



General Certificate of Secondary Education
2014–2015

Centre Number

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Candidate Number

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Double Award Science: Biology

Unit B1
Higher Tier



[GSD12]

TUESDAY 24 FEBRUARY 2015, MORNING

TIME

1 hour.

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 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 4 and 7.

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	

Total Marks	
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1 The drawing shows a corncrake.



© Sheila Terry / Science Photo Library

Read the following passage.

The world population of corncrakes has been estimated to be between 2–3 million **pairs**.

Line

1

Corncrakes spend the winter in Africa. They migrate northwards to arrive on their breeding grounds in Europe from early April onwards. They live and lay their eggs in long grass in open fields.

3

5

Adults and young birds return to Africa in August and September.

The bird was once common in Ireland, but in 2005 only 164 singing males were heard in the country. The fall in corncrake numbers in Ireland is mainly due to the earlier cutting of grass fields by farmers. Grass fields are now often cut for the first time in May. Large machines attached to tractors are used to cut the grass.

7

9

11

Grass fields are usually cut from the outer edges towards the centre of the field. In some areas in Ireland where corncrakes nest, government grants have been given to farmers to cut their fields starting from the centre going to the outer edges.

13

15

Examiner Only	
Marks	Remark
○	○

Use the information in the passage and your knowledge to answer the following questions.

- (a) What is the **maximum** estimated number of **individual** corncrakes in the world? (lines 1–2)

_____ million birds [1]

- (b) Explain why the corncrake is a rarely seen bird (line 5).

_____ [1]

- (c) Suggest two reasons why the earlier cutting of grass fields leads to a fall in corncrake numbers (lines 7–11).

1. _____

2. _____ [2]

- (d) Suggest why the numbers of corncrakes increase if farmers cut their grass fields from the centre outwards (lines 12–15).

_____ [1]

- (e) The corncrake is a chordate.
Give **one** feature of chordates.

_____ [1]

Examiner Only	
Marks	Remark

2 The digestive enzyme amylase is present in the mouth and small intestine.

(a) (i) Name the large food molecule that amylase breaks down to glucose.

[1]

(ii) The small intestine is adapted to absorb glucose. Give two ways it is adapted.

1. _____

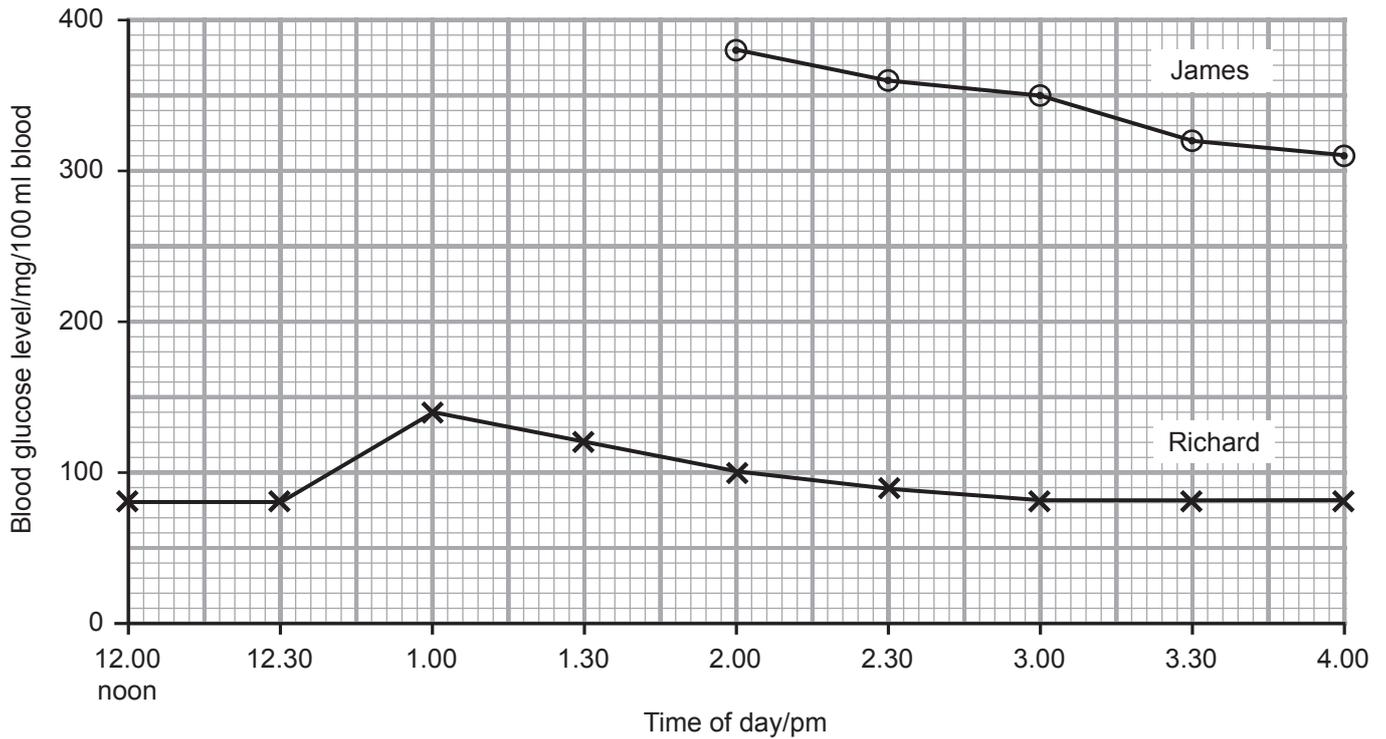
2. _____ [2]

