AQA

Please write clearly in block capitals.

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

Surname _____

Forename(s) _____

Candidate signature _____

GCSE
SCIENCE A
BIOLOGY

F

Foundation Tier Unit Biology B1

Tuesday 17 May 2016 Afternoon 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 8 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.

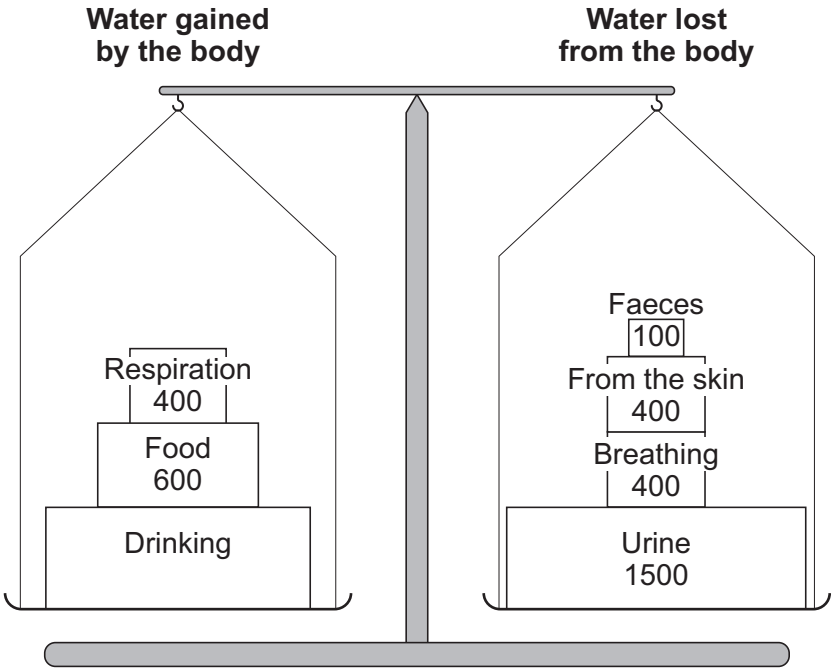
Do not write outside the box

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

1 **Figure 1** shows the water balance for a person on a cold day.

The numbers show the volume of water, in cm^3, the person's body gained and lost.

Figure 1



1 (a) (i) How much water was lost from the body on the cold day?

[1 mark]

Draw a ring around the correct answer.

1800 cm^3 **2400 cm^3** **3300 cm^3**

1 (a) (ii) The volume of water gained by the body should balance the volume of water lost from the body.

How much water should the person have drunk to keep the balance?

[2 marks]

_____

_____

Volume of water = _____ cm^3

Do not write outside the box

1 (b) (i) Name the process by which water is lost from the skin.

[1 mark]

_____

1 (b) (ii) Why does the body need to lose water from the skin?

[1 mark]

_____

_____

1 (c) The next day was a hot day. The person gained the same volume of water and did the same activities.

1 (c) (i) What effect did the increase in temperature have on the volume of water the person lost?

[1 mark]

Tick (✓) **one** box.

Less water was lost through the skin. ☐

More water was lost through the skin. ☐

More water was lost in faeces. ☐

1 (c) (ii) What effect would the increase in temperature have on the volume of urine the person lost?

[1 mark]

Draw a ring around the correct answer.

decrease **increase** **no change**

7

Turn over for the next question

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ANSWER IN THE SPACES PROVIDED

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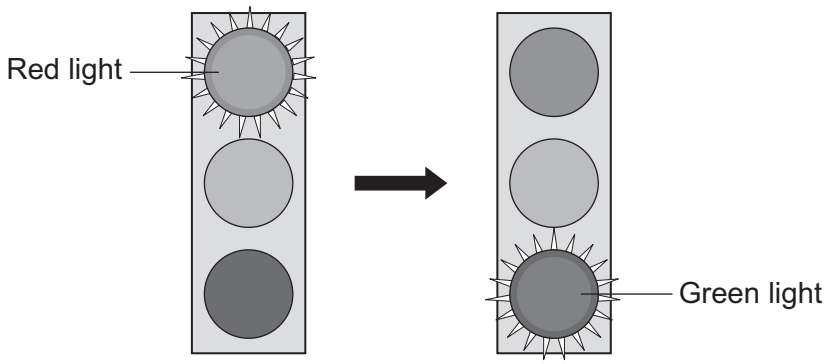
2 Car drivers need quick reactions to avoid accidents.

