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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

Time 1 hour 45 minutes

Paper reference **4HB1/01**

Human Biology

UNIT: 4HB1
PAPER: 01

You must have:
Calculator, 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.

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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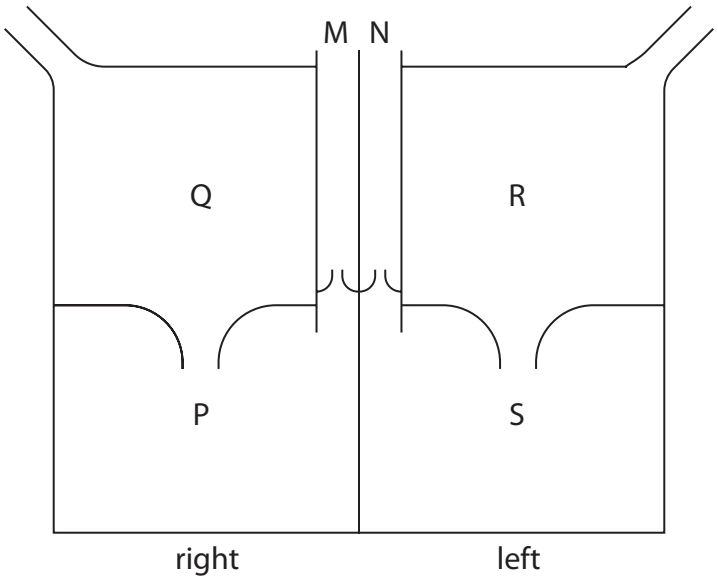
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Answer ALL questions.

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 The diagram shows a human heart in simple form.



(a) (i) Which of these is the name of blood vessel M?

(1)

☒ **A** aorta

☒ **B** pulmonary artery

☒ **C** pulmonary vein

☒ **D** vena cava

(ii) Which of these is the name of blood vessel N?

(1)

☒ **A** aorta

☒ **B** pulmonary artery

☒ **C** pulmonary vein

☒ **D** vena cava

(iii) Draw arrows on the diagram to show the flow of blood through the heart.

(2)

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(iv) Explain why the blood can only flow in the direction of the arrows.

(2)

(b) The width of the walls of each of the four chambers is measured.

These are the results.

0.2 cm 1.0 cm 1.5 cm 0.2 cm

(i) Complete the table by putting the correct width next to the letter of each chamber.

(3)

Chamber	Width in cm
P	
Q	
R	
S	

(ii) Explain the differences in the widths.

(3)

(Total for Question 1 = 12 marks)

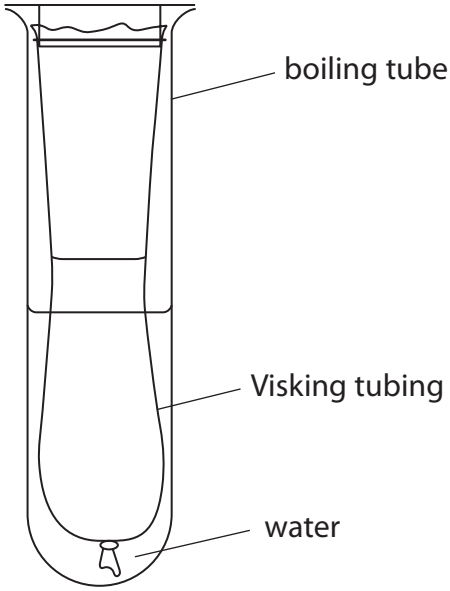
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2 A student investigates absorption in the ileum by using a model gut made of Visking tubing.

This is the student's method.

- tie a knot in one end of a 15 cm length of Visking tubing to make a bag
- place 5 cm^3 of starch suspension and 5 cm^3 of glucose solution into the bag
- rinse the outside of the bag with water
- place the bag into a boiling tube containing distilled water
- leave the bag for one hour

The diagram shows the student's apparatus.



