CCEA GCSE DOUBLE AWARD SCIENCE

SCIENCE



EXAM QUESTION PACK

BIOLOGY UNIT B1 FOUNDATION TIER GSD11 PAPERS

STEMUP

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Rewarding Learning

General Certificate of Secondary Education
2016–2017

Double Award Science: Biology

Unit B1

Foundation Tier

[GSD11]

WEDNESDAY 9 NOVEMBER 2016, MORNING

MARK SCHEME

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General Marking Instructions

Introduction

Mark schemes are published to assist teachers and students in their preparation for examinations. Through the mark schemes teachers and students will be able to see what examiners are looking for in response to questions and exactly where the marks have been awarded. The publishing of the mark schemes may help to show that examiners are not concerned about finding out what a student does not know but rather with rewarding students for what they do know.

The Purpose of Mark Schemes

Examination papers are set and revised by teams of examiners and revisers appointed by the Council. The teams of examiners and revisers include experienced teachers who are familiar with the level and standards expected of students in schools and colleges.

The job of the examiners is to set the questions and the mark schemes; and the job of the revisers is to review the questions and mark schemes commenting on a large range of issues about which they must be satisfied before the question papers and mark schemes are finalised.

The questions and the mark schemes are developed in association with each other so that the issues of differentiation and positive achievement can be addressed right from the start. Mark schemes, therefore, are regarded as part of an integral process which begins with the setting of questions and ends with the marking of the examination.

The main purpose of the mark scheme is to provide a uniform basis for the marking process so that all the markers are following exactly the same instructions and making the same judgements in so far as this is possible. Before marking begins a standardising meeting is held where all the markers are briefed using the mark scheme and samples of the students' work in the form of scripts. Consideration is also given at this stage to any comments on the operational papers received from teachers and their organisations. During this meeting, and up to and including the end of the marking, there is provision for amendments to be made to the mark scheme. What is published represents this final form of the mark scheme.

It is important to recognise that in some cases there may well be other correct responses which are equally acceptable to those published: the mark scheme can only cover those responses which emerged in the examination. There may also be instances where certain judgements may have to be left to the experience of the examiner, for example, where there is no absolute correct response – all teachers will be familiar with making such judgements.

					AVAILABLE MARKS
1	DCPIP; blue to colourless/blue to pink to colourless; **not** blue → pink protein; blue to purple; sugar/glucose; Benedict's			[6]	6
2	**(a)**	**(i)**	low fitness	[1]	
		(ii)	Any **two** from: high blood pressure; high cholesterol; diabetes	[2]	
		(iii)	1st mark: 4% from graph 2nd mark: 27 000 or $\left(\frac{54\,000}{2}\right)$ 3rd mark: ÷ 100 × 27 000/1080 correct answer = [3] marks	[3]	
	(b)		high blood glucose/sugar/glucose in the urine/lethargy/thirst drinking lots of water/frequent toileting	[1]	
	(c)		• lack of time to exercise • smoking difficult to stop/don't want to stop • difficult to change diet/don't want to change diet • don't care/don't believe results • study is in America • already taking medication/HBP/cholesterol/diabetes • don't think they have the risk factor (or named)	[1]	8
3	**(a)**	**(i)**	killl the leaf/stop the reactions	[1]	
		(ii)	remove chlorophyll/remove green colour	[1]	
		(iii)	alcohol is flammable	[1]	
		(iv)	green part/**centre** of leaf → **blue-black** or black on its own; white/**outer** part of leaf → **yellow/brown**; no chlorophyll/no chloroplasts in the white part/or chloroplasts in green part/ chlorophyll only in middle/starch found in green (centre) part but not white (edges)	[3]	
	(b)	**(i)**	0.07/0.069; maximum photosynthesis for least carbon dioxide/any additional carbon dioxide is a waste/tomatoes won't P.S. more/rate won't increase more/P.S. won't happen faster	[2]	
		(ii)	cost of adding carbon dioxide/whether make enough money to cover CO_2 cost/enough profit	[1]	9

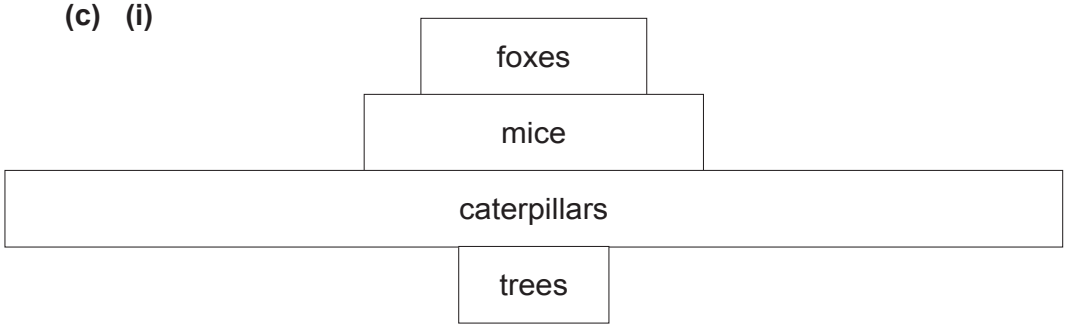
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	AVAILABLE MARKS

4 **(a)** trees → caterpillars → mice → foxes
[1] for organisms in correct order;
[1] for arrows correct direction [2]

(b) mice [1]

(c) **(i)**



[1] for bottom box trees smaller than caterpillars box and labelled;
[1] for foxes above mice and smaller box for foxes and labelled; [2]

(ii) add fleas at top and bigger box [1]

(d) Any **two** from:
heat/respiration; **not**: digestion on own/eating/not all mice are eaten
movement;
excretion/egestion/waste materials/incomplete digestion;
reproduction;
uneaten structures; [2]

(e) **(i)** 100 + 4 – 60 – 20 or 104 – 80;
+ 24;
200 + 24 = 224;
correct answer, award [3] marks [3]

(ii) old age/disease/lack of food/more foxes/eaten by foxes/cold/predators/too hot or cold/extreme weather
not weather changes on own [1] 12

5 **(a)** Any **three** from:
put down transect line/tape/string/belt transect/line/described;
use quadrat;
at different distances/placing of quadrats front to back of dunes/sampling across the dunes;
measure % cover marram grass in each quadrat/measure marram grass in quadrat; [3]

(b) **(i)** increases then decreases/increases then exception/anomaly at 40 [1]

(ii) salt content 2.5;
pH 8.1; [2]

(c) pH paper/pH probe or pH sensor/soil testing kit/universal indicator/pH meter/pH indicator [1]

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AVAILABLE MARKS
8

(d) animals or named, e.g. snails eating marram grass/disease/ competition (from other species)/organisms that feed on the marram grass/ humans/predators/insects [1]

6 **(a)** Accept:

- one Petri dish into box; } Petri dish; with lamp
- shine lamp from one side } from one side
- take 2nd Petri dish;
- shine light from above/put into box with opening only at the top;
- carry out for a set time/specific time given;
- record results

Band	Response	Mark
A	Candidates use appropriate terms throughout to give at least five points from the indicative content. They use good spelling, punctuation and grammar skills. Form and style are of a high standard.	[5]–[6]
B	Candidates use appropriate terms throughout to give at least three or four points from the indicative content. They use satisfactory spelling, punctuation and grammar. Form and style are of a satisfactory standard.	[3]–[4]
C	Candidates use appropriate terms throughout to give 1 or 2 points from the indicative content. They use limited spelling, punctuation and grammar and have made little use of specialist terms.	[1]–[2]
D	Response not worthy of credit.	[0]

[6]

(b) seedlings grow straight up with light from above;
seedlings in box grow to side with the hole/or to where light coming from; [2]
one bent to light and other straight = [1]

(c) Any **two** from:

- type/variety/species/number/size of seedling;
- time;
- distance of lamp from seedlings/light intensity/bulbs/brightness;
- temperature/heat
- water [2]

(d) **(i)** tip [1]

(ii) auxin [1]

12

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					AVAILABLE MARKS
7	(a)	(i)	Accept: 1st mark: lignin; 2nd and 3rd mark: can be 'comparison + 1 data' or '2 data' **comparison** most/more remaining (after 15 weeks) than starch/cellulose **or** starch/cellulose have much less remaining (after 15 weeks) **or** only starts to be broken down after 10 weeks/only starts to break down at 15 weeks **data** lignin: 90% remaining after 15 weeks 10% broken down after 15 weeks starch: 90% broken down at 15 weeks 10% remaining after 15 weeks 80% more starch (than lignin) broken down at 15 weeks cellulose: 40% broken down by 15 weeks 60% remaining after 15 weeks 30% more remains after 15 weeks	[3]	
		(ii)	type 2	[1]	
		(iii)	90/60/30 = 1 mark; 6 = 2 marks;	[2]	
		(iv)	glucose **not** sugar	[1]	
	(b)	(i)	root hair (cells)	[1]	
		(ii)	water/H_2O	[1]	
		(iii)	amino acids/proteins	[1]	
	(c)	(i)	Any **three** from: long; folds; villi; microvilli;	[3]	
		(ii)	Any **two** from: short diffusion distance/thin/one cell thick/thin wall/thin lining **not** cell wall permeable; moist; good blood supply/diffusion gradient/described blood supply, e.g. good network of capillaries;	[2]	
				Total	15
					70

Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2015–2016

Double Award Science: Biology

Unit B1

Foundation Tier

[GSD11]

GSD11

TUESDAY 17 MAY 2016, AFTERNOON

TIME

1 hour.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
You must answer the questions in the spaces provided.
Do not write outside the boxed area on each page or on blank pages.
Complete in blue or black ink only. **Do not write with a gel pen.**
Answer **all eight** 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 Question **8(b)**.

10175

1 Diabetes is a condition in which the body cannot control blood glucose levels. Diabetes can have long-term effects.

(a) Choose **two** possible long-term effects of diabetes from the list.

loss of hearing	**kidney failure**	**eye damage**	**thirst**

1. _____

2. _____ [2]

(b) The increase in the percentage of people with diabetes in the countries of the United Kingdom between 2007 and 2012 is given in the table.

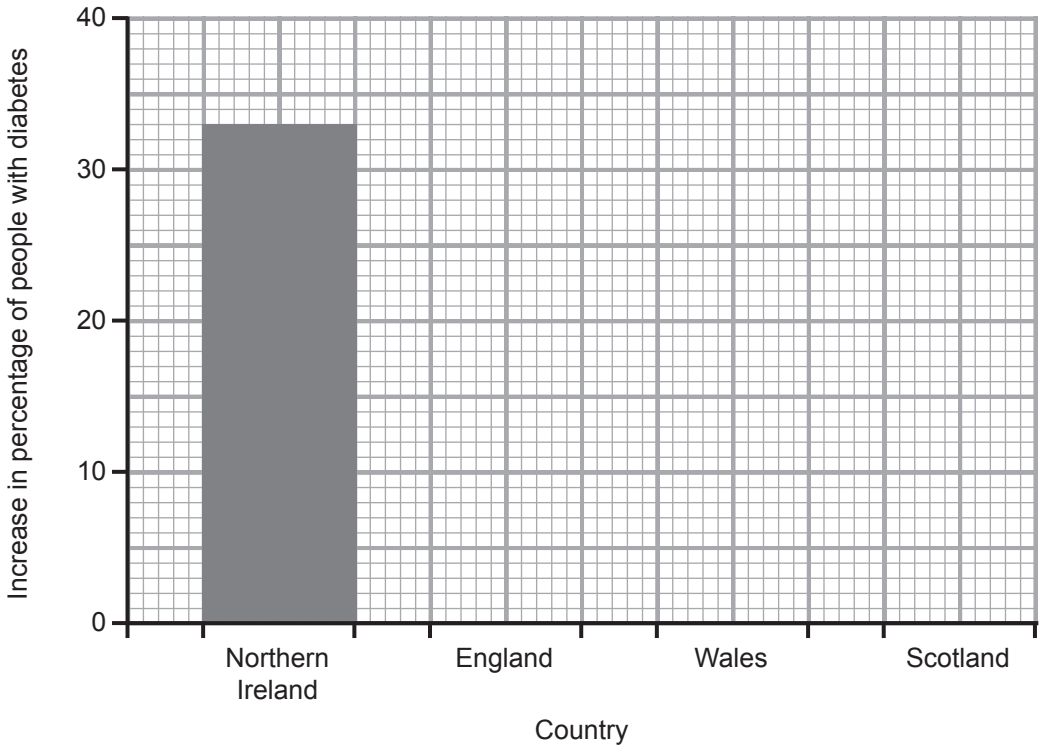
Country	Increase in percentage of people with diabetes between 2007 and 2012
Northern Ireland	33
England	25
Wales	20
Scotland	18

Source: Diabetes UK

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(i) Use the data in the table opposite to complete the bar chart.

The data for Northern Ireland has been plotted.



[3]

(ii) Suggest **two** reasons for the increase in diabetes in all the countries of the United Kingdom.

1. _____

2. _____ [2]

Glucose is needed in cells for respiration.

(c) Complete the word equation for respiration by writing in the boxes.

glucose	+		→		+		+	energy

[3]

[Turn over

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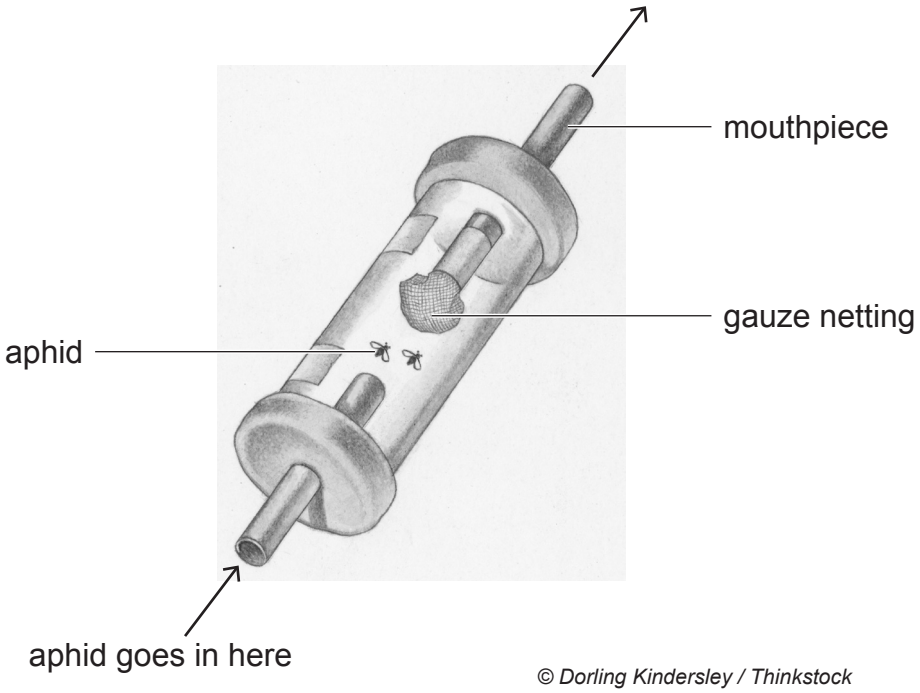
2 **(a)** The table gives information about three animal groups and their features.
Complete the table for the three animal groups.
Use a tick (✓) to show that the feature is present.

	Feature		
Animal Group	Backbone	Chaetae	Exoskeleton
Annelids			
Insects			
Chordates			

[3]

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(b) Aphids are small insects.
The diagram shows the apparatus used to collect them.



© Dorling Kindersley / Thinkstock

(i) Name the apparatus shown.

_____ [1]

(ii) What is the function of the piece of gauze netting in the apparatus?

_____

_____ [1]

[Turn over

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24GSD1105

(iii) Many aphids feed on one tree.
Aphids are eaten by blue tits.
Use the information given to draw a food chain for these three organisms.

[2]

(iv) Draw a pyramid of numbers for the food chain you have drawn in part **(iii)** above.
Label the organisms.

[2]

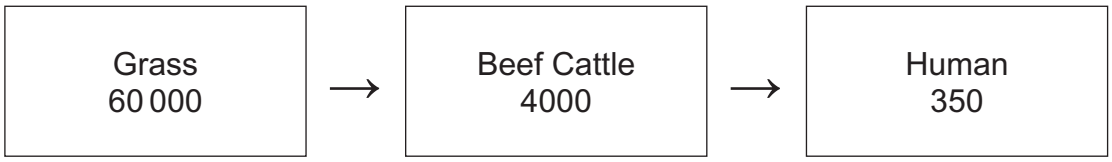
(v) What would you do to obtain the information needed to draw a pyramid of biomass for a food chain?

_____

_____ [1]

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(c) The diagram shows the amount of energy available at three trophic levels in a food chain for a Northern Ireland beef cattle farm.
Figures are in kJ/m^2/year.



Trophic Level 1 Trophic Level 2 Trophic Level 3

(i) What is the source of energy for this food chain?

_____ [1]

(ii) Give **two** reasons why there is less energy at trophic level 3 than at trophic level 2.

1. _____

_____

2. _____

_____ [2]

[Turn over

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3 **(a)** Complete the passage about enzymes by writing the correct words in the spaces.
Choose the correct words from the list.

starch	**fat**	**living**
biological	**product**	**protein**

All enzymes are made of _____.

