Centre Number

71

Candidate Number

Rewarding Learning

cea

**General Certificate of Secondary Education
2014–2015**

Double Award Science: Biology

Unit B1

Foundation Tier

[GSD11]

WEDNESDAY 12 NOVEMBER 2014, MORNING

MV18

TIME

1 hour, plus your additional time allowance.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
Write your answers in the spaces provided in this question paper.
Answer **all seven** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 70.
Figures in brackets printed at the end of each question indicate the marks awarded to each question or part question.
Quality of written communication will be assessed in Question **7(d)**.

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1 **(a)** The diagram shows part of a food chain.

Grass [ ] **Rabbit** [ ] **Fox**

   (i) Draw arrows in the boxes to complete this food chain. [1 mark]

   (ii) Name the producer in the food chain. [1 mark]

     _____

   (iii) What is the energy source for the producer? [1 mark]

     _____

   (iv) What would happen to the rabbit population if a disease killed all the foxes? [1 mark]

     _____

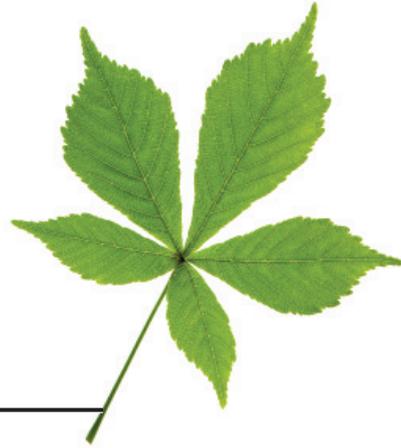**(b)** Giant pandas eat only bamboo.

What is the danger to a population of animals like giant pandas that have only one food source? [2 marks]

_____

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_____

2 The photographs show four different types of leaf.

stalk

Leaf A   **Leaf B**
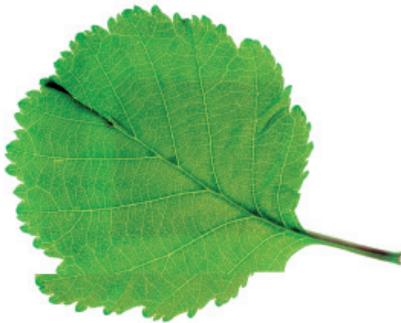
leaflets

Leaf C   **Leaf D**

The key below can be used to identify each leaf.

Leaf shape

One leaf on the stalk → Many leaflets on the stalk

One leaf on the stalk:
- Top of leaf pointed → **Lime**
- Top of leaf rounded → **Alder**

