Write your name here

| Surname | Other names |
|---|---|
| | |

**Pearson Edexcel**
**International GCSE**

Centre Number | | | | | |

Candidate Number | | | | |

# Human Biology

## Unit: 4HB0
## Paper: 02

Friday 12 May 2017 – 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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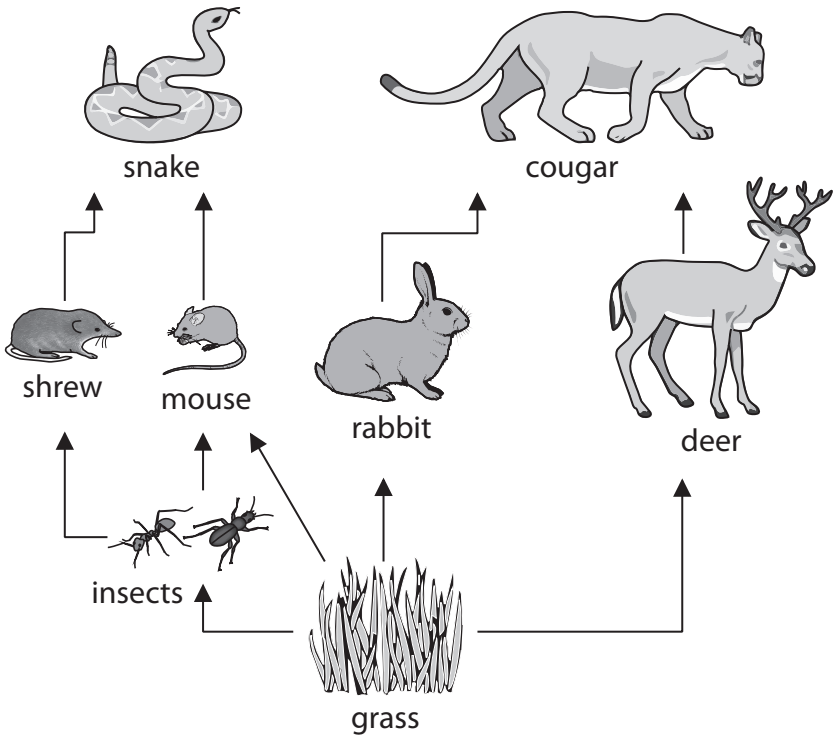
P 4 8 1 5 2 A 0 1 1 6

Pearson

**Answer ALL questions.**

**1** (a) The diagram shows a food web.




(i) Which of these is the source of energy for this food web?

**(1)**

☒ **A** grass

☒ **B** Sun

☒ **C** insects

☒ **D** water

(ii) Construct a food chain containing four organisms using the information in the food web.

**(2)**

(iii) State one way that energy is lost from this food chain.

**(1)**

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(b) Not all of the organisms in the food web are eaten, but they all eventually die.

Describe what happens to the bodies of these organisms after they have died.

**(2)**

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**(Total for Question 1 = 6 marks)**

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**2** (a) (i) The volume of water lost in breathing and the volume of water lost in sweat change when a person exercises.

Which row of the table shows the correct changes?

**(1)**

| | Volume of water lost in breathing | Volume of water lost in sweat |
|---|---|---|
| ☒ **A** | increases | decreases |
| ☒ **B** | decreases | increases |
| ☒ **C** | increases | increases |
| ☒ **D** | decreases | decreases |

(ii) Explain why the volume of water lost in breathing changes when a person exercises.

**(2)**

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(b) The table shows the results of an investigation into the volume of urine produced on a hot day and the volume of urine produced on a cold day by four people.

| | Volume of urine produced in $cm^3$ | |
|---|---|---|
| **Person** | **hot day** | **cold day** |
| 1 | 420 | 880 |
| 2 | 370 | 1040 |
| 3 | 260 | 950 |
| 4 | 560 | 1180 |

(i) Draw a bar chart to show the results for each person.

**(4)**

(ii) Describe the difference in the volume of urine produced on a hot day and the volume of urine produced on a cold day.

**(1)**

(iii) Explain the difference in the volume of urine produced on a hot day and the volume of urine produced on a cold day.

**(3)**

(iv) Which person has the greatest difference in the volume of urine produced on a hot day and the volume of urine produced on a cold day?

**(1)**

(v) Describe how the investigation could be improved to increase the reliability of the results.

**(2)**

**(Total for Question 2 = 14 marks)**

**3** (a) The passage is about defence against disease.

Complete the passage by writing a suitable word in each blank space.