The table shows the blood glucose levels for James and Richard before and after eating a meal containing mostly carbohydrates. The meal was eaten at 12.30 pm.

Time of day/pm	Blood glucose level/mg/100 ml blood	
	James	Richard
12.00 (noon)	190	80
12.30 (meal eaten)	180	80
1.00	250	140
1.30	390	120
2.00	380	100
2.30	360	90
3.00	350	80
3.30	320	80
4.00	310	80

Examiner Only	
Marks	Remark
○	○

(b) (i) Use the information in the table to complete the line graph for James on the grid below.



[2]

(ii) Use the graphs to state two ways that the trend for James is different from the trend for Richard.

1. _____

2. _____ [2]

(iii) Explain how Richard's blood glucose returns to its normal level.

 _____ [3]

(iv) James has diabetes.

Give two possible long term effects of diabetes.

1. _____

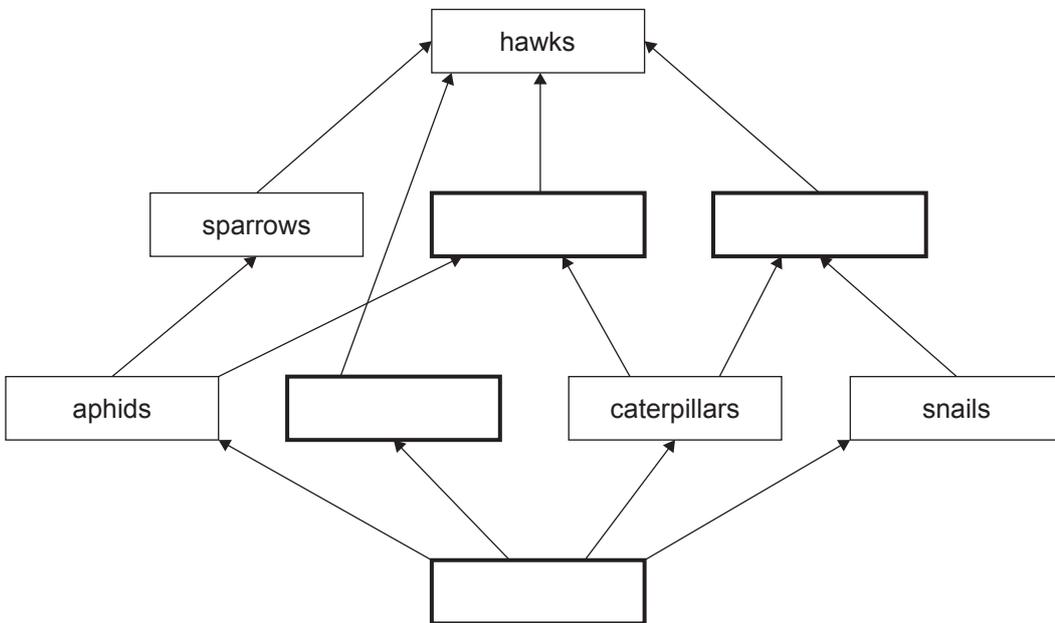
2. _____ [2]

