

	Centre Number				
Ca	ndida	te Nu	mber		
Ca	ndida	te Nu	mber		

General Certificate of Secondary Education 2014–2015

Double Award Science: Biology

Unit B1 Higher Tier



[GSD12] TUESDAY 24 FEBRUARY 2015, 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 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	

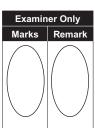
1 The drawing shows a corncrake.



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Read the following passage.

	Line
The world population of corncrakes has been estimated to be between 2 and 3 million pairs .	1
Corncrakes spend the winter in Africa. They migrate northwards to arrive at their breeding grounds in Europe from early April onwards.	3
They live and lay their eggs in long grass in open fields.	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	7
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	9
machines attached to tractors are used to cut the grass.	11
Grass fields are usually cut from the outer edges towards the centre of the field. In some areas in Ireland where corncrakes nest,	13
government grants have been given to farmers to cut their fields	
starting from the centre going to the outer edges.	15



	e the information in the passage and your knowledge to answer following questions.	Examiner Only Marks Remark
(a)	What is the maximum estimated number of individual corncrakes the world? (lines 1–2)	s in
	million birds	s [1]
(b)	Explain why the corncrake is a bird that is rarely seen (line 5).	
		_ [1]
(c)	Give two reasons why the earlier cutting of grass fields leads to a fall in corncrake numbers (lines 7–11).	
	1	
	2	_ [2]
(d)	Why do the numbers of corncrakes increase if farmers cut their grass fields from the centre outwards (lines 12–15)?	
(e)	The corncrake is a chordate. Give one feature of chordates.	
		_ [1]

- 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]
		L'.

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

1.				

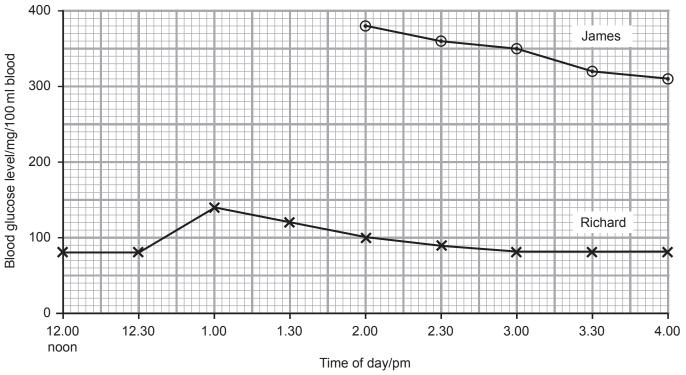
The table shows the blood glucose levels for James and Richard before and after eating a meal containing mostly carbohydrates. The meal was eaten at 12.30 pm.

Time of day/am	Blood glucose leve	el/mg/100 ml blood
Time of day/pm	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

Ex Mai	amin	nly nark

[2]

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



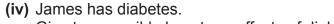
(ii)	Look at the graphs. Give two ways that the trend for James is
	different from the trend for Richard.

1. _____

2. ______[2]

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

_____[3]



Give two possible long term effects of diabetes.

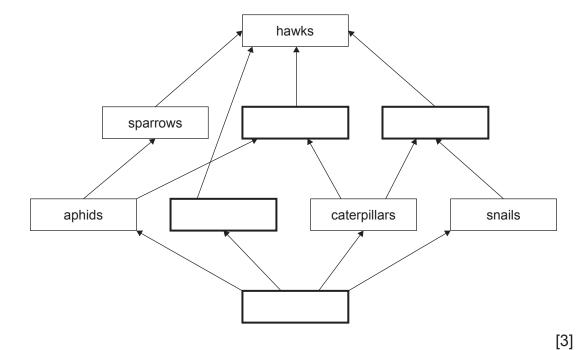
1. _____

2. ______[2]

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.

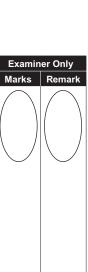


(b) ((i)	Name	а	producer.
١	ν,	, ,		, manic	ч	producer.

_____[1]

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

______[1]



(c)	Give one way that energy is lost between the sparrows and the hawks.	_ [1]	Examiner Only Marks Remark
(4)	A pyramid of numbers for a woodland is shown.		
(u)	A pyramid of humbers for a woodiand is shown.		
	hawks		
	blue tits		
	caterpillars		
	trees		
	e this information to draw and label the pyramid of biomass for this odland in the space below.	[2]	

Benedict's reagent is used to test for the presence of sugar (glucose food.	e) in	Examiner Only Marks Rema
The intensity (strength) of the colour of Benedict's reagent at the end the test indicates the amount of sugar (glucose) present.	d of	
Paula planned an investigation to compare the amount of sugar (gluin two types of biscuit.	ıcose)	
Describe the method Paula used to carry out her investigation.		
State two variables she would have controlled.		
Describe the results she would expect if one biscuit contained m sugar (glucose) than the other biscuit.	iore	
In this question you will be assessed on your written communic skills, including the use of specialist scientific terms.	ation	
	[6]	

In 1990, carbon dioxide emissions in Britain were 770 million tonnes.	Examiner Only
In 2013, carbon dioxide emissions in Britain were 572 million tonnes.	Marks Remar
(a) Use the information given to calculate the percentage reduction in carbon dioxide emissions from 1990 to 2013.	
Show your working out.	
% [3]	
(b) Britain has reduced its carbon dioxide emissions, but global levels of this gas continue to rise.	
Why do 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 more ways of producing electricity that reduce carbon dioxide emissions.	
Give 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]	

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

(a)	Give o	ne use	of nitrates	in	plants.
-----	--------	--------	-------------	----	---------

[1]

Examiner Only Marks Rema

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

[0]		