**(4)**

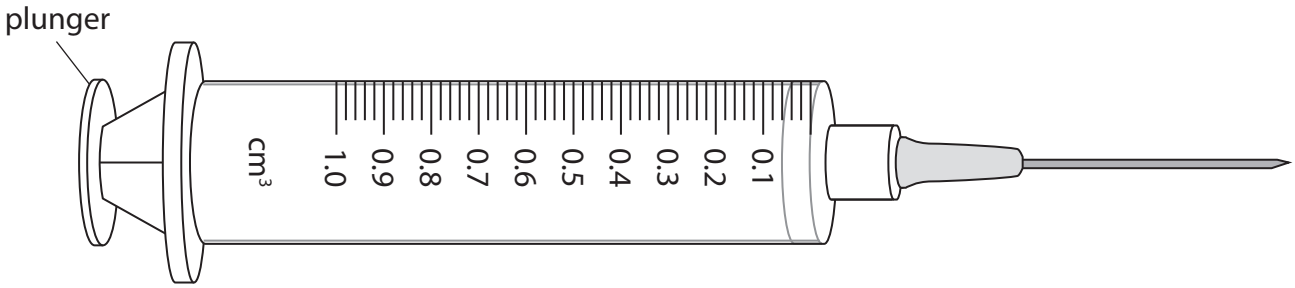
There are several ways that the entry of pathogens into the human body is prevented.

The ..... is a barrier to the entry of viruses.

The ..... contains cilia and produces a sticky mucus that traps microbes. Acid in the ..... kills most bacteria. If pathogens such as bacteria enter our blood circulation then ..... can be taken to destroy them.

(b) The diagram shows a hypodermic syringe that is used to give vaccinations by injection.

The plunger is pulled back so that the vaccine enters the syringe through the needle.




Only 0.56 $cm^3$ of vaccine is needed by a patient.

Draw a line on the diagram to show 0.56 $cm^3$ of vaccine in the syringe.

**(1)**

(c) Suggest two reasons why new vaccines are tested before being widely used.

**(2)**

1 .....

.....

2 .....

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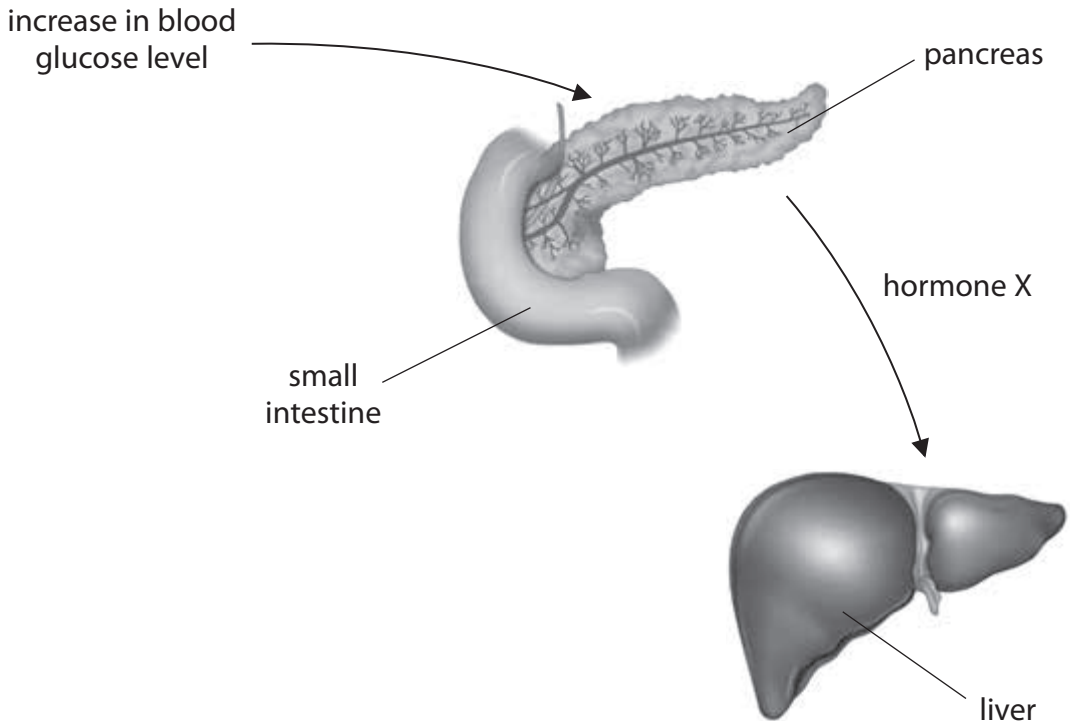
**(Total for Question 3 = 7 marks)**

**4** Glucose is an important biological molecule.

(a) The diagram shows how the body responds to high blood glucose levels.




(i) Give the name of hormone X.

**(1)**

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(ii) Explain the effect of hormone X on blood glucose levels.