Examiner Only	
Marks	Remark

3 The table shows the diets of some animals in a grassland.

Aphids, rabbits, caterpillars and snails eat plants
Sparrows eat aphids
Thrushes eat caterpillars and snails
Blue tits eat aphids and caterpillars
Hawks eat sparrows, rabbits, blue tits and thrushes

(a) Use the information in the table to fill in the boxes in the food web.



[3]

(b) (i) Name a producer.

[1]

(ii) Name an animal that is feeding at two trophic levels.

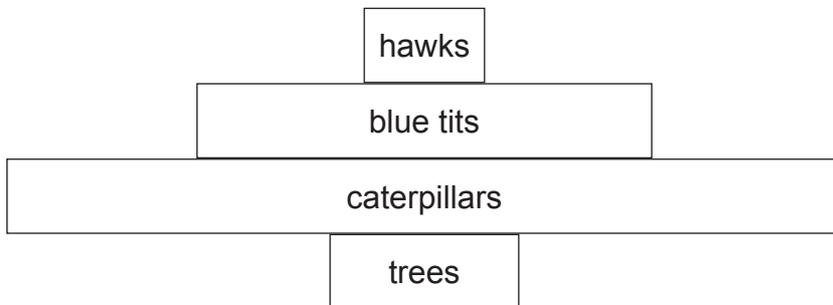
[1]

Examiner Only	
Marks	Remark
○	○

(c) Give **one** way that energy is lost between the sparrows and the hawks.

_____ [1]

(d) A pyramid of numbers for a woodland is shown.



Use this information to draw and label the pyramid of biomass for this woodland in the space.

[2]

Examiner Only	
Marks	Remark

5 In 1990, carbon dioxide emissions in Britain were 770 million tonnes.

In 2013, carbon dioxide emissions in Britain were 572 million tonnes.

- (a) Use the information given to calculate the percentage reduction in carbon dioxide emissions from 1990 to 2013.

Show your working.

_____ % [3]

- (b) Britain has reduced its carbon dioxide emissions, but global levels of this gas continue to rise.

Suggest why the levels continue to rise.

 _____ [1]

The government set a target to reduce carbon dioxide emissions by 50% by the year 2030.

- (c) For Britain to reach this target, there must be an increase in ways of producing electricity that reduce carbon dioxide emissions.

Suggest two ways of producing electricity that reduce carbon dioxide emissions.

1. _____
 2. _____ [2]

- (d) State two effects of high levels of carbon dioxide on the environment.

1. _____
 2. _____ [2]

Examiner Only	
Marks	Remark
○	○

6 Plants take up nitrates from the soil using root hair cells.

(a) Give **one** use of nitrates in plants.

[1]

(b) Describe and explain how the structure of a root hair cell is adapted for the uptake of nitrates.