Many leaflets on the stalk:
- More than 10 leaflets present → **Rowan**
- Less than 10 leaflets present → **Horse Chestnut**
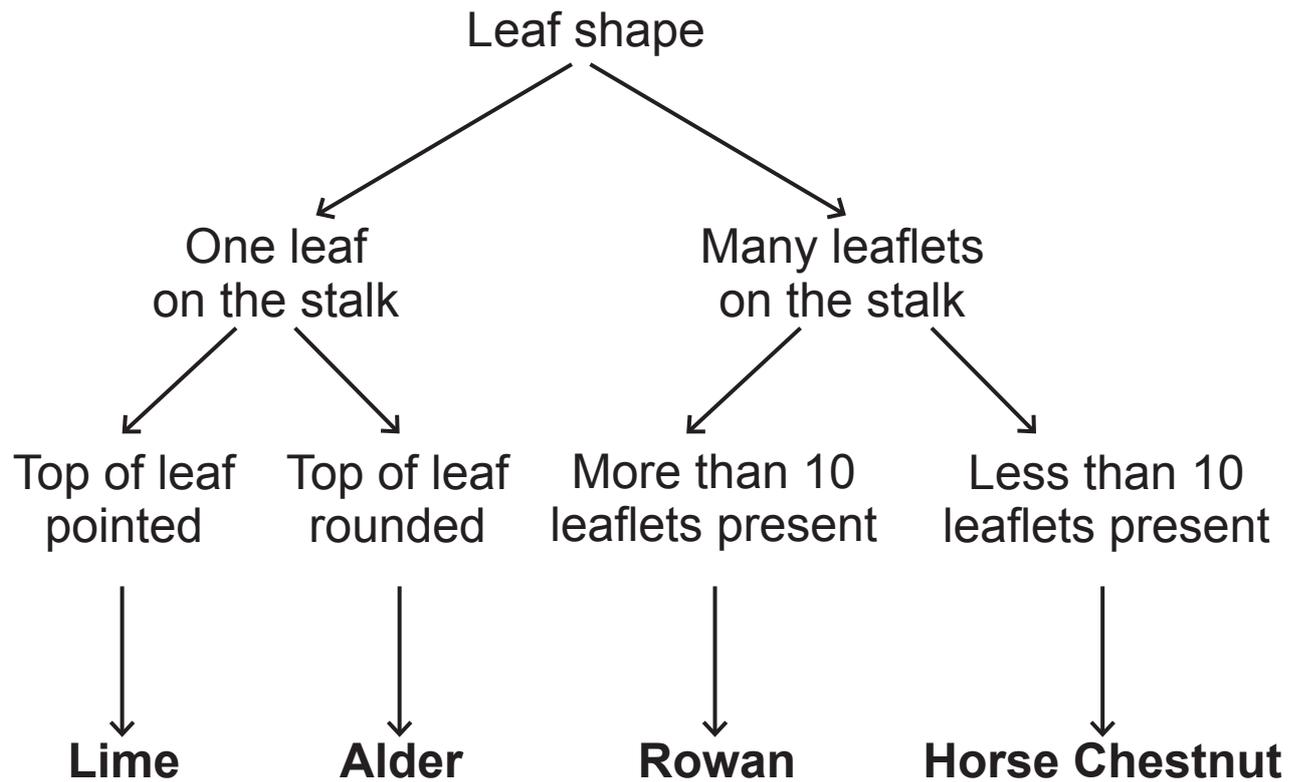
(a) Use the key to identify each leaf. [3 marks]

A _____

B _____

C _____

D _____

**(b)** The diagram shows an experiment to test if light is needed for photosynthesis.
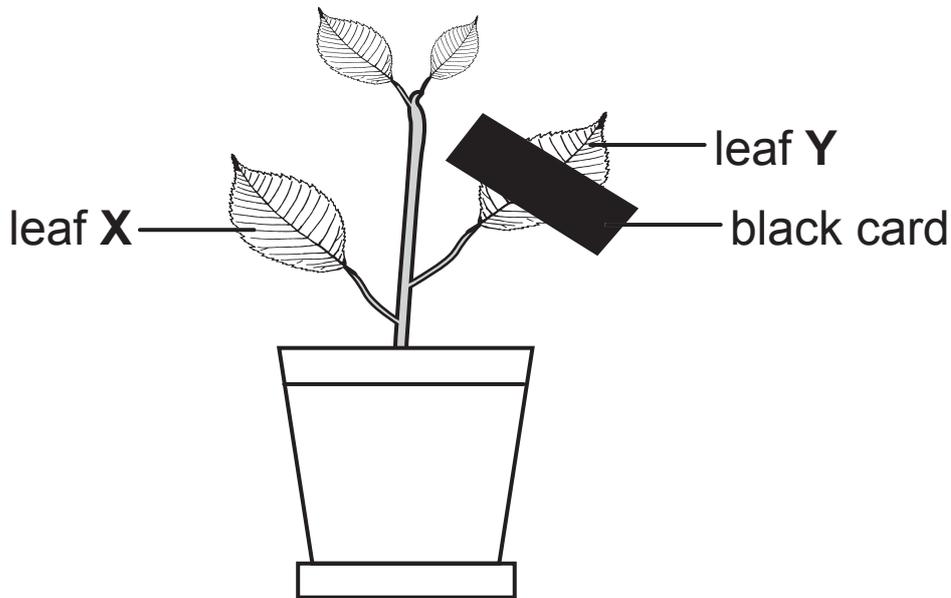
(i) The plant had been left in the dark for 48 hours before the experiment.
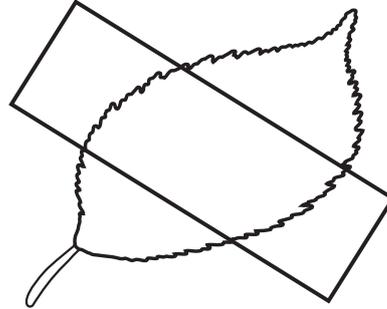
Why was this done? [1 mark]

