| Centre Number | | | | | | Candidate Number | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Surname | | | | | | | | | | |
| Other Names | | | | | | | | | | |
| Candidate Signature | | | | | | | | | | |

| For Examiner's Use | |
|---|---|
| Examiner's Initials | |
| Question | Mark |
| 1 | |
| 2 | |
| 3 | |
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| 6 | |
| 7 | |
| 8 | |
| TOTAL | |

General Certificate of Secondary Education
Foundation Tier
June 2013

# Biology

# BL3FP

## Unit Biology B3

# F

**Tuesday 14 May 2013 9.00 am to 10.00 am**

**For this paper you must have:**
- a ruler.

You may use a calculator.

**Time allowed**
- 1 hour

**Instructions**
- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

**Information**
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 60.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.
- Question 8(b) should be answered in continuous prose.
  In this question you will be marked on your ability to:
  – use good English
  – organise information clearly
  – use specialist vocabulary where appropriate.

**Advice**
- In all calculations, show clearly how you work out your answer.

Answer **all** questions in the spaces provided.

**1** Human activities affect the environment.

**1 (a)** **List A** gives four human activities.

**List B** gives the effect of the activities on the environment.

Draw **one** line from each human activity in **List A** to its effect on the environment in **List B**.

| **List A**<br>**Human activity** | **List B**<br>**Effect on the environment** |
|---|---|
| | Adds methane to the atmosphere |
| Digging a new quarry | |
| | Pollutes hedges around fields |
| Spraying pesticides on crops | |
| | Reduces the land available for wild animals |
| Growing rice | |
| | Produces lots of litter |
| Driving cars that release sulfur dioxide | |
| | Produces acid rain |

*(4 marks)*

**1 (b)** Human activities are increasing *global warming*.

Give **two** effects of *global warming* on the environment.

1 .....

.....

2 .....

.....

*(2 marks)*

6

**Turn over for the next question**

**2** Plants exchange substances with the environment.

**2 (a)** Use words from the box to complete each sentence.

| | | | |
|---|---|---|---|
| **alveoli** | **phloem** | **root hairs** | **stomata** |
| **storage organs** | **villi** | **xylem** | |

**2 (a) (i)** Most water enters a plant through ..... .

*(1 mark)*

**2 (a) (ii)** The water is transported up the stem to the leaves in the ..... .

*(1 mark)*

**2 (a) (iii)** Carbon dioxide enters leaves through ..... .

*(1 mark)*

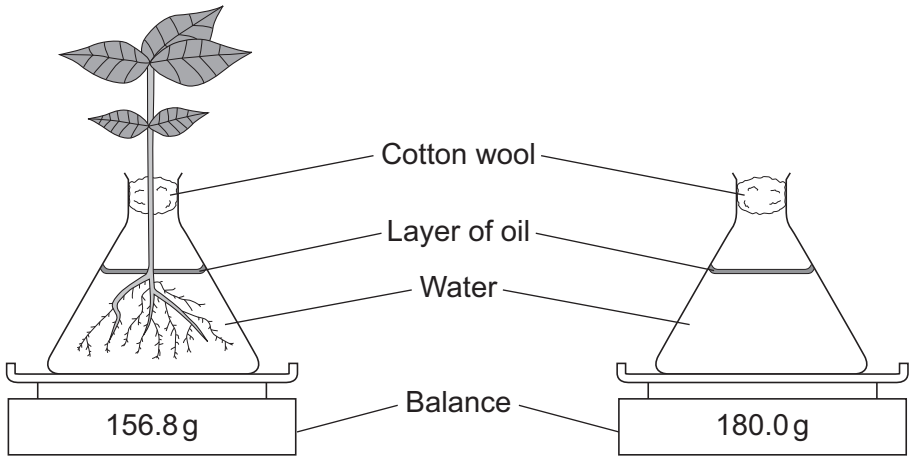
**2 (a) (iv)** A leaf uses the carbon dioxide to produce sugars.