After an hour the contents of the Visking tubing bag are tested for glucose and starch.

The water in the boiling tube is also tested for glucose and starch.

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(a) (i) Describe how the student should test the contents of the Visking tubing bag for glucose.

(4)

(ii) Describe how the student should test the contents of the Visking tubing bag for starch.

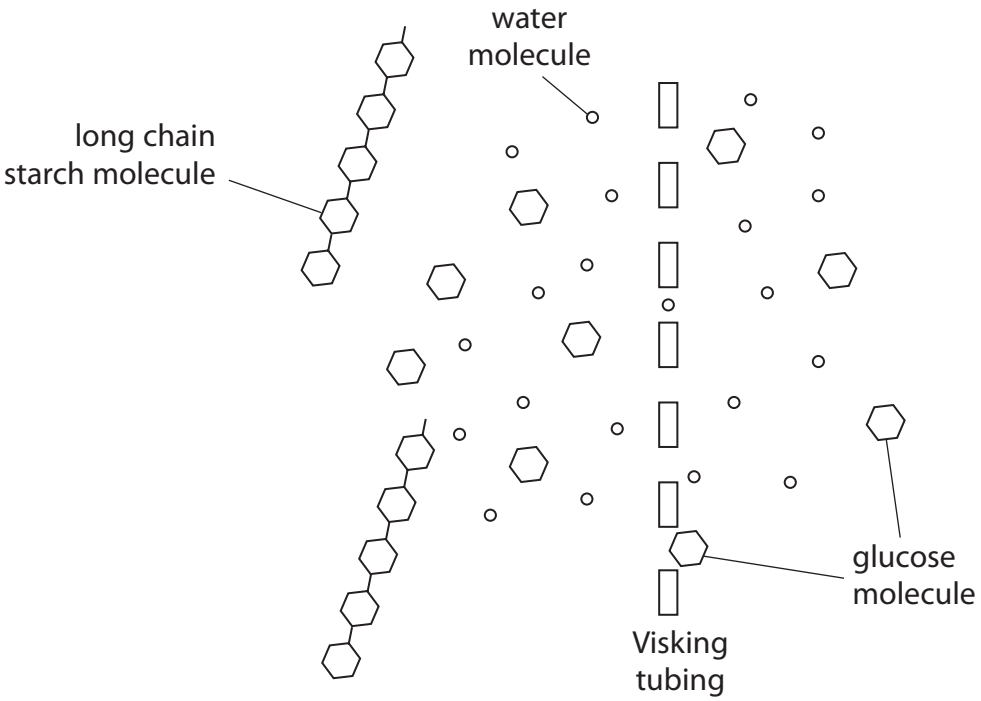
(3)

(iii) Explain why the outside of the Visking tubing bag was rinsed with water before being placed in the boiling tube.

(3)

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(b) The student draws this diagram to explain the results obtained.



Explain the results the student obtains.

Refer to the diagram in your answer.

(5)

(Total for Question 2 = 15 marks)