_____

_____

(ii) What is the function of the black card on leaf **Y**? [1 mark]

_____

(iii) The plant was then left in light for four hours. Leaf **X** and leaf **Y** were tested for starch.
Shade the areas on **both** drawings that will give a positive starch result. [2 marks]
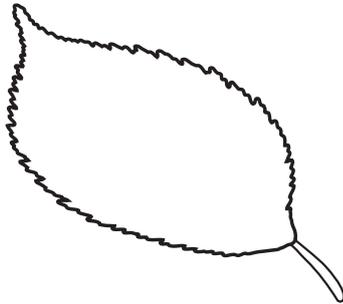
leaf **X**   leaf **Y**

(c) (i) Write in the boxes to complete the word equation for photosynthesis. [3 marks]

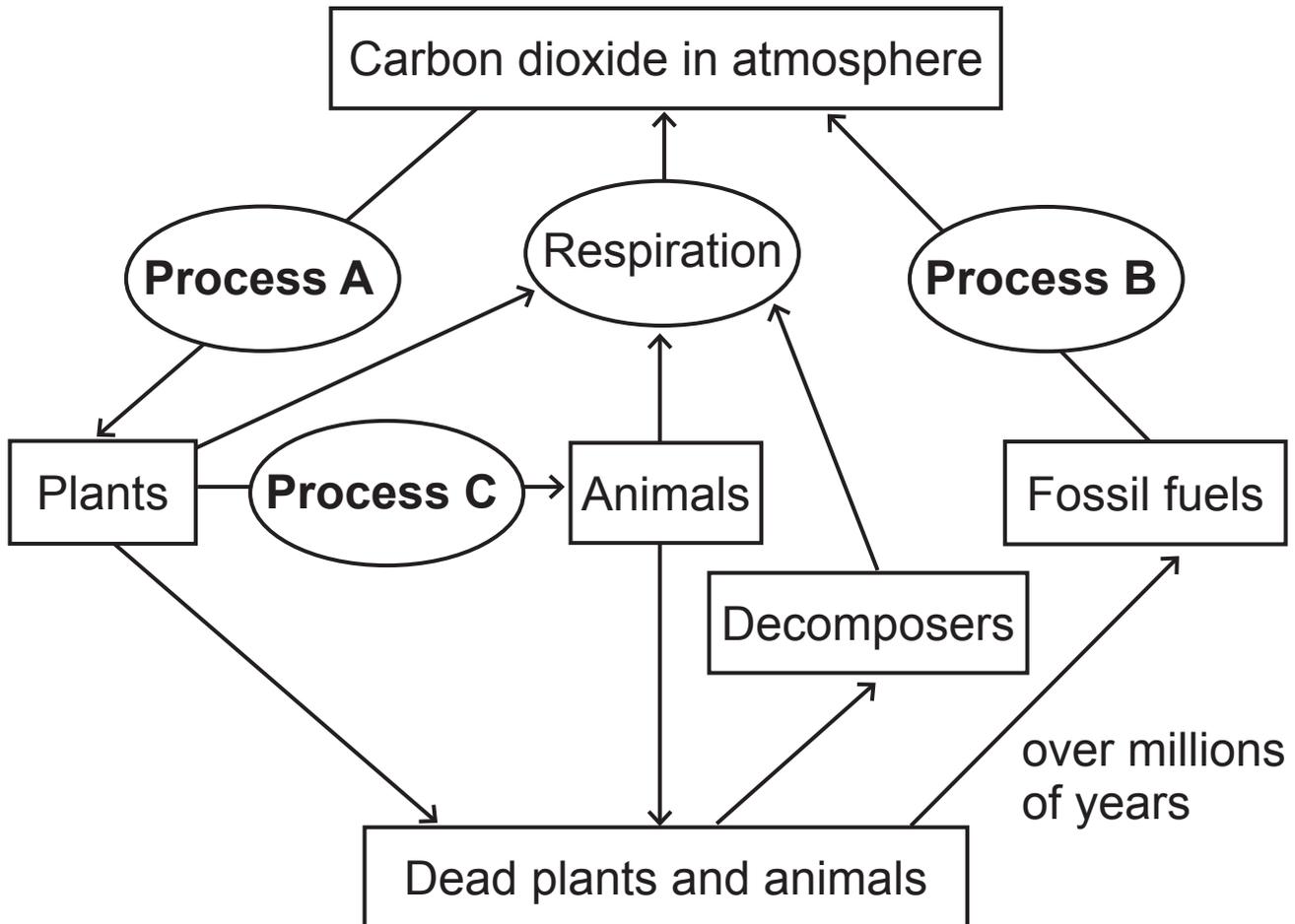$$\boxed{} + \boxed{\text{glucose}} \xleftarrow[\text{chlorophyll}]{\text{sunlight}} \boxed{} + \boxed{}$$

