Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2017–2018

Double Award Science: Biology

Unit B1
Foundation Tier

MV18

[GSD11]

WEDNESDAY 8 NOVEMBER 2017, MORNING

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 nine** 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 **8(b)**.

1 The photograph shows a flowering plant.

One feature of flowering plants is flowers.

(a) Give **two other** features of flowering plants. [2 marks]

1. _____

2. _____

The image shows an insect.

(b) Give **two** features of insects. [2 marks]

1. _____

2. _____

Three types of apparatus and their use in fieldwork are given below.

(c) Draw a line to link each type of apparatus to its use in fieldwork. [2 marks]

Apparatus	**Use**
pitfall trap	to suck up and collect very small insects
net	to trap small animals that crawl along the ground
pooter	to catch small animals in long grass or in a pond

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(Questions continue overleaf)

2 A food chain from a woodland is given below.

oak tree → aphids → blue tits → sparrowhawks

(a) What do the arrows represent? [1 mark]

_____

The table gives the number of each organism in the food chain.

Organism	**Number**
sparrowhawks	4
blue tits	20
aphids	16 000
oak tree	1

(b) (i) In the space below, sketch a pyramid of numbers for the food chain opposite.
Label the organisms. [3 marks]

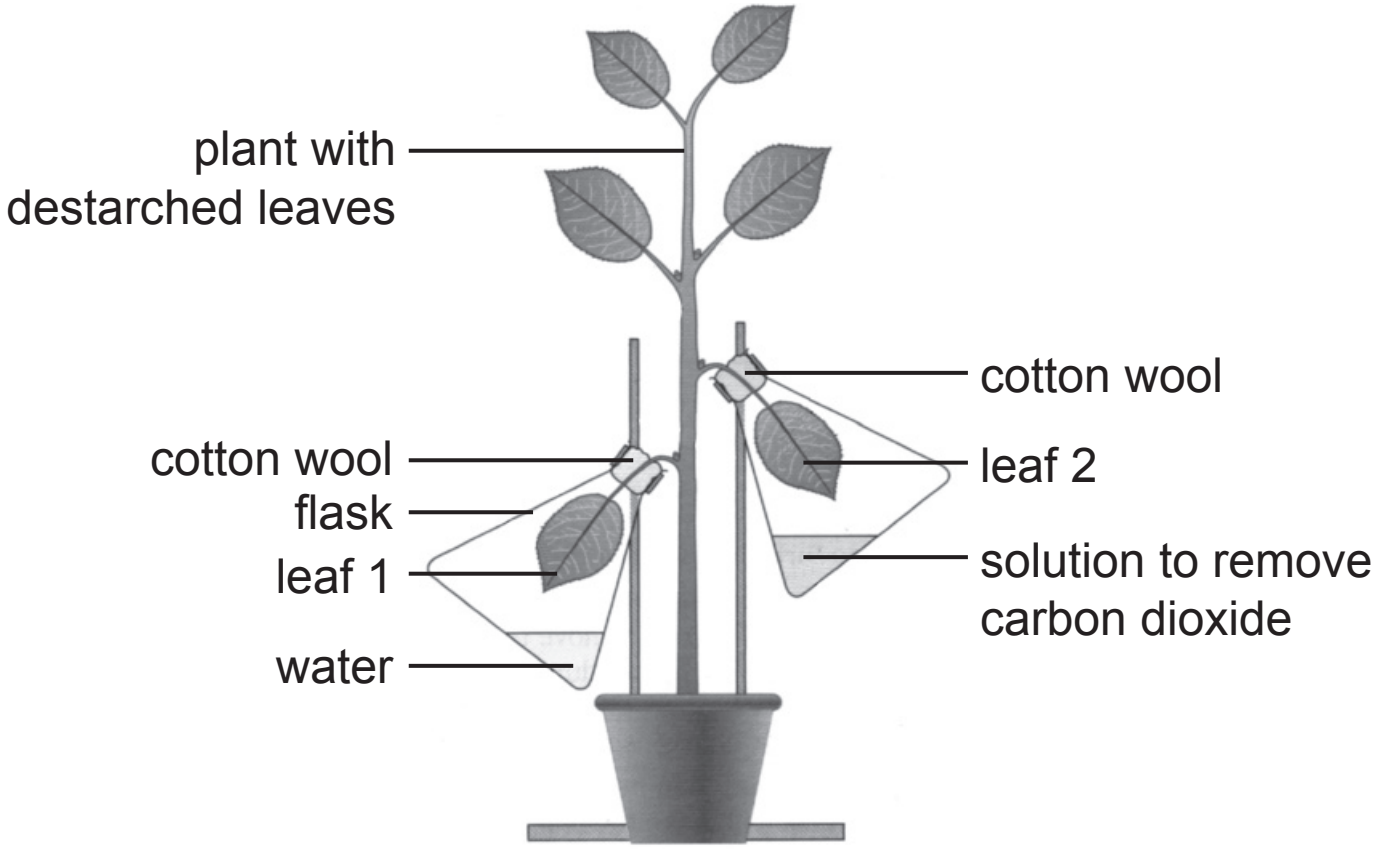
(ii) The average mass of one blue tit is 11 grams.
Use the information in the table opposite to calculate the biomass of all the blue tits in the food chain.
[2 marks]

