AQA

Please write clearly in block capitals.

Centre number | | | | | | Candidate number | | | | |

Surname _____

Forename(s) _____

Candidate signature _____

GCSE
Biology

F

Foundation Tier Unit Biology B3

Friday 10 June 2016 Morning Time allowed: 1 hour

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

You may use a calculator.

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 9 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.

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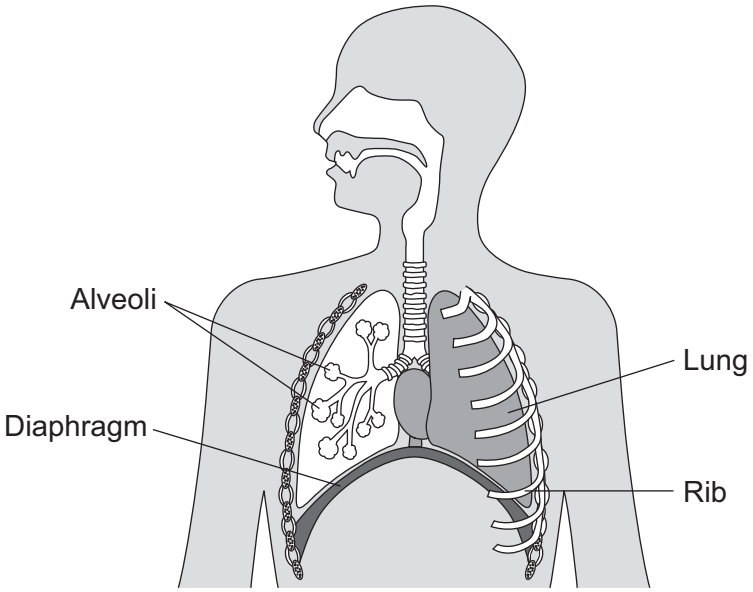
Answer **all** questions in the spaces provided.

1 (a) **Figure 1** shows the breathing system in humans.

Figure 1



Use the correct answer from the box to complete the sentence.

[1 mark]

abdomen	**air passages**	**thorax**

The lungs and ribs are found in the _____ .

1 (b) (i) What happens to the ribs when we breathe in?

[1 mark]

Tick (✓) **one** box.

The ribs move down and in. ☐

The ribs move up and in. ☐

The ribs move up and out. ☐

1 (b) (ii) Describe what happens to the muscles between the ribs when we breathe in.

[1 mark]

_____

_____

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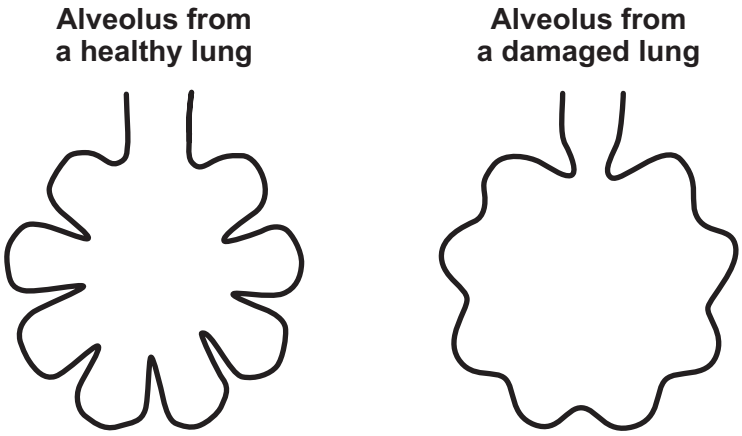
1 (c) **Figure 2** shows an alveolus from a healthy lung and an alveolus from a damaged lung.

Figure 2



1 (c) (i) Which **one** of the following is a difference between the alveolus from the damaged lung and the alveolus from the healthy lung?

[1 mark]

Tick (✓) **one** box.

The damaged alveolus has a smaller surface area. ☐

The damaged alveolus has a shorter diffusion pathway. ☐

The damaged alveolus has a better blood supply. ☐

1 (c) (ii) A person with damaged alveoli finds exercising difficult.

Which **one** of the following is the reason why the damaged alveoli will make exercising difficult?

[1 mark]

Tick (✓) **one** box.