 _____ [2]

Examiner Only	
Marks	Remark
○	○

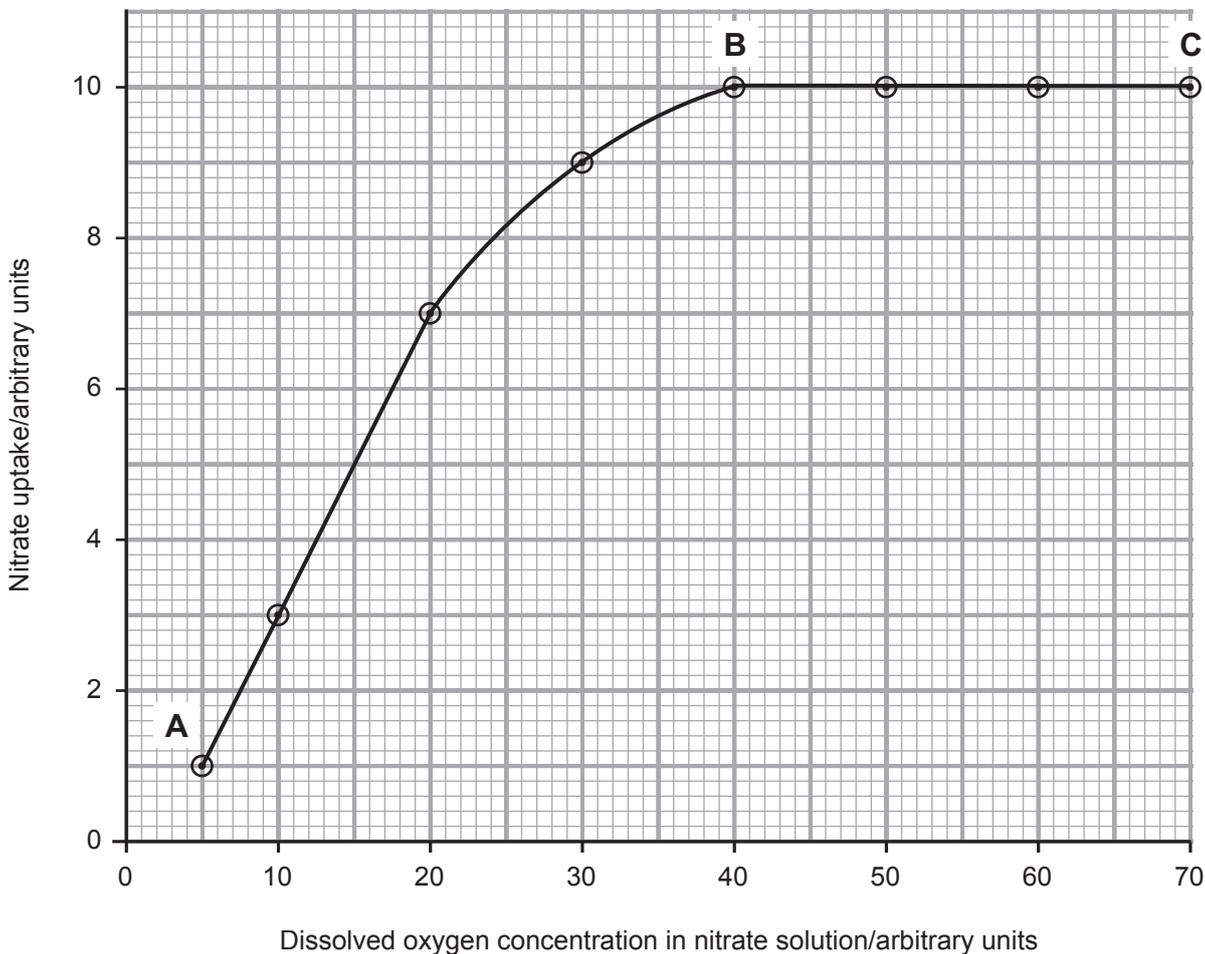
Barley seedlings were grown in test tubes containing nitrate solution.

(c) An experiment was set up to investigate the effect of dissolved oxygen on the uptake of nitrates by these seedlings.

Oxygen was bubbled through the nitrate solution.

The amount of nitrate taken up by the barley seedlings was measured.

The results of the investigation are shown in the graph.



- 8 A farmer set up an experiment to find the effect of increasing the number of carrot seedlings/m² on carrot growth.

The table shows the results after four months growth.

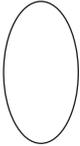
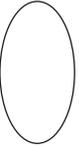
Number of carrot seedlings/m ²	Average carrot mass/g
100	40
200	21
300	13

- (a) Describe the effect of increasing the number of carrot seedlings/m² on average carrot mass.

_____ [1]

- (b) Explain the results of this experiment.