A student uses a computer program to measure reaction time.
The computer screen shows a traffic light on red. The traffic light then changes to green.

Figure 2 shows the change the person sees on the computer screen.

Figure 2



When the traffic light changes to green the person has to click the computer mouse as quickly as possible.
The computer program works out the time taken to react to the light changing colour.

2 (a) Special cells detect the change in colour.

2 (a) (i) What word is used to describe special cells that detect a change in the environment?

[1 mark]

Draw a ring around the correct answer.

receptor cells **reflex cells** **stimulus cells**

2 (a) (ii) Where in the body are the special cells that detect the change in colour of the traffic lights?

[1 mark]

_____

2 (b) The student used the computer program on one computer to measure the reaction times of people of different ages.

2 (b) (i) Give **one** variable the student should control so that a fair comparison can be made between the people of different ages.

[1 mark]

_____

_____

Do not write outside the box

2 (b) (ii) The student did each measurement three times to calculate a mean value. **Table 1** shows the results.

Table 1

Age in years	Mean reaction time in milliseconds
15	242
30	
45	221
60	258
75	364
90	526

The reaction times for the 30-year-old person were **192**, **174** and **180** milliseconds.

Calculate the mean reaction time of the 30-year-old person.

[1 mark]

Mean reaction time = _____ milliseconds

2 (b) (iii) Which **one** of the following is an advantage of repeating each test three times and **not** doing the test just once?

[1 mark]

Tick (✓) **one** box.

Any anomalies can be identified. ☐

The results will be more precise. ☐

There will be no errors. ☐

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2 (b) (iv) Some people think that old people should **not** be allowed to drive a car.

Why is it more dangerous for old people to drive cars?

Use information from **Table 1** to support your answer.

[2 marks]

_____

_____

_____

_____

7

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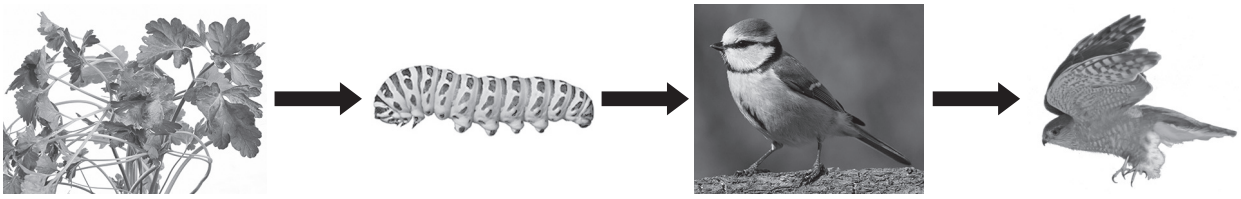
3 **Figure 3** shows how energy and biomass pass along a food chain.

Figure 3



Parsley → Swallowtail caterpillar → Blue tit → Hawk

3 (a) The parsley shown in **Figure 3** carries out photosynthesis.

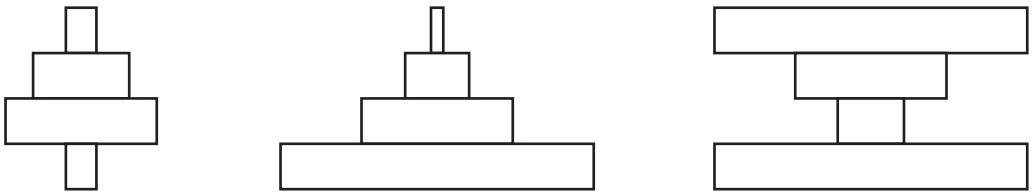
Why is photosynthesis important in the food chain?

[2 marks]

3 (b) Which diagram shows the pyramid of biomass for the food chain in **Figure 3**?

[1 mark]

Tick (✓) **one** box.



