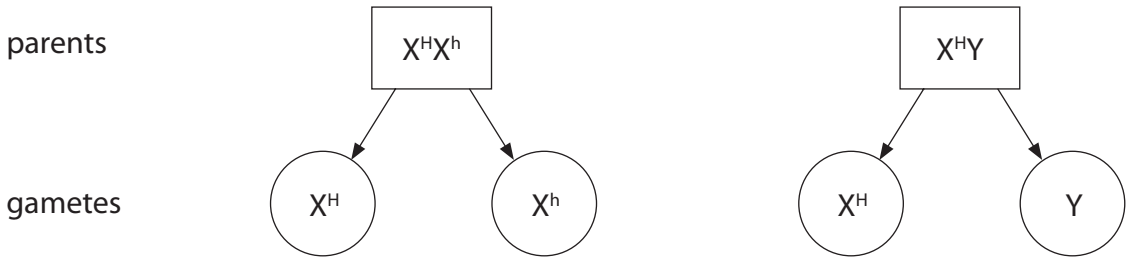
Answer ALL questions.

1 (a) Haemophilia is a genetic disorder caused by a recessive allele.

(i) Complete the genetic diagram to show the genotypes and phenotypes of the offspring.

(4)



genotypes of offspring ....

phenotypes of offspring ....

....

(ii) The parents in the genetic diagram have another child.

What is the probability that this child will be female?

(1)

.....

(iii) Explain why it is not possible for a male child to inherit haemophilia from his father.

(2)

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(b) Which row of the table shows the characteristics of the cells produced by mitosis and meiosis in humans?

(1)

	Mitosis produces	Meiosis produces
☒ **A**	diploid cells	2 cells
☒ **B**	4 cells	diploid cells
☒ **C**	haploid cells	4 cells
☒ **D**	2 cells	haploid cells

(c) (i) The cells produced by meiosis combine during fertilisation. This process involves the DNA from the mother mixing with the DNA from the father.

Describe the function of DNA.

(2)

(ii) DNA contains four bases, adenine, guanine, cytosine and thymine.

Complete the table by giving the percentage of thymine and cytosine in a DNA molecule.

(2)

Base	Percentage (%)
adenine	22.8
guanine	18.2
thymine	
cytosine	

(d) Describe the effect of ionising radiation on DNA.

(1)

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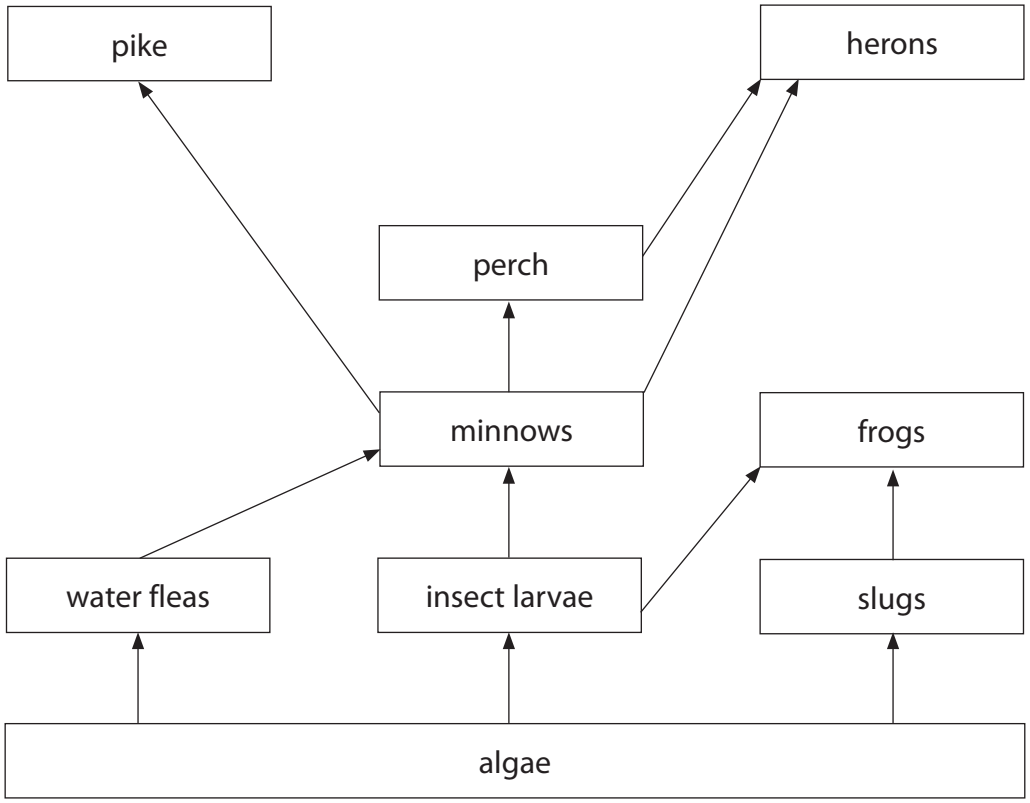
(Total for Question 1 = 13 marks)