They are _____ catalysts that speed up the rate of reactions. The enzyme amylase breaks down _____. [3]

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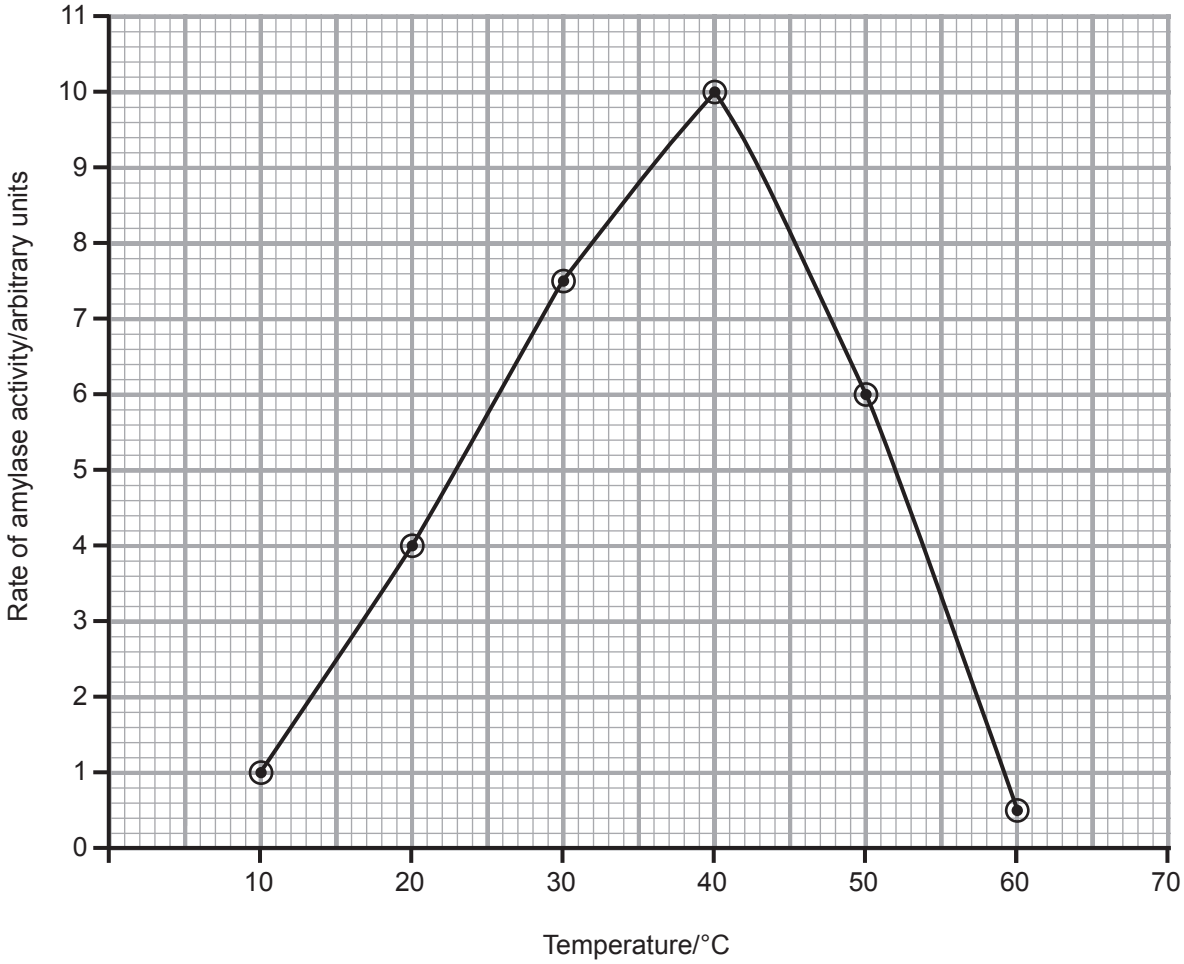
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(Questions continue overleaf)

(b) A student carried out an experiment to investigate the effect of temperature on the rate of amylase activity.

The graph shows the results of the student's experiment.



Use the graph and your knowledge to answer the following.

(i) What is the best temperature for amylase activity?

_____ °C [1]

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(ii) Describe and explain the rate of amylase activity at 60 °C.

_____

_____

_____

_____

_____

_____

_____

_____ [2]

(iii) Name **two** variables that should be controlled in this experiment.

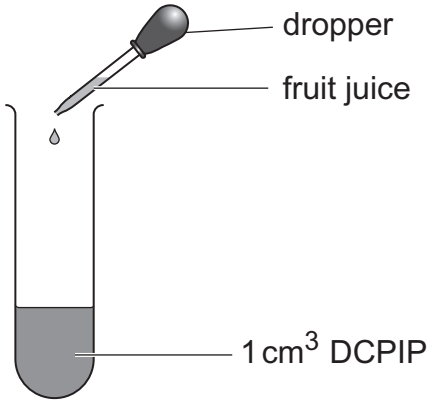
1. _____

2. _____ [2]

[Turn over

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4 Jane carried out an experiment to compare the vitamin C content of three fruit juices. The diagram shows the apparatus she used.



Source: Principal Examiner

Jane added one fruit juice, drop by drop, to 1 cm^3 of DCPIP in a test tube and swirled the test tube around to mix the contents.
After several drops of fruit juice were added, the DCPIP changed colour.
She repeated this method for the two other fruit juices.

(a) Describe the colour change that takes place in the DCPIP.

_____ to _____ [1]

(b) Jane counted the number of drops of each fruit juice needed to change the colour of 1 cm^3 of DCPIP.
She repeated this five times for each fruit juice.

The table shows her results.

Fruit juice	Number of drops of fruit juice needed to change the colour of 1 cm^3 of DCPIP					Average number of drops
Orange	3	4	3	5	5	4
Boiled orange	9	7	6	6	7	
Lemon	4	3	3	2	3	3

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Use the table opposite and your knowledge to answer the following.

(i) Calculate the average number of drops of boiled orange juice needed to change the colour of the DCPIP.
Write this number in the table opposite.

[1]

(ii) Which fruit juice had the highest vitamin C content?

_____

Explain your answer.

_____

_____ [2]

(iii) How does boiling orange juice affect its vitamin C content?

_____

_____ [1]

(c) Explain why the results of this experiment are reliable.

_____

_____ [1]

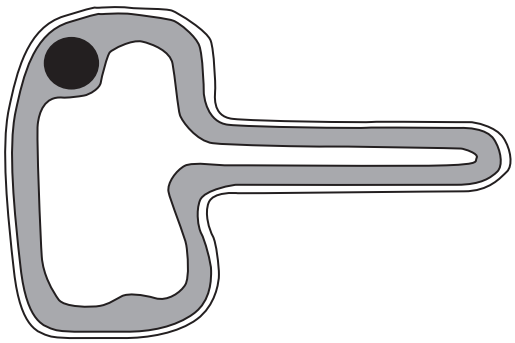
(d) A different piece of apparatus could be used to accurately measure the volume of fruit juice added to the DCPIP.
Name this piece of apparatus.

_____ [1]

[Turn over

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5 **(a)** Plants take up minerals from the soil using specialised cells.
The drawing shows one of these specialised cells.



Source: Principal Examiner

(i) Name this specialised cell.

_____ [1]

(ii) Use the drawing to describe and explain how this cell is adapted for its role in mineral uptake.

_____

_____

_____

_____

_____ [2]

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(b) Farmyard manure is a natural fertiliser.
The table shows the mass of three minerals in farmyard manure and in an artificial fertiliser.

	Mass of mineral/kg/tonne		
Fertiliser	**Nitrate**	**Phosphate**	**Potassium**
Farmyard manure	6.0	3.5	8.0
Artificial fertiliser	200.0	100.0	100.0

(i) Plants use nitrates to make a substance needed for growth.
Name this substance.

_____ [1]

(ii) There is an advantage in using artificial fertiliser rather than farmyard manure.
Give **data** from the table that supports this statement.

_____

_____

_____

_____ [1]

(iii) Give **three** advantages of using farmyard manure rather than artificial fertiliser.

1. _____

_____

2. _____

_____

3. _____

_____ [3]

[Turn over

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6 **(a)** When coal and oil are burned, they produce air pollutants.
Sulfur dioxide is one of these air pollutants.
Coal and oil are the main fuels burned for heating homes in Belfast.
Natural gas is another fuel that has become recently available for heating homes in Belfast.

The table shows sulfur dioxide levels in Belfast city centre from 1990 to 2010.

Year	Sulfur dioxide level/μg/m^3
1990	65
1995	47
2000	18
2005	7
2010	5

© Crown Copyright. Air pollution in Northern Ireland by Alison Loader and Paul Willis. Department of Environment. ISBN: 978-1-907053-39-9

Use the table and the information given to answer the following.

(i) Which **10 year** period showed the greatest decrease in sulfur dioxide levels? Give this decrease.

Show your working.

- 10 year period: _____ to _____
- Decrease: _____ μg/m^3 [2]

(ii) Explain why sulfur dioxide levels have decreased.

_____

_____

_____ [1]

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Lichens are small organisms that are found living on rocks, walls and trees.
They are sensitive to air pollution, especially sulfur dioxide.

The photographs show three types of lichen, a crusty, a leafy and a shrubby lichen.



Crusty lichen

© Dr Jeremy Burgess / Science Photo Library



Leafy lichen

© Claude Nuridsany & Marie Perennou / Science Photo Library



Shrubby lichen

© mtreasure / iStock / Thinkstock

- Crusty lichens can survive in levels of sulfur dioxide up to 70 µg/m^3.
- Leafy lichens can survive in levels of sulfur dioxide up to 59 µg/m^3.
- Shrubby lichens only survive in levels of sulfur dioxide below 19 µg/m^3.

(b) Use this information and the table opposite to give the type of lichen that would have been found in Belfast city centre in 1990.

Type of lichen: _____

Reason for choice: _____

_____

_____

_____ [2]

(c) Sulfur dioxide levels in Belfast city centre are now low.
Explain why it is still important to continue monitoring the level of sulfur dioxide.

_____

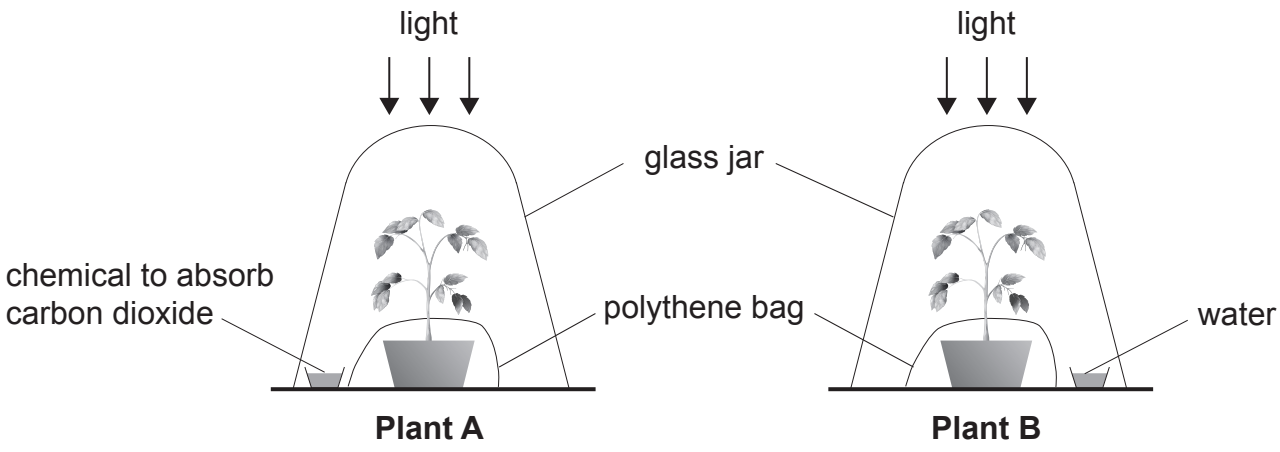
_____

_____ [1]

[Turn over

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7 **(a)** The diagram shows an experiment to investigate if carbon dioxide is needed for photosynthesis.



Source: Principal Examiner

Both plants were destarched before the experiment.
They were **then** left in warm, sunny conditions for 24 hours.

(i) How were the plants destarched?

_____

_____

_____ [1]

(ii) Why were the plants destarched?

_____

_____

_____

_____ [1]

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(iii) Bacteria are living organisms present in the soil in the plant pots.
Suggest why the plant pots are covered with polythene bags.

[2]

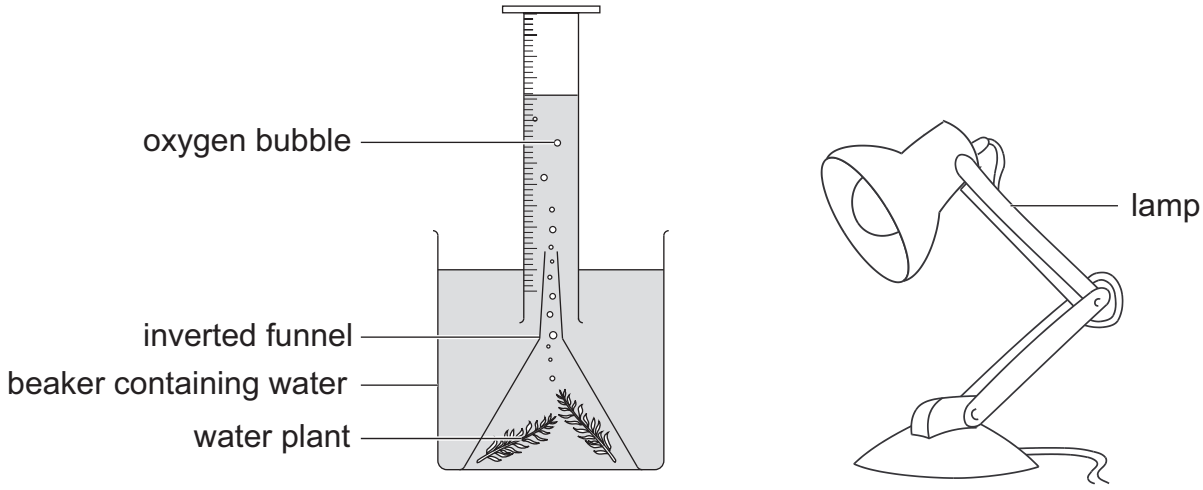
(iv) After 24 hours in warm, sunny conditions, a leaf from plant **A** and a leaf from plant **B** were tested for starch using iodine solution.
Describe and explain the results you would expect for the leaf from plant **A** and the leaf from plant **B** after testing with iodine solution.

[3]

[Turn over

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(b) Jude carried out an experiment to measure the rate of photosynthesis in a water plant at different light intensities.
The diagram shows the apparatus he used.



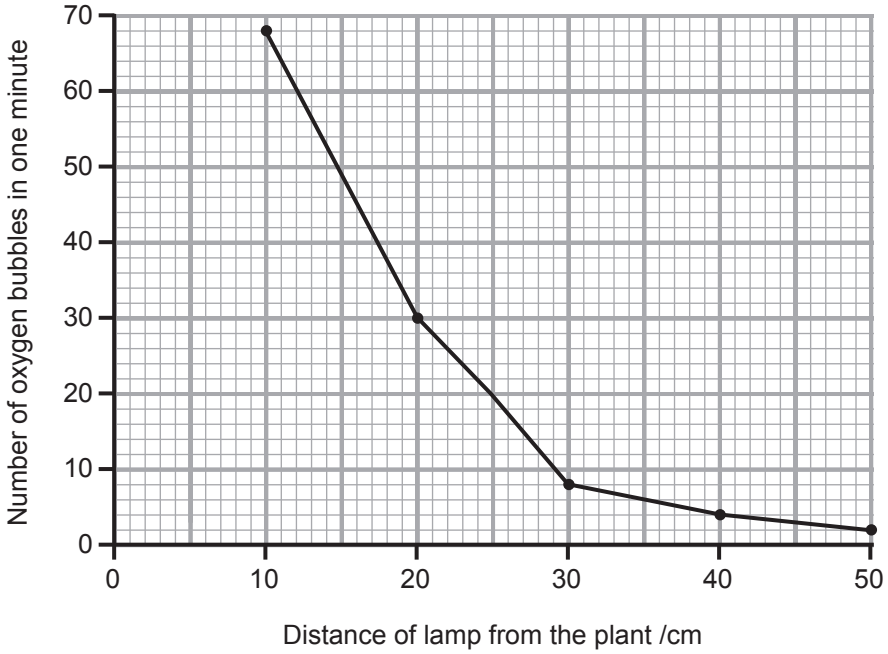
Source: Principal Examiner

The light intensity decreases as the lamp is moved further away from the plant.

Jude counted the number of oxygen bubbles given off by the plant in one minute at different distances of the lamp from the plant.

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The graph shows the results of Jude's experiment.



(i) Use the information given opposite and the graph to describe what happens to the number of oxygen bubbles given off by the plant as the light intensity decreases.

_____

_____ [1]

(ii) At what distance of the lamp from the plant did the plant produce **24 oxygen bubbles** in one minute?

_____ cm [1]

(iii) When Jude moved the lamp to a different distance, he waited for two minutes before counting the number of oxygen bubbles.

Explain why he did this.

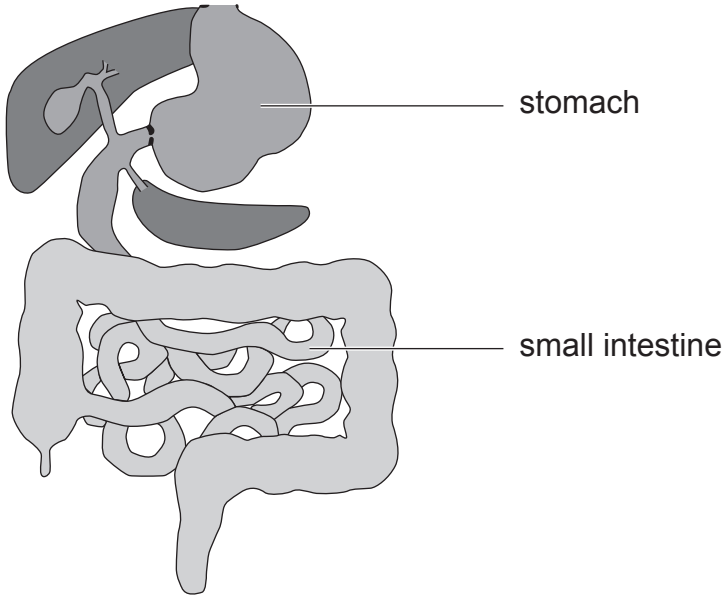
_____

_____ [1]

[Turn over

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8 The diagram shows part of the digestive system.