Less carbon dioxide is taken in. ☐

Less energy is needed for exercise. ☐

Less oxygen is taken in. ☐

5

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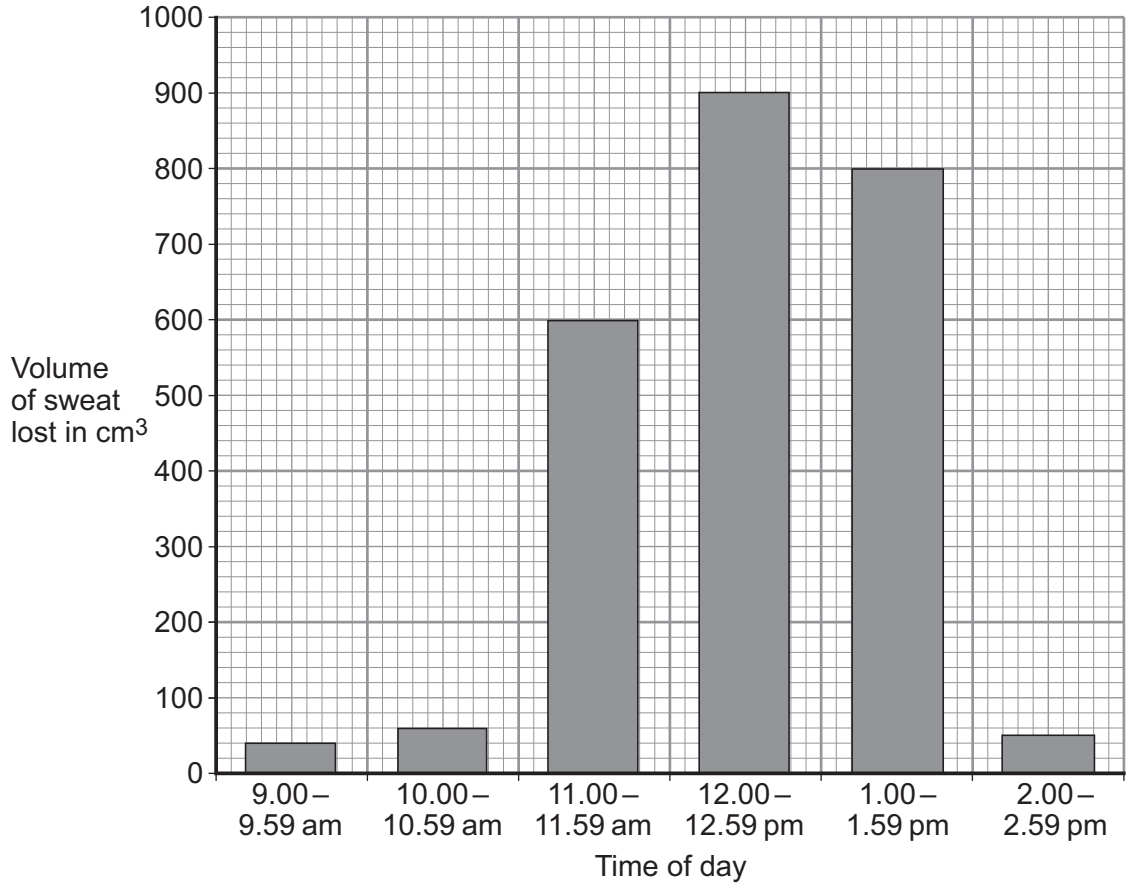
2 A scientist measured the volume of sweat lost between 9.00 am and 2.59 pm in one day by one person. **Figure 3** shows the results.

Figure 3



2 (a) (i) Suggest what happened at 11.00 am.

[1 mark]

Tick (✓) **one** box.

The person moved into a cold room. ☐

The person removed their coat. ☐

The person started running a race. ☐

2 (a) (ii) Calculate the total volume of sweat lost between 11.00 am and 1.59 pm.

[1 mark]

_____

_____

Total volume of sweat lost = _____ cm^3

Do not write outside the box

2 (a) (iii) Suggest **one** way the person could replace the water that was lost as sweat.

[1 mark]

_____

_____

2 (b) (i) Sweating helps keep our internal body temperature within a narrow range.

Which organ monitors body temperature?