Sugars are transported to ..... through the ..... .

*(2 marks)*

**2 (b)** A student set up the apparatus shown in the diagram.

At the start of the experiment both balances showed a mass of 180.0 g.




The diagram shows the reading on each balance 24 hours later.

**2 (b) (i)** Look at the mass shown on each balance.

Calculate the difference between the two masses.

.....

.....

Difference in mass = ..... g

*(1 mark)*

**2 (b) (ii)** Suggest an explanation for the difference between the two masses.

.....

.....

.....

.....

*(2 marks)*

8

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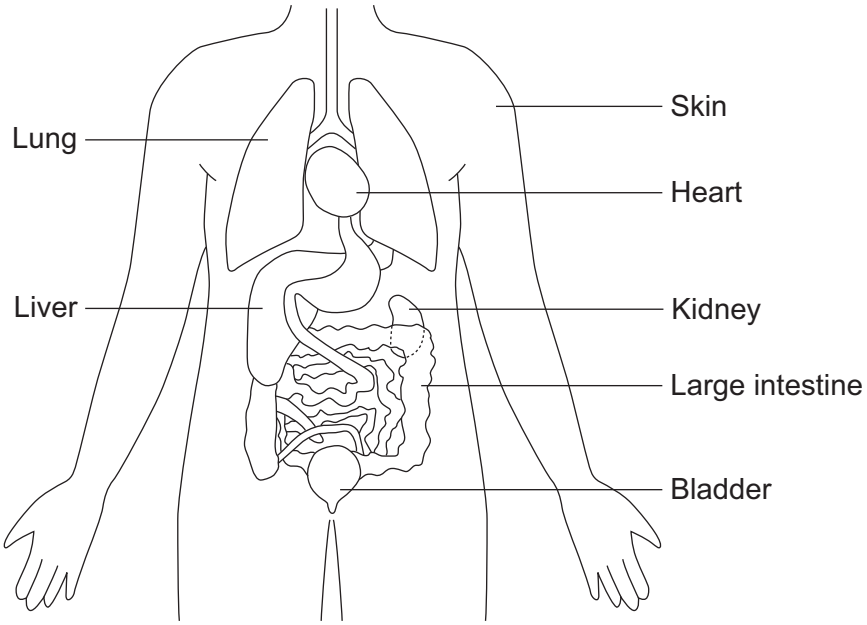
**ANSWER IN THE SPACES PROVIDED**