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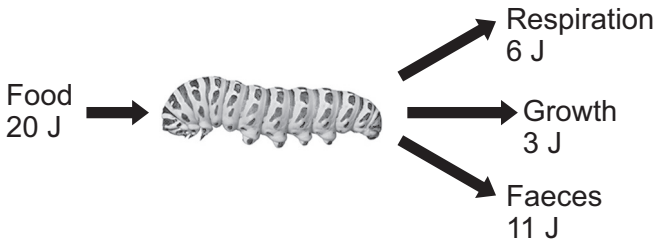
3 (c) **Figure 4** shows the ways a swallowtail caterpillar transfers 20 J of energy from food.

Figure 4



What percentage of the energy in the caterpillar's food is used for growth?

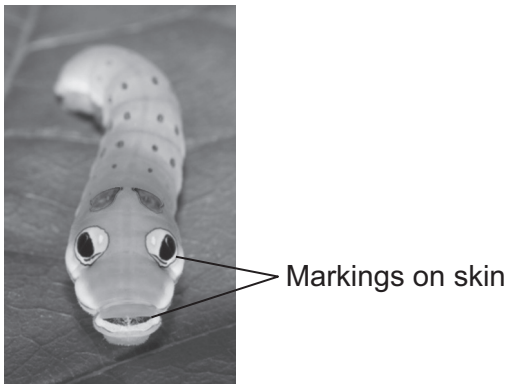
[2 marks]

Percentage = _____

3 (d) The organisms in the food chain are adapted for survival.

3 (d) (i) **Figure 5** shows a swallowtail caterpillar seen from the back.

Figure 5



Suggest how the swallowtail caterpillar shown in **Figure 5** is adapted to reduce the chance of being eaten by blue tits.

[2 marks]

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3 (d) (ii) **Figure 6** shows a hawk.

Figure 6

Suggest **two** ways that the hawk is adapted to catch and kill blue tits.

[2 marks]

1 _____

_____

2 _____

_____

9

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4 Hormones are involved in controlling the menstrual cycle and fertility.

4 (a) (i) Use the correct answer from the box to complete the sentence.

[1 mark]

auxin	**follicle stimulating hormone (FSH)**	**thalidomide**

A hormone produced by the pituitary gland is _____ .

4 (a) (ii) Use the correct answer from the box to complete the sentence.

[1 mark]

luteinising hormone (LH)	**oestrogen**	**statin**

A hormone produced by the ovaries is _____ .

4 (b) (i) Why are fertility drugs given to some women?

[1 mark]

_____

_____

4 (b) (ii) A doctor injects fertility drugs into a woman. After the injection, the hormones travel to the woman's ovaries.

How do the hormones travel to the ovaries?

[1 mark]

Draw a ring around the correct answer.

through the bloodstream **through the neurones** **through the skin**

4 (c) Which **two** hormones are used in contraceptive pills?

[2 marks]

Tick (✓) **two** boxes.

FSH	☐	oestrogen	☐
LH	☐	progesterone	☐

6

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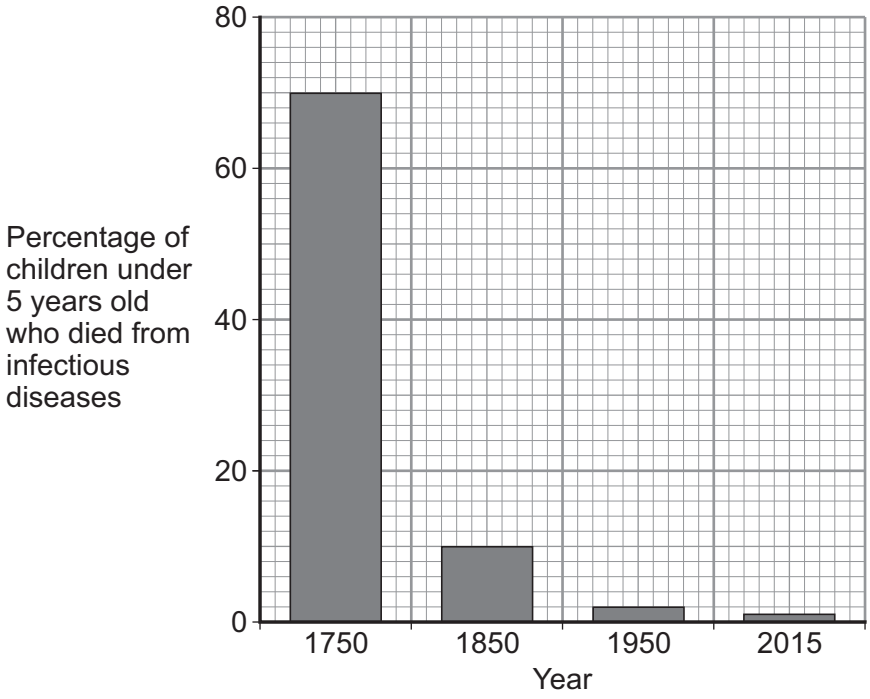
5 Pathogens are microorganisms that cause infectious diseases.