_____ [3]

Examiner Only	
Marks	Remark
	

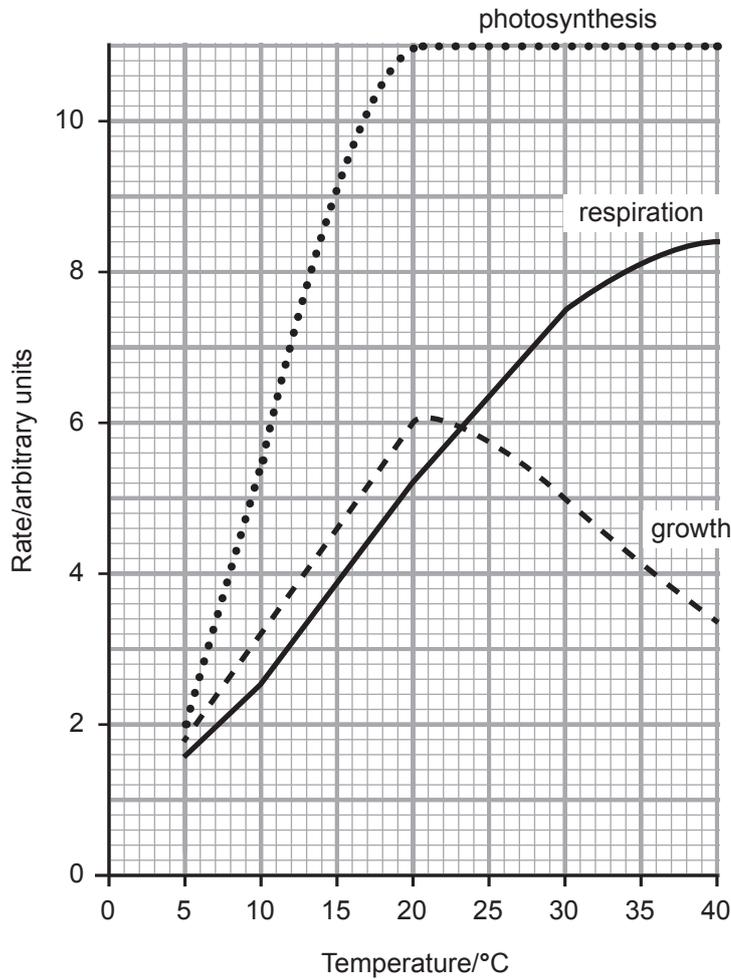
- 9 (a) A plant shoot bends towards the light when light shines on it from one side only.

This response is called phototropism.

Explain how this response occurs.

[3]

The graph shows the effect of temperature on the rates of photosynthesis, respiration and growth in plants.



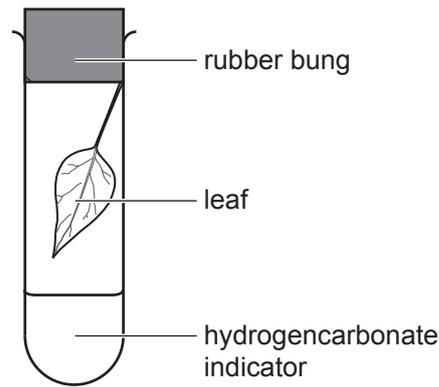
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Marks	Remark
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(b) Use the graph and your knowledge of photosynthesis and respiration to explain why the rate of growth decreases above 20 °C.

[3]