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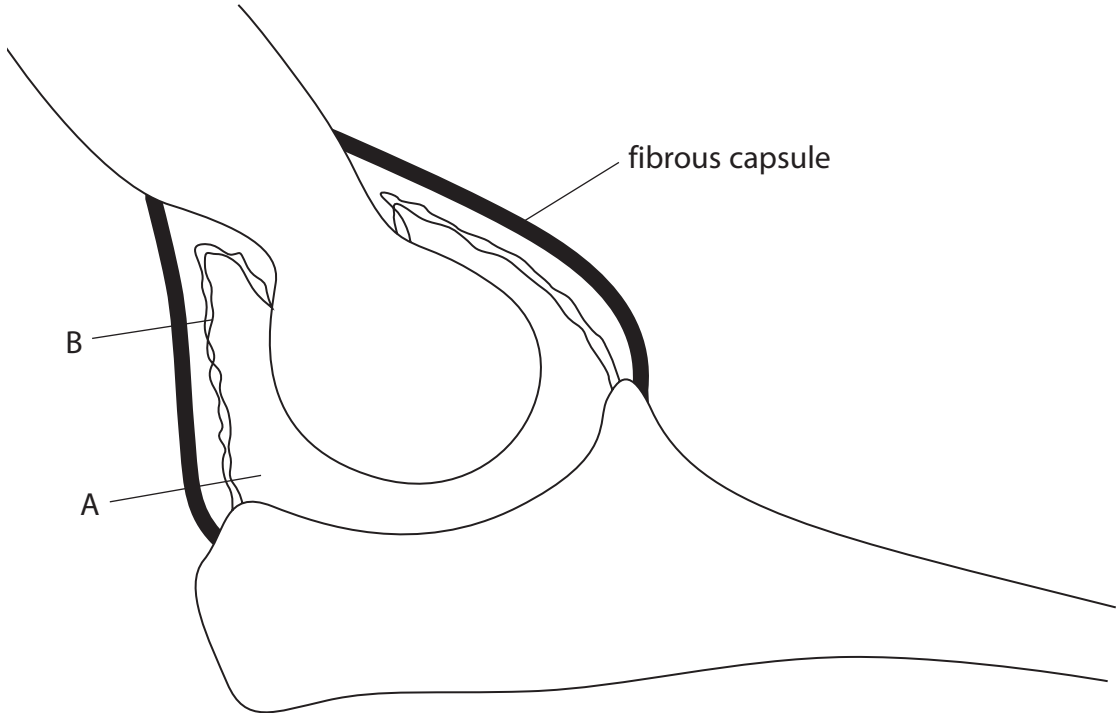
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3 The diagram shows part of an elbow joint without any cartilage.



(a) (i) Identify part A and part B.

(2)

part A .....

part B .....

(ii) Describe the function of part A.

(2)

.....

.....

.....

.....

(b) (i) Complete the diagram by drawing the cartilage.

(2)

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(ii) Cartilage often breaks down as people become older.

Explain the effects this has on the working of the joint.

(2)

(c) Explain the role of tendons in the movement of the lower arm.

(5)

(Total for Question 3 = 13 marks)

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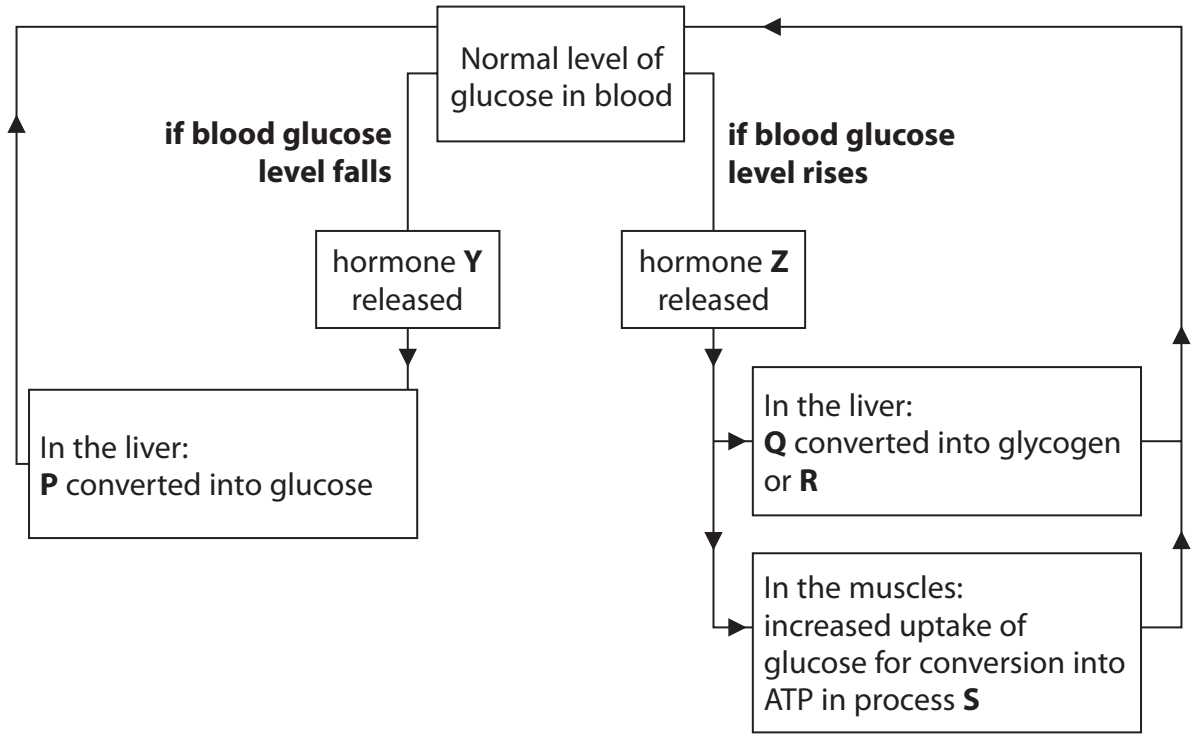
4 Metabolic processes in the body are controlled by homeostasis.