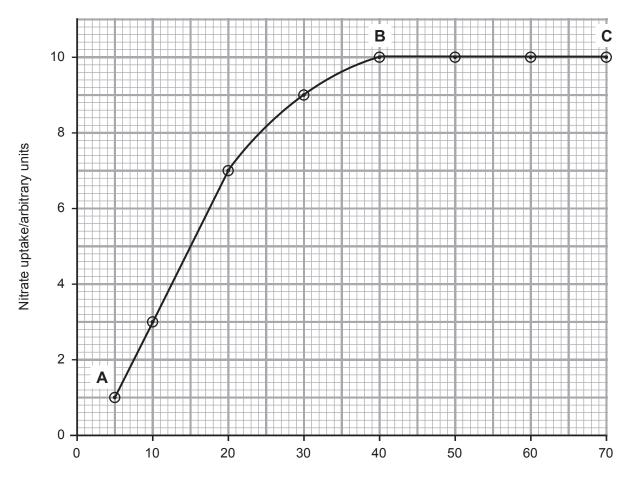
Barley seedlings were grown in test tubes containing nitrate solution.

(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.



Dissolved oxygen concentration in nitrate solution/arbitrary units

(i)	State two variables that should be controlled in the experiment.	Examin Marks	er Only Remark
	1		
	2 [2]		
(ii)	Describe and explain the change in nitrate uptake between points A and B .		
	[4]		
(iii)	Explain why the nitrate uptake levels off between points B and C .		
	[1]		

Earthworms burrow through the soil creating air spaces. They eat leaves and farmyard manure. They pass out undigested material into the soil. This forms humus which is broken down by decomposers into ammonium compounds.	Marks	ner Only Remark
Use this information and your knowledge of the nitrogen cycle to explain how earthworms increase nitrate levels in the soil.		
In this question you will be assessed on your written communication skills, including the use of specialist scientific terms.	n	
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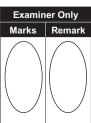
7

8	A farmer set up an experiment to find the effect of increasing the number
	of carrot seedlings/m ² 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/m ² or average carrot mass.		
		[1	
(b)	Explain the results of this experiment.		
		[3	

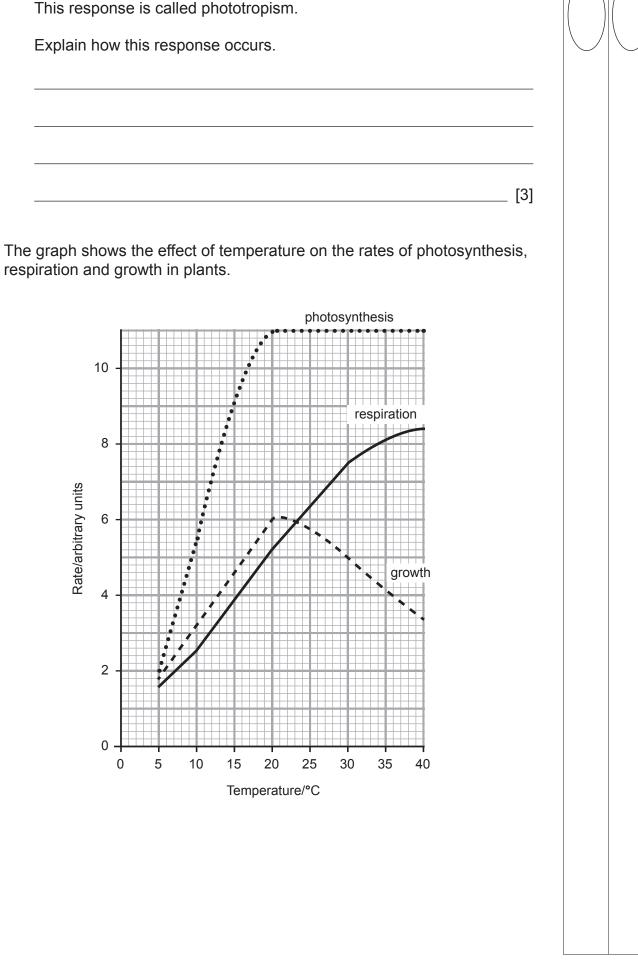


9	(a)	A plant shoot bends towards the light when light shines on it from one
		side only.

Examiner Only Marks Remark

This response is called phototropism.

respiration and growth in plants.

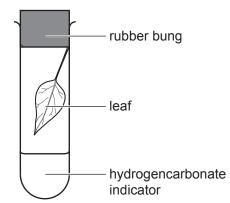


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_			
_			
3]	[3]		

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

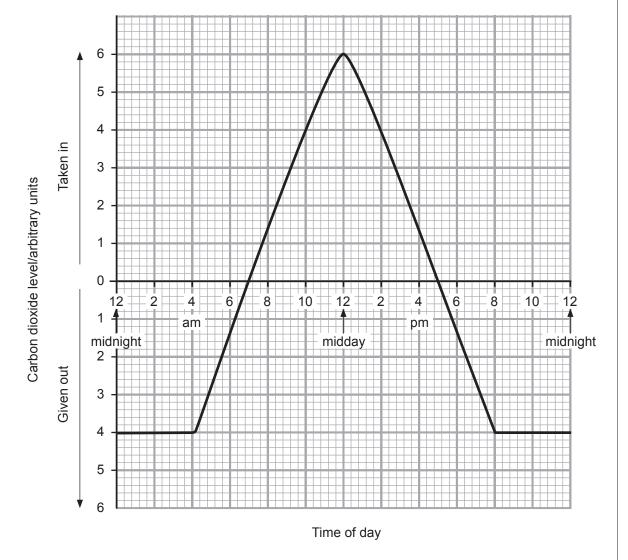
Examiner Only

Marks Remark



Source: Chief Examiner

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



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

Examiner Only				
Remark				

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

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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