Show your working.

_____ grams

3 Jane carried out an experiment to investigate photosynthesis.

The diagram shows how she set up the experiment.



(a) Describe how Jane destarched the plant. [1 mark]

_____

_____

(b) Jane left the destarched plant in light for two days. She then carried out the starch test on leaf 1 and leaf 2.

(i) What colour will iodine turn when it is added to a leaf containing starch? [1 mark]

yellow/brown _____ to _____

(ii) Explain why leaf 2 did **not** contain starch when tested. [2 marks]

_____

_____

_____

_____

(c) Give the change in the oxygen and carbon dioxide concentration in the flask containing leaf 1 after two days in light. [2 marks]

Oxygen _____

Carbon dioxide _____

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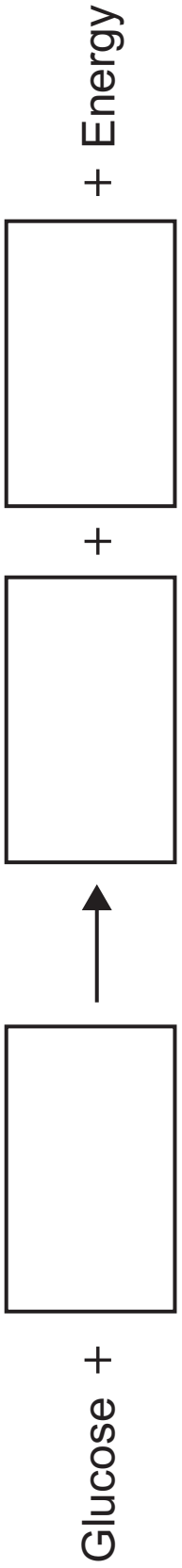
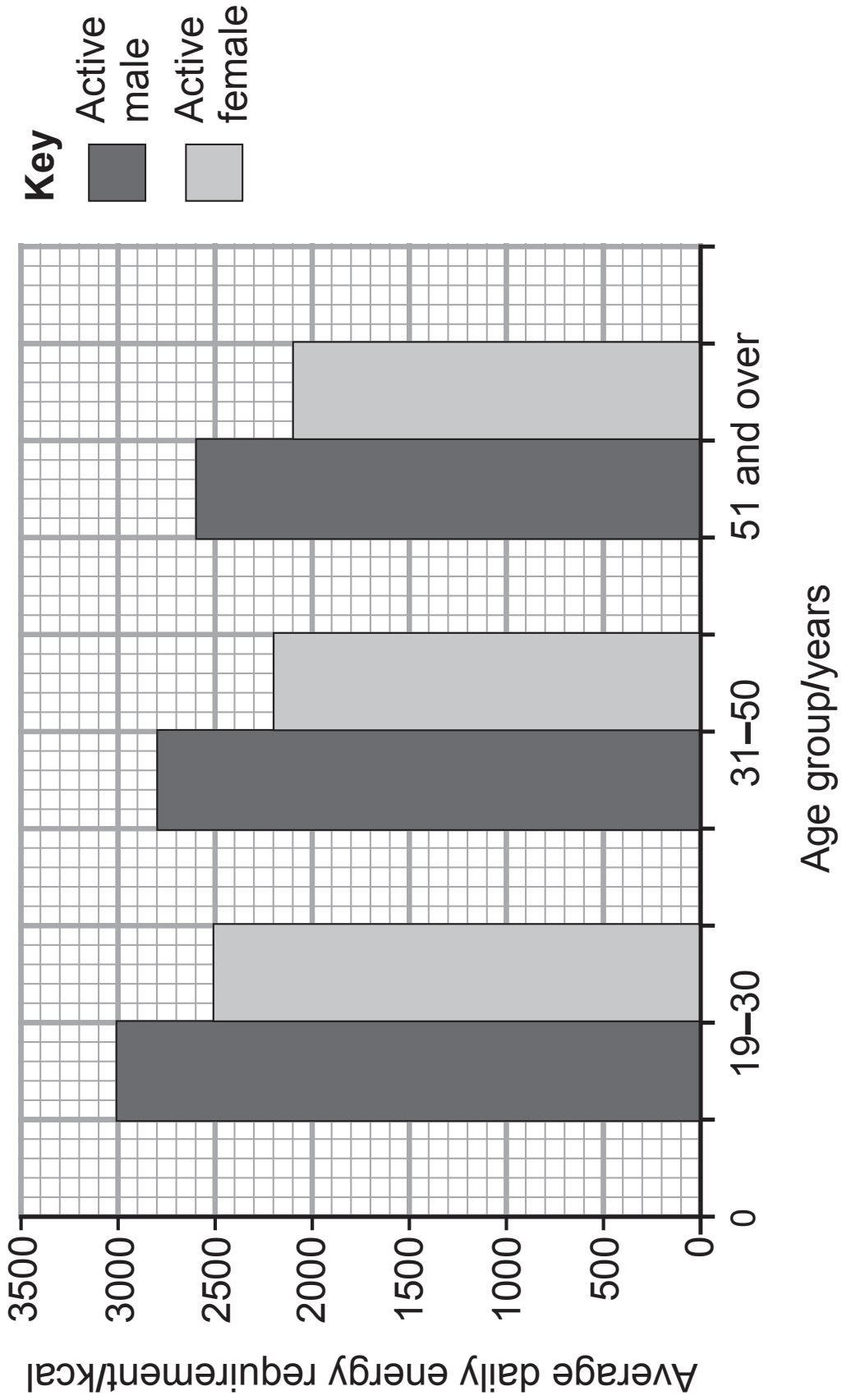
4 Energy is released in the process of respiration.