5 (a) **Figure 7** shows the percentage of children under 5 years old who died from infectious diseases, in the UK, in four different years.

Figure 7



5 (a) (i) In the 1840s Dr Semmelweis introduced a new idea into hospitals.
What was this idea?

[1 mark]

Tick (✓) **one** box.

hand-washing ☐

immunisation ☐

painkillers ☐

5 (a) (ii) Between 1750 and 1850 vaccinations were also developed.
What is in a vaccine?

[1 mark]

Tick (✓) **one** box.

large amounts of dead pathogens ☐

large amounts of live pathogens ☐

small amounts of dead pathogens ☐

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5 (a) (iii) The advances in medicine had an effect on death rate.

Describe the effect these advances had between 1750 and 1850.

To gain full marks you should include data from **Figure 7**.

[2 marks]

5 (b) Antibiotics were developed in the 1940s. Antibiotics kill bacteria.

5 (b) (i) Which **one** of the following is an antibiotic?

[1 mark]

Draw a ring around the correct answer.

cholesterol **penicillin** **thalidomide**

5 (b) (ii) The use of antibiotics has **not** reduced the death rate due to all diseases to zero.

Suggest **two** reasons why.

[2 marks]

1

2

5 (c) In school laboratories, bacteria should be grown at a maximum temperature of 25 °C.

Give **one** reason why companies testing new antibiotics grow bacteria at 37 °C.

[1 mark]

8

Do not write outside the box

6 Darwin's theory of natural selection states that all living things have evolved from simple life forms.

6 (a) Use the correct answer from the box to complete the sentence.

[1 mark]

three billion	**three million**	**three thousand**

Darwin's theory states that life began on Earth _____ years ago.

6 (b) Life evolved due to changes in genes. Changes in genes cause variation.

Complete the sentences.

[2 marks]

Changes in genes are called _____ .

Individuals with characteristics most suited to the environment are more likely to survive and _____ .

3

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7 Nicotine and alcohol are drugs that affect the brain.

7 (a) (i) What is the correct description of both nicotine and alcohol?

[1 mark]

Tick (✓) **one** box.

illegal, medical drugs ☐

illegal, recreational drugs ☐

legal, medical drugs ☐

legal, recreational drugs ☐

7 (a) (ii) Why do people find it difficult to stop smoking?

[1 mark]

_____

_____

7 (b) A drug company has developed a new drug which helps people to stop smoking.
The new drug prevents the feeling of pleasure caused by nicotine in the smoke.

The new drug is now being tested on rats which have been given a lot of alcohol to drink.
The company wants to find out if the drug can help people to stop drinking alcohol.

7 (b) (i) It is important that the tests on rats are done by an independent company.

What is meant by an independent company?

[1 mark]

_____

_____

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7 (b) (ii) Why is it important that the tests are done by an independent company?

[1 mark]

7 (b) (iii) Some scientists believe that the part of the brain sensitive to alcohol is the same as the part of the brain sensitive to nicotine.

Explain why the new drug might be useful for treating people who find it difficult to stop drinking alcohol.

