



Centre Number

71

Candidate Number

General Certificate of Secondary Education  
2013–2014

## Double Award Science: Biology

Unit B1

Higher Tier

[GSD12]

ML

WEDNESDAY 13 NOVEMBER 2013, AFTERNOON

### 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 down the right-hand side of pages indicate the marks awarded to each question or part question.

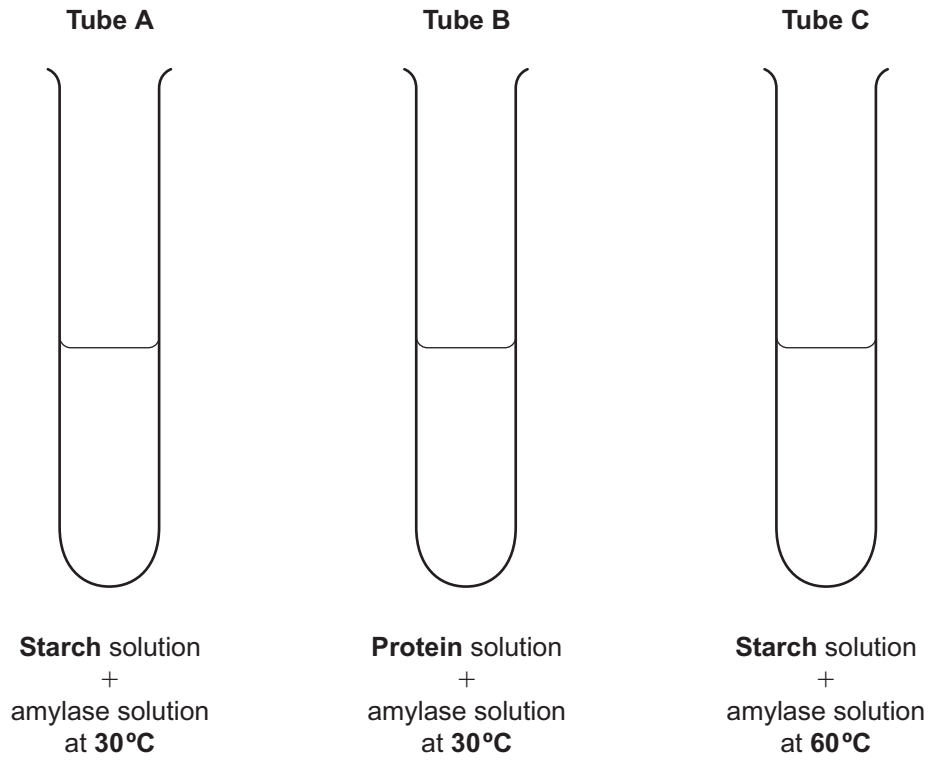
Quality of written communication will be assessed in Questions **3** and **6(c)**.

For Examiner's  
use only

Question Number	Marks
1	
2	
3	
4	
5	
6	
7	

Total  
Marks

1 Look at the diagram below. It shows an investigation into the action of the enzyme amylase.



Samples were taken from the tubes at the start of the experiment and again after 60 minutes. The samples were tested with iodine solution.

Iodine solution is yellow-brown. It changes to blue-black in the presence of starch.

Look at the table below. It shows the results of the tests on the samples.

Tube	Colour of tube contents	
	At start	After 60 minutes
<b>A</b>	Blue-black	Yellow-brown
<b>B</b>	Yellow-brown	Yellow-brown
<b>C</b>	Blue-black	Blue-black

(a) Explain why the iodine solution remained yellow-brown when added to tube **B** at the start.

\_\_\_\_\_ [1]

(b) Explain the difference between the results for tube **A** and tube **C** after 60 minutes.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ [4]

(c) Write down the name of the model that explains how enzymes work.

\_\_\_\_\_ [1]

Examiner Only	
Marks	Remark

2 (a) Look at the diagram. It shows the instructions for carrying out a starch test on a leaf.