**(2)**

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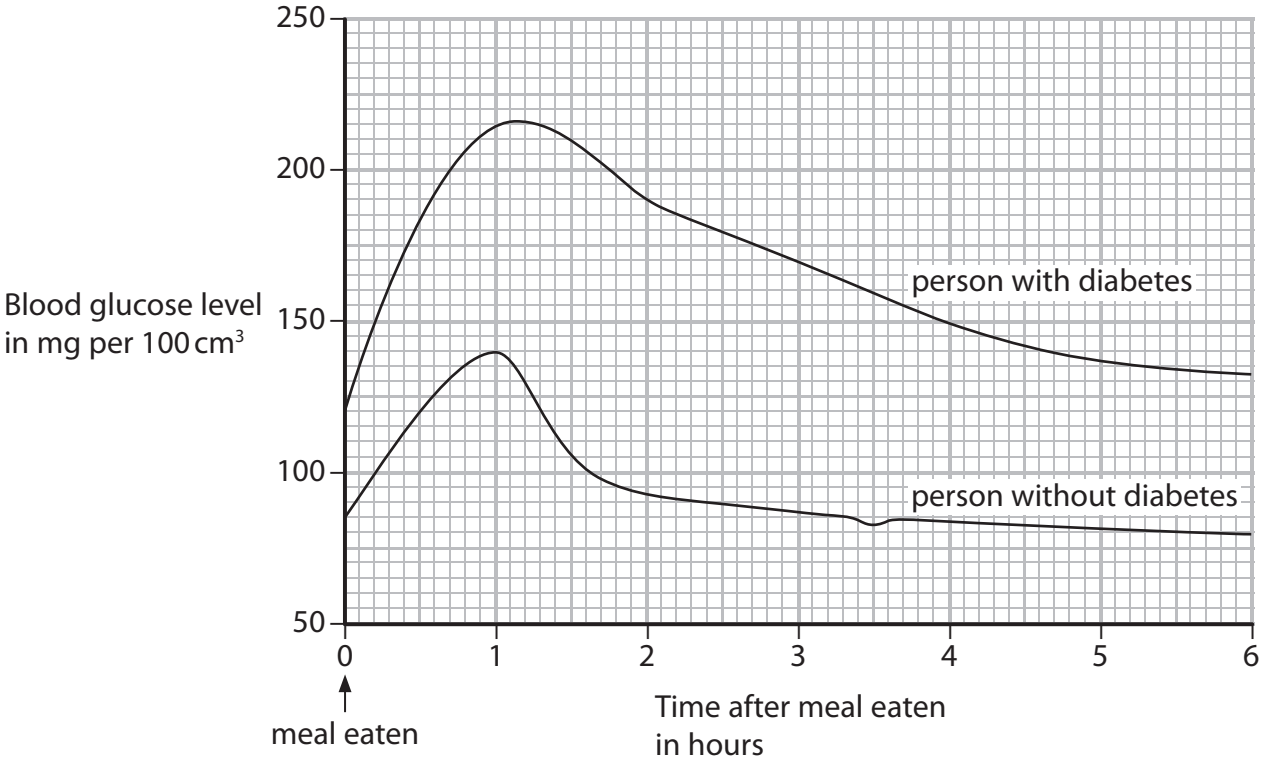
(b) Some people cannot control their blood glucose levels. These people have diabetes.

The graph shows the blood glucose level of a person with diabetes and the blood glucose level of a person without diabetes.




(i) Describe the differences between the blood glucose level of the person with diabetes and the blood glucose level of the person without diabetes.

**(3)**

(ii) Explain the small increase in the blood glucose level of the person without diabetes 3.5 hours after eating a meal.

**(3)**

(c) (i) Name the three elements in a glucose molecule.

**(1)**

1 .....

2 .....

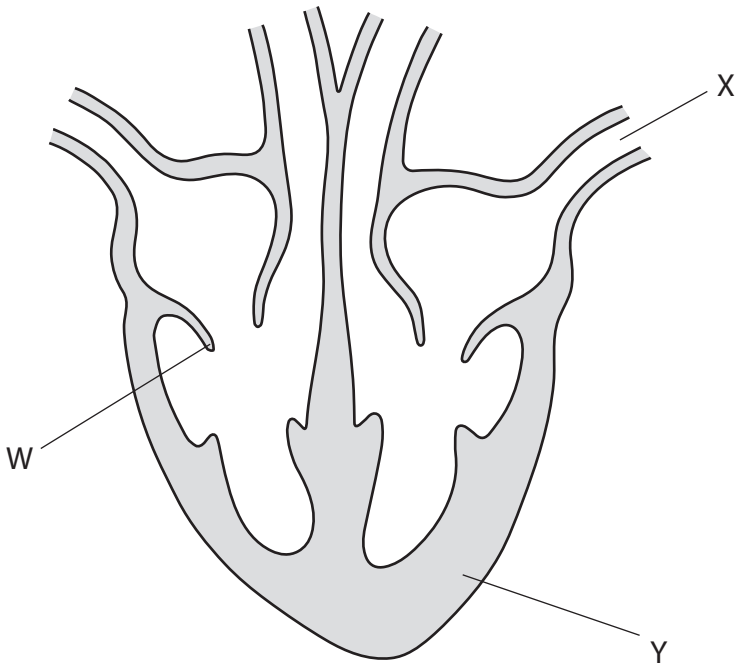
3 .....