(a) Explain what is meant by the term **homeostasis**.

(3)

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(b) The diagram shows the homeostatic control of blood glucose levels.



(i) Which of these is the name of hormone Y?

(1)

- ☒ **A** ADH
- ☒ **B** glucagon
- ☒ **C** insulin
- ☒ **D** testosterone

(ii) Which of these is the name of hormone Z?

(1)

- ☒ **A** ADH
- ☒ **B** glucagon
- ☒ **C** insulin
- ☒ **D** testosterone

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(iii) Identify P, Q, R and S.

(4)

P .....

Q .....

R .....

S .....

(c) The homeostatic process shown in the diagram is controlled by negative feedback.

Using the example shown in the diagram, explain what is meant by negative feedback.

(4)

(Total for Question 4 = 13 marks)

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5 (a) Describe the possible effects of a DNA mutation.

(3)

(b) Changes to whole chromosomes can happen when meiosis does not occur properly.

These changes are called chromosome aberrations.

The table shows the probability of children being born with a chromosome aberration to mothers of different ages.

Age of mother in years	15–19	20–24	25–29	30–34	35–39	40–44
Probability of chromosome aberration	0.0010	0.0010	0.0010	0.0015	0.0045	0.0140

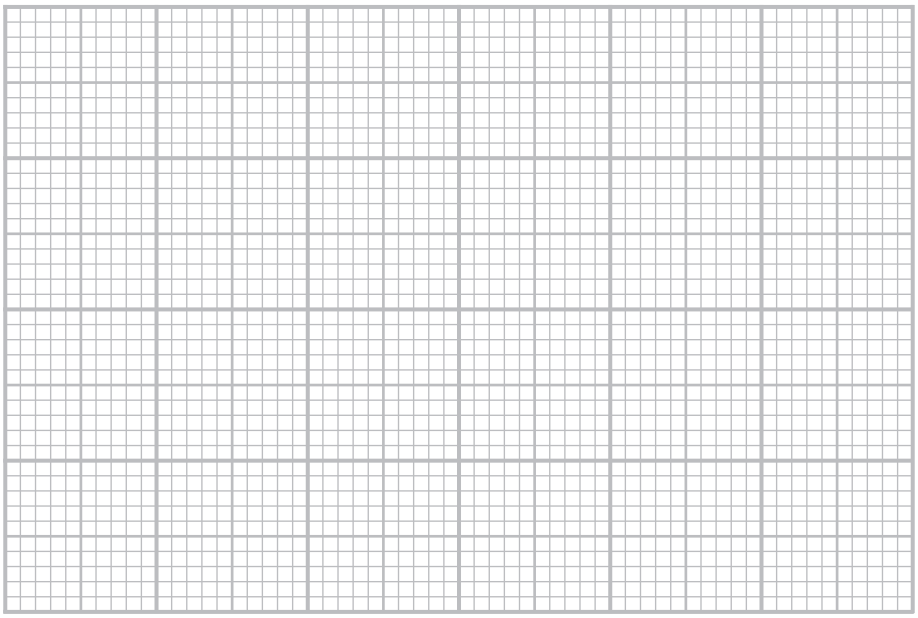
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(i) Plot a bar chart of the results.