© GCSE Biology for CCEA, Rose McIlwaine and James Napier (ISBN-9780340858257). "Reproduced by permission of Hodder Education".

(a) State **two** ways in which the small intestine is adapted for digestion.

1. _____

2. _____ [2]

(b) Meat is a major source of protein in our diet.
Digestion of meat starts in the stomach and is completed in the small intestine.

As George got older, he produced less hydrochloric acid in his stomach.
After eating any meal containing a lot of meat, George felt his stomach remaining full for longer, compared to when he was younger.

- Describe and explain the effect of reduced acid production on digestion of meat in the stomach of an older person like George.
- Describe the digestion of meat in the **small intestine**.
- Describe what happens to the products of digestion of meat in the small intestine.

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

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[6]

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

Examiner Number

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Rewarding Learning

General Certificate of Secondary Education
2015–2016

Double Award Science: Biology

Unit B1

Foundation Tier

[GSD11]

TUESDAY 17 MAY 2016, AFTERNOON

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The job of the examiners is to set the questions and the mark schemes; and the job of the revisers is to review the questions and mark schemes commenting on a large range of issues about which they must be satisfied before the question papers and mark schemes are finalised.

The questions and the mark schemes are developed in association with each other so that the issues of differentiation and positive achievement can be addressed right from the start. Mark schemes, therefore, are regarded as part of an integral process which begins with the setting of questions and ends with the marking of the examination.

The main purpose of the mark scheme is to provide a uniform basis for the marking process so that all the markers are following exactly the same instructions and making the same judgements in so far as this is possible. Before marking begins a standardising meeting is held where all the markers are briefed using the mark scheme and samples of the students' work in the form of scripts. Consideration is also given at this stage to any comments on the operational papers received from teachers and their organisations. During this meeting, and up to and including the end of the marking, there is provision for amendments to be made to the mark scheme. What is published represents this final form of the mark scheme.

It is important to recognise that in some cases there may well be other correct responses which are equally acceptable to those published: the mark scheme can only cover those responses which emerged in the examination. There may also be instances where certain judgements may have to be left to the experience of the examiner, for example, where there is no absolute correct response – all teachers will be familiar with making such judgements.

1 **(a)** Kidney failure; eye damage [2]

(b) **(i)** One mark for each bar correctly plotted [3]

(ii) Any **two** from:
- Too much sugar in diet
- Lack of exercise
- Obesity/overweight
- Too much food/too much fatty foods/unhealthy **diet** [2]

(c) Oxygen/O_2;
carbon dioxide/CO_2; water/H_2O [3]

AVAILABLE MARKS

10

2 **(a)**

	Feature		
Animal Group	Backbone	Chaetae	Exoskeleton
Annelids		✓	
Insects			✓
Chordates	✓		

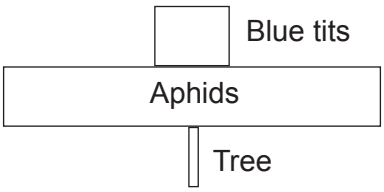
One mark for each correct row [3]

(b) **(i)** Pooter [1]

(ii) So that insects/aphids are not sucked into the mouth [1]

(iii) Tree → aphids → blue tits
One mark for the three organisms in correct order
One mark for arrows [2]

(iv)



One mark for correct shape with narrowest bar at the bottom
One mark for all labels correct [2]

(v) Need to get mass/weight of organisms/weigh the organisms [1]

(c) **(i)** Sun/sunlight/light [1]

(ii) Any **two** from:
Energy is lost as:
- Heat/respiration
- Movement or described
- Waste materials/faeces/urine/slurry/excreta/egestion/manure
- Uneaten parts/hooves/bones/hair/teeth
- Reproduction [2]

13

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				AVAILABLE MARKS
3	**(a)**	protein; biological; starch	[3]	
	(b)	**(i)** 40 °C	[1]	
		(ii) Any **two**: Amylase activity is very low/lowest/only 0.5/0.6 arbitrary units/gone to 0.5 or 0.6; Amylase is denatured/destroyed/damaged/substrate no longer fits into the (active site) of the enzyme (amylase)/enzyme substrate complex not formed/bonds broken in enzyme; Activity decreased/dropped/not as fast/fallen/not as effective	[2]	
		(iii) Any **two** from: • pH • volume/amount/concentration of enzyme • volume/amount/concentration of substrate/starch • time of reaction • number of enzyme (molecules) • apparatus • volume of water	[2]	8
4	**(a)**	Blue → Clear/colourless/pink	[1]	
	(b)	**(i)** 7	[1]	
		(ii) Lemon; smallest number of drops needed/least no. of drops only takes 3 drops/less than others	[2]	
		(iii) Reduces the vitamin C content	[1]	
	(c)	Five repeats/replicates/there is an average	[1]	
	(d)	Syringe/pipette/burette	[1]	7

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					AVAILABLE MARKS
5	**(a)**	**(i)**	Root hair (cell) [1]		
		(ii)	Cell has extension/described; that gives increased surface area [2]		
	(b)	**(i)**	Protein/amino acids [1]		
		(ii)	Artificial fertiliser: 200 nitrate, FYM 6/(194) (× $33\frac{1}{3}$) 100 phosphate, FYM 3.5/(96.5) (× 28.6) 100 potassium, FYM 8.0 (9.2) (12.5 ×) (Any **one**) Data • more + 1 data statement • 2 data (N/P/K) statements • Difference • Times more with numbers [1]		
		(iii)	Any **three** from: Farmyard manure has: • Slower release of minerals • Minerals less likely to be leached/washed out of soil/less soluble/less runoff/less water pollution/less eutrophication • Costs less/'free' byproduct from farms/already on farm • Improves soil structure/crumb structure/adds humus/adds organic matter/improves soil texture • Encourages more earthworms/air in the soil [3]		8
6	**(a)**	**(i)**	10 year period: 1990–2000; Decrease: 47 µg/m^3 [2]		
		(ii)	Switch to natural gas/less coal or oil used/less burning of FF/less reliance on FF/more renewable sources used or named, e.g. solar/natural gas contains less SO_2 [1]		
	(b)		Crusty lichens; they are the only ones that can grow at 65 µg/m^3 sulfur dioxide/they can grow up to 70/others can't survive at 65 or up to 70 [2]		
	(c)		To trigger action if level starts to increase/ensure targets for clean air are being met/avoid fines/in case SO_2 levels start to go up again [1]		6

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					AVAILABLE MARKS
7	(a)	(i)	In a dark cupboard for 24 hours (or more) [1]		
		(ii)	To show that any starch made is made during the experiment/ to ensure that **all** starch has been used up/to ensure there's no starch from before/ensure no starch present [1]		
		(iii)	Bacteria in soil **respire**; to stop carbon dioxide entering the flask/around the plant/bacteria produce CO_2 [2]		
		(iv)	• **A** – Leaf is yellow-brown; • **B** – Leaf turns blue-black/black **not** blue on own; both for first mark • No carbon dioxide in **A or** carbon dioxide present in **B**; • No starch in **A or** starch in **B**; [3]		
	(b)	(i)	Less/decreased/smaller number of bubbles [1]		
		(ii)	23 cm [1]		
		(iii)	To allow the plant to adjust/acclimatise [1]		10
8	(a)		Any **two** from: • Large surface area • Folds • Villi/microvilli • Long/length • Produces enzymes/named enzyme [2]		
	(b)		**Indicative content** (Reduced hydrochloric acid in the stomach) – in Q: • Reduced enzyme/enzyme action • Protease (named as enzyme involved) • So less digestion (of the meat/protein/food/meal) – rate of breakdown slower/more time taken to digest • **Meat** remains in the stomach for longer • There will be less amino acids produced (credit mention of amino acids only once in answer) Small intestine: • Meat/protein is digested by proteases (do not credit if mentioned above) • To amino acids (do not credit if mentioned above) Products: • They are absorbed/diffused/active transport; • Into the blood/capillary/villi/bloodstream;		

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Response	Marks
Candidates use appropriate terms throughout to explain the effect of reduced hydrochloric acid production on digestion in the stomach and describe protein digestion and absorption in the small intestine. They use **five to six** points from the indicative content. They use good spelling, punctuation and grammar. Form and style are of a high standard.	[5]–[6]
Candidates use appropriate terms throughout to explain the effect of reduced hydrochloric acid production on digestion in the stomach and describe protein digestion and absorption in the small intestine. They use **three to four** points from the indicative content. They use satisfactory spelling, punctuation and grammar. Form and style are of a satisfactory standard.	[3]–[4]
Candidates use **one or two** points from the indicative content to explain the effect of reduced hydrochloric acid production on digestion in the stomach and/or describe protein digestion and absorption in the small intestine. They use limited spelling, punctuation and grammar. They make limited use of specialist scientific terms.	[1]–[2]
Response not worthy of credit.	[0]

	AVAILABLE MARKS
[6]	8
Total	**70**

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Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2015–2016

Double Award Science: Biology

Unit B1
Foundation Tier

GSD11

[GSD11]
WEDNESDAY 24 FEBRUARY 2016, 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 Question **9(a)**.

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

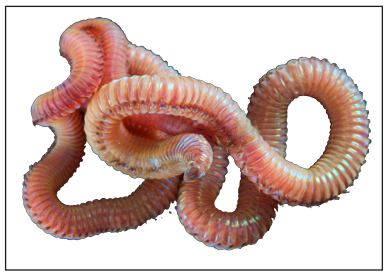
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Examiner Only	
Marks	Remark

1 The photographs show four organisms.

Draw a line to link each organism with its feature.

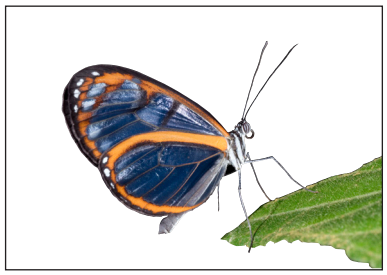
Organism	Feature
annelid	has an exoskeleton
flowering plant	is segmented
insect	has a backbone
chordate	produces seeds



© Alexander Semenov / Science Photo Library



© Gilles Mermet / Science Photo Library



© Sinclair Stammers / Science Photo Library



© Simon Murrell / Cultura / Science Photo Library

[3]

Examiner Only	
Marks	Remark

2 **(a)** There is increasing international concern about global warming. Complete the passage below about global warming by writing the correct words in the spaces.

Choose the words from the list.

sound	**sulfur dioxide**	**light**
heat	**carbon monoxide**	**carbon dioxide**

Some gases in the atmosphere help keep the Earth warm.

One of these gases is _____ _____.

If the level of this gas in the atmosphere increases, it may lead to global warming. This is because it causes more _____ energy from the Sun to be trapped within the atmosphere. [2]

(b) The four statements below are about the causes and the effects of global warming.
In the box beside each statement, write the letter **C** if it is a **cause** of global warming or the letter **E** if it is an **effect** of global warming.

Statements

cutting down trees in forests ☐

rise in sea levels ☐

changes in weather patterns ☐

burning of fossil fuels ☐ [3]

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Examiner Only	
Marks	Remark

3 **(a)** What does the term habitat mean?

_____

_____ [1]

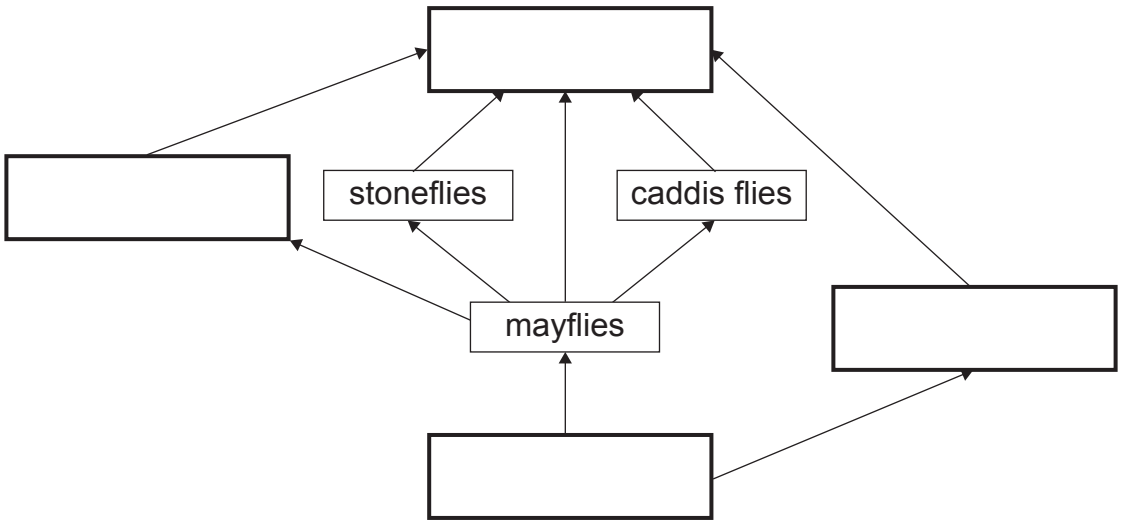
(b) Three food chains from a river habitat are shown below.

algae → river limpets → trout

algae → mayflies → trout

algae → mayflies → dragonflies → trout

(i) Use the information from the three food chains to complete the food web.



[4]

(ii) Name the producer in this food web.

_____ [1]

(iii) Name the organism that is feeding at two trophic levels.

_____ [1]

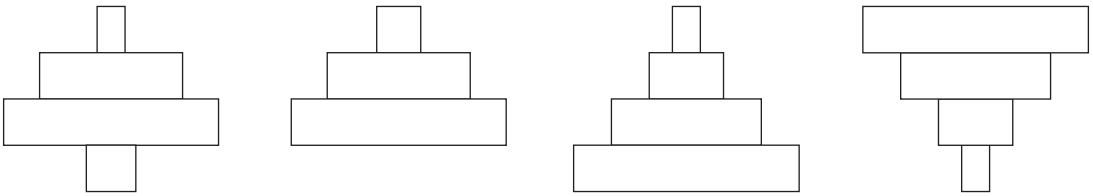
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Examiner Only	
Marks	Remark

(iv) One of the food chains from the river habitat is shown.

algae → mayflies → dragonflies → trout

Draw a circle around the pyramid of **biomass** for this food chain.



[1]

(c) The photograph shows a river flowing past a farmer's field.



© Meinzahn / iStock / Thinkstock

The farmer used artificial fertiliser to increase his crop yield. If large amounts of this artificial fertiliser run off into the river, biodiversity in the river would be affected.

(i) What does the term biodiversity mean?

_____

_____ [1]

(ii) Artificial fertiliser is more likely to run off into the river than natural fertiliser.
Suggest why.

_____

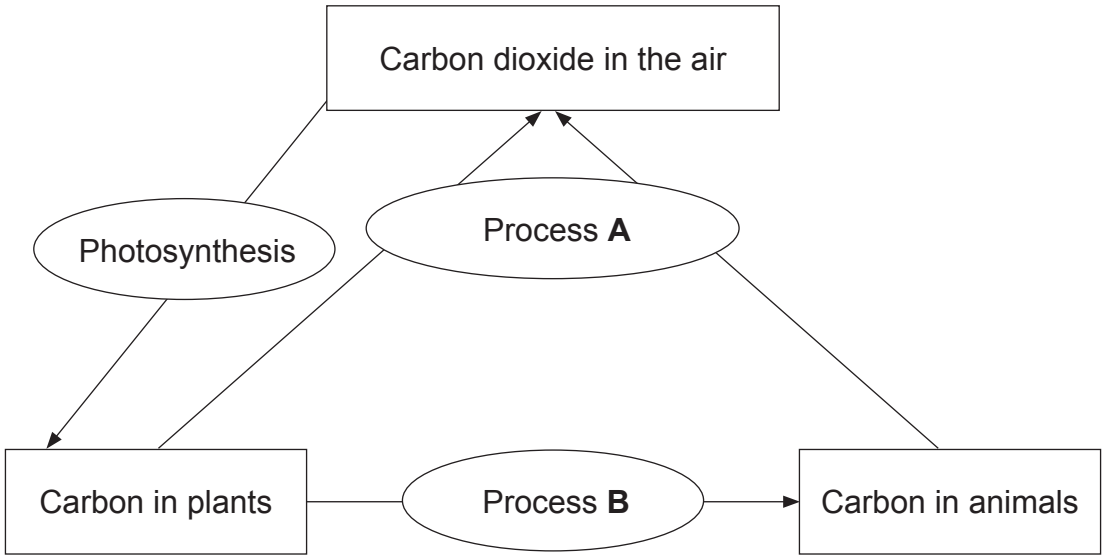
_____ [1]

(iii) Give an example of a **natural** fertiliser the farmer could use to increase his crop yield.

_____ [1]

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4 The diagram shows part of the carbon cycle.



(a) Name processes **A** and **B**.

Process **A** _____

Process **B** _____ [2]

(b) **(i)** Complete the equation for photosynthesis by writing in the boxes below.

	+		light / chlorophyll →	glucose	+	

[3]

(ii) Give **one** way plants use glucose.