**3** The diagram shows some of the organs of the human body.




**3 (a)** Which organ labelled on the diagram:

**3 (a) (i)** produces urine .....

*(1 mark)*

**3 (a) (ii)** stores urine .....

*(1 mark)*

**3 (a) (iii)** produces urea .....

*(1 mark)*

**3 (a) (iv)** gets rid of carbon dioxide .....

*(1 mark)*

**3 (a) (v)** helps to control body temperature? .....

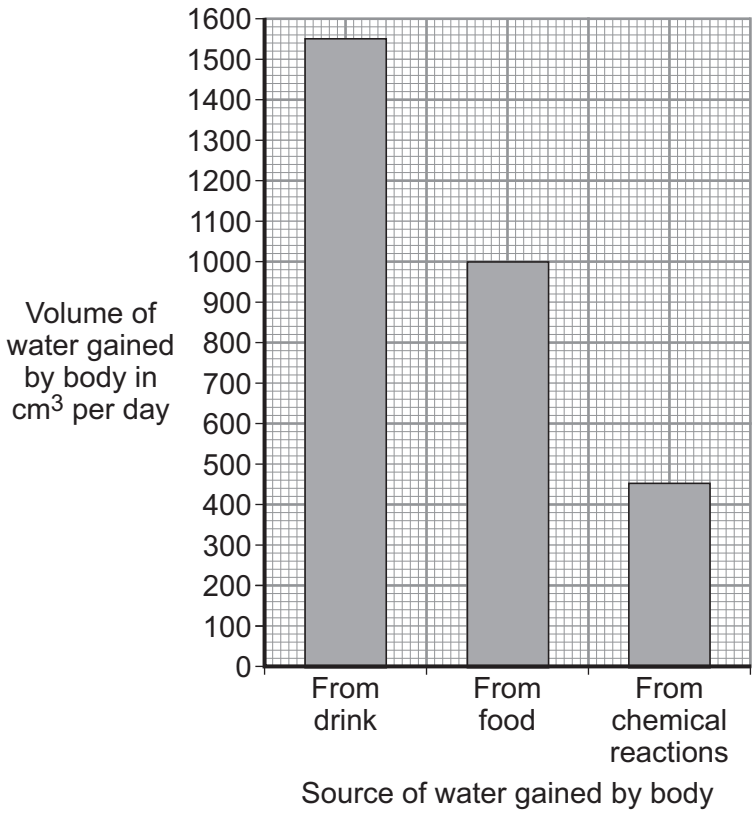
*(1 mark)*

**Question 3 continues on the next page**

**Turn over ▶**

**3 (b)** **Bar chart 1** shows the volume of water the human body gains each day.

**Bar chart 1**




**3 (b) (i)** Calculate the total volume of water the body gains each day.

.....

.....

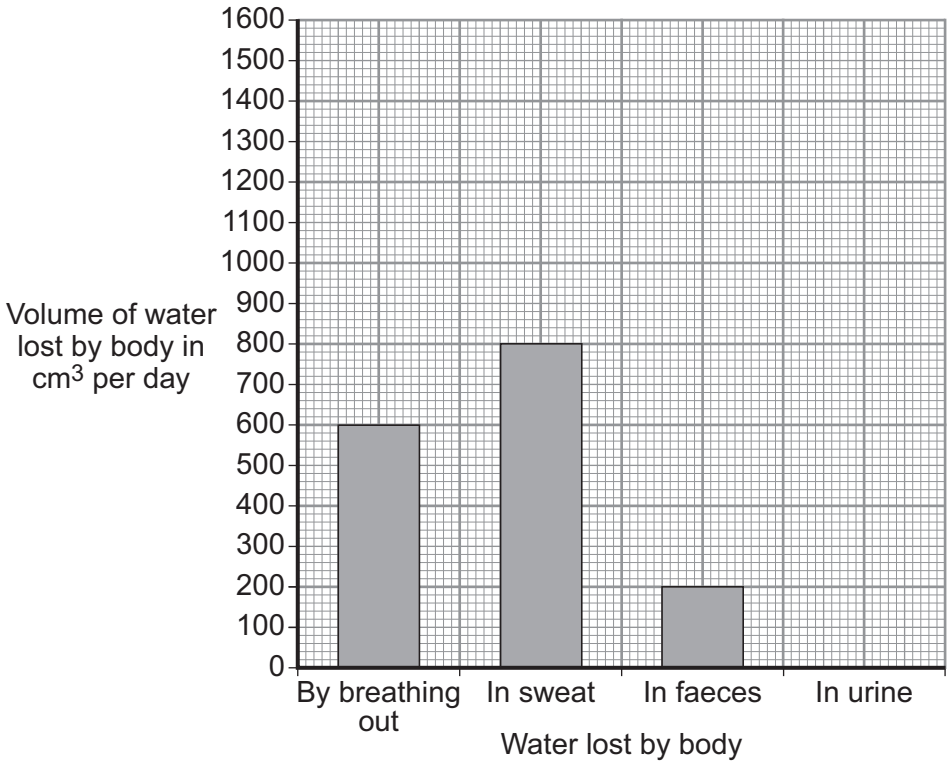
.....

Total volume of water gained = ..... $cm^3$

*(2 marks)*

**Bar chart 2** shows the volume of water lost each day by breathing out, in sweat and in faeces.

**Bar chart 2**




**3 (b) (ii)** Calculate the total volume of water lost each day by breathing out, in sweat and in faeces.

.....