[2 marks]

Question 7 continues on the next page

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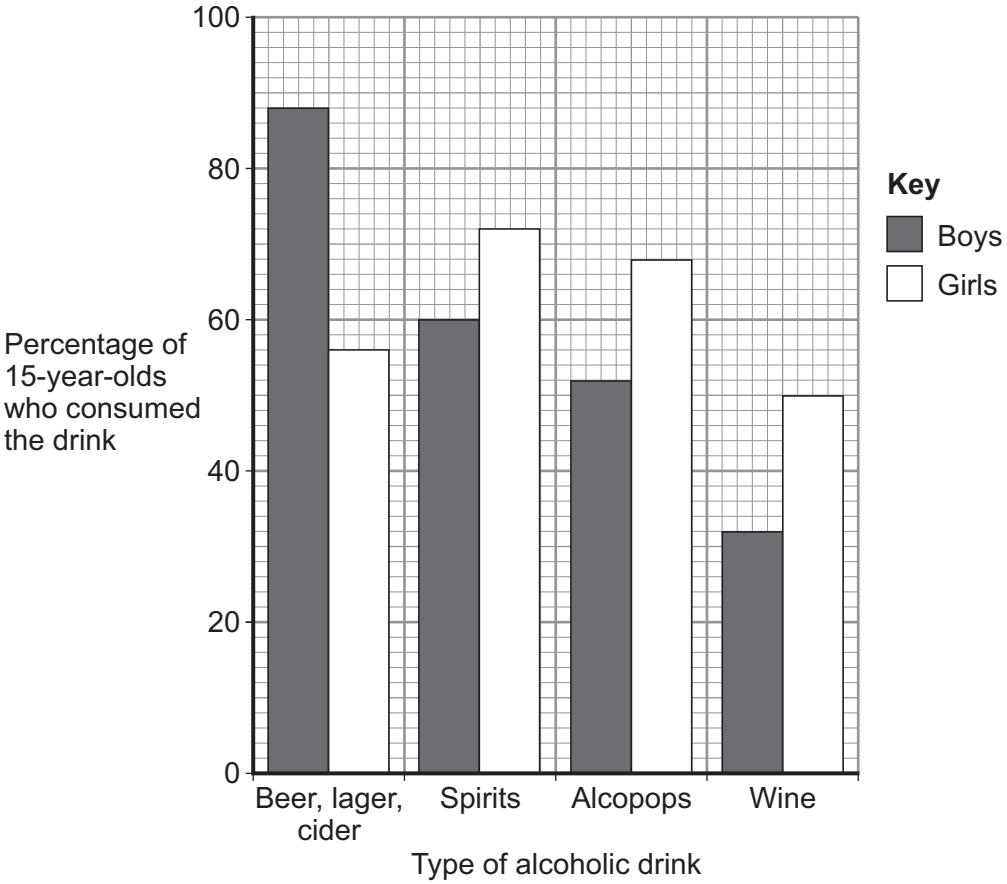
7 (c) **Figure 8** shows the results of a survey into the different types of alcoholic drinks consumed by one hundred 15-year-old boys and one hundred 15-year-old girls in the UK.

Figure 8



7 (c) (i) Describe the differences between the **types** of alcoholic drink consumed by boys and by girls.

Use **only** information from **Figure 8**.

[2 marks]

7 (c) (ii) A newspaper headline stated:

"All boys drink alcohol"

Use information from part **(c)** and **Figure 8** to give **one** reason why the newspaper headline may **not** be correct.

[1 mark]

9

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

Mineral ions are an important component of a healthy diet.

Describe how the other components of the diet are important in keeping us healthy.

In your answer you should refer to:

- the different components
- why we need each component.

[6 marks]

Extra space

6

Turn over for the next question

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9 Students investigated decomposition.