(a) Complete the word equation for respiration by writing in the boxes. [3 marks]



(b) The bar chart shows the average daily energy requirements for active males and active females in different age groups.



Use the bar chart and your knowledge to answer the following questions.

(i) Give **one** similarity and **one** difference between the energy requirements for active males and active females. [2 marks]

Similarity _____

_____

Difference _____

_____

(ii) Calculate the difference in the average daily energy requirements between active males and females in the 31–50 years age group. [2 marks]

Show your working.

_____ kcal

(c) (i) Suggest **one** way a person can avoid gaining weight. [1 mark]

_____

_____

(ii) Give **two** long term health risks of gaining excess weight. [2 marks]

1. _____

2. _____

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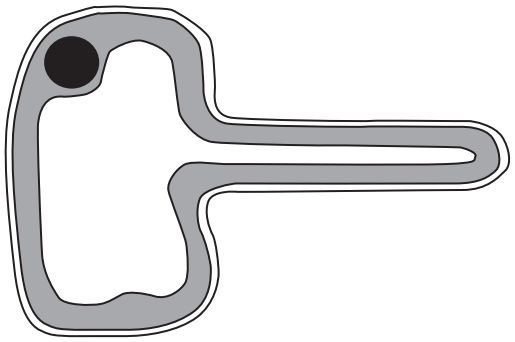
(Questions continue overleaf)

5 **(a)** Specialised plant cells absorb minerals from the soil. The diagram shows one of these cells.



(i) Name this specialised plant cell. [1 mark]

_____

These cells have an extension.

(ii) How does the extension help to increase the absorption of minerals from the soil? [1 mark]

_____

_____

(iii) Give the function of the mineral calcium in plant cells. [1 mark]

_____

(b) (i) Name **one natural** fertiliser used by farmers to increase the mineral content of soil. [1 mark]

_____

(ii) Give **one** advantage to a farmer of using an **artificial** fertiliser rather than a natural fertiliser. [1 mark]

_____

_____

Fertiliser run off pollutes a river by causing excess minerals to enter the river.