_____

_____ [1]

Examiner Only

Marks	Remark

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(Questions continue overleaf)

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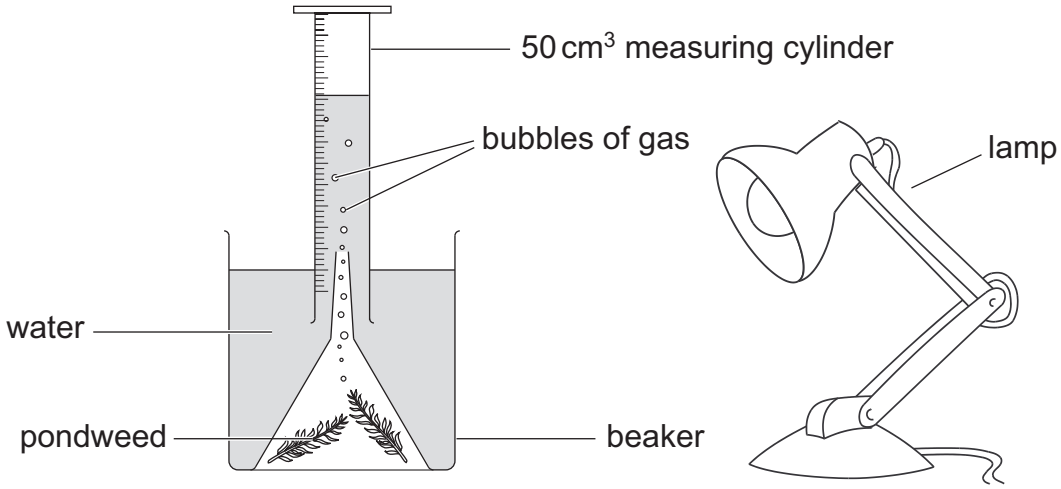
Examiner Only	
Marks	Remark

5 **(a)** Two students carried out an experiment to investigate the effect of light intensity on photosynthesis.

Emma placed a lamp at different distances from the beaker containing pondweed. She recorded the volume of gas collected in **1 minute** at each distance.

Tom repeated the experiment but recorded the volume of gas collected in **10 minutes** at each distance.

The diagram shows the apparatus they used.

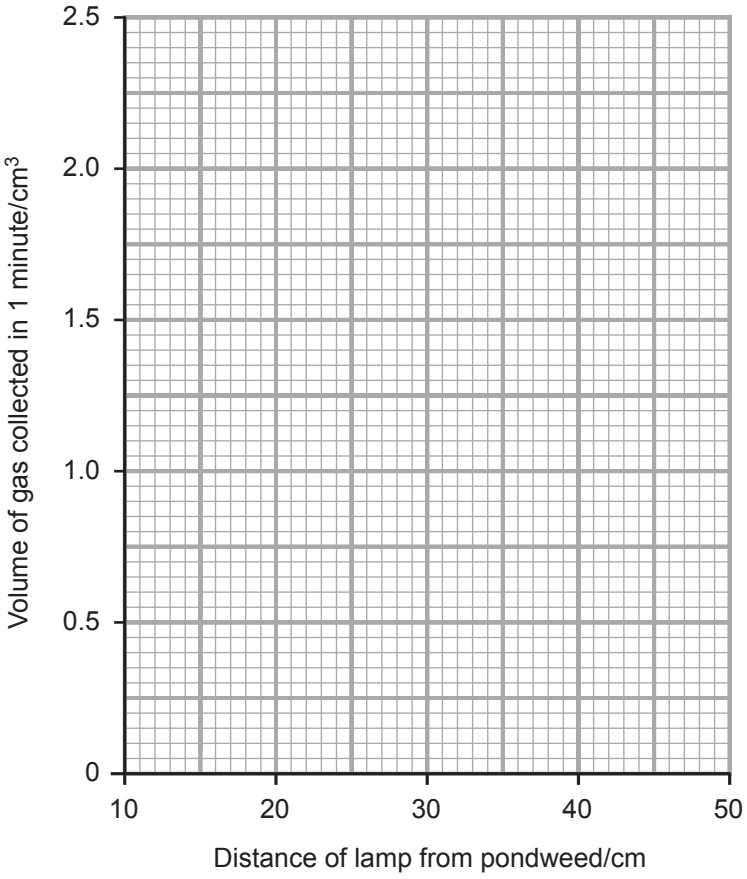


Source: Principal Examiner

The table shows Emma's and Tom's results.

Distance of lamp from pondweed/cm	Emma – volume of gas collected in 1 minute/cm^3	Tom – volume of gas collected in 10 minutes/cm^3
10	2.4	22.7
20	1.0	12.0
30	0.6	6.0
40	0.5	5.5
50	0.4	4.5

(i) Draw a line graph on the grid to show Emma's results.



[3]

(ii) The results from both students show the same trend.
Describe and explain this trend.

_____

_____

_____

_____

_____

_____ [3]

(iii) One distance of the lamp from the pondweed gave the **same rate** of photosynthesis for both students' experiments.

Use data from the table to give this distance.

_____ cm [1]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

(iv) Each time the students moved the lamp to a different distance, they waited for two minutes before starting to collect the gas.

Suggest why they did this.

_____

_____

_____ [1]

(b) (i) Emma suggested **two** improvements to their experiments.

These are given below.

A: Use a 25 cm^3 measuring cylinder instead of a 50 cm^3 measuring cylinder.
B: Repeat the experiment three times.

Explain how each of these suggestions would improve the experiment.

A: _____

_____

_____

B: _____

_____

_____ [2]

(ii) Tom suggested placing a large beaker of cold water between the lamp and the pondweed to absorb heat from the lamp.

Suggest how this would improve the experiment.

_____

_____

_____ [1]

Examiner Only	
Marks	Remark

6 Rebecca tested each of three solutions, **A**, **B** and **C**, with Benedict's reagent, Biuret reagent and iodine solution.

One solution contained only starch, one contained only protein and one contained only glucose.

She recorded positive results with a tick ✓.
She recorded negative results with a cross ✗.

The table shows her results.

Solution	Benedict's test result	Biuret test result	Iodine test result	Name of substance present
A	✓	✗	✗	
B	✗	✗	✓	
C	✗	✓	✗	

(a) Complete the table by writing in the name of the substance present in each solution. [3]

(b) **(i)** Describe how Rebecca carried out the Benedict's test.

_____

_____

_____

_____ [2]

(ii) Give the colour change that shows a positive result for the Benedict's test.

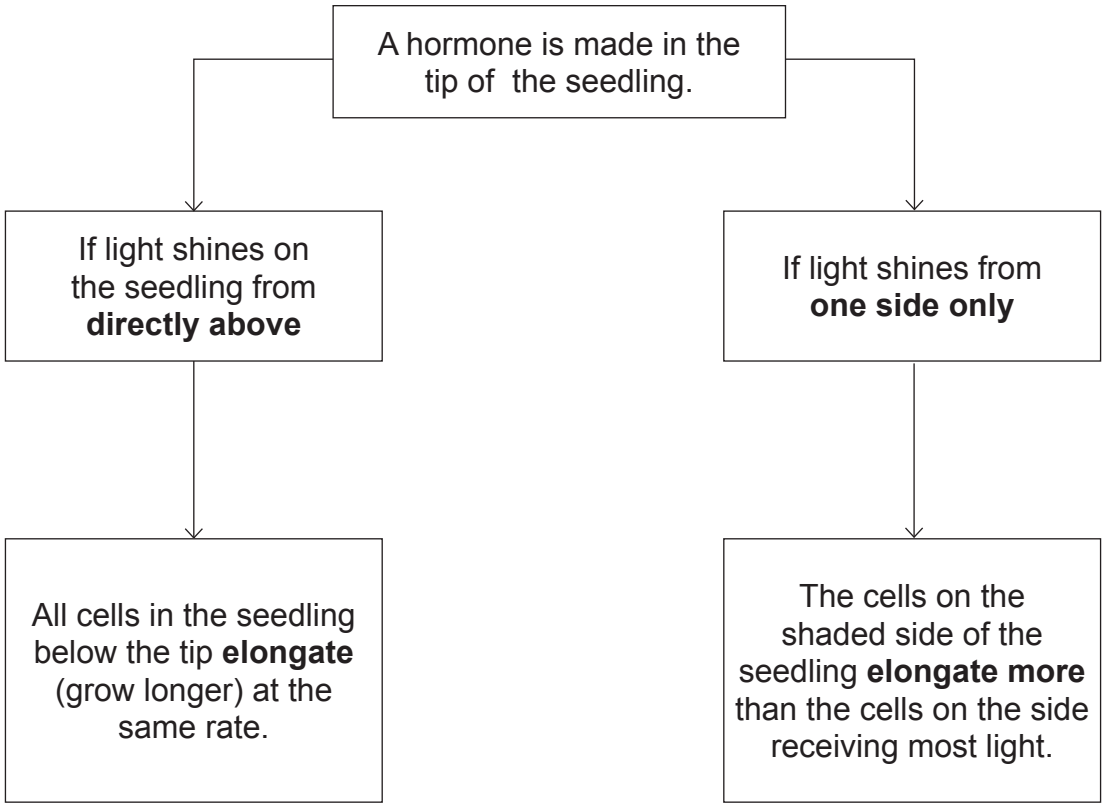
_____ to _____ [1]

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Examiner Only	
Marks	Remark

7 The growth of a seedling is affected by the direction from which light shines on it.

The flow diagram describes a seedling's growth response to light.



(a) (i) Name the seedling's growth response to light.

_____ [1]

(ii) Name the plant hormone that causes this growth response in the seedling.

_____ [1]

(iii) Explain the advantage to the seedling of this growth response to light.

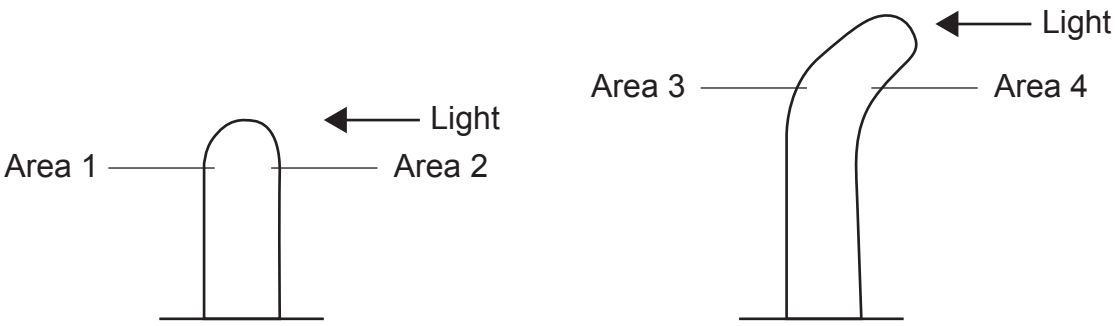
_____

_____

_____ [2]

Examiner Only	
Marks	Remark

(b) The diagram shows how shining a light from **one side only** affects the growth of a seedling.

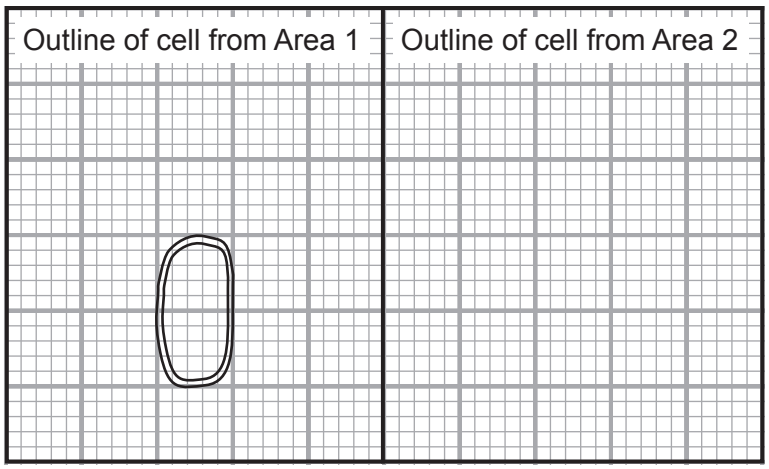


At start **After two days**

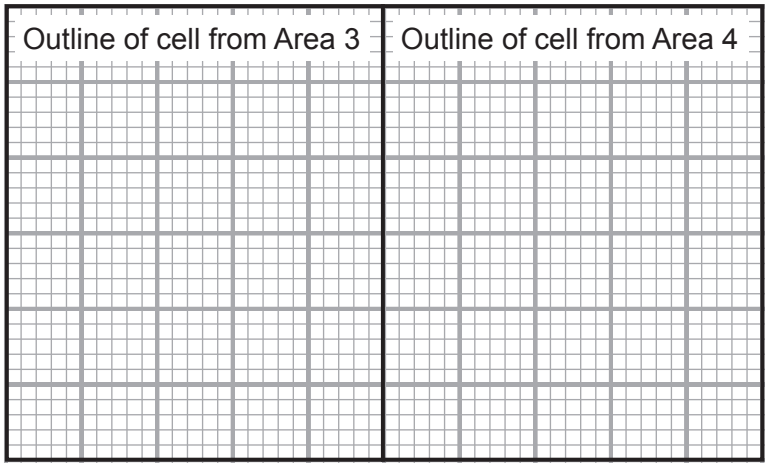
The outline of a cell from Area 1 has been drawn below.

Use the flow diagram opposite and the diagram above to help draw the outlines of cells from Areas 2, 3 and 4 on the grids.

At start



After two days



[3]

Examiner Only	
Marks	Remark

8 **(a)** **(i)** What is an enzyme?

_____

_____

_____ [2]

Protease is an enzyme found in the digestive system. It breaks down protein in the stomach.

(ii) Name another organ of the digestive system where protease is produced.

_____ [1]

(b) Why is digestion necessary?

_____

_____

_____

_____ [2]

(c) **Diagram 1** below shows the shape of a stomach protease molecule in acid and in alkali.

The shape of albumin which is a protein molecule is also shown.

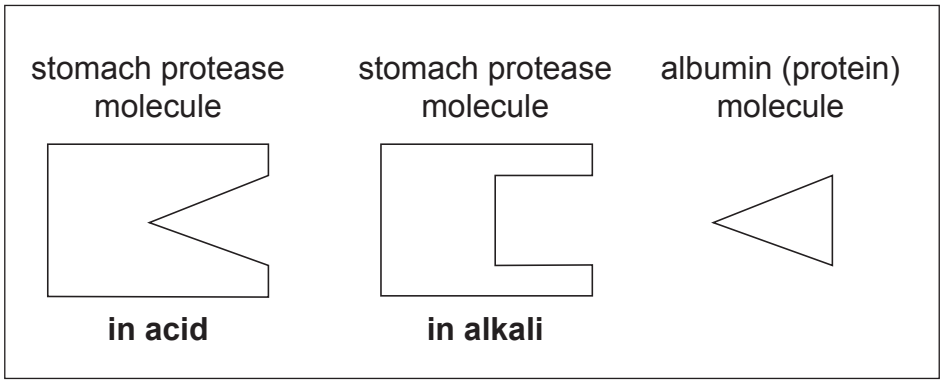


Diagram 1

When albumin is added to water it makes a cloudy solution. If the albumin in the solution is broken down by stomach protease, the cloudy solution goes clear.

David tested the effect of adding stomach protease to albumin in **acid** and in **alkali**.

Diagram 2 below shows the results of his experiment.

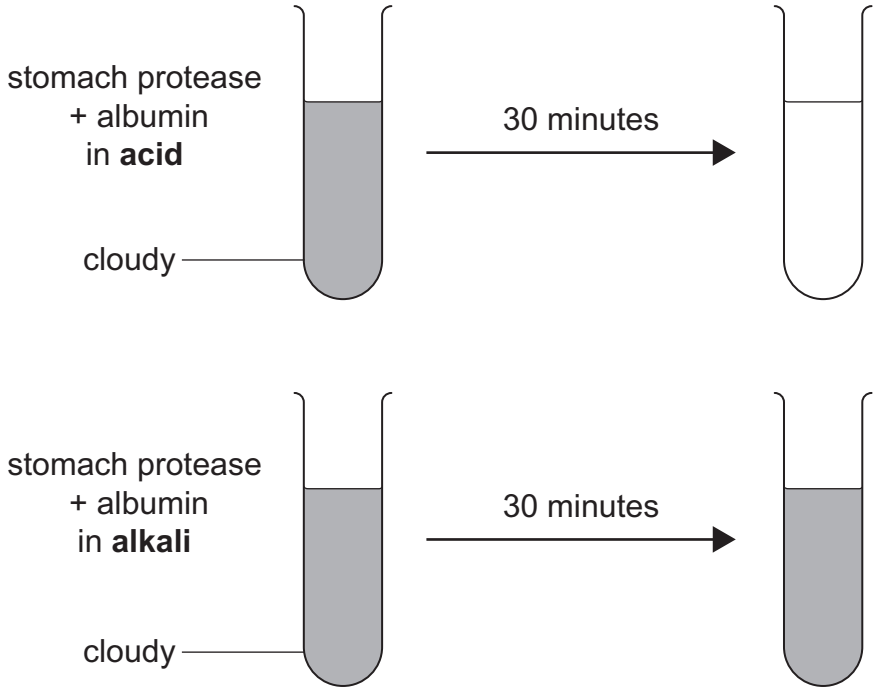


Diagram 2

(i) Use the information in **Diagram 2** to describe the results of David's experiment.

_____

_____ [1]

(ii) Use the information in **Diagrams 1 and 2** and your knowledge of enzyme action to explain the results of David's experiment in **acidic** conditions.