2 (a) The diagram shows a food web for a pond.



(i) Name a secondary consumer in the food web that feeds on insect larvae.

(1)

.....

(ii) Algae are producers that carry out photosynthesis.

Complete the word equation for photosynthesis.

(2)

carbon dioxide + ... ⟶ ..... + oxygen

(iii) Algae can use the products from photosynthesis to produce starch.

Describe a test for starch.

(2)

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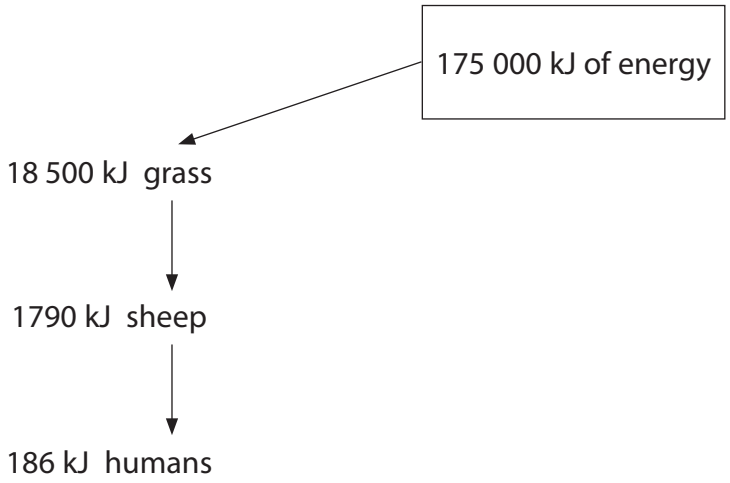
(b) The diagram represents the flow of energy through a food chain.



Calculate the percentage of energy transferred from grass to sheep.

Show your working.

(2)

Percentage = ... %

(c) Some of the energy stored in the grass is transferred to herbivores and decomposers.

(i) Name a type of organism that can act as a decomposer.

(1)

.....

(ii) Some of the energy in the grass is lost from the sheep into the surroundings.

Suggest one way in which a farmer could reduce the percentage energy lost from his sheep.