[1 mark]

Tick (✓) **one** box.

brain ☐

kidney ☐

pancreas ☐

2 (b) (ii) The organ that monitors internal body temperature receives information about temperature from the skin.

Which structures in the skin send impulses with this information?

[1 mark]

Tick (✓) **one** box.

capillaries ☐

glands ☐

receptors ☐

2 (c) How does sweating help to control body temperature?

[1 mark]

_____

_____

6

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3 The heart is part of the circulatory system.

3 (a) (i) Name **one** substance transported by the blood in the circulatory system.

[1 mark]

_____

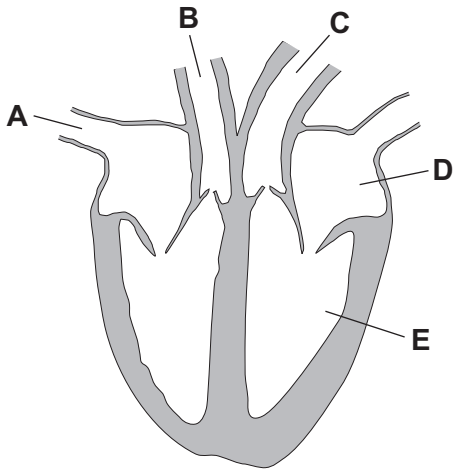
3 (a) (ii) What is the main type of tissue in the heart wall?

[1 mark]

_____

3 (b) **Figure 4** shows the human heart.

Figure 4



3 (b) (i) Which blood vessel, **A**, **B** or **C**, takes blood to the lungs?

[1 mark]

3 (b) (ii) Name parts **D** and **E** shown in **Figure 4**.

[2 marks]

D _____

E _____

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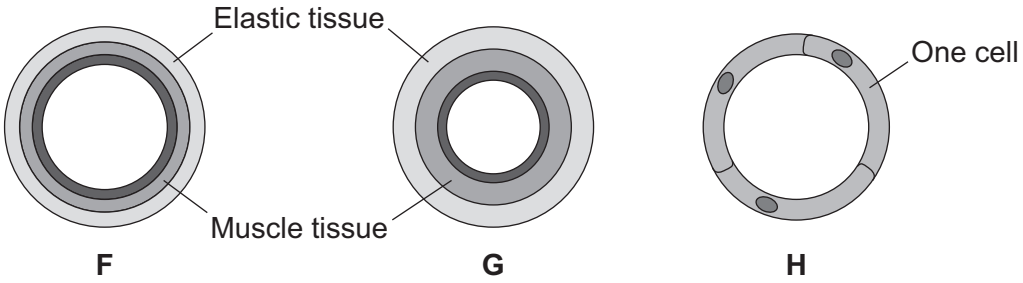
3 (c) **Figure 5** shows three types of blood vessel, **F**, **G** and **H**.

Figure 5



Not to scale

3 (c) (i) What type of blood vessel is **F**?

[1 mark]

Tick (✓) **one** box.

an artery ☐

a capillary ☐

a vein ☐

3 (c) (ii) A man needs to have a stent fitted to prevent a heart attack.

In which type of blood vessel would the stent be placed?

[1 mark]

Tick (✓) **one** box.

an artery ☐

a capillary ☐

a vein ☐

3 (c) (iii) Explain how a stent helps to prevent a heart attack.

[2 marks]

_____

_____

_____

_____

9

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4 Some people with diabetes do not produce enough insulin to keep their blood glucose at the correct levels.

4 (a) (i) Which organ monitors blood glucose levels?

[1 mark]

Tick (✓) **one** box.

liver ☐

pancreas ☐

skin ☐

4 (a) (ii) What effect does insulin have on glucose in the blood?

[1 mark]

Tick (✓) **one** box.