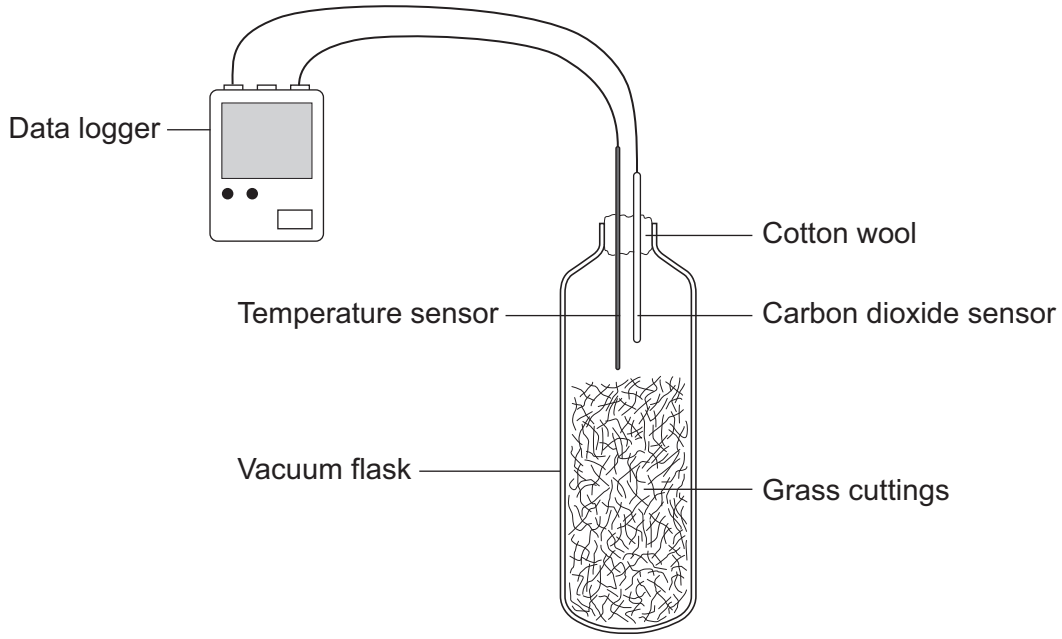
The students:

- put some decaying grass cuttings into a vacuum flask
- put a carbon dioxide sensor and a temperature sensor in the flask
- attached the sensors to a data logger
- closed the flask with cotton wool.

A vacuum flask was used to reduce the loss of thermal energy.

Figure 9 shows the investigation.

Figure 9



9 (a) Give **one** advantage of using a temperature sensor attached to a data logger instead of a thermometer.

[1 mark]

_____

_____

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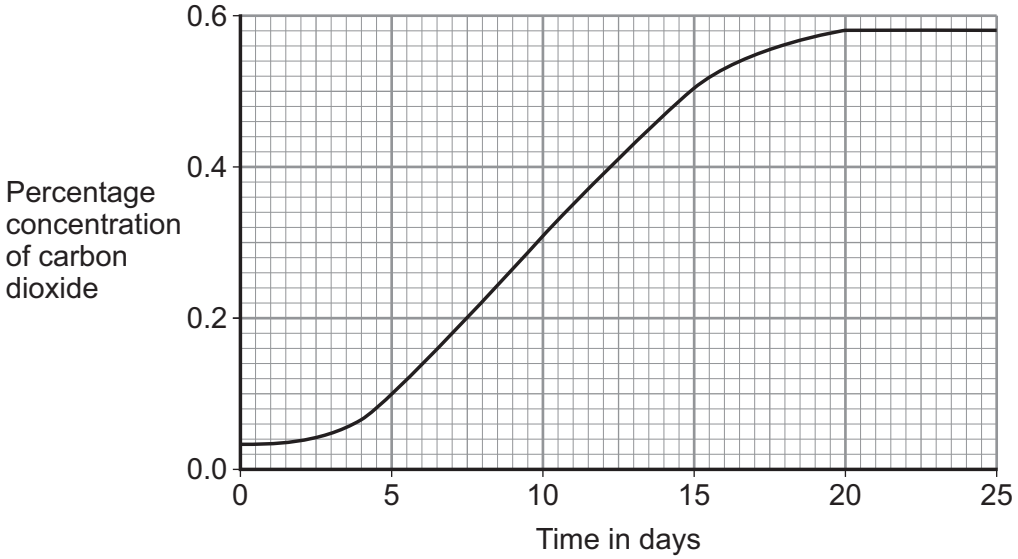
9 (b) **Figure 10** shows the results from the data logger for carbon dioxide concentration in the flask for the next 25 days.

Figure 10



9 (b) (i) Why did the concentration of carbon dioxide in the flask increase?

[3 marks]

9 (b) (ii) Suggest what has happened in the flask to cause the carbon dioxide concentration to level off after 20 days.

[1 mark]

5

END OF QUESTIONS

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