(ii) Plants produce glucose during photosynthesis.

Give **two** ways plants use glucose. [2 marks]

1. _____

2. _____

9

[Turn over

3 **(a)** The diagram shows the carbon cycle.

Name **Process A**, **Process B** and **Process C** in the diagram. [3 marks]

A _____

B _____

C _____

(b) (i) Respiration takes place in all living organisms.

What is the function of respiration? [1 mark]

_____

_____

(ii) Name the **two** substances used in respiration.
[2 marks]

1. _____

2. _____

(c) The Maldives are a group of islands in the Indian Ocean.
The highest point on the islands is only 2.4 metres
above sea level.
The photograph shows one of these islands.

(i) Use the information and your knowledge to explain
how global warming may cause the islands to flood.
[3 marks]

_____

_____

_____

_____

_____

_____

(ii) International treaties help to reduce global warming.

Give **one** way in which international treaties do this.
[1 mark]

_____

_____

4 **(a)** A man trips on a footpath. He is immediately aware that he has tripped. About three seconds later his heart rate increases and he feels the shock of nearly falling.

(i) Name the organ system which is responsible for the man's **immediate** awareness of nearly falling.
[1 mark]

_____

(ii) A chemical messenger, called adrenaline, causes his heart rate to increase.

What type of chemical is adrenaline? [1 mark]

_____

(iii) Suggest how adrenaline is transported around the body. [1 mark]

_____

(b) Insulin is a chemical messenger used to control blood glucose levels.

(i) Where is insulin made in the body? [1 mark]

_____

(ii) Describe how insulin lowers blood glucose levels.
[2 marks]

_____

_____

_____

_____

(c) Diabetes is a condition in which the blood glucose control mechanism fails.