_____

_____

_____ [2]

(iii) Use the information in **Diagrams 1 and 2** and your knowledge of enzyme action to explain the results of David's experiment in **alkaline** conditions.

_____

_____

_____ [2]

Examiner Only

Marks	Remark

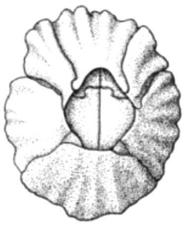
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Examiner Only	
Marks	Remark

9 Barnacles are small animals that live inside shells attached to rocks on shores.

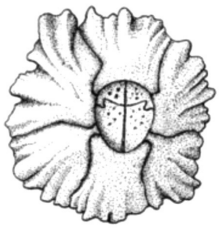
A scientist investigated the distribution of two different species of barnacle, **A** and **B**, on a rocky shore.

The drawings show the two species of barnacle.
The photograph shows the rocky shore he sampled.



Species **A**

© Rocky Shore Animals, Nature in Shetland. http://www.nature-shetland.co.uk/brc/rocky.htm



Species **B**

© Rocky Shore Animals, Nature in Shetland. http://www.nature-shetland.co.uk/brc/rocky.htm



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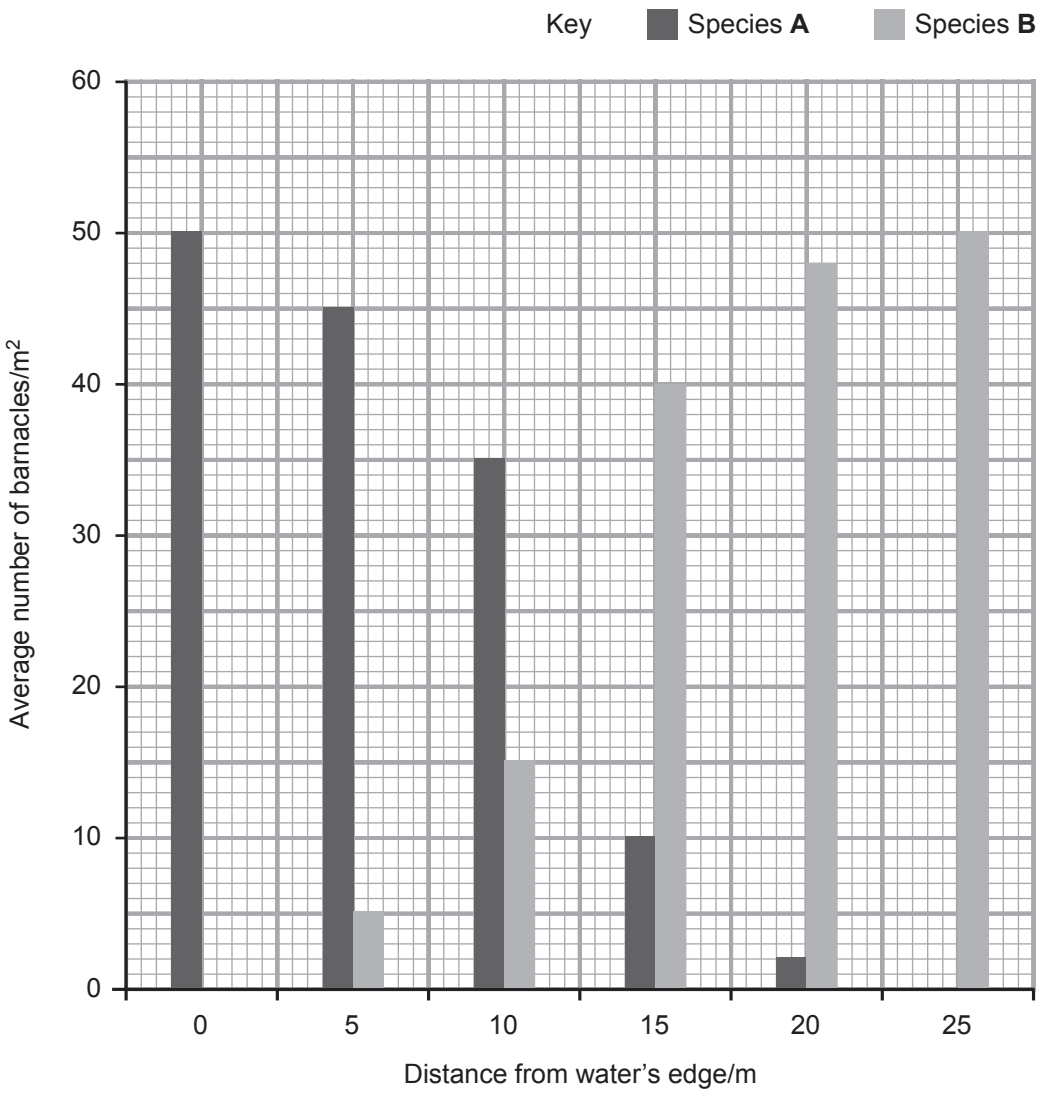
(a) Describe how the scientist sampled the rocky shore.

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

Examiner Only	
Marks	Remark

[6]

(b) The bar chart shows his results.



(i) The scientist had predicted that the numbers of species **A** would decrease with increasing distance from the water's edge.

Give **two** pieces of data from the bar chart that support this prediction.

_____

_____

_____

_____ [2]

Examiner Only

Marks	Remark

Using the data from his bar chart, the scientist calculated the **percentage** of barnacles belonging to each species at each distance from the water's edge.

The table shows these percentages.

Distance from water's edge/m	Percentage of barnacles present	
	Species A/%	Species B/%
0	100	0
5	90	10
10	70	30
15	20	80
20		
25	0	100

(ii) Complete the table by using data from the bar chart to calculate the **percentage** of barnacles of species **A** and species **B** at 20 metres from the water's edge.

Show your working.

[3]

Examiner Only

Marks	Remark

THIS IS THE END OF THE QUESTION PAPER

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113166

Rewarding Learning

General Certificate of Secondary Education
2015–2016

Double Award Science: Biology

Unit B1

Foundation Tier

[GSD11]

WEDNESDAY 24 FEBRUARY 2016, MORNING

MARK SCHEME

STEMUP.CO.UK

General Marking Instructions

Introduction

Mark schemes are published to assist teachers and students in their preparation for examinations. Through the mark schemes teachers and students will be able to see what examiners are looking for in response to questions and exactly where the marks have been awarded. The publishing of the mark schemes may help to show that examiners are not concerned about finding out what a student does not know but rather with rewarding students for what they do know.

The Purpose of Mark Schemes

Examination papers are set and revised by teams of examiners and revisers appointed by the Council. The teams of examiners and revisers include experienced teachers who are familiar with the level and standards expected of students in schools and colleges.

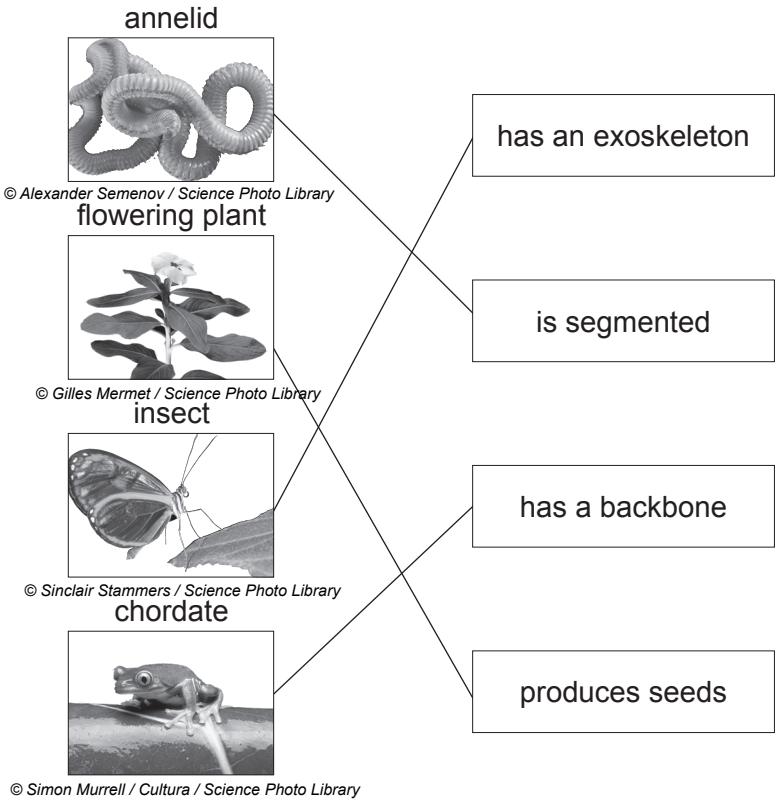
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			AVAILABLE MARKS
1	**Organism**	**Feature**	



all 4 correct [3]
2 or 3 correct [2]
1 correct [1] [3] 3

2 **(a)** Carbon dioxide [1]
Heat [1] [2]

(b)

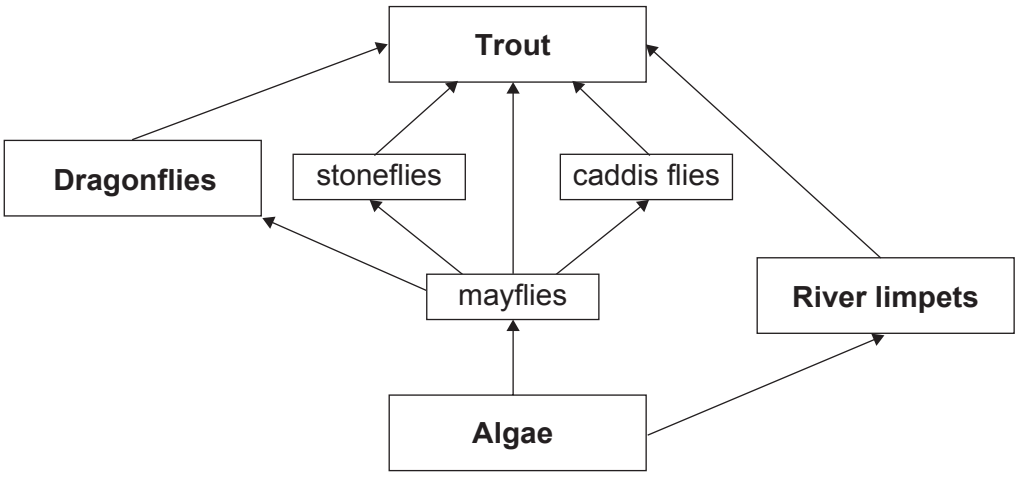
Cutting down trees in forests	**C**
Rise in sea levels	**E**
Changes in weather patterns	**E**
Burning of fossil fuels	**C**

all 4 correct [3]
3 correct [2]
2 or 1 correct [1] [3] 5

AVAILABLE MARKS

3 **(a)** Place where an organism lives [1]

(b) **(i)**



[4]

(ii) Algae [1]

(iii) Trout [1]

(iv) Third diagram



[1]

(c) **(i)** Number of (different) species/number of (different) types
All the different species/types [1]

(ii) More soluble/soaks into soil straight away [1]

(iii) Farmyard manure/compost/slurry/cow faeces/animal waste [1] 11

					AVAILABLE MARKS
4	**(a)**		Process A = Respiration Process B = Feeding/eating/ingestion/consumption	[2]	
	(b)	**(i)**	water/H_2O; carbon dioxide/CO_2 (either order) oxygen/O_2;	[3]	
		(ii)	In respiration/for energy/cellulose/oil/starch/protein/amino acids/ reproduction/store in seeds	[1]	6
5	**(a)**	**(i)**	All points correct [2]/3 or 4 points correct [1]; line [1]	[3]	
		(ii)	As **distance** from the lamp increased, **volume** of gas collected decreased; Light intensity is less (when distance of lamp is increased); So rate of photosynthesis is less	[3]	
		(iii)	30 cm	[1]	
		(iv)	To allow equilibration/to get steady stream/rate of bubbles/to adjust to that light intensity	[1]	
	(b)	**(i)**	**A**: improve accuracy; **B**: improve reliability/get an average/spot anomalous results	[2]	
		(ii)	So rate of photosynthesis not affected by heat from the lamp/so light is the only factor (affecting photosynthesis)/so temperature will not affect photosynthesis	[1]	11
6	**(a)**		**A**: glucose/sugar **B**: starch **C**: protein	[3]	
	(b)	**(i)**	Boiling/heat; in a water bath/beaker of water	[2]	
		(ii)	Blue to brick red (orange/yellow/green)	[1]	6
7	**(a)**	**(i)**	Phototropism/tropism	[1]	
		(ii)	Auxin	[1]	
		(iii)	More light; for more photosynthesis (more must be once)	[2]	
	(b)		Area 2: same as cell in Area 1 (exactly same) Area 3: longer Area 4: longer or same as cell in Area 1 but not as long as cell in Area 3	[3]	7

				AVAILABLE MARKS
8	(a)	(i)	Any **two** from: Biological catalyst; speeds up the rate of a reaction; protein [2]	
		(ii)	Small intestine/ileum/pancreas [1]	
	(b)		Any **two** from: Small molecules/soluble molecules; To allow absorption into the **bloodstream**/blood/capillary [2]	
	(c)	(i)	Alkali tube stayed/remained cloudy [1]	
		(ii)	– Albumin broken down/digested; – Enzyme active site is the correct shape/complementary (to substrate)/ albumin fits into the enzyme/lock and key/optimum pH/best pH [2]	
		(iii)	– Albumin not broken down/digested; – Enzyme changes shape/denatured/damaged/incorrect shape/ albumin will not fit enzyme/lock and key doesn't work/ not at optimum pH [2]	10

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AVAILABLE MARKS

9 (a) Indicative content

Use a quadrat;
Placed in a line/along a belt/transect/random placement;
Move quadrat/place at different distances;
Use a key/identification book/identify barnacle species;
For each quadrat estimate percentage cover/count the number of barnacles of **each** species (not the number of species);
Record results/data;
Repeat/replicate whole experiment [6]

Response	Marks
Candidates use appropriate terms throughout in describing the sampling method. This must include 5–6 points from the indicative content. They use good spelling, punctuation and grammar skills. Form and style are of a high standard.	[5]–[6]
Candidates use appropriate terms throughout in describing the sampling method. This must include 3–4 points from the indicative content. They use satisfactory spelling, punctuation and grammar skills. Form and style are of a satisfactory standard.	[3]–[4]
Candidates include 1–2 points from the indicative content when describing the sampling process. They use limited spelling, punctuation and grammar and have made little use of specialist terms.	[1]–[2]
Response not worthy of credit.	[0]

(b) (i) 50 species **A** present at 0 m; (at water's edge);
No species **A** at 25 m/only 2 at 20 m/none at furthest point
Any **two** correct pieces of evidence [2]

(ii) 2 and 48; [1] for reading graph
4; 96; [1] each for doubling
4 and 96 [3] [3] 11

Total **70**

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Rewarding Learning

General Certificate of Secondary Education
2015–2016

Double Award Science: Biology

Unit B1

Foundation Tier

[GSD11]

WEDNESDAY 11 NOVEMBER 2015, MORNING

MARK SCHEME

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General Marking Instructions

Introduction

Mark schemes are published to assist teachers and students in their preparation for examinations. Through the mark schemes teachers and students will be able to see what examiners are looking for in response to questions and exactly where the marks have been awarded. The publishing of the mark schemes may help to show that examiners are not concerned about finding out what a student does not know but rather with rewarding students for what they do know.