(1)

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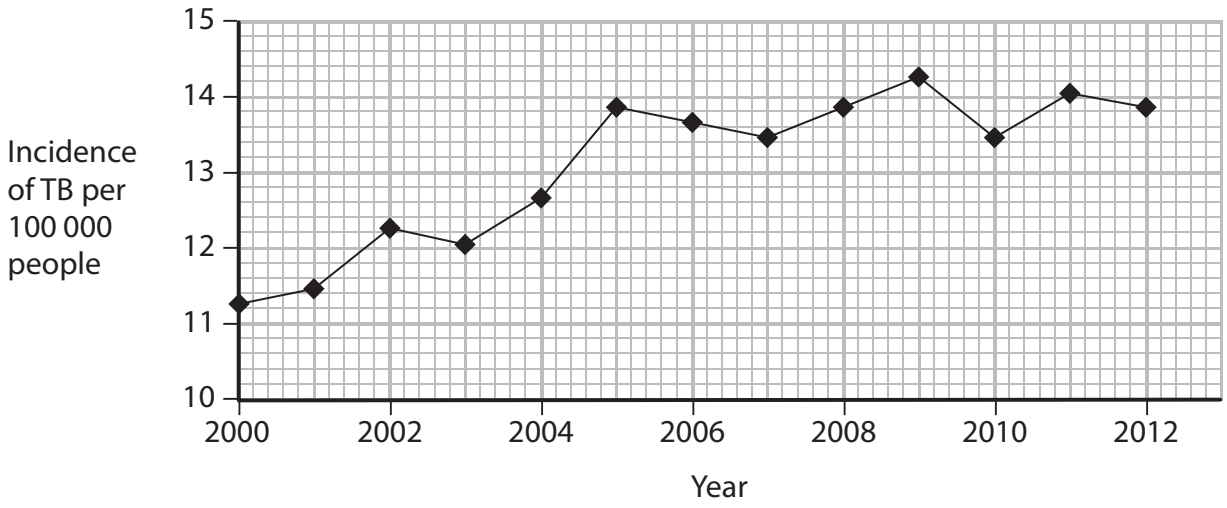
(Total for Question 2 = 9 marks)

3 (a) The graph shows the incidence of tuberculosis (TB) per 100 000 people in the UK over a 13-year period.



(i) Describe the trend in the incidence of TB in the UK over this 12-year period.

(2)

.....

.....

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(ii) In 2012 the population of the UK was 63 million.

Calculate the number of people who were infected with TB in 2012.
Show your working.

(2)

number of people infected = ...

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(iii) Suggest why the majority of cases of TB occur in large cities.

(2)

(b) Name the type of organism that causes TB.

(1)

(c) Athlete's foot is a disease that affects the skin.

Describe how to prevent the spread of athlete's foot.

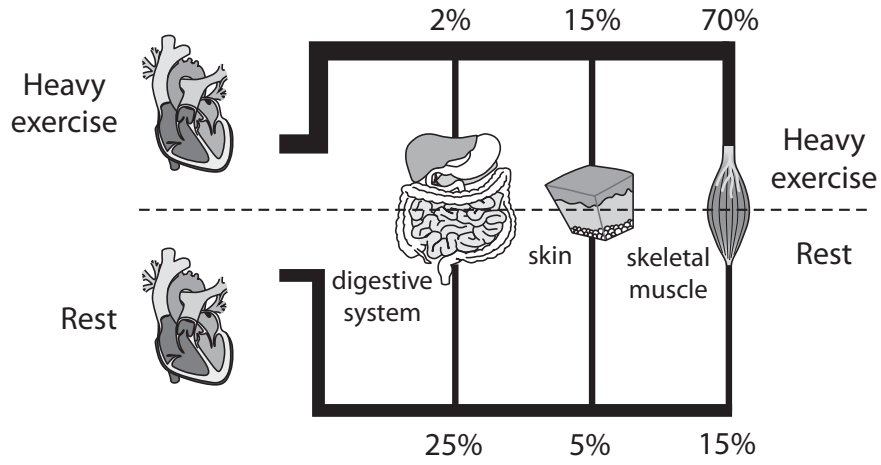
(2)

(d) Explain how vaccinations work to prevent the spread of disease.