(5)



(ii) In one year, 43 000 children are born to mothers aged 30–34.

Calculate the probable number of these children who will have a chromosome aberration.

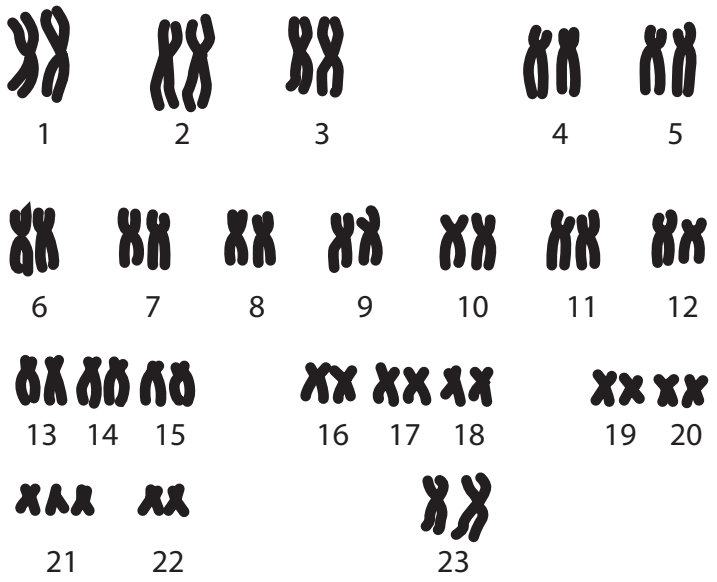
Give your answer to two significant figures.

(3)

number of children = ...

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(c) The diagram shows the full diploid number of chromosomes in a person.



Justify the statement that this diagram shows the genotype of a female with a chromosome aberration.

(4)

(Total for Question 5 = 15 marks)

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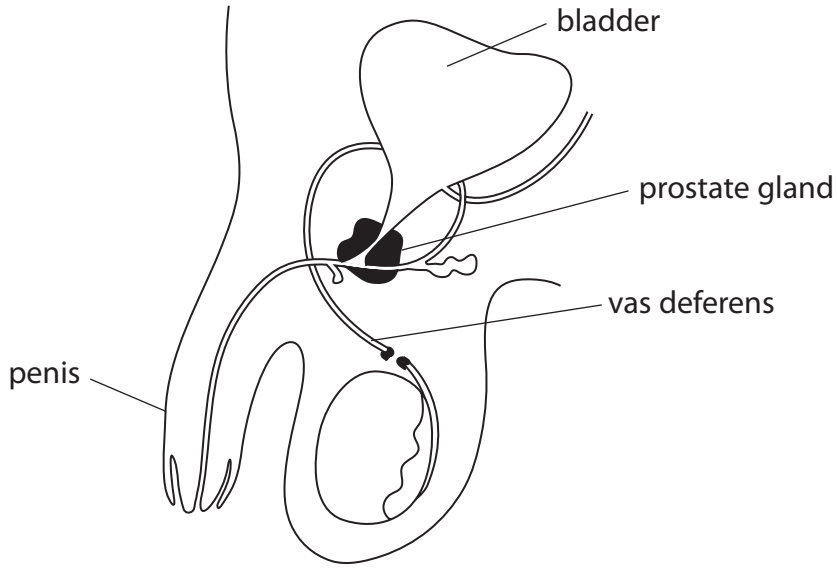
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6 The diagram shows the reproductive organs of a male who has had a vasectomy.