.....

Volume = ..... $cm^3$

*(1 mark)*

**3 (b) (iii)** The volume of water the body loses must balance the volume of water the body gains.

Use your answers to part **(b)(i)** and part **(b)(ii)** to calculate the volume of water lost in urine.

.....

.....

Volume of water lost in urine = ..... $cm^3$

*(1 mark)*

**3 (b) (iv)** Plot your answer to part **(b)(iii)** on **Bar chart 2**.

*(1 mark)*

**Turn over ▶**

**3 (b) (v)** After taking some types of recreational drugs, the kidneys produce very little urine.

What happens to the body cells if the kidneys produce very little urine?

.....

.....

*(1 mark)*

11

**4** Type 1 diabetes develops when the body does not produce enough insulin.

**4 (a)** Which organ produces insulin?

.....

*(1 mark)*

**4 (b)** One treatment for diabetes is to inject insulin.

The table gives the properties of four different types of insulin, **A**, **B**, **C** and **D**.

| Type of insulin | Time taken for the insulin to begin to work in minutes | Time taken for insulin to reach maximum concentration in the blood in minutes | Time when insulin is no longer effective in hours |
|---|---|---|---|
| **A** | 15–20 | 30–90 | 3–4 |
| **B** | 30–60 | 80–120 | 4–6 |
| **C** | 120–240 | 360–600 | 14–16 |
| **D** | 240–360 | 600–960 | 18–20 |

**4 (b) (i)** Some people with diabetes need to inject insulin just before a meal to stop a big increase in blood sugar concentration.

Which type of insulin, **A**, **B**, **C** or **D**, should these people with diabetes inject just before a meal?

.....

Give the reason for your answer.

.....

.....

*(2 marks)*

**4 (b) (ii)** A person with diabetes is told to inject type **B** insulin immediately after breakfast at 09.00.
The person with diabetes is told to then inject a second type of insulin at lunchtime at 12.00.
The second type of insulin should keep the blood sugar level under control for the rest of the 24 hours.

Which type of insulin, **A**, **C** or **D**, should this person with diabetes inject at lunchtime?

.....

Give the reason for your answer.

.....

.....

*(2 marks)*

**4 (b) (iii)** Apart from injecting insulin, give **one** other way in which Type 1 diabetes can be controlled.

.....