(ii) Describe the test for glucose.

**(3)**

**(Total for Question 4 = 13 marks)**

**5** (a) The diagram shows a human heart.




(i) Draw arrows on the diagram of the heart to show the direction of blood flow from the body to the lungs.

**(2)**

(ii) Complete the table by giving the function of parts W, X and Y.

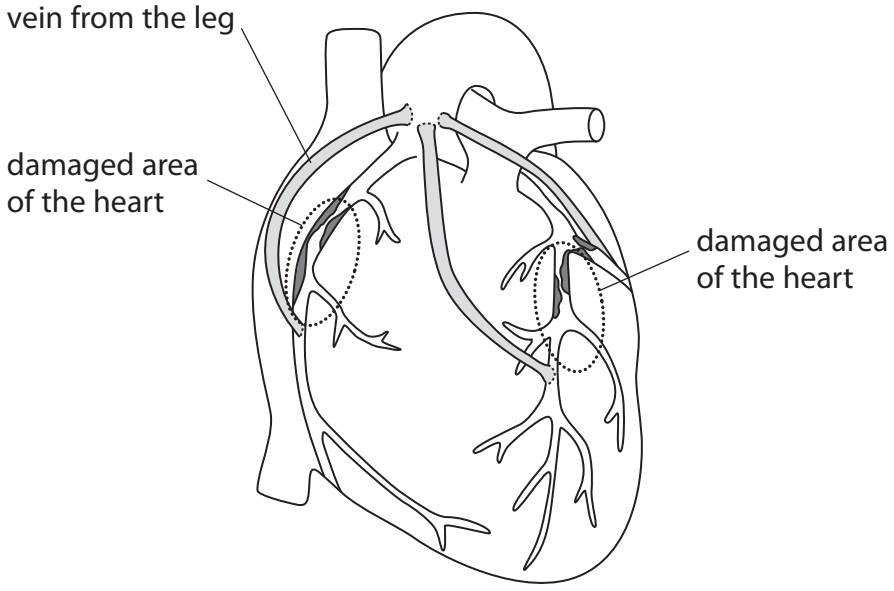
**(3)**

| Part | Function |
|---|---|
| W | |
| X | |
| Y | |

(b) Some people affected by heart disease can have heart surgery to reduce the risk of heart failure.

The diagram shows a type of heart surgery known as a triple bypass.

Three veins are taken from the patient's leg and attached to the heart.




(i) State why veins from the patient's own leg are used for the triple bypass rather than veins from another person.

**(1)**

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(ii) Explain how a heart triple bypass can reduce the risk of heart failure.

**(3)**

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(c) In England, 20 000 heart bypass operations are carried out every year and 80% of these are carried out on people over the age of 60.

(i) Calculate the number of people in England, over the age of 60, who have had heart bypass surgery in one year.

**(2)**

number of people = .....

(ii) Describe lifestyle changes that can reduce the number of people needing heart bypass surgery.

**(2)**

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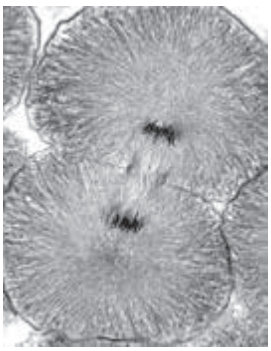
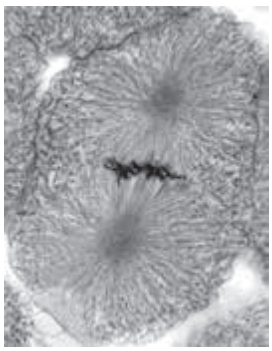
**(Total for Question 5 = 13 marks)**

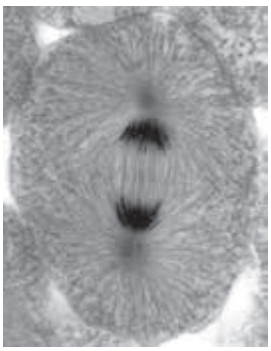
**6** The micrographs show some of the stages in mitosis. They are not in the correct order.



stage A



stage B



stage C

(a) Name stages A, B and C.

**(3)**

stage A .....

stage B .....

stage C .....

(b) Write A, B or C in each of the boxes to show the correct order of these stages in mitosis.

**(2)**

(c) Describe the function of mitosis in humans.

**(2)**

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**(Total for Question 6 = 7 marks)**

**TOTAL FOR PAPER = 60 MARKS**

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