The graph shows how blood glucose levels change for Tom and Amy, after they have eaten an identical meal. Tom does not have diabetes.
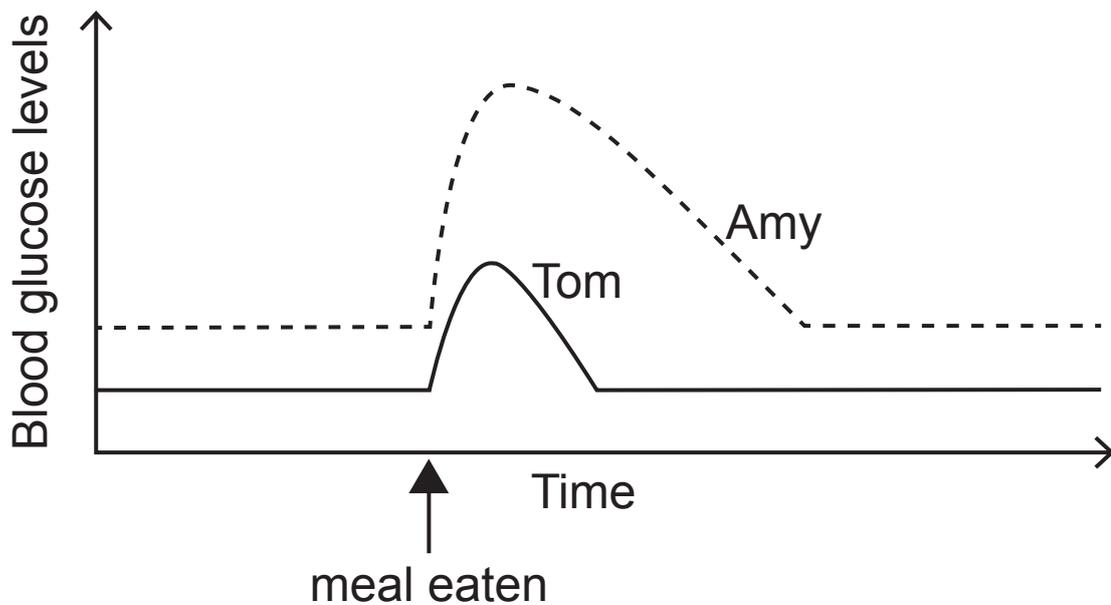
Give **two** pieces of evidence from the graph which suggest Amy may have diabetes. [2 marks]
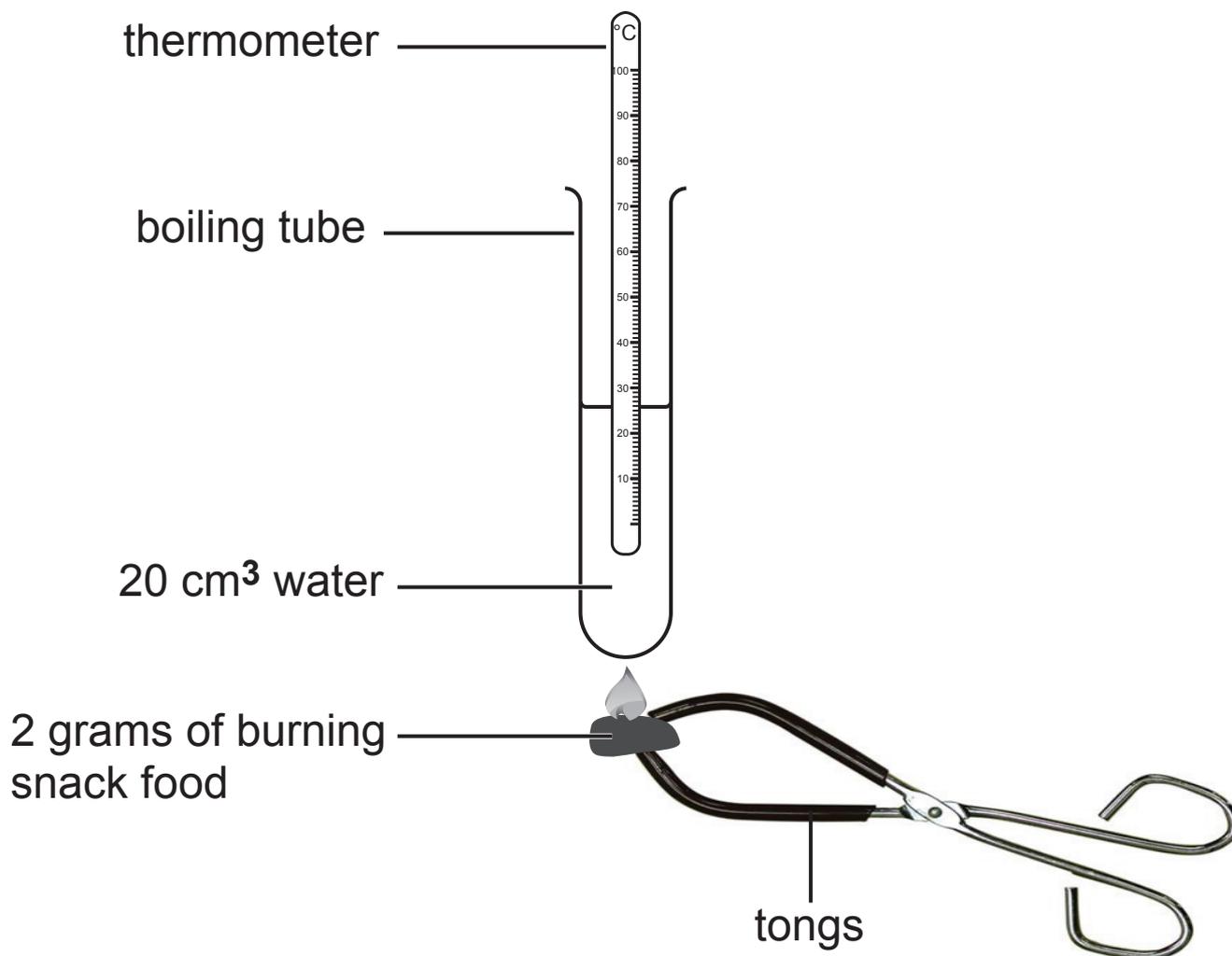
1. _____