Insulin causes glucose to move into the cells. ☐

Insulin increases the amount of glucose in the blood. ☐

Insulin converts glucose to starch. ☐

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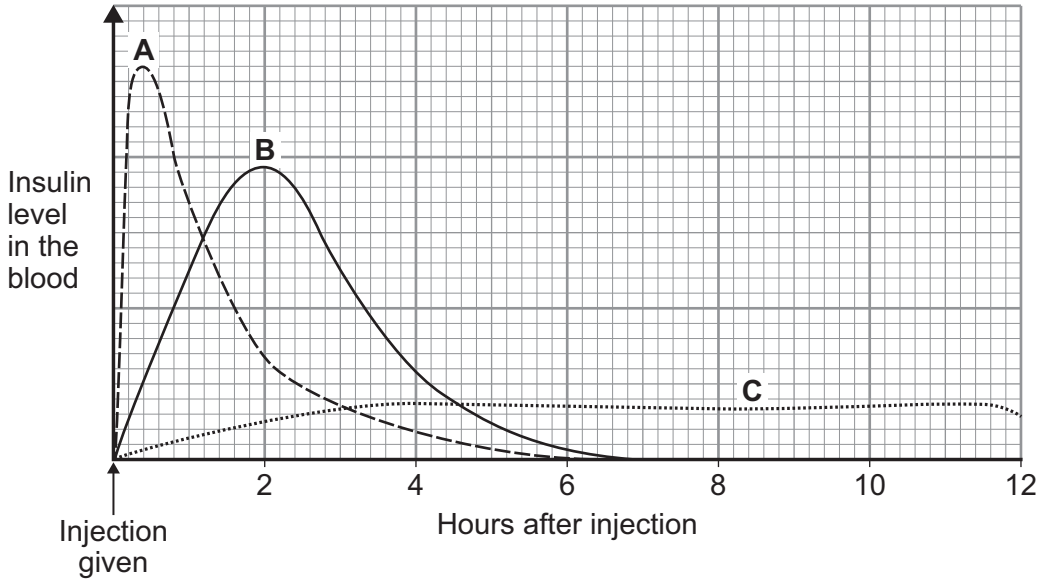
4 (b) Some people with diabetes inject insulin several times a day.

There are different types of insulin.

Figure 6 shows some information about three different types of insulin, **A**, **B** and **C**.

Figure 6



4 (b) (i) Which type of insulin, **A**, **B** or **C**, should a person with diabetes inject just before eating a meal high in carbohydrates?

[2 marks]

_____

Give a reason for your answer.

_____

_____

Question 4 continues on the next page

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4 (b) (ii) A woman with diabetes has a blood glucose level of 12 mmol per dm^3 of blood.

The woman's normal blood glucose level is 6 mmol per dm^3.

The woman will need to inject insulin to lower her blood glucose level.

For each unit of insulin injected the blood glucose level will fall by 3 mmol per dm^3.

How many units of insulin does the woman need to inject to bring her blood glucose level down to the normal level?

[1 mark]

Number of units = _____

4 (c) Some people have pancreas transplants to treat diabetes.

Give **one** possible disadvantage of a pancreas transplant.

[1 mark]

Tick (✓) **one** box.

The pancreas could be rejected. ☐

The patient will need to inject insulin every day. ☐

The patient's blood glucose levels may rise and fall too much. ☐

6

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Turn over for the next question

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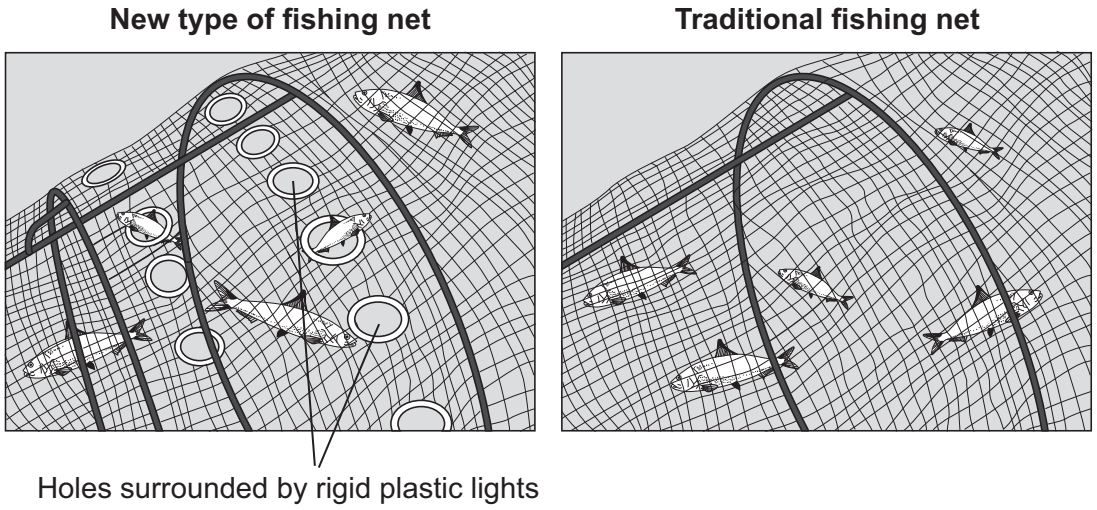
5 It is important to conserve fish stocks.