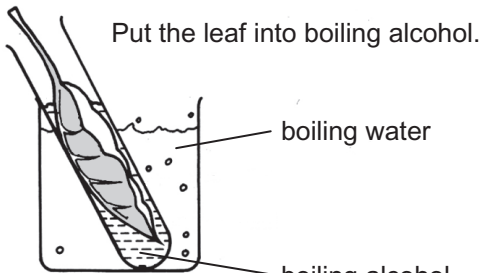
Remove a leaf from a plant kept in bright light for 24 hours.

**Step 1**

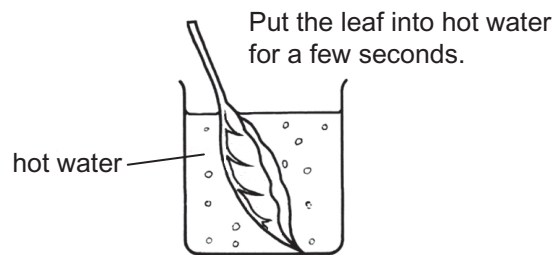


↑  
↑  
HEAT

**Step 2**

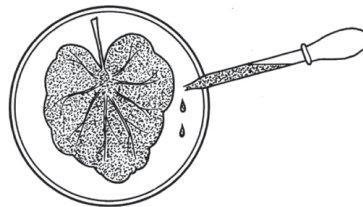


**Step 3**



**Step 4**

Add iodine solution to the leaf.



**Step 5**

Source: Principal Examiner











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4 Lichens are organisms that are sensitive to the amount of sulfur dioxide (air pollution) in the air.

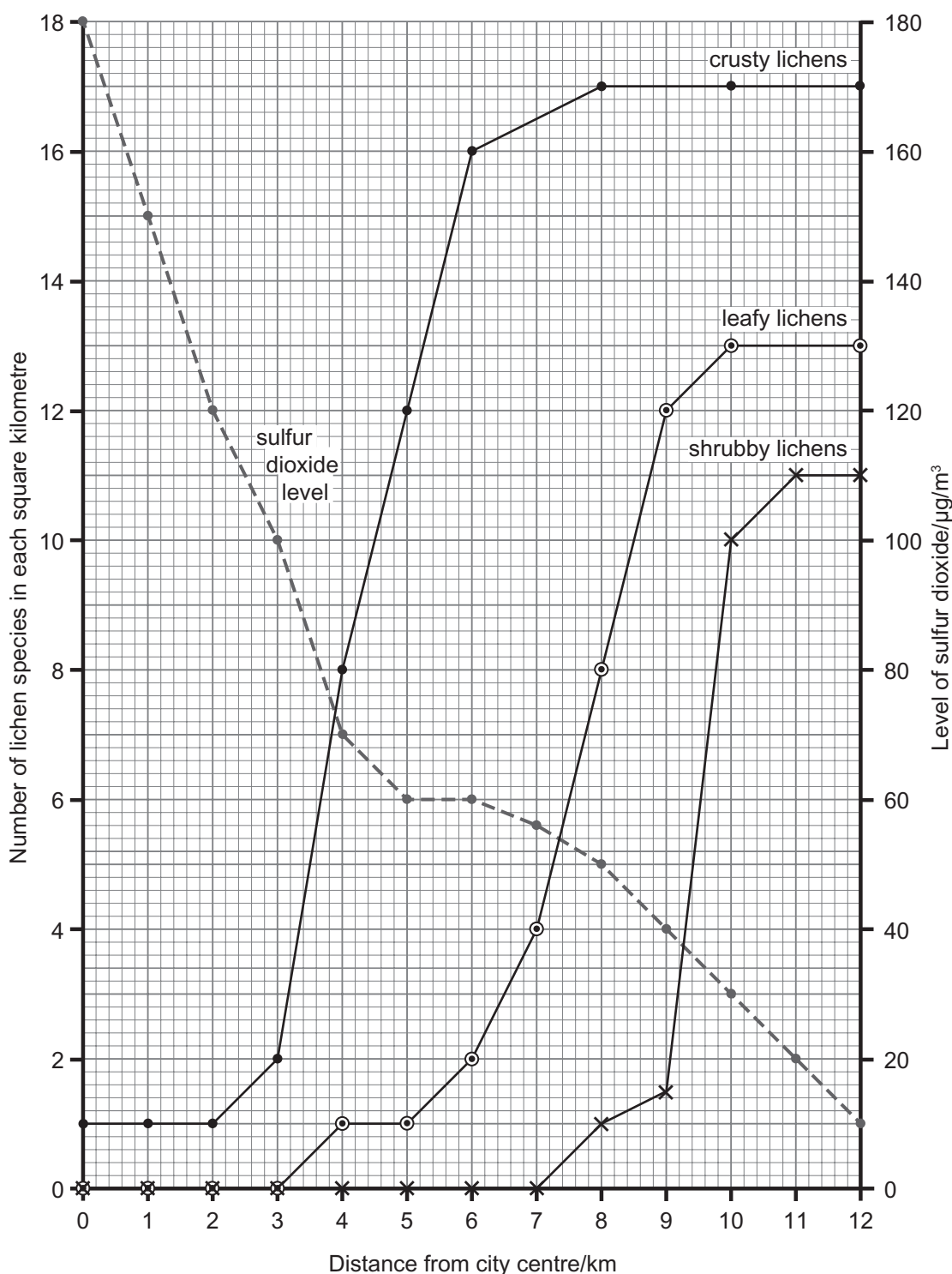
They are used as indicator species for air pollution.