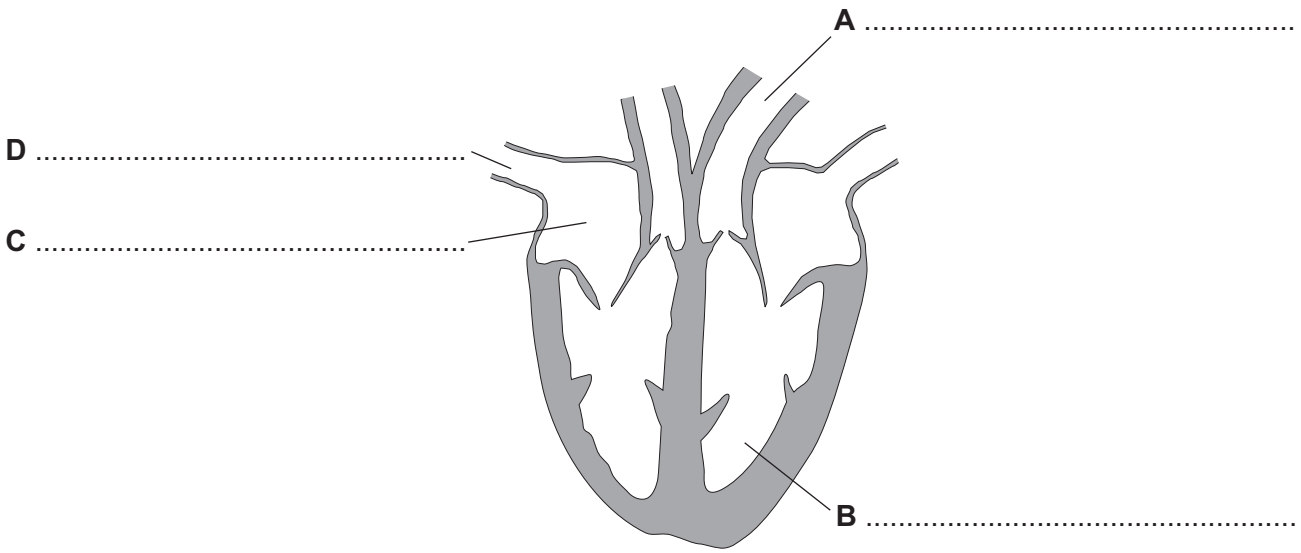
*(1 mark)*

**6**

**Turn over for the next question**

**5** **Diagram 1** shows a section through the heart.

**Diagram 1**



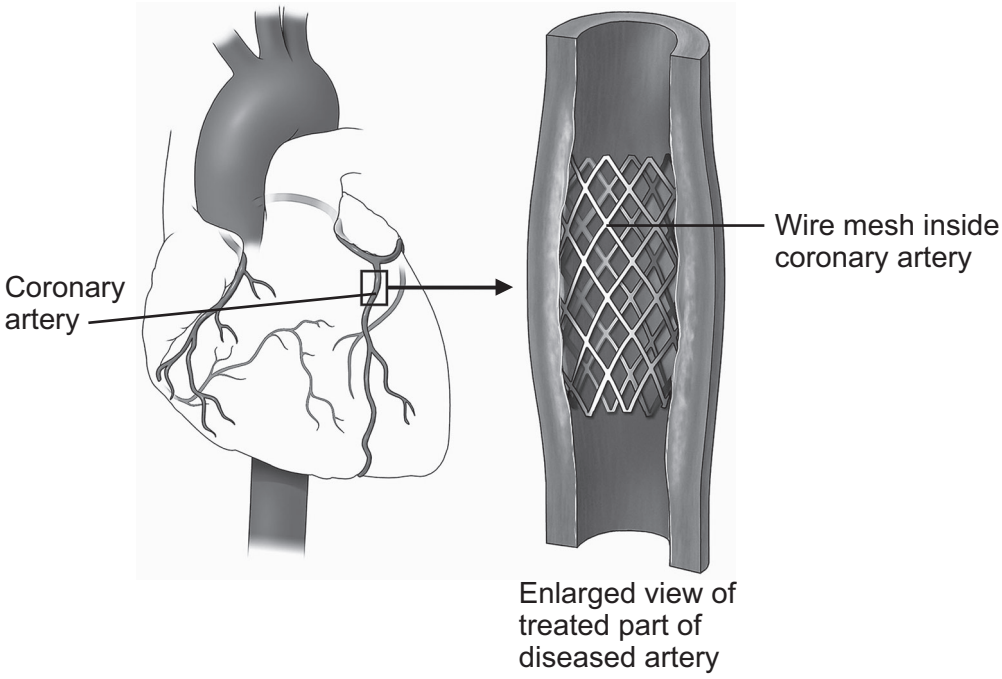

**5 (a)** Use words from the box to label parts **A**, **B**, **C** and **D**.

| | | | | | |
|---|---|---|---|---|---|
| **artery** | **atrium** | **capillary** | **platelet** | **vein** | **ventricle** |

*(4 marks)*

**5 (b)** **Diagram 2** shows one treatment for a diseased coronary artery.

**Diagram 2**




**5 (b) (i)** Name the treatment shown in **Diagram 2**.

.....

*(1 mark)*

**5 (b) (ii)** Explain how the treatment works.

.....

.....

.....