Figure 7 shows a new type of fishing net and a traditional fishing net.

Figure 7



5 (a) (i) Describe how the new type of fishing net helps to conserve fish stocks.

[3 marks]

5 (a) (ii) Give **one** way, other than controlling nets, to reduce overfishing.

[1 mark]

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5 (b) Another way to make sure there is food for an increasing human population is to make food production more efficient.

Figure 8 shows how some cows are farmed.

Figure 8

5 (b) (i) Use information from **Figure 8** to suggest **two** ways in which this type of farming reduces energy loss from the cows.

[2 marks]

1 _____

_____

2 _____

_____

5 (b) (ii) Give **two** reasons why some people disagree with farming cows in this way.

[2 marks]

1 _____

_____

2 _____

_____

8

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6 Human activity affects ecosystems.

6 (a) Draw **one** line from each human activity to the effect on ecosystems.

[2 marks]

Human activity	Effect on ecosystems
Increase in rice fields	Increases the amount of methane in the atmosphere
Destruction of peat bogs	Increases the amount of carbon dioxide that is released into the atmosphere
	Reduces the rate at which carbon dioxide is locked up as wood

6 (b) (i) Deforestation also affects the atmosphere.

Give **two** reasons why deforestation takes place.

[2 marks]

1 _____

_____

2 _____

_____

6 (b) (ii) Changes in the gases in our atmosphere can cause global warming.

Give **two** possible effects of a rise in the Earth's temperature.

[2 marks]

1 _____

_____

2 _____

_____

6

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7 Cells, tissues and organs are adapted to take in different substances and get rid of different substances.

Table 1 shows the concentration of four ions outside cells and inside cells.

Table 1

Ion	Concentration outside cells in mmol per dm^3	Concentration inside cells in mmol per dm^3
Sodium	140	9
Potassium	7	138
Calcium	2	27
Chloride	118	3

7 (a) Use information from **Table 1** to complete the following sentences.

[2 marks]

Sodium ions will move into cells by the process

of _____ .

Potassium ions will move into cells by the process

of _____ .

7 (b) Some students investigated the effect of the different concentrations of sugar in four drinks, **A**, **B**, **C** and **D**, on the movement of water across a partially permeable membrane.

The students:

- made four bags from artificial partially permeable membrane
- put equal volumes of 5% sugar solution in each bag
- weighed each bag containing the sugar solution
- placed one bag in each of the drinks, **A**, **B**, **C** and **D**
- after 20 minutes removed the bags containing the sugar solution and weighed them again.

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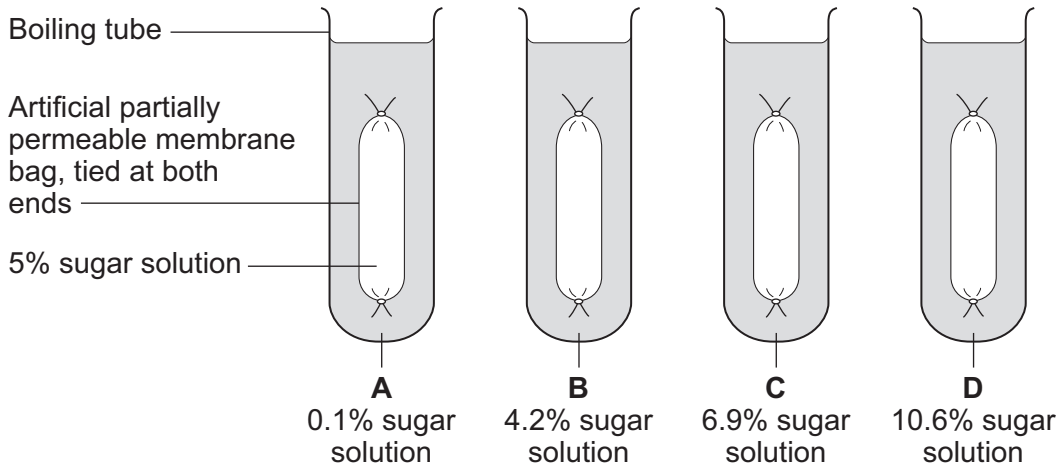
Figure 9 shows how they set up the investigation.