The Purpose of Mark Schemes

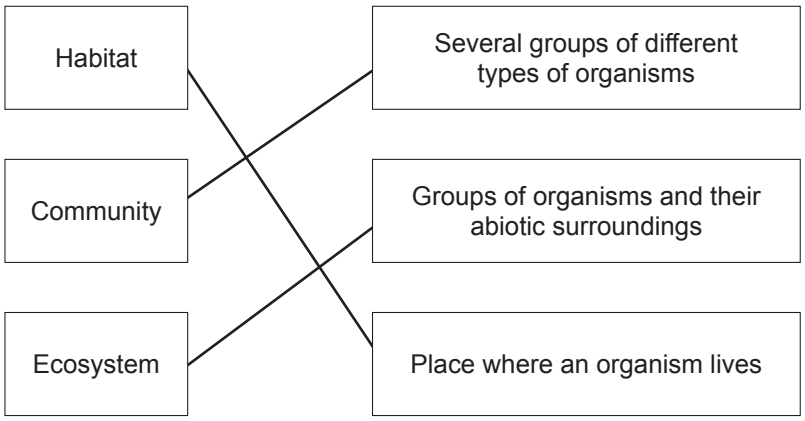
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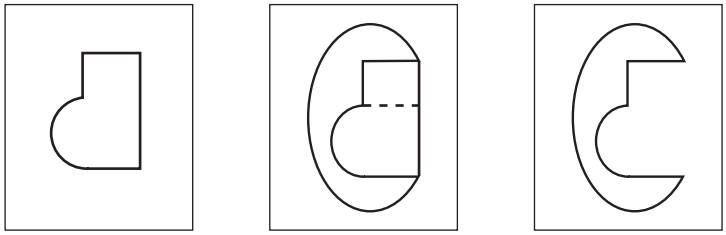
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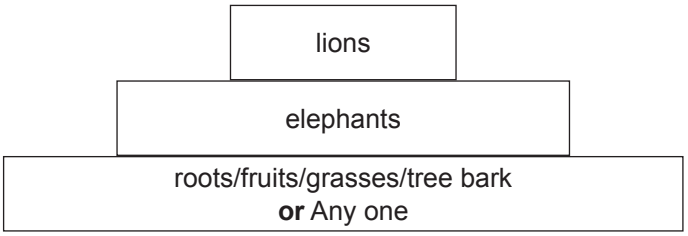
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					AVAILABLE MARKS
1	**(a)**	**(i)**	Annelids – segmented – chaetae Insects – any two from: – 3 body parts – 3 pairs jointed limbs – two pairs wings [1] mark each	[4]	
		(ii)	quadrat	[1]	
		(iii)	temperature/light/pH/wind/water level/rain/sun; thermometer/temp probe/light meter/light sensor/pH paper/lux meter/ pH meter/pH probe/measuring cylinder/rain guage/anemometer	[2]	
	(b)		**Term** / **Definition**  All three correct = 2 1 correct = 1	[2]	9
2	**(a)**	**(i)**	carbon dioxide on l.h.s.; oxygen on r.h.s./CO_2; O_2	[2]	
		(ii)	chlorophyll	[1]	
		(iii)	provide energy/create or produce energy/release energy	[1]	
	(b)	**(i)**	put into (hot) alcohol/ethanol; rinse in (hot) water	[2]	
		(ii)	blue/black	[1]	7
3	**(a)**		cell walls; chlorophyll	[2]	
	(b)	**(i)**	root hair cell	[1]	
		(ii)	extension; large surface area	[2]	5

				AVAILABLE MARKS
4	**(a)**	18–21; 18–28	[2]	
	(b)	diabetes 6 heart disease 2 (need both for [1] mark); 3 times	[2]	
	(c)	eat less; more activity	[2]	6
5	**(a)**	**(i)** pancreas	[1]	
		(ii) liver/muscles	[1]	
	(b)	**(i)** A – high	[1]	
		(ii) **more** glucose respired/**more** uptake of glucose/glucose converted to fat/**more** respiration	[1]	4
6	**(a)**	A – night B – dawn D – afternoon	[3]	
	(b)	**(i)** photosynthesis and respiration [1] mark **each**	[2]	
		(ii) C and E need **both** for [1] mark	[1]	6
7	**(a)**		[5]	
	(b)	temperature/pH/concentration (any two)	[2]	
	(c)	 [1] mark each diagram	[3]	
	(d)	villi; folds; long; microvilli any three [1] mark each	[3]	13

Enzyme	Substrate	Product
amylase		
	protein	amino acids
	lipid/fat/oil	glycerol

				AVAILABLE MARKS
8	**(a)**	predators/lions/disease/lack of food/abundant food	[1]	
	(b)	protection/so lions can't get near babies	[1]	
	(c)	reliability/confirm findings/compare findings	[1]	
	(d)	**(i)** roots/fruits/grasses/tree bark → elephants → lions [1] for arrows	[2]	
		(ii)  [1] mark shape with 3 levels; [1] mark correct organisms	[2]	
	(e)	**(i)** decrease in population/extinct/die out	[1]	
		(ii) **6%** from graph; 350 × 6/100 = 21 thousand **350 + 21 = 371 thousand**	[3]	
		(iii) no account of deaths/still being hunted/death rate increasing	[1]	12

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9 (a) Indicative content

- blue to clear/blue to pink/blue to colourless
- same concentration of DCPIP
- same volume of DCPIP/amount of DCPIP
- drops of same volume
- same amount of shaking or mixing
- same temperature

} max. 3 marks for variables V_1 V_2 V_3

- fruit juice Y
- fewest drops (of fruit juice) needed to change colour

Band	Response	Mark
A	Candidates use appropriate terms throughout to give at least five points from the indicative content. They use good spelling, punctuation and grammar skills. Form and style are of a high standard.	[5–6]
B	Candidates use appropriate terms throughout to give at least three points from the indicative content. They use satisfactory spelling, punctuation and grammar. Form and style are of a satisfactory standard.	[3–4]
C	Candidates use appropriate terms throughout to give 1 or 2 points from the indicative content. They use limited spelling, punctuation and grammar and have made little use of specialist terms.	[1–2]
D	Response not worthy of credit.	[0]

[6]

(b) 10 and 20: 0.5 [2]

8

Total

70

AVAILABLE MARKS

Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2014–2015

Double Award Science: Biology

Unit B1

Foundation Tier

[GSD11]

GSD11

TUESDAY 12 MAY 2015, AFTERNOON

TIME

1 hour.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
You must answer the questions in the spaces provided.
Do not write outside the boxed area on each page or on blank pages.
Complete in blue or black ink only. **Do not write with a gel pen.**
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 Question **9(a)**.

9639

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1 Complete the passage by writing the correct words in the spaces.
Choose the words from the list.

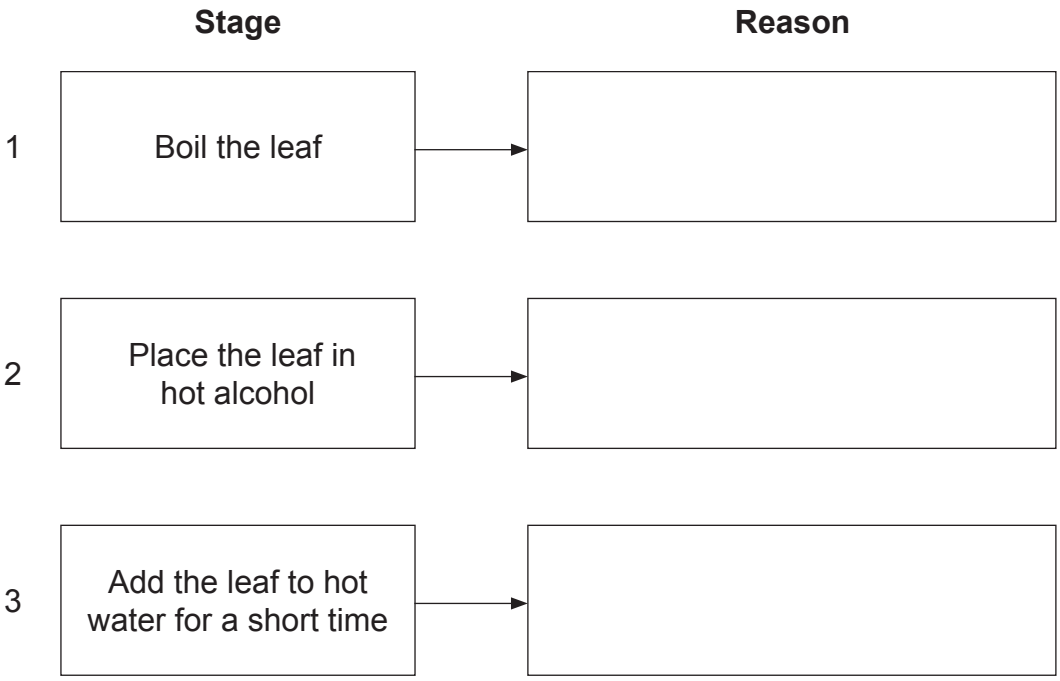
brain	**heart**	**faster**	**slower**	**organ**	**blood**

The Central Nervous System (CNS) is made up of the _____ and spinal cord. It co-ordinates responses between the receptors and the muscles. The nervous system responds _____ than the hormonal system. Hormones are chemical messengers that travel in the _____ to a target _____. [4]

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2 The diagram gives the first three stages when testing a leaf for starch.

(a) Complete the diagram by writing the reason for each stage in the box opposite.



[3]

(b) **(i)** Name the chemical used to test the leaf for starch.

_____ [1]

(ii) Give the colour the leaf would turn if starch is present.

_____ [1]

[Turn over

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3 **(a)** Human health can be affected by environmental factors and food choices.

Give **one other** factor that affects human health.

_____ [1]

(b) An unhealthy diet can result in obesity and diabetes.

Name **two other** conditions that can result from an unhealthy diet.

1. _____

2. _____ [2]

(c) Vitamin C is needed in a balanced diet.

(i) Name the chemical that is used to test for vitamin C in a food sample.

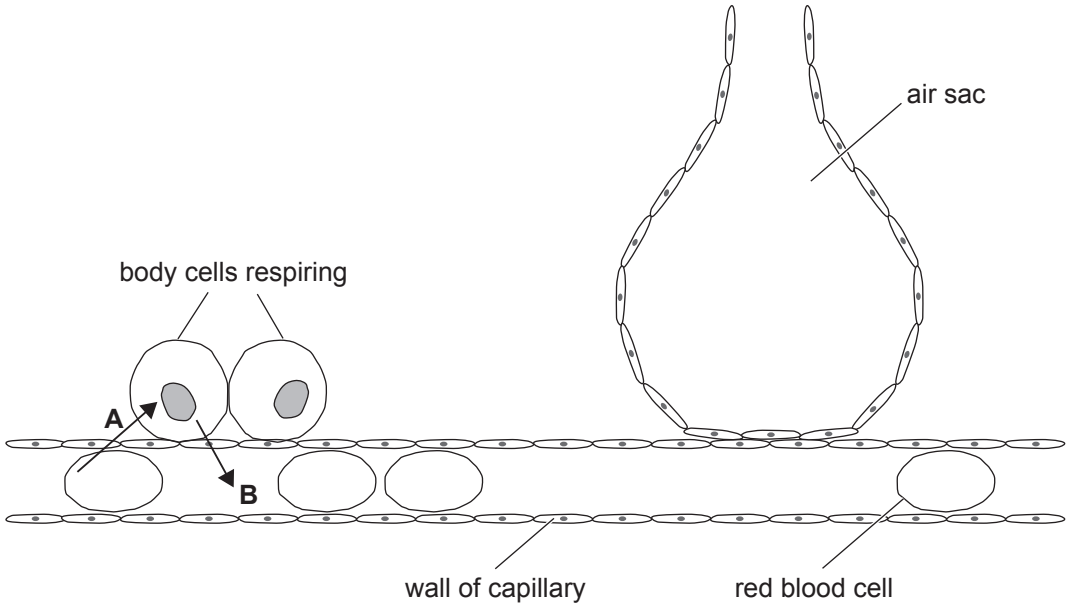
_____ [1]

(ii) Give the colour change you would expect if vitamin C is present in the food sample when tested with this chemical.

Colour change _____ to _____ [1]

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4 **(a)** The diagram shows a blood capillary, an air sac from the lungs and body cells that are respiring.



Source: Principal Examiner

(i) Why do cells need to respire?

_____ [1]

(ii) Name gas **A** that enters the body cells to allow them to carry out respiration.

_____ [1]

(iii) Name gas **B** that is produced when the body cells respire.

_____ [1]

(b) Use the diagram to give **two** ways the air sacs of the lungs are adapted as a respiratory surface.

_____

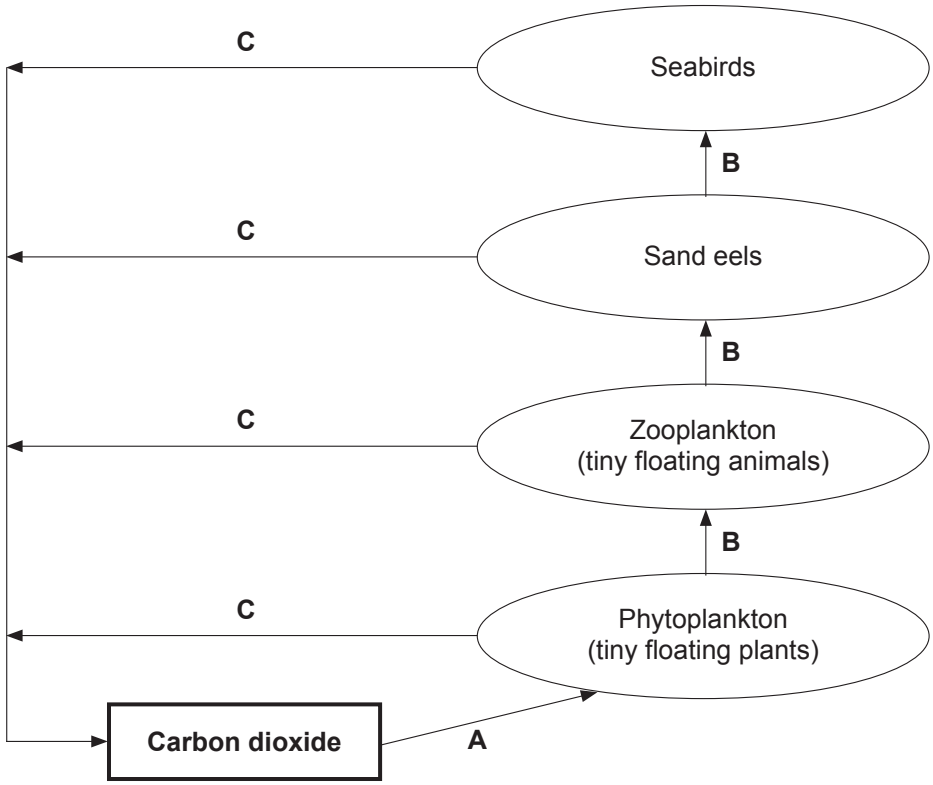
_____

_____ [2]

[Turn over

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5 The diagram shows how carbon is cycled through a food chain in the sea.



Source: Principal Examiner

(a) Name processes **A**, **B** and **C**.

A _____

B _____

C _____ [3]

(b) **(i)** What is the source of energy for the food chain?

_____ [1]

(ii) Name the producer in the food chain.

_____ [1]

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(c) Use the food chain in the diagram opposite to draw a pyramid of biomass.

Label the organisms in the pyramid.

[3]

[Turn over

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24GSD1107

6 **(a)** Minerals in the soil are used by plants.

(i) Name the cells in the plant that take up minerals from the soil.

_____ [1]

(ii) Plants use nitrates to produce a substance.

Name this substance.

_____ [1]

(b) Farmers can increase the nitrates in the soil by adding artificial or natural fertiliser.

The photographs show a farmer spreading artificial fertiliser and some natural fertiliser.

Artificial



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Natural



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(i) Give **one** example of a natural fertiliser.

_____ [1]

(ii) Give **one** advantage to the **soil** of using a natural fertiliser rather than an artificial fertiliser.

_____

_____ [1]

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(Questions continue overleaf)

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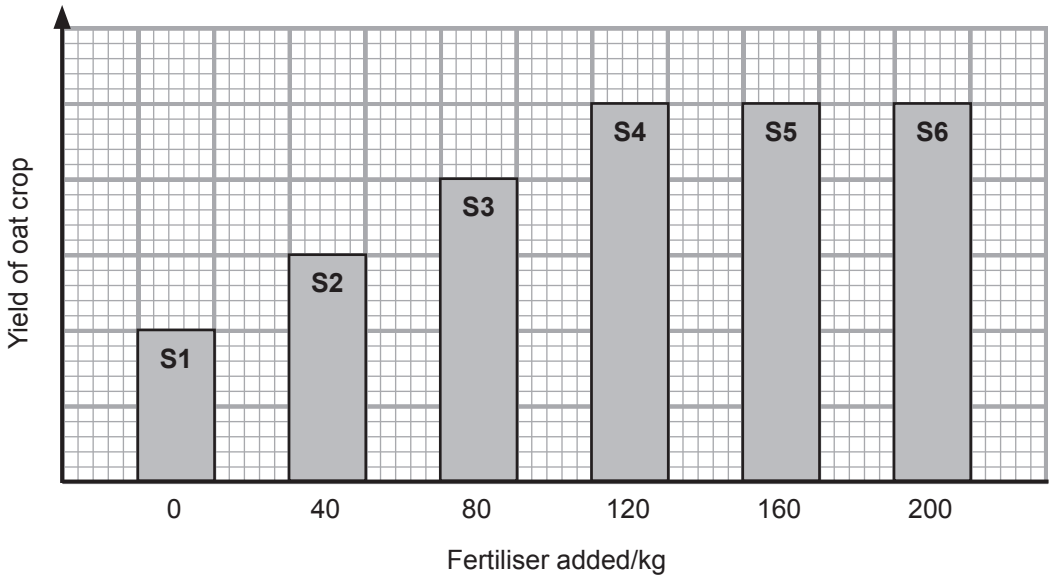
(c) Fertilisers add minerals to the soil.

A farmer planted the same number of oat seedlings in each of six equal-sized strips (**S1** to **S6**) in a field.

He added no fertiliser to strip **S1**, and different amounts of the same fertiliser to strips **S2** to **S6**.

He recorded the yield of the oat crop for each strip after five months.

The bar chart shows the results.



Source: Principal Examiner

(i) Why did oat seedlings grow in strip **S1** in the field?

_____

_____

_____ [1]

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(ii) Use **data** from the graph to describe the trend in the yield of the oat crop when increasing amounts of fertiliser were added.

_____

_____

_____

_____ [2]

(iii) Why should the farmer **not** add more than 120 kg of fertiliser when growing oats the following year?

_____

_____

_____ [1]

[Turn over

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7 Shags and cormorants are birds that nest on the same cliffs and feed on prey in the same waters.

(a) (i) What does the term habitat mean?

_____

_____ [1]

(ii) What is the habitat of the shags and cormorants?

_____ [1]

(b) The table shows the results from a study of the birds' feeding habits over a two week period.

Region of water where prey live	Type of prey eaten	Numbers of prey eaten/day by the different types of bird	
		Shag	Cormorant
Surface dwelling	Sand eels	33	0
	Herring	49	0
Bottom dwelling	Flatfish	0	26
	Shrimps	0	33

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

(i) Describe and explain how the shags and cormorants can live together in the same area.

_____

_____

_____ [2]

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(ii) A change in currents in the water causes less sand eels and herring to arrive near these cliffs.

Describe and explain what effect this would have on the shag and cormorant populations.

[4]

[Turn over

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8 **(a)** What are enzymes?