_____

2. _____

_____

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5 Harry and James investigated the energy content of four different snack foods.

The diagram shows how they carried out their investigation.

thermometer

boiling tube

20 cm^3 water

2 grams of burning snack food

tongs

They measured the temperature of 20 cm³ of water before and after **completely** burning **2 grams** of each snack food. They calculated the rise in temperature for each snack food.

The table shows the results obtained.

Snack food	Temperature of 20 cm³ of water/°C		Rise in Temperature /°C
	Before burning	After burning	
Cheesy crackers	19	47	28
Potato crisps	19	40	21
Plain biscuit	19	37	
Chocolate biscuit	19	54	35

(a) (i) Complete the table to show the rise in water temperature for the plain biscuit. [1 mark]

(ii) The equation below is used to calculate how much energy 1 gram of each snack food contains.

Energy in food /J per gram =	$\dfrac{\text{Rise in water temperature/°C} \times \text{Volume of water/cm}^3 \times 4.2}{\text{Mass of food burned in grams}}$

Use this equation to calculate the energy content in **1 gram of the potato crisps.**

Show your working. [3 marks]

_____ **J**

(iii) Before Harry and James calculated the energy content of the snack foods, Harry looked at the table of results and said "I think the chocolate biscuit has the highest energy content."

What information from the table of results supports Harry's statement? [1 mark]

_____

_____

(iv) James suggested repeating the chocolate biscuit experiment three times.

What is the advantage of doing this? [1 mark]

_____

_____

(b) The energy content of 1 gram of potato crisps is much higher than the value calculated by Harry and James.

Suggest a reason why the experimental result is lower. [1 mark]

_____

_____

(c) Give **one** health problem that could result from eating too many snack foods. [1 mark]

_____

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(Questions continue overleaf)

21

[Turn over

6 **(a)** The photograph shows an oak tree.

Read the following passage.

	Line
Scientists in North America are concerned that mature	1
oak trees are not being replaced by oak seedlings but	
by seedlings of other types of trees.	3

One reason suggested for this is competition from the
seedlings of other types of trees. These seedlings are   5
better adapted than the oak seedlings to grow in the
shady conditions on the forest floor.   7

Another suggestion is that oak seedling roots are eaten
by voles, which are small animals living in the forest.   9

Any decrease in the size of oak forests will cause a
problem for the timber industry, which uses the oak wood.   11
It will also affect biodiversity, as a large wildlife population
lives in oak forests.

(i) Read lines 1–7 of the passage.

Use **only** the information in the passage to suggest what the oak seedlings and seedlings of other types of tree are competing for. [1 mark]

_____

(ii) Read lines 8–9 of the passage.

What trophic level are the voles feeding at? [1 mark]

_____

(iii) Read lines 10–13 of the passage.

Name **one** economic problem and **one** environmental problem which would result from the oak seedlings not growing into oak trees. [2 marks]

Economic _____

_____

Environmental _____

_____

(b) (i) A pitfall trap can be used to collect insects living on the forest floor.
Draw and label a diagram of a pitfall trap. [2 marks]

(ii) Describe how a pitfall trap would be used to collect a sample of insects living on the forest floor. [2 marks]

_____

_____

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7   A student carried out an experiment to find out which food groups are in a cheese sandwich.