Figure 9



7 (b) (i) The bag in drink **A** got heavier after 20 minutes.

Explain why.

[3 marks]

7 (b) (ii) In which drink, **A**, **B**, **C** or **D**, would you expect the bag to show the smallest change in mass?

[1 mark]

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

7 (b) (iii) Explain why you think the bag you chose in part **(b)(ii)** would show the smallest change.

[2 marks]

8

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8 (a) Carbon dioxide enters a plant through stomata on the leaves.

Name the cells that control the size of the stomata.

[1 mark]

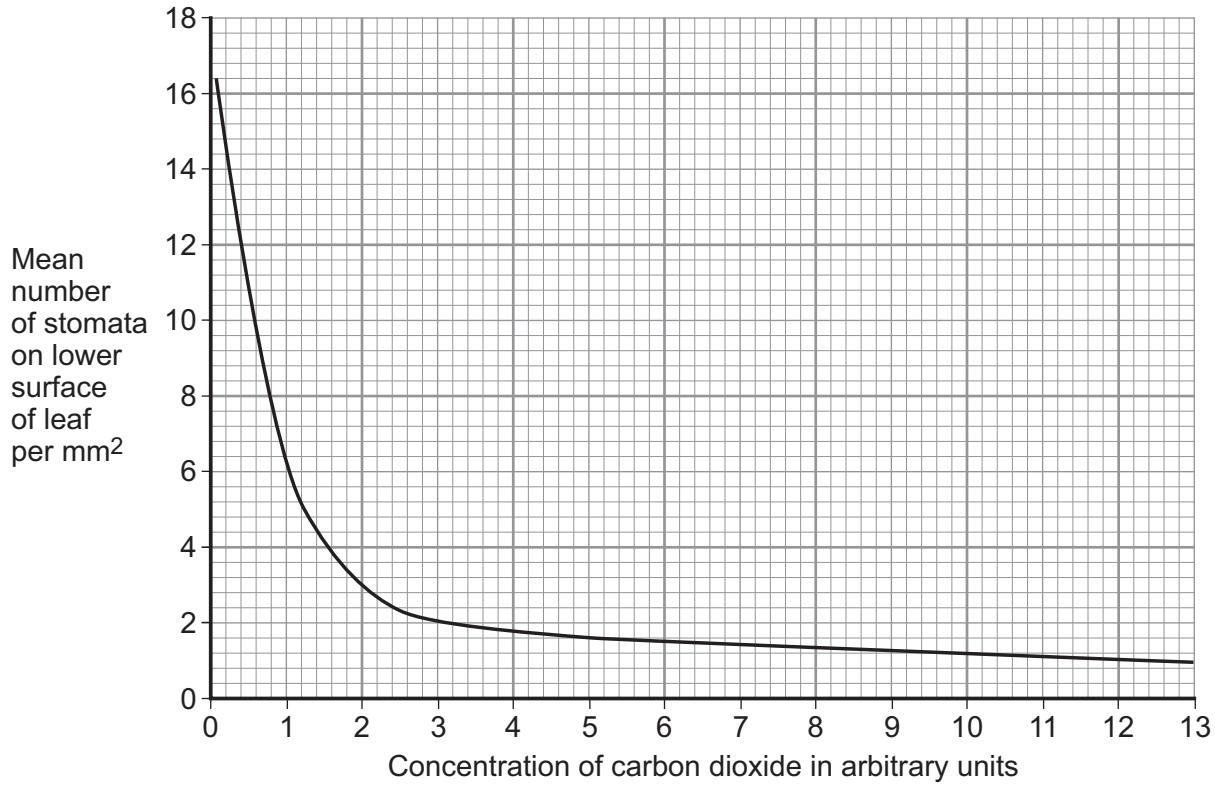
_____

8 (b) Scientists grew tomato plants in air containing different concentrations of carbon dioxide.