(iii) Name this process. [1 mark]
Choose from the list below.

digestion

eutrophication

absorption

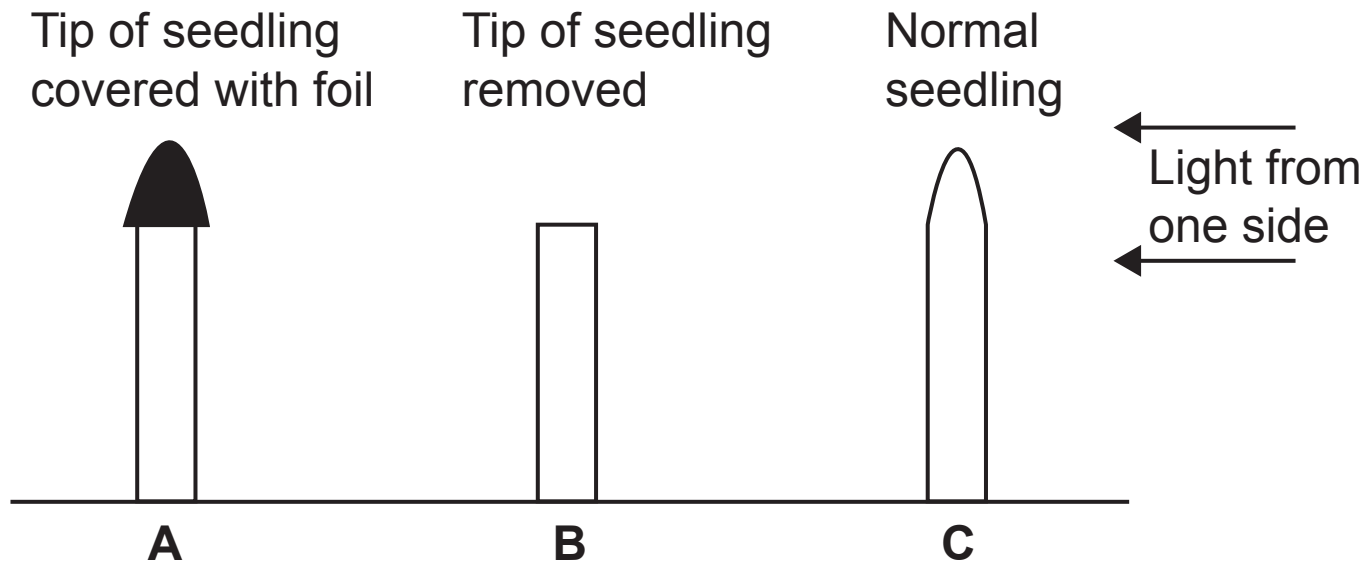
_____

(iv) Name an indicator species of water pollution. [1 mark]

_____

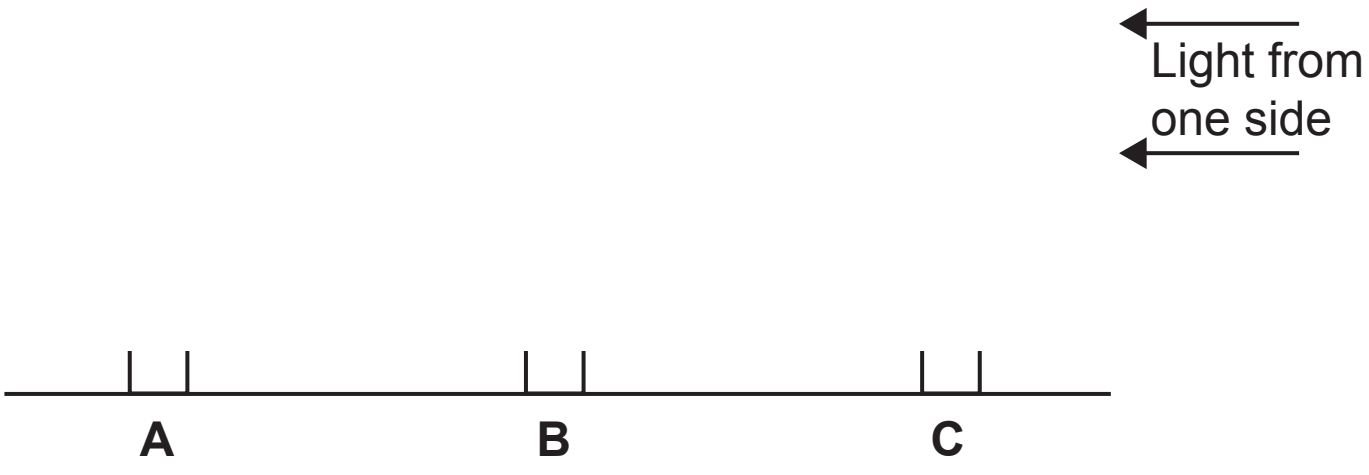
6 A student investigated the growth response of plant seedlings to light coming from one side.
Diagram 1 shows how the student set up the investigation.