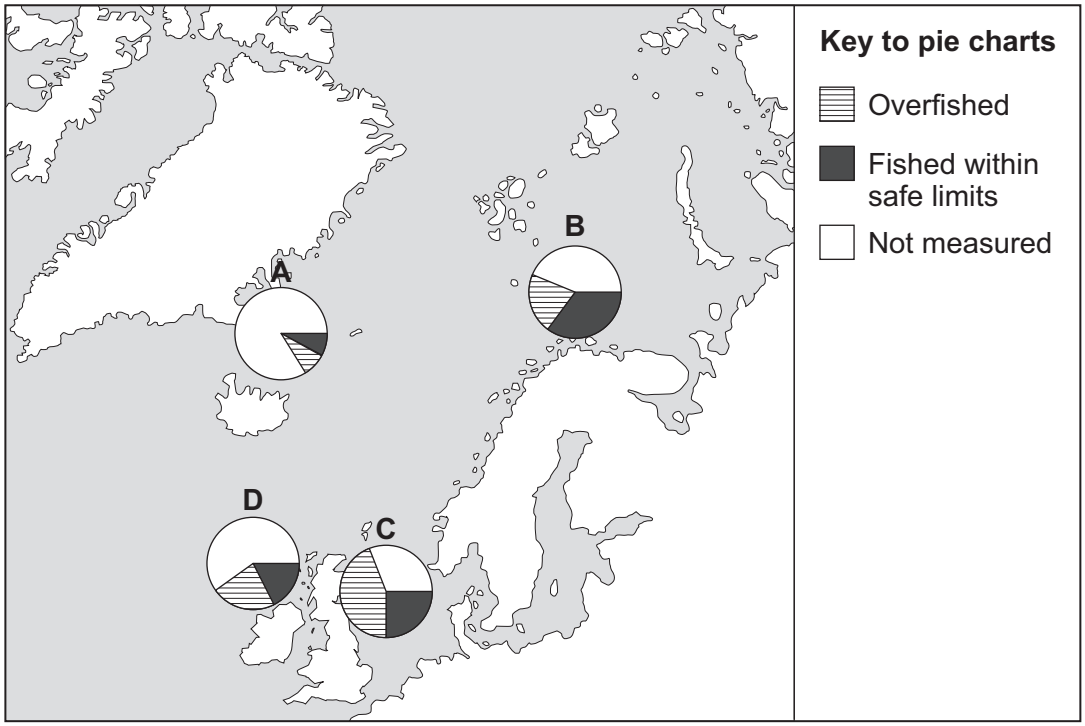
.....

*(2 marks)*

7

**Turn over for the next question**

**6** The map shows pie charts, **A**, **B**, **C** and **D**, that give information about fisheries in some of the seas around Europe.




**6 (a)** Which pie chart, **A**, **B**, **C** or **D**, shows the fishery with the largest amount of overfishing? ☐

*(1 mark)*

**6 (b)** It is important to maintain fish stocks high enough for breeding to continue.

Give the reason why.

.....

.....

*(1 mark)*

**6 (c)** Give **two** ways fish stocks can be conserved.

.....

.....

.....

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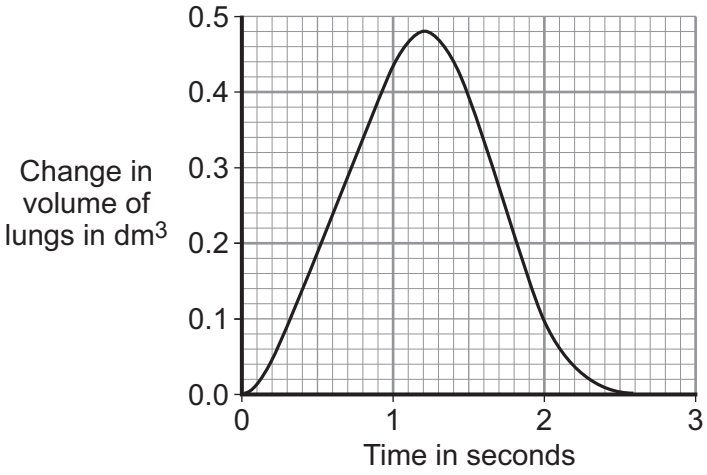
*(2 marks)*

4

**7** The diaphragm and ribcage move air into the lungs and out of the lungs.

The graph shows changes in the volume of the lungs in one breathing cycle.