The scientists recorded the number of stomata found on the lower surface of the leaves of plants grown at each carbon dioxide concentration.

Figure 10 shows the results.

Figure 10



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8 (b) (i) Describe the relationship between the mean number of stomata per mm^2 and carbon dioxide concentration.

[2 marks]

8 (b) (ii) Suggest a reason for the relationship you described in part **(b)(i)**.

[1 mark]

8 (c) (i) Suggest **one** disadvantage to a plant of having a large number of stomata per mm^2 on each leaf.

[1 mark]

8 (c) (ii) Suggest **one** environmental condition where a large number of stomata per mm^2 on each leaf would be a disadvantage.

[1 mark]

6

Turn over for the next question

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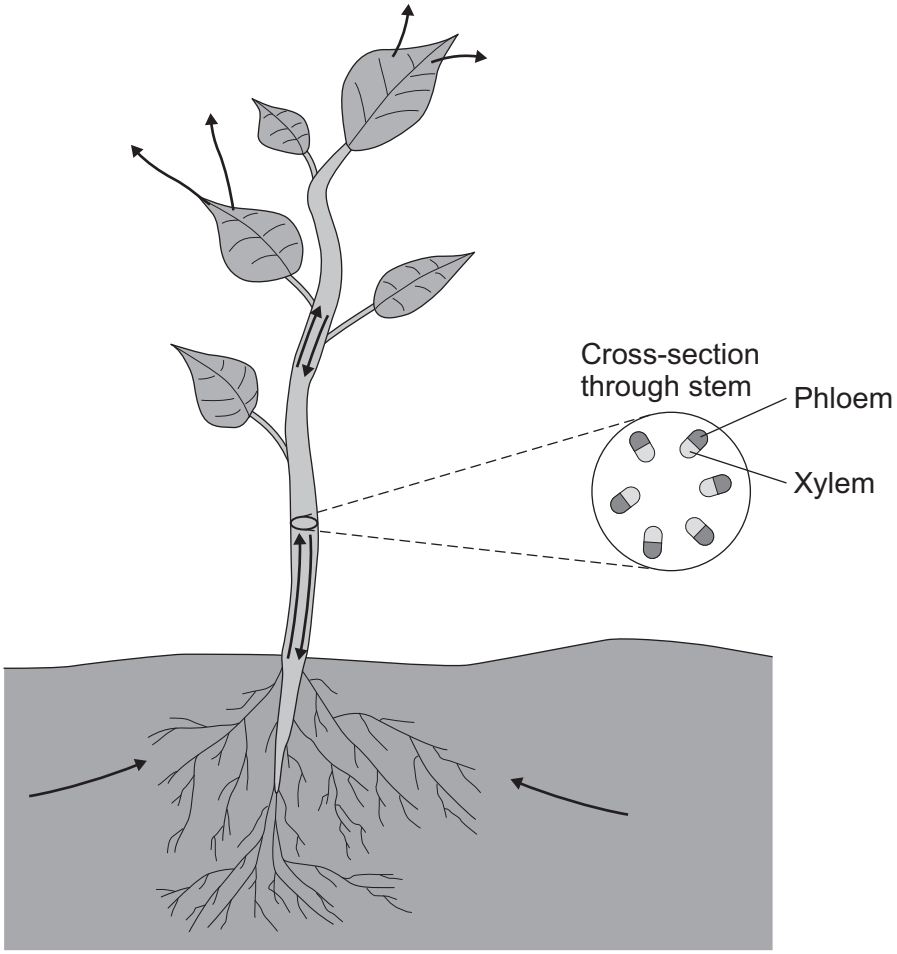
9 **In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.**

Plants transport many substances between their leaves and roots.

Figure 11 shows the direction of movement of substances through a plant.

Figure 11



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Describe how **ions**, **water** and **sugar** are obtained and transported through plants.

In your answer you should refer to materials moving upwards in a plant and to materials moving downwards in a plant.

[6 marks]

Extra space

6

END OF QUESTIONS

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