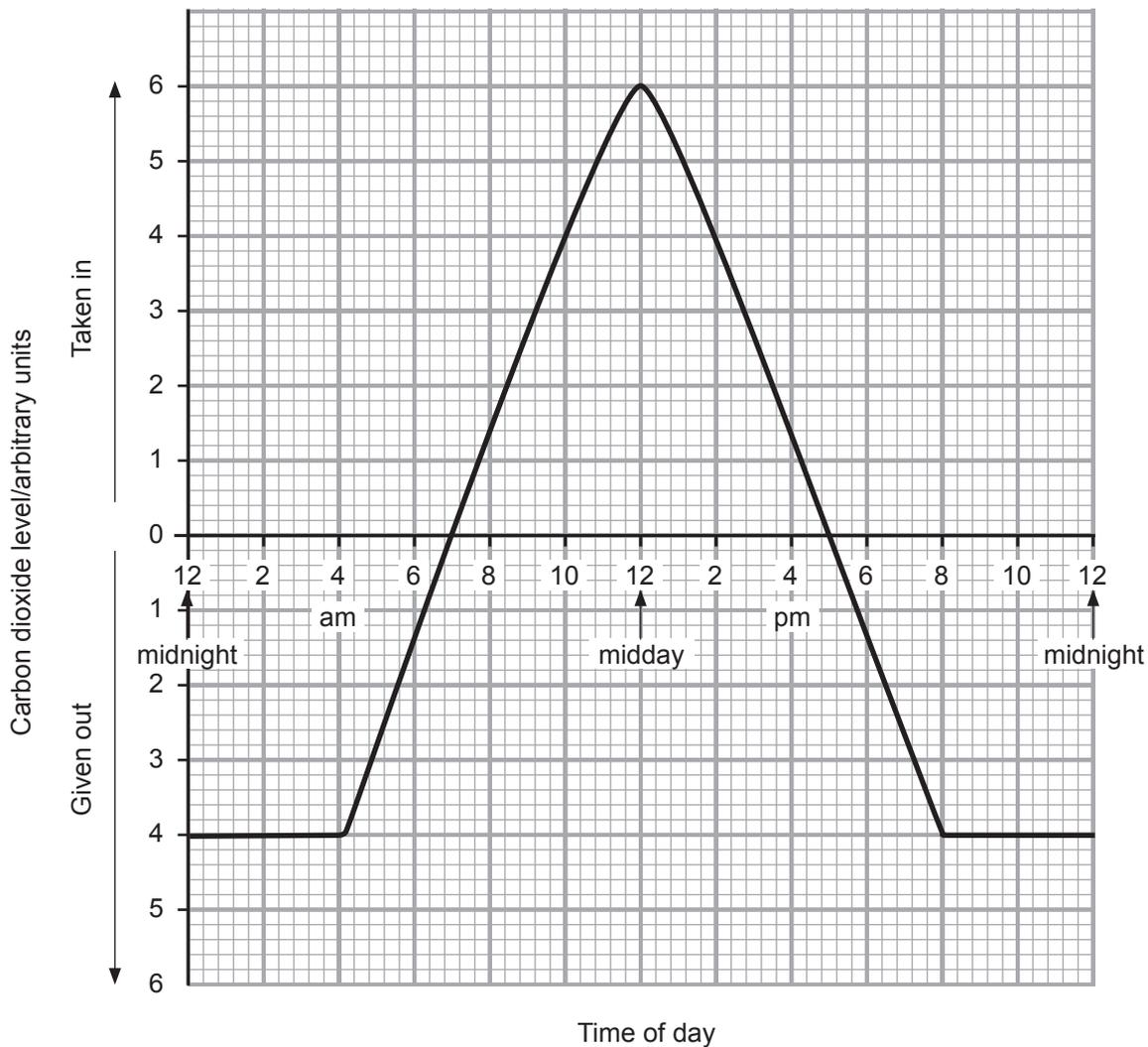
Examiner Only	
Marks	Remark

(c) The diagram shows a leaf placed in a sealed test tube containing hydrogencarbonate indicator.



Source: Chief Examiner

The graph shows the carbon dioxide taken in and given out by this leaf during a summer's day.



Examiner Only	
Marks	Remark
○	○

Use the graph and your knowledge of photosynthesis and respiration to complete the table.

- Give the colour of the hydrogencarbonate indicator at midday
- Give a reason to explain the colour of the indicator at each time.

Examiner Only	
Marks	Remark

Time	Colour of hydrogen carbonate indicator	Reason to explain colour of hydrogencarbonate indicator
2 am	Yellow	
12 midday		
5 pm	Red	

[4]

THIS IS THE END OF THE QUESTION PAPER

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