Air pollution is generally higher in city centres than in the countryside.

Lichen species can be classified into three types, **crusty**, **leafy** or **shrubby**.

The graph below shows the number of crusty, leafy and shrubby lichen species at different distances from a city centre.

The graph below also shows the level of sulfur dioxide recorded at different distances from the city centre.





(e) Sulfur dioxide is released into the air when some fuels are burned.

Since the 1970s, sulfur dioxide levels have been falling in UK city centres.

(i) Write down **one** reason why sulfur dioxide levels have gone down since the 1970s.

\_\_\_\_\_ [1]

(ii) Write down why some types of lichen are still not found in the city centres.

\_\_\_\_\_ [1]

(f) Lichen is the name given to an association between an algae (plant) and a fungus.

The chlorophyll in the lichen is destroyed by high concentrations of sulfur dioxide.

Use this information and your knowledge to suggest how high concentrations of sulfur dioxide in the air result in the death of lichens.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ [2]

(g) Write down **one** reason why it is necessary to monitor the level of sulfur dioxide in the air.

\_\_\_\_\_ [1]

(h) Write down **one** advantage of using indicator species like lichens to monitor environmental changes.

\_\_\_\_\_ [1]

Examiner Only

Marks Remark

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(c) After eating a meal, the glucose level of the blood rises.

Describe how insulin brings the blood glucose level back to normal.

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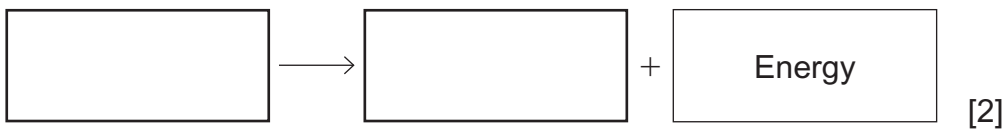
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[2]

(d) When oxygen is in short supply, muscles respire anaerobically.

Complete the word equation below for **anaerobic** respiration in muscle.