(4)

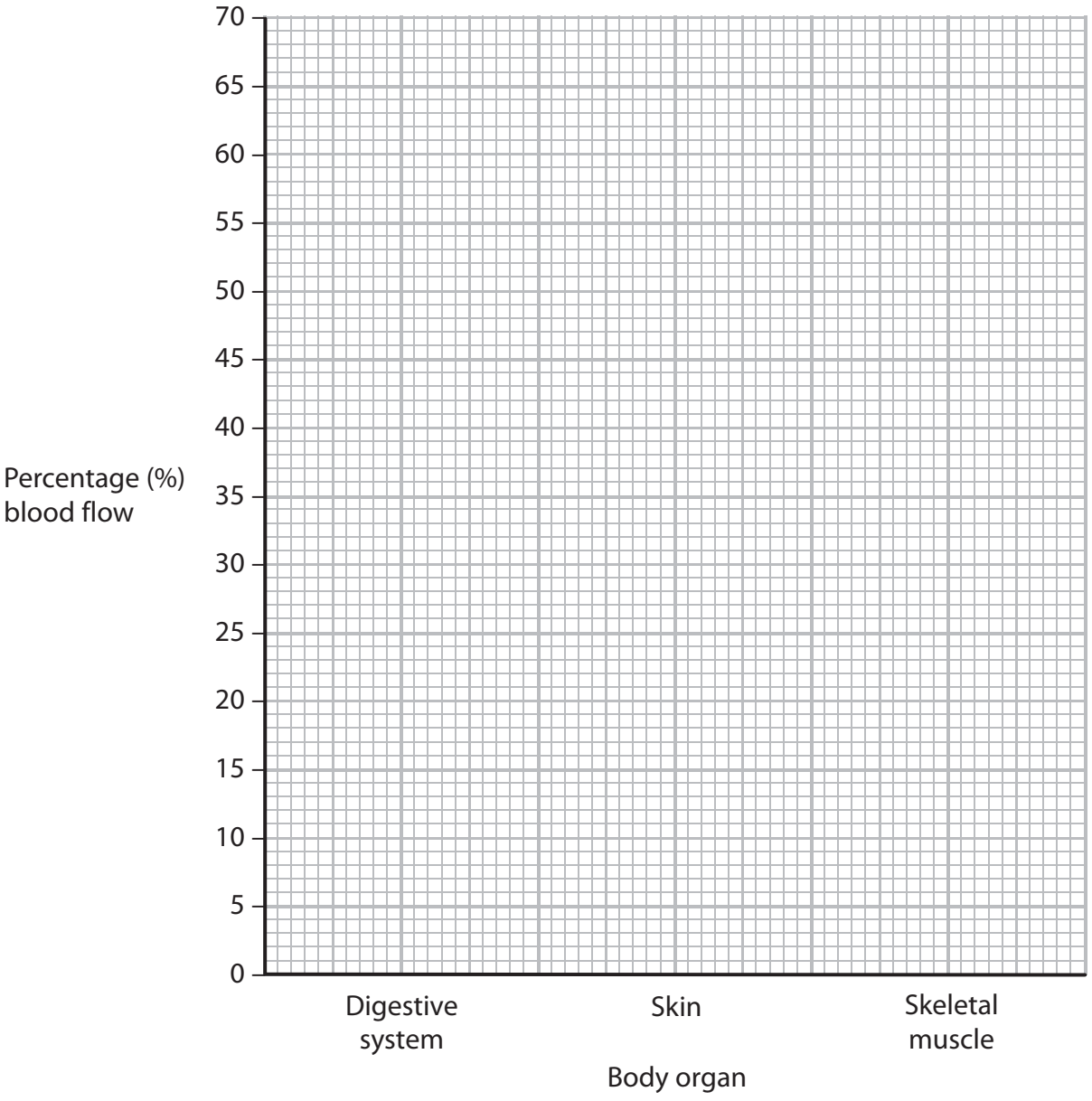
(Total for Question 3 = 13 marks)

4 The diagram shows the percentage of blood that flows to some body organs at rest and during heavy exercise.



(a) Plot a bar chart comparing the two sets of data for each body organ in the diagram.