  (a) Complete the table by writing in the missing information. [3 marks]

Food group	Test reagent	Colour of test reagent at start	Colour of test reagent if food group present
Starch		Yellow/brown	
Protein	Biuret solution		Purple

  (b) Describe how the student would test for fat in a sample of the cheese sandwich. Give the positive result for a fat test. [3 marks]

  _____

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(c) Amylase is the enzyme that breaks down starch.

Another student investigated how pH affects the breakdown of starch.

The table shows the results of this investigation.
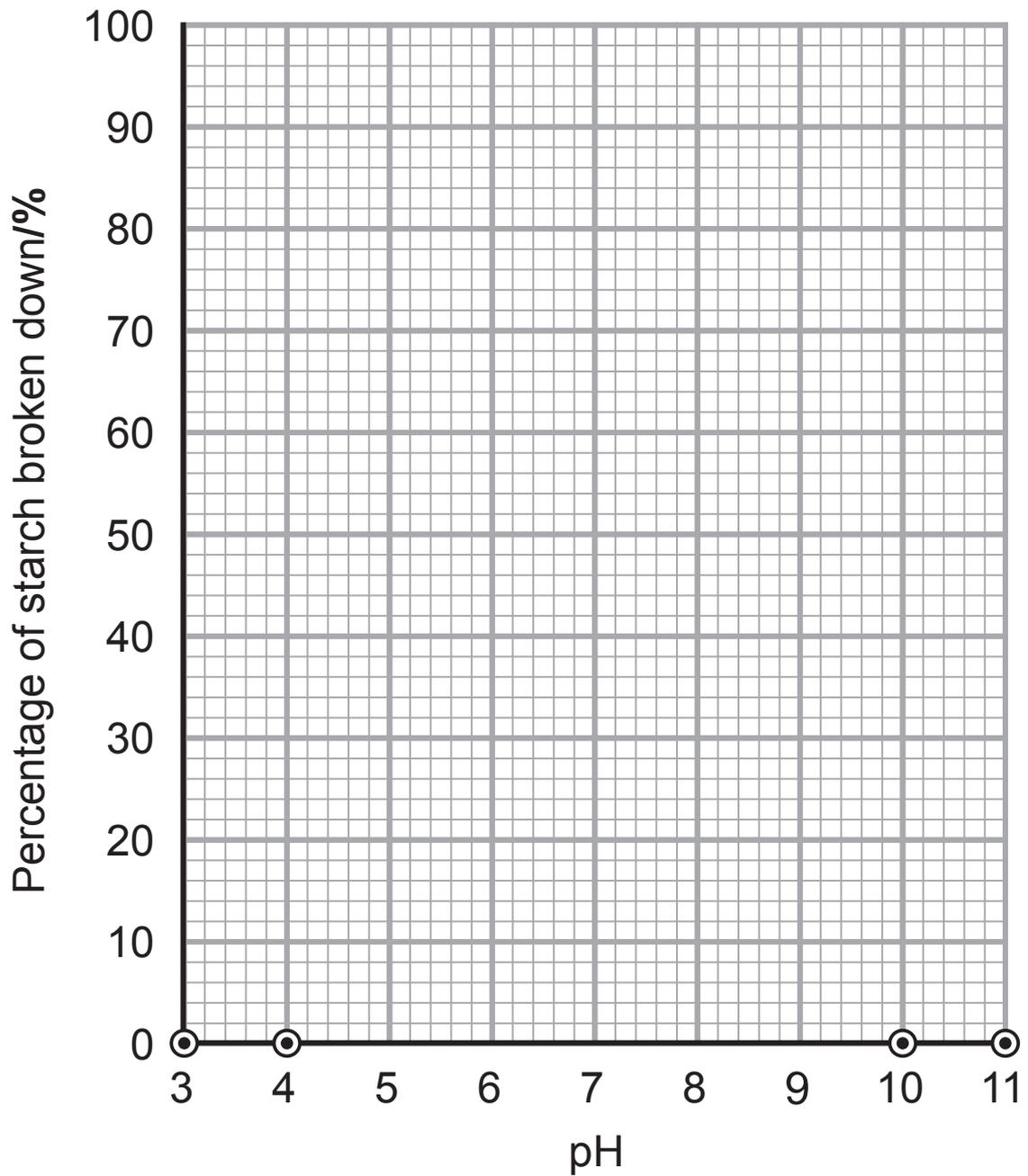
pH	Percentage of starch broken down/%
3	0
4	0
5	10
6	64
7	96
8	68
9	12
10	0
11	0