(a) (i) Explain why having a vasectomy is an effective method of contraception.

(4)

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(ii) Explain why this method of contraception does not prevent the spread of HIV which can cause AIDS.

(3)

(b) (i) Add an X to the diagram to show where haploid cells are produced.

(1)

(ii) Explain the importance of haploid cells in the process of fertilisation.

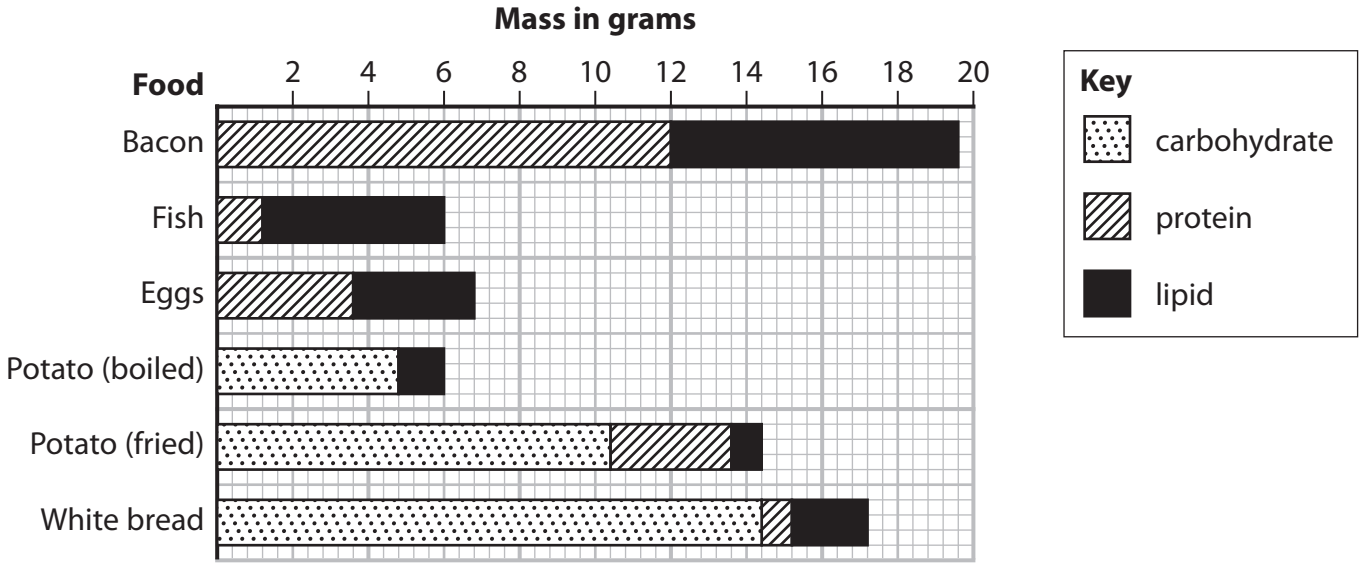
(4)

(Total for Question 6 = 12 marks)

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7 Most diets contain carbohydrates, lipids and proteins.

The bar chart shows the masses of each of these in 26 g samples of different foods.



(a) (i) State the names of the three chemical elements found in all carbohydrates, lipids and proteins.

(1)

.....

(ii) State the name of one chemical element found in proteins but not found in carbohydrates or lipids.

(1)

.....

(iii) Deduce the mass of lipid in 26 g of bacon.

(2)

mass of lipid = ... g

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(iv) The energy in one gram of protein is 17 kJ and the energy in one gram of lipid is 37 kJ.

Calculate the total energy in 26 g of fish.

(3)

total energy = ... kJ

(b) Describe how to test for the presence of lipid in the fish.

(3)

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(Total for Question 7 = 10 marks)

TOTAL FOR PAPER = 90 MARKS

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