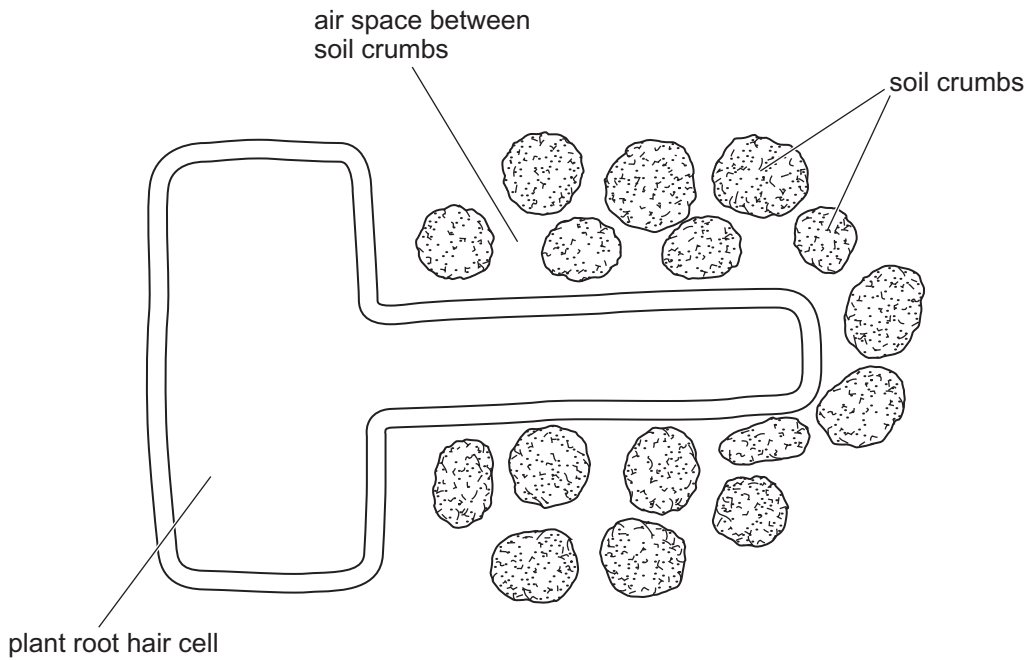


Examiner Only	
Marks	Remark

6 (a) Farmyard manure improves soil fertility and structure.

It acts as a glue, so that the soil particles, sand, silt and clay, are held together in structures called soil crumbs. This creates larger air spaces in the soil.

Look at the diagram below. It shows soil crumbs around a plant root hair cell.



(i) Use the information given to explain how the addition of farmyard manure can lead to increased active uptake in plants.

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[3]

Examiner Only	
Marks	Remark



(ii) Write down two advantages to a farmer of using farmyard manure rather than artificial fertilisers. Do not write about improving soil fertility and structure in your answer.

1. \_\_\_\_\_

\_\_\_\_\_

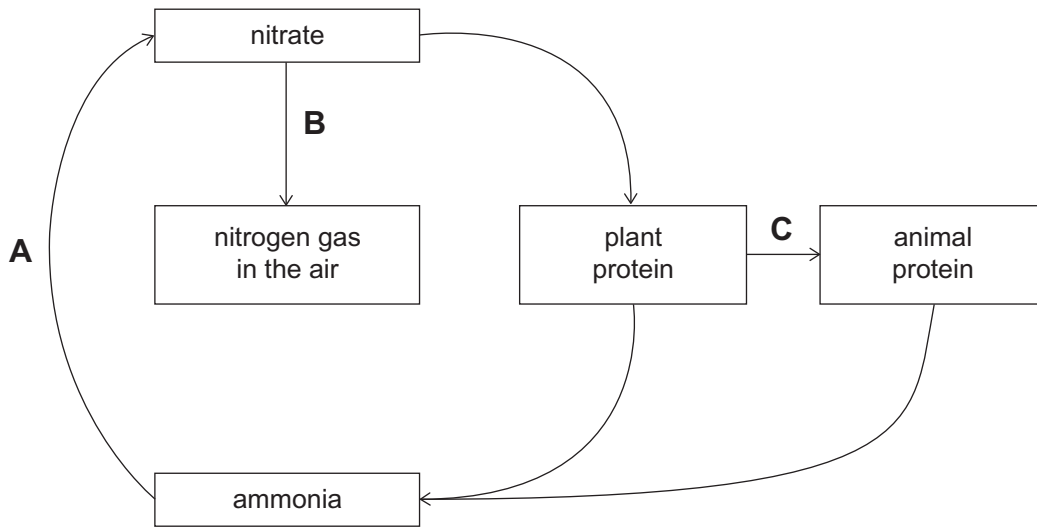
2. \_\_\_\_\_

\_\_\_\_\_ [2]