(i) Plot a line graph on the grid opposite, using the data in the table above.
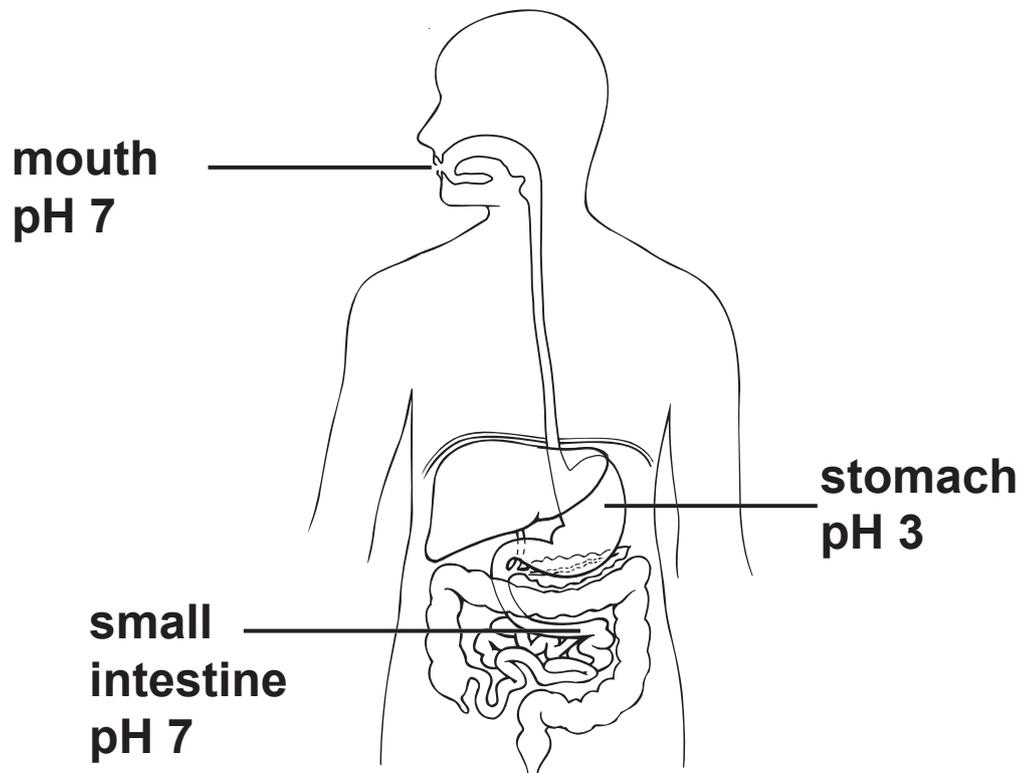
Four plots have been done for you. [3 marks]

(ii) What is the best pH for amylase to break down starch? [1 mark]

_____

(iii) Use **data** from the graph to describe the trend shown. [2 marks]

_____

_____

_____

_____

27

[Turn over

(d) The diagram shows part of the human digestive system.
The pH of some parts is shown.
Food stays only a very short time in the mouth.

mouth
pH 7

stomach
pH 3

small
intestine
pH 7

Use the graph on page 25, the diagram above and your knowledge of enzymes to:

- Describe the activity of amylase in the
    – mouth
    – stomach
    – small intestine

- Explain why it is important that amylase is made in the small intestine as well as in the mouth.

28

In this question you will be assessed on your written communication skills, including the use of specialist scientific terms. [6 marks]

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THIS IS THE END OF THE QUESTION PAPER

SOURCES

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Page 28, Question 7d, Diagram of the digestive system, © CCEA

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Question Number	**Marks**
1	
2	
3	
4	
5	
6	
7	
Total Marks	