**7 (a) (i)** Describe the changes in the volume of the lungs in one breathing cycle.

.....

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.....

.....

.....

.....

*(3 marks)*

**7 (a) (ii)** Explain how the diaphragm and ribcage cause the changes in lung volume shown in the graph.

.....

.....

.....

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.....

.....

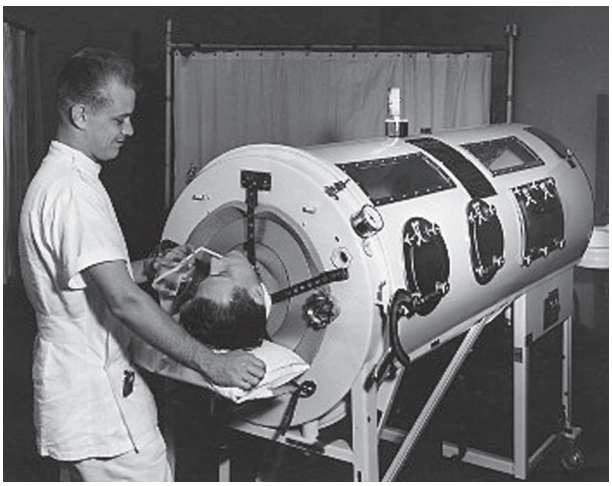
*(3 marks)*

**Turn over ▶**

**7 (b)** Sometimes patients are unable to breathe for themselves.
Mechanical ventilators are used to make these patients breathe.

**Photograph 1** shows a patient in an iron lung ventilator.

**Photograph 1**



Air is pumped out of the iron lung, creating a very low pressure.
This low pressure causes the thorax to expand, causing air to flow into the lungs.
When air is pumped back into the iron lung the pressure inside the tank increases, causing air to move out of the lungs.

**Photograph 2** shows a modern ventilator.

**Photograph 2**

Modern ventilators increase the pressure in the patient's airways using a tube put into the trachea.
The increased pressure in the patient's airways causes air to flow into the patient's lungs.
Then, the ventilator causes the pressure in the patient's airways to drop to zero, and the patient breathes out.

**7 (b) (i)** The ventilators shown in **Photographs 1** and **2** make the patient inhale in a very different way.

Describe this difference.

.....

.....

.....

.....

*(2 marks)*

**7 (b) (ii)** The iron lung ventilator was used mainly in the 1900s.

Most patients are now treated with the type of ventilator shown in **Photograph 2**.

Give **one** advantage and **one** disadvantage of using the modern ventilator rather than the iron lung ventilator.

.....

.....

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*(2 marks)*

10

**Turn over for the next question**

**8** There are many ways to increase the efficiency of food production.

**8 (a)** The table shows the energy available to humans from two different food chains.

| Food chain | Energy transferred to humans in kJ per hectare of crop |
|---|---|
| Wheat → humans | 900 000 |
| Wheat → pigs → humans | 90 000 |

**8 (a) (i)** Compare the amount of energy the two food chains transfer to humans.

.....

.....

*(1 mark)*

**8 (a) (ii)** Give **one** reason for the difference in the amount of energy the two food chains transfer to humans.

.....

.....

*(1 mark)*

**8 (b)** *In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.*

Give methods used in the factory farming of animals.
Explain the advantages and disadvantages of these methods.

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*(6 marks)*

8

**END OF QUESTIONS**

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Question 6 Map: © European Environment Agency

Question 7 Photograph 1: © SuperStock/Corbis

Question 7 Photograph 2: © Getty Images