Examiner Only	
Marks	Remark

(b) Look at the diagram below. It shows a simplified nitrogen cycle.

The bacteria that carry out process **A** are aerobic and the bacteria that carry out process **B** are anaerobic.



Use the diagram and your knowledge to answer the questions below.

(i) Write down the names of processes **A** and **C**.

**A** \_\_\_\_\_

**C** \_\_\_\_\_

[2]

When a soil becomes waterlogged, the spaces between the soil crumbs fill with water and the soil contains less air (anaerobic conditions).

(ii) Use the diagram and your knowledge to explain why a waterlogged soil has reduced nitrate levels.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ [2]

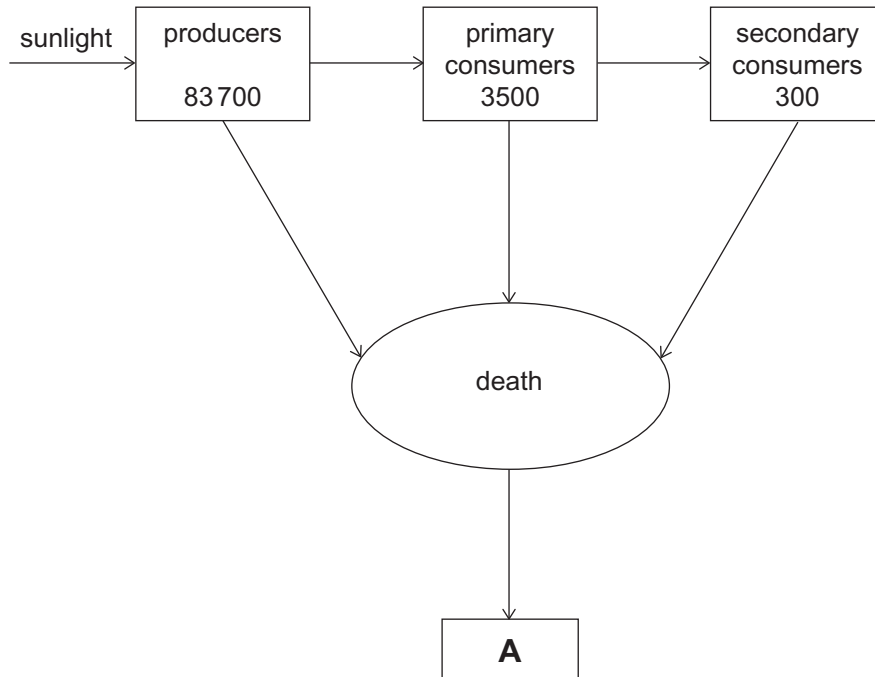
Examiner Only	
Marks	Remark





(c) Look at the diagram below. It shows the flow of energy through an ecosystem.

The figures in the boxes are  $\text{kJ/m}^2/\text{year}$ .



(i) Write down the name of the group of organisms represented by box **A**.

\_\_\_\_\_

[1]

(ii) Calculate the percentage of energy **lost** between primary consumers and secondary consumers.

Show your working out.

\_\_\_\_\_ % [3]

(iii) Write down two reasons why there is less energy available at the secondary consumer level compared to the primary consumer level. Do not write about the death of the primary consumers in your answer.

1. \_\_\_\_\_

2. \_\_\_\_\_ [2]

Examiner Only	
Marks	Remark

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**THIS IS THE END OF THE QUESTION PAPER**

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