Diagram 1



(a) Complete diagram 2 below by drawing how the plant seedlings would appear after five days. [3 marks]

Diagram 2



(b) Explain how a normal plant seedling responds to light coming from one side. [3 marks]

(c) Name this growth response. [1 mark]

7 **(a)** Protease is an enzyme which breaks down protein.

(i) Complete the sentence below. [1 mark]

Protease breaks down protein into

_____

(ii) Where is protein broken down in the digestive system? [2 marks]

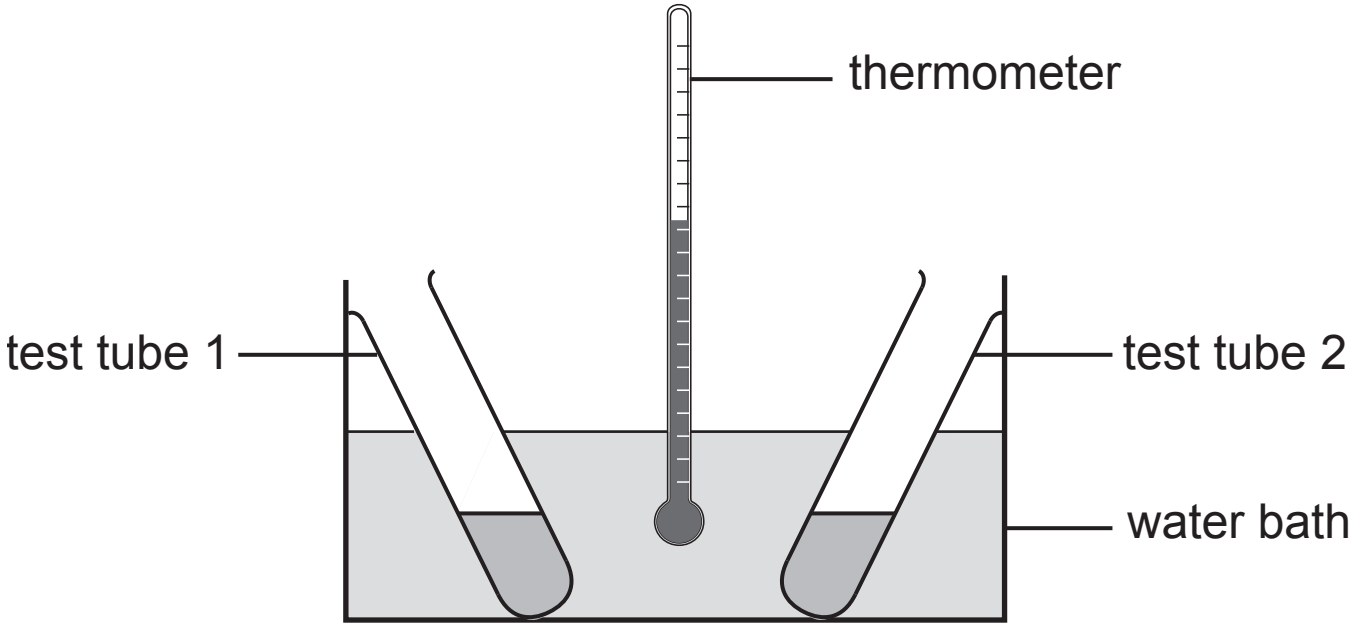
1. _____

2. _____

(b) Rory carried out an experiment to investigate how temperature affects the rate of breakdown of protein in milk by protease.