(2)



(b) Explain the difference in the percentage blood flow to skeletal muscles at rest and during heavy exercise.

(3)

(c) Explain the difference in the percentage blood flow to the skin at rest and during heavy exercise.

(3)

(Total for Question 4 = 8 marks)

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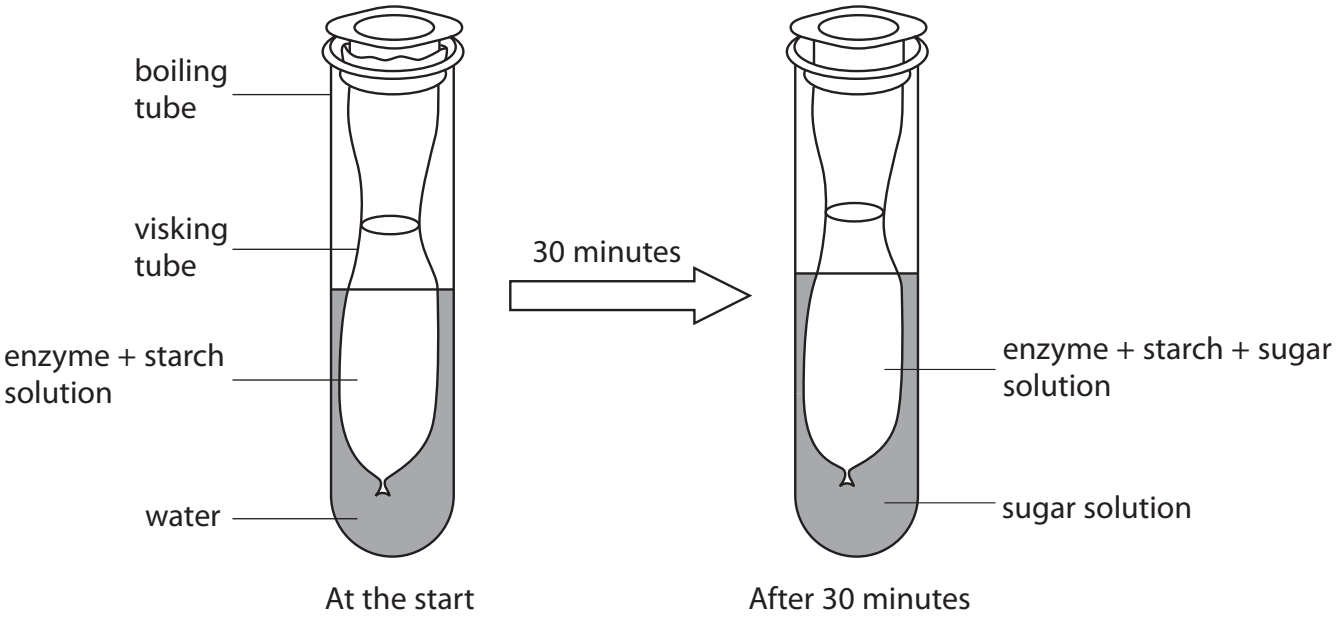
5 Visking tubing can be used to represent the small intestine.

The diagram shows apparatus used to investigate the digestion of starch in the small intestine. The apparatus is set up and left at a temperature of 40 °C for 30 minutes.



(a) Explain the changes that occur in the apparatus during the investigation.

(4)

(b) Explain why repeating the experiment at 70 °C will give different results.

(3)

(c) Explain what effect changing the concentration of the starch solution and the size of the visking tubing would have on the experiment.

(4)

(d) Name a location in the digestive system where the enzyme used in this investigation is produced.

(1)

(Total for Question 5 = 12 marks)

6 Explain how hormones control the menstrual cycle.

(5)

(Total for Question 6 = 5 marks)

TOTAL FOR PAPER = 60 MARKS

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