_____

_____

_____ [2]

(b) Biological washing powders contain enzymes that break down stains on clothes.

One brand of biological washing powder contains the enzymes lipase and protease. These enzymes work best at 40 °C.

Use this information and your knowledge to answer the following questions.

(i) This brand of washing powder was used on clothes that had **only** protein stains.

Name the breakdown product found in the resulting waste water.

_____ [1]

(ii) What type of stain would be broken down by the lipase enzyme?

_____ [1]

(iii) Suggest **one** reason why it is important to follow the manufacturer's guidelines on the amount of powder to add to each wash.

_____

_____ [1]

(iv) What is the advantage to the **environment** of using a washing powder that works best at 40 °C rather than at a higher temperature?

_____ [1]

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(v) Non-biological washing powders do **not** contain enzymes.

Why can non-biological washing powders be used at higher temperatures than biological washing powders?

_____

_____ [1]

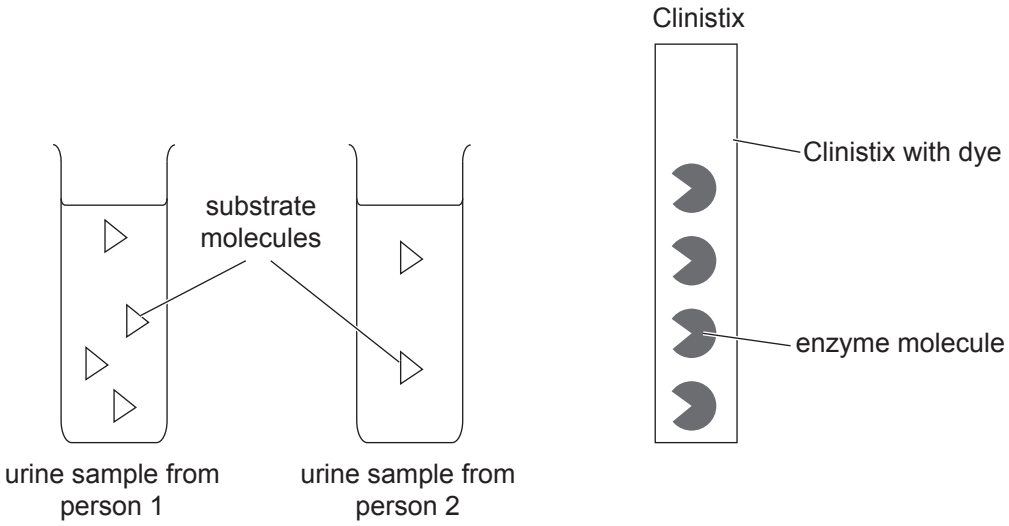
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(c) A Clinistix is a small paper strip containing one type of enzyme and a dye. It is used to test urine to find out if someone has diabetes.

When **each** enzyme molecule on the Clinistix joins with a substrate molecule, it produces a small change in the colour of the dye.

The diagram shows urine samples from two people with untreated diabetes and a Clinistix.



Source: Principal Examiner

Use this information, the diagram and your knowledge to answer the following questions.

(i) What substance if found in the urine of a person indicates that they may have diabetes?

_____ [1]

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(ii) Separate Clinistix were placed in the urine samples of person 1 and person 2.

Describe and explain the difference you would expect to see in the two Clinistix test results.

[2]

(iii) Explain why the Clinistix will **not** react to the presence of other molecules in the urine.

[1]

(d) Some people with diabetes have to inject a hormone into their bloodstream.

(i) Name this hormone.

[1]

(ii) Where in the body is this hormone produced?

[1]

(iii) Describe and explain the action of this hormone.

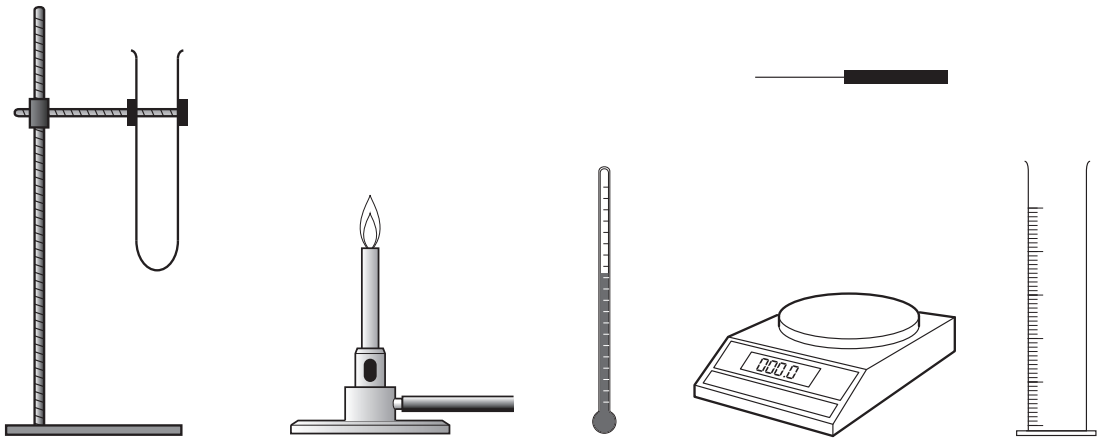
[3]

[Turn over

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9 **(a)** A student wants to find out the energy content of 1 gram of cheese.

The diagram shows the apparatus that she needs.



Source: Principal Examiner

Describe how the student would carry out this experiment.

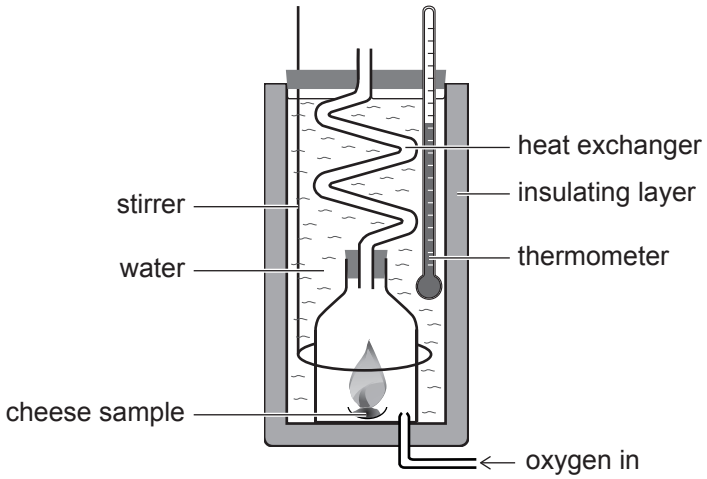
State any measurements she would need to take when using this apparatus.

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

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[6]

(b) The diagram shows apparatus that a manufacturer would use to check the energy content of 1 gram of cheese.



Source: Examining Team

This apparatus will give more accurate values compared to the student's apparatus.

Give **three** reasons why.

1. _____

2. _____

3. _____

[3]

[Turn over

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24GSD1119

(c) The energy content of a food is calculated using the formula below.

Energy in food/J = Mass of water/g × Rise in temperature/°C × 4.2

The table below shows the results obtained by a manufacturer when using this apparatus with 1 gram of cheese.

20 grams of water were used.

Food	Temperature of water/°C	
	Initial	Final
Cheese	25	55

Calculate the energy content of 1 gram of this cheese.

Show your working.

_____ J [2]

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

Examiner Number

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Rewarding Learning

General Certificate of Secondary Education
2014–2015

Double Award Science: Biology

Unit B1

Foundation Tier

[GSD11]

TUESDAY 12 MAY 2015, AFTERNOON

MARK SCHEME

STEMUP.CO.UK

General Marking Instructions

Introduction

Mark schemes are published to assist teachers and students in their preparation for examinations. Through the mark schemes teachers and students will be able to see what examiners are looking for in response to questions and exactly where the marks have been awarded. The publishing of the mark schemes may help to show that examiners are not concerned about finding out what a student does not know but rather with rewarding students for what they do know.

The Purpose of Mark Schemes

Examination papers are set and revised by teams of examiners and revisers appointed by the Council. The teams of examiners and revisers include experienced teachers who are familiar with the level and standards expected of students in schools and colleges.

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				AVAILABLE MARKS
1	**(a)**	brain; faster; blood; organ	[4]	4
2	**(a)**	Boil leaf → to stop reactions in the leaf/kills leaf Place the leaf in hot alcohol → to remove chlorophyll/decolourise Add to hot water for a short time → to soften the leaf/less brittle	[3]	
	(b)	**(i)** Iodine	[1]	
		(ii) blue/black	[1]	5
3	**(a)**	inherited/genetic	[1]	
	(b)	Any **two** from: Any of: strokes/high blood pressure/joint problems/rickets/scurvy/ bowel cancer/anaemia/dental decay Any one of these: CHD/heart attack/heart disease	[2]	
	(c)	**(i)** DCPIP	[1]	
		(ii) **blue** to colourless (both needed)	[1]	5
4	**(a)**	**(i)** to produce energy	[1]	
		(ii) oxygen	[1]	
		(iii) carbon dioxide	[1]	
	(b)	Any **two** from: • large surface area • thin/(air sac) wall is one cell thick/capillary wall is one cell thick • **good** blood supply	[2]	5

		AVAILABLE MARKS
5 **(a)**	A – photosynthesis B – feeding/eating/ingestion/consumption C – respiration [3]	
(b) **(i)**	sun/sunlight [1]	
(ii)	phytoplankton [1]	
(c)	 4 levels, biggest at bottom and symmetrical; phytoplankton labelled at bottom and biggest; others labelled in correct order: zooplankton, sand eels, seabird [3]	8
6 **(a)** **(i)**	root hair (cells) [1]	
(ii)	protein/amino acids [1]	
(b) **(i)**	slurry/animal waste/manure/compost/farmyard manure (FYM)/ cow faeces [1]	
(ii)	**minerals** available for longer/slow release **of minerals**/improves soil texture/improves soil structure/improves drainage/more air/adds humus/ adds organic matter [1]	
(c) **(i)**	must be minerals/nitrates in the soil [1]	
(ii)	1st mark: increase in yield with increasing fertiliser; no increase in yield above 120 kg [2]	
(iii)	waste/uneconomic/yield won't get any bigger [1]	8

					AVAILABLE MARKS
7	(a)	(i)	the place where an organism lives	[1]	
		(ii)	cliffs	[1]	
	(b)	(i)	Shag eats surface swimming prey/fish/sand eels and herrings and cormorants eat bottom swimming prey/fish/flatfish and shrimps; They are not competing for the same food/prey/fish/different types of food eaten/don't eat each other's food	[2]	
		(ii)	decline in shag population; – due to lack of food; **or** shags relocate; to get food cormorants stay the same; cormorants still have food/don't eat surface dwelling species **or** cormorants increase; more space for nests	[4]	8

				AVAILABLE MARKS
8	**(a)**	Any **two** from: • (biological) catalysts • proteins • speed up reactions	[2]	
	(b) **(i)**	amino acids	[1]	
	(ii)	fat/lipid/oil/grease	[1]	
	(iii)	use too much – is a waste/uneconomic/ends up in the waste water don't use enough – stains not removed	[1]	
	(iv)	less energy is used/less electricity used/less CO_2 produced/less greenhouse gases/less global warming/less fossil fuels burned	[1]	
	(v)	there are no enzymes that would be broken down at higher temperatures	[1]	
	(c) **(i)**	glucose	[1]	
	(ii)	more glucose/substrate in urine of person 1/or converse; greater intensity of dye or greater degree of colour change in person 1/or converse	[2]	
	(iii)	enzyme is specific to glucose/shape of enzyme only fits with glucose/ it is specific/'lock and key'/no other substance will fit	[1]	
	(d) **(i)**	insulin	[1]	
	(ii)	pancreas	[1]	
	(iii)	Any **three** from: lowers blood sugar/glucose; by converting glucose to glycogen; **increasing** rate of respiration; in the liver; by converting glucose to fat/stores it as fat; uptake of more glucose	[3]	16

AVAILABLE MARKS

9 (a) Indicative content

- 1. weigh cheese sample/use top pan balance/scale;
- 2. put cheese sample onto mounted needle;
- 3. measure water into **measuring cylinder**;
- 4. add water to the test tube;
- 5. record initial temperature (of the water);
- 6. set fire to cheese;
- 7. place (burning) cheese under test tube;
- 8. completely burn the cheese;
- 9. stir the water (before recording temperature);
- 10. record final temperature of the water/measure temperature change = 1 mark [6]

Response	Marks
Candidates use appropriate terms throughout to give at least five points about how to carry out the experiment. They use good spelling, punctuation and grammar. Form and style are of a high standard.	[5]–[6]
Candidates use appropriate terms throughout to give at least three or four points on how to carry out the experiment. They use satisfactory spelling, punctuation and grammar. Form and style are of a satisfactory standard.	[3]–[4]
Candidates use appropriate terms throughout to give one or two points about how to carry out the experiment. They use limited spelling, punctuation and grammar and have made little use of specialist terms.	[1]–[2]
Response not worthy of credit.	[0]

(b) Any **three** from:
- stirrer gives more even distribution of heat;
- food more completely burnt/more oxygen for burning of food;
- energy not lost to surrounding air/more insulation/so no heat can escape;
- coiled glass tube means more heat transfer to water;
- no cheese can fall off [3]

(c) $20 \times 30 \times 4.2$; 2520 J [2] 11

Total **70**

Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2014–2015

Double Award Science: Biology

GSD11

Unit B1
Foundation Tier

[GSD11]

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 eight** 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 Question **8**.

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

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Examiner Only	
Marks	Remark

1 **(a)** Complete the passage by writing the correct words in the spaces.

Choose the correct words from the box below.

dark	**hormone**	**photosynthesis**
tip	**side**	**phototropism**

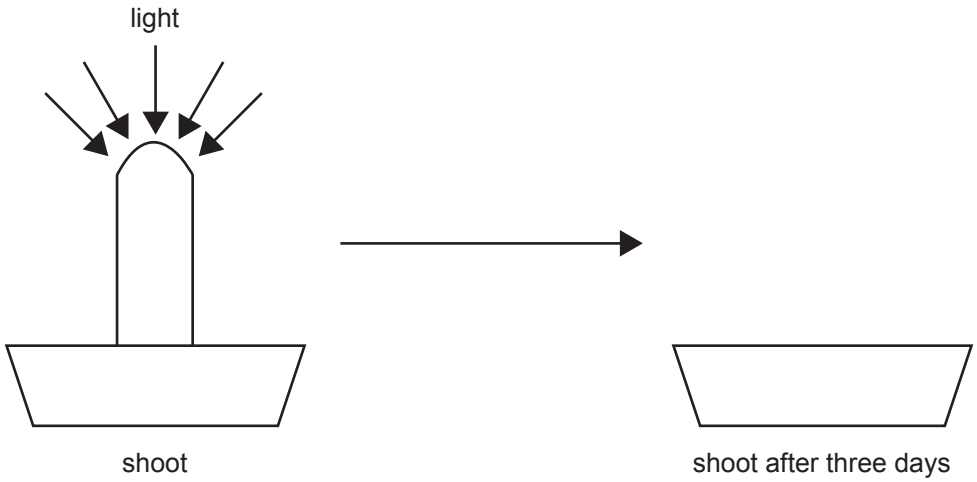
Auxin is a plant _____. It is found in the _____ of the shoot. Light coming from one _____ of the plant causes the shoot to bend towards the light. This growth response is called _____. [4]

(b) Suggest two advantages to the plant of bending towards the light.

1. _____

2. _____ [2]

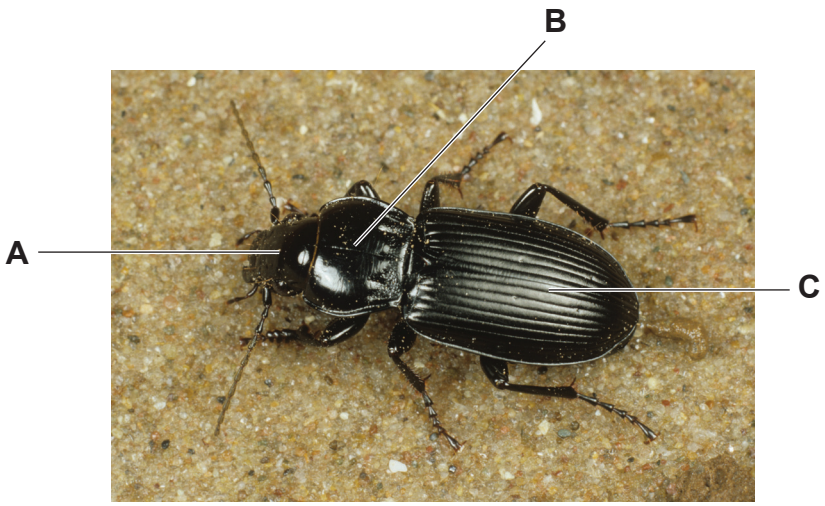
(c) Complete the diagram to show how this shoot grows when light shines from all sides.



[2]

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2 The photograph shows a beetle.



© Nigel Cattlin / Science Photo Library

(a) Beetles are insects. Insects have three main body parts.

Name parts **A**, **B** and **C**.