When all the protein in the milk is broken down by protease the milk turns colourless.

The diagram shows some of the apparatus Rory used in his experiment.



The diagram shows the test tubes at the start of the experiment.
The reaction occurred in test tube 1.
Test tube 2 was a control.

(i) Give **one** difference in the contents of test tubes 1 and 2 at the start of the experiment. [1 mark]

_____

_____

Rory carried out the experiment at five different temperatures.

The table shows his results.

Temperature/°C	Time for completion of the reaction/min
20	25
30	15
40	5
50	10
80	still not completed after 60 minutes

(ii) Name **one** other piece of apparatus, not shown in the diagram on page 21, that Rory used to obtain his results. [1 mark]

_____

(iii) Give **one** factor he would have kept constant in the experiment. [1 mark]

_____

(iv) How could he tell when the reaction was complete? [1 mark]

_____

(v) At what temperature did the protease work best? [1 mark]

_____ °C

(vi) The experiment could be improved to find a more accurate value for the temperature protease works best at.
Suggest how. [2 marks]

_____

_____

_____

(c) Use your knowledge of enzymes to explain the result at 80 °C. [3 marks]

_____

_____

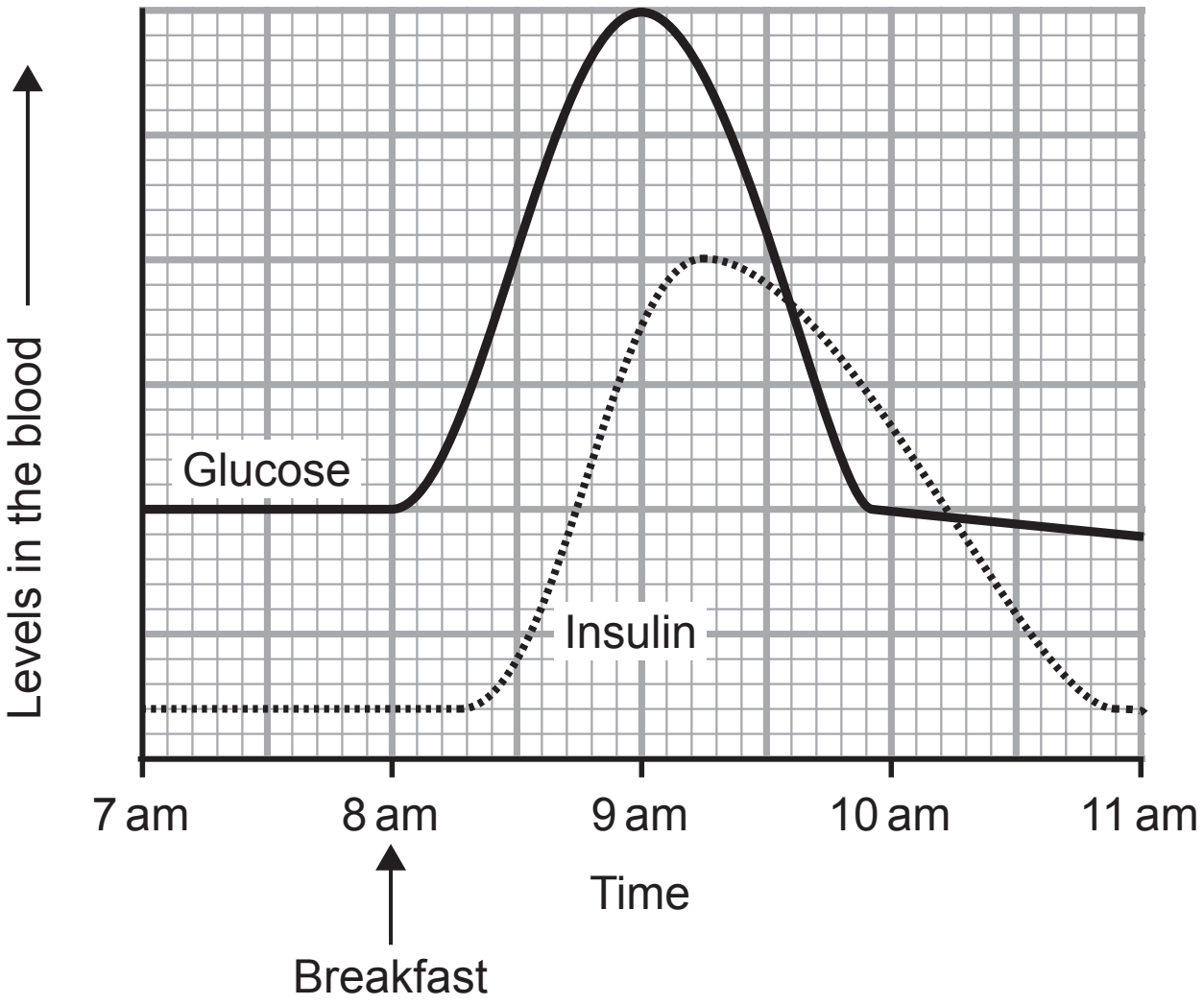
_____

_____

_____

_____

8 The graph shows the levels of glucose and insulin in a person's blood between 7 am and 11 am.



(a) Use the graph to explain the change in the **level of insulin** between 8 am and 11 am. [2 marks]

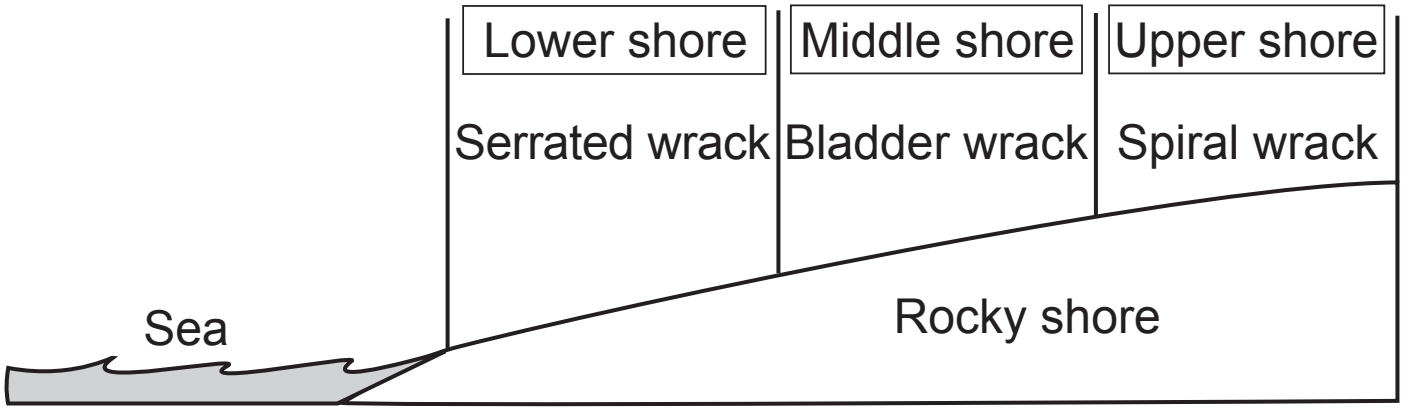
(b) Describe how insulin controls the **level of glucose** in the blood. [6 marks]

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

9 Seaweeds are adapted to living on different parts of a rocky shore.
As seaweeds (wracks) dry out they lose water causing their mass to decrease.

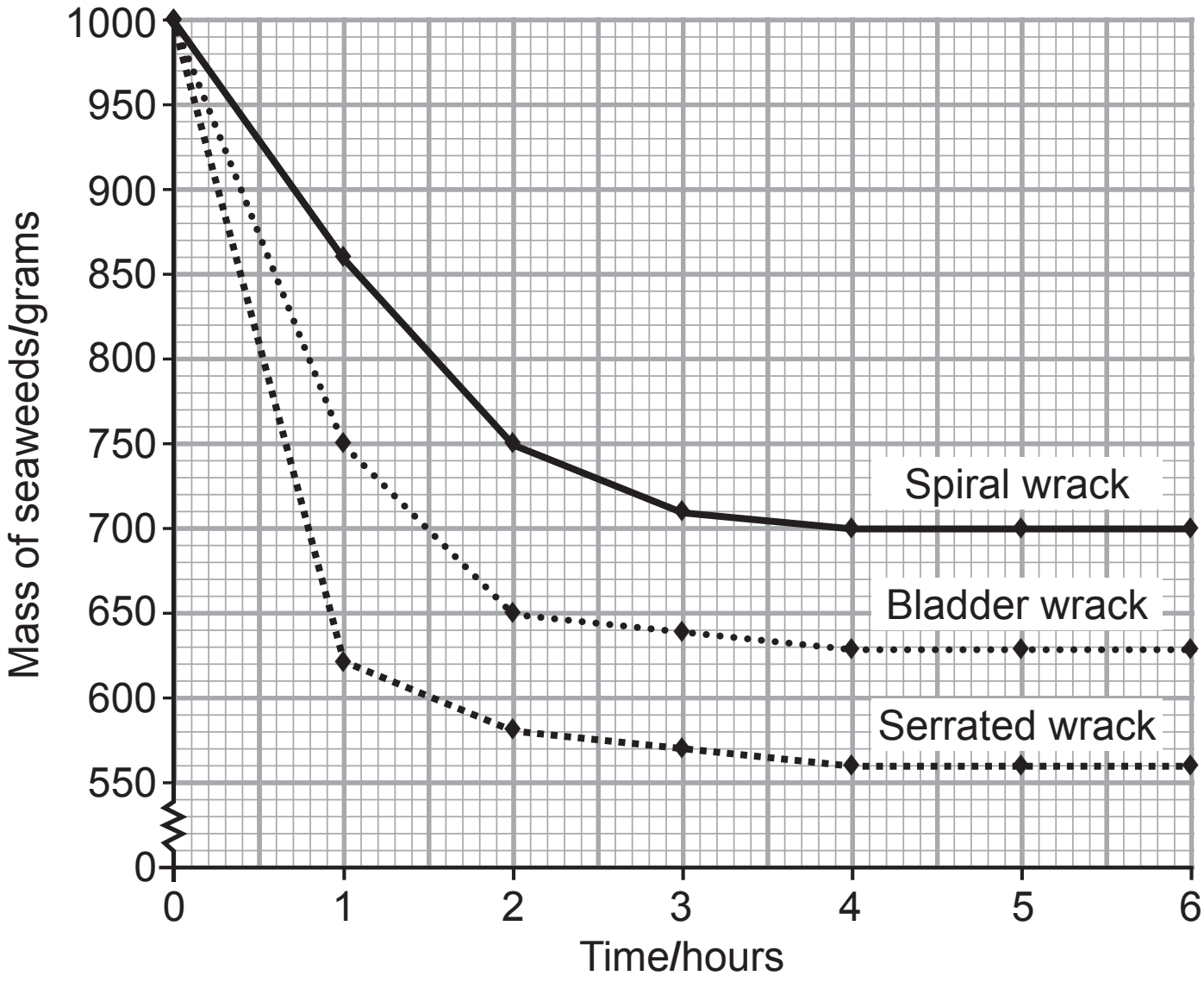
The upper shore is covered by sea water for a shorter time each day than the lower shore.

The diagram shows the areas of a rocky shore where three different seaweeds are found growing.



Students carried out an investigation to find out which of the three seaweeds dried out the least.
They collected 1000 grams of each seaweed and dried them over six hours.
They weighed the seaweeds every hour.

The graph shows the results.



(a) Use the information given and the graph above to answer the following questions.

(i) Name the seaweed which has dried out the least after six hours. [1 mark]

_____

(ii) Use data to support your answer. [2 marks]

_____

_____

_____

_____

(iii) Suggest **two** reasons why the seaweed **needs** to be adapted so that it dries out the least of the three seaweeds. [2 marks]

1. _____

_____

2. _____

_____

Seaweeds produce a substance called mucus. This covers their surface and helps prevent the seaweeds drying out when not covered with sea water.
Serrated wrack produces the least amount of mucus.

(b) Use the diagram and the information on the rocky shore on page 26 to suggest why. [2 marks]

_____

_____

_____

_____

THIS IS THE END OF THE QUESTION PAPER

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Q6. . . . . *Source: Principal Examiner*
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Q8. . . . . *Source: Principal Examiner*
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Question Number	**Marks**
1	
2	
3	
4	
5	
6	
7	
8	
9	
Total Marks	