A _____

B _____

C _____ [3]

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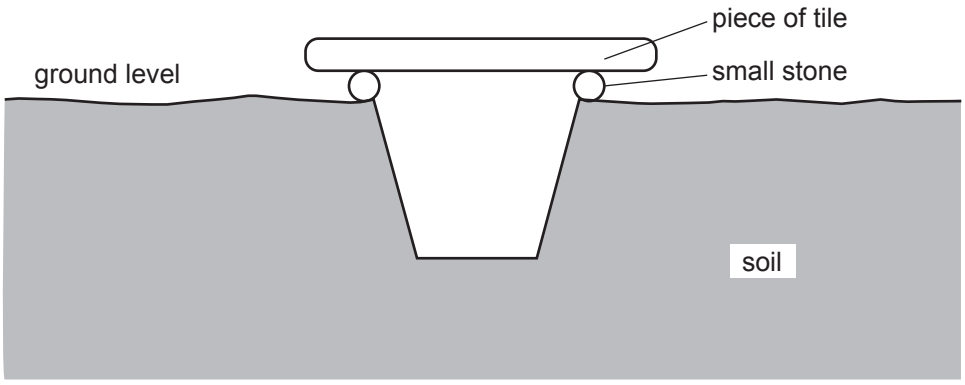
Marks	Remark

Examiner Only	
Marks	Remark

(b) A scientist wanted to estimate the number of beetles in a grassland.

He randomly placed ten sampling devices in the grassland and left them for three days.

The diagram shows the sampling device.



(i) Name the sampling device used.

_____ [1]

(ii) Suggest a reason for a piece of tile being placed on top of the sampling device.

_____ [1]

After three days, the scientist captured 50 beetles in the ten sampling devices. This is **Sample 1**.

He marked the underside of each beetle with a small spot of harmless paint.

Then he released all these beetles into the grassland.

After a further three days, he captured another sample of 45 beetles in the sampling devices. This is **Sample 2**.

Five of these beetles were marked with the paint. This is **Sample 3**.

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The scientist used the equation below to calculate the number of beetles in the grassland.

$$\textbf{Number of beetles} = \frac{\textbf{Sample 1} \times \textbf{Sample 2}}{\textbf{Sample 3}}$$

(c) (i) Use the information given and the equation to calculate the number of beetles in the grassland.

Show your working.

_____ [3]

(ii) Beetles are eaten by birds and squirrels.

Suggest why the beetles in **Sample 1** were marked with paint on the underside of the body rather than on the top side.

_____ [1]

(iii) One month later, the scientist estimated the number of beetles again.

He found that it had decreased by 130.

Give two reasons to explain this decrease.

1. _____

2. _____ [2]

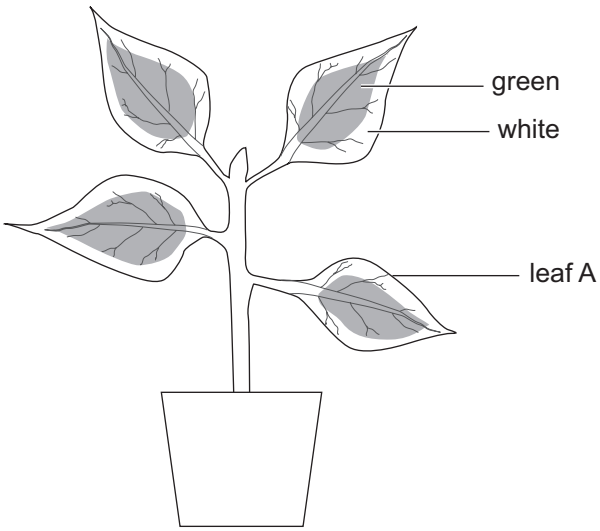
Examiner Only

Marks	Remark

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Examiner Only	
Marks	Remark

3 **(a)** A variegated leaf is green and white.
The diagram shows a plant with variegated leaves.



The plant was left in a warm, sunny room for two days.
Leaf A was then tested for starch.

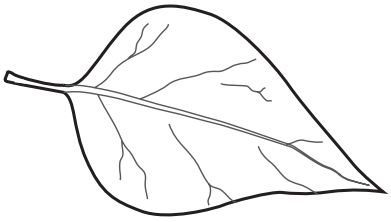
(i) Name the chemical used to test for starch.

_____ [1]

(ii) What colour would the leaf turn where starch is present?

_____ [1]

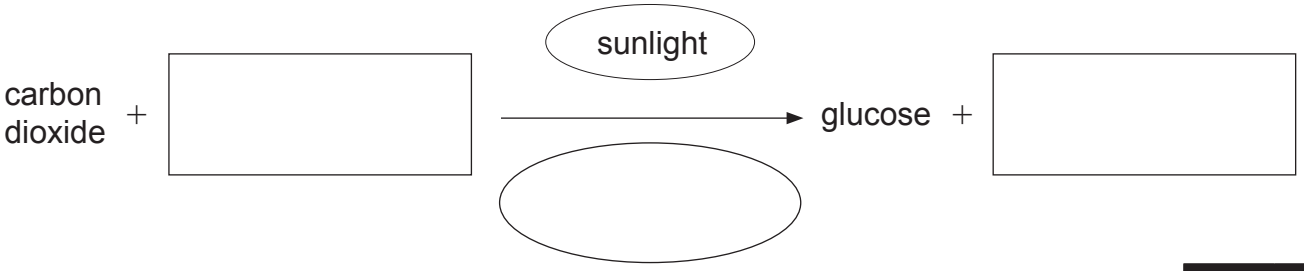
The diagram below shows the outline of leaf A.



(iii) Shade the part of the leaf where you would expect to find starch. [1]

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(b) (i) Write in the spaces to complete the word equation for photosynthesis.



[3]

(ii) Give two ways a plant uses glucose.

1. _____

2. _____ [2]

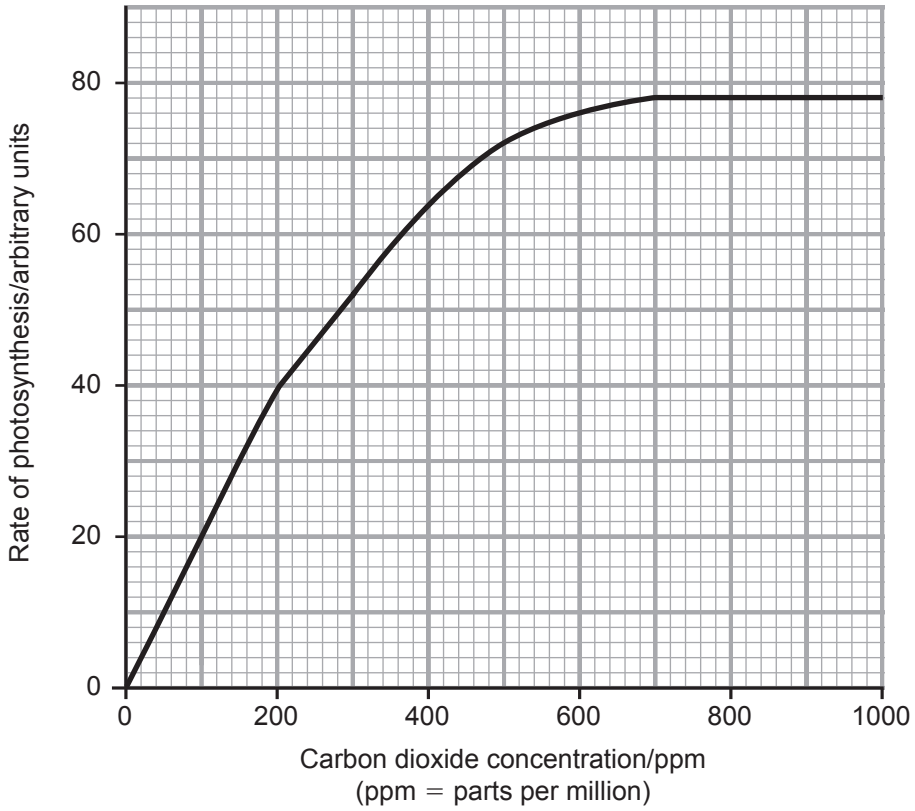
Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

(c) Tomato plants can be grown in a glasshouse.

A tomato grower can add carbon dioxide to increase the rate of photosynthesis. This increases the yield of tomatoes.

The graph shows the effect of carbon dioxide concentration on the rate of photosynthesis of tomato plants in a glasshouse.



(i) Use the graph to give the rate of photosynthesis when the carbon dioxide concentration is 200 ppm.

_____ arbitrary units [1]

(ii) Name two factors that could limit the rate of photosynthesis when carbon dioxide concentrations are above 700 ppm.

1. _____

2. _____ [2]

(iii) Extra carbon dioxide can be added in a glasshouse by using an oil burner.

Apart from adding carbon dioxide, explain another advantage to the tomato plants of using an oil burner.

_____

_____ [2]

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(Questions continue overleaf)

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Examiner Only	
Marks	Remark

4 **(a)** A student investigated the effect of temperature on the action of a biological washing powder in 30 minute washing cycles.

She washed six pieces of cloth, each with the same size of egg yolk stain, at six different temperatures.

Egg yolk contains protein.

She used a biological washing powder containing the enzyme protease in the washing cycles.

At the end of the washing cycle, she recorded the percentage of stain **remaining** on each piece of cloth.

The table shows her results.

Temperature/°C	Percentage of stain remaining on cloth/%
10	90
20	75
30	60
40	10
50	25
60	70

(i) Use the information in the table to give the best temperature when using this washing powder.

Explain your answer.

_____

_____

_____ [2]

(ii) Even at the best temperature not all the stain is removed.

Suggest two changes the student could make so that more of the stain is removed.

1. _____

2. _____ [2]

(b) The student carried out another investigation with similar pieces of cloth stained with **fat**. She used the same biological washing powder as before.

Explain why none of the fat stains will be removed.

_____

_____

_____

_____ [2]

Examiner Only

Marks	Remark

5 The drawing shows a corncrake.



© Sheila Terry / Science Photo Library

Read the following passage.

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

Examiner Only	
Marks	Remark

(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]

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Examiner Only

Marks	Remark

6 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. _____

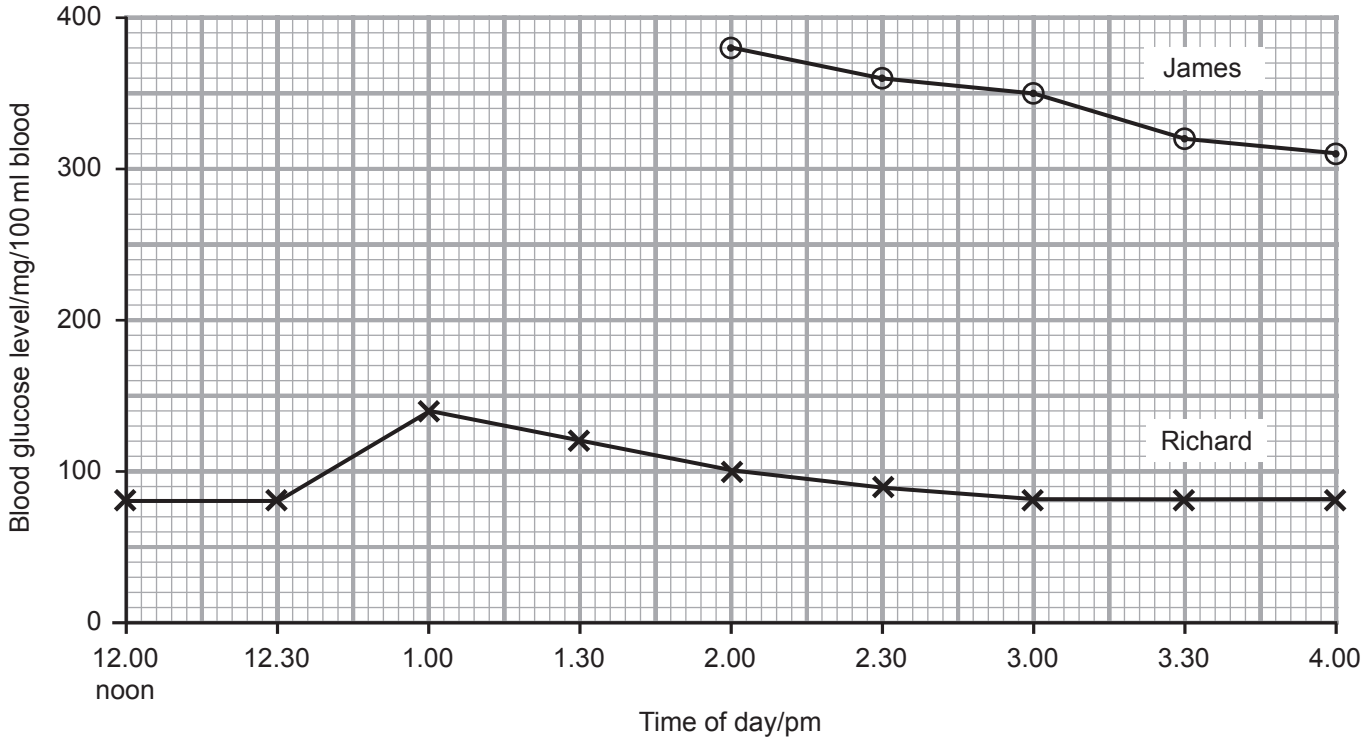
2. _____ [2]

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

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



[2]

Examiner Only	
Marks	Remark

(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. _____

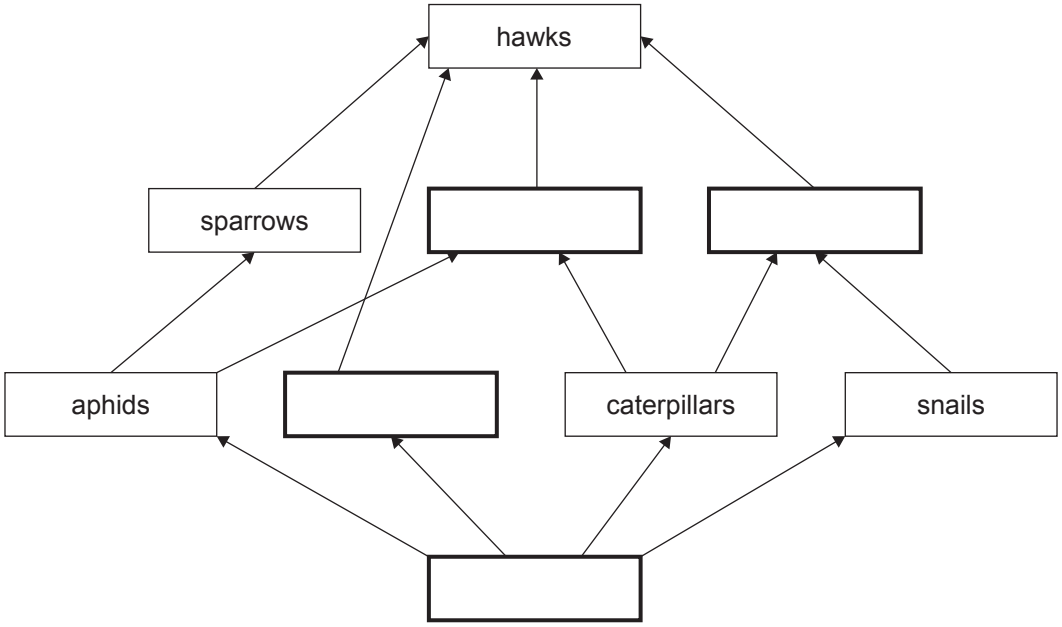
2. _____ [2]

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7 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]

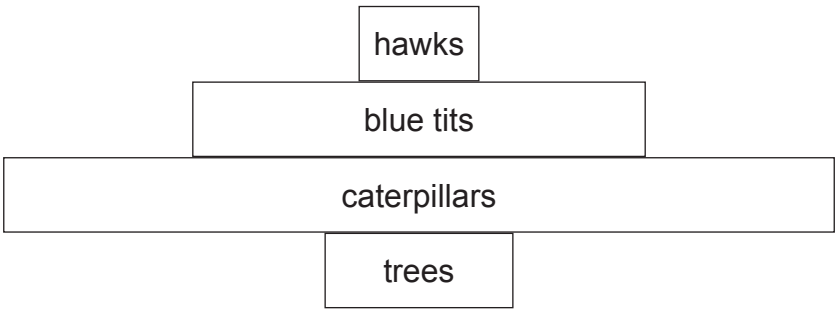
Examiner Only

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

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Examiner Only	
Marks	Remark

8 Benedict's reagent is used to test for the presence of sugar (glucose) in food.

The intensity (strength) of the colour of Benedict's reagent at the end of the test indicates the amount of sugar (glucose) present.

Paula planned an investigation to compare the **amount** of sugar (glucose) in two types of biscuit.

- 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 more sugar (glucose) than the other biscuit.

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

[6]

THIS IS THE END OF THE QUESTION PAPER

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Rewarding Learning

General Certificate of Secondary Education
2014–2015

Double Award Science: Biology

Unit B1

Foundation Tier

[GSD11]

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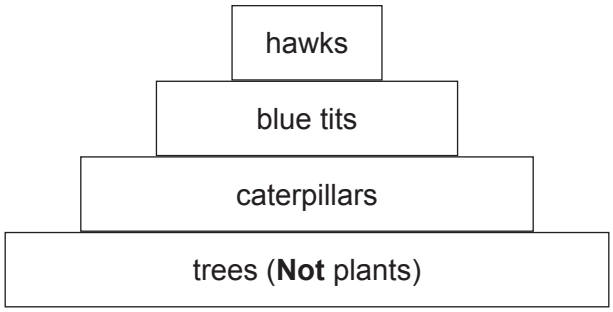
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				AVAILABLE MARKS
1	(a)	Hormone; tip; side; **phototropism**	[4]	
	(b)	Any **two** from: • Plant receives **more** light/all possible light/energy from sun • **Increases** photosynthesis • **Increases** growth	[2]	
	(c)	Shoot is taller; grows straight up	[2]	8
2	(a)	A – head B – thorax C – abdomen	[3]	
	(b) (i)	Pitfall (trap)	[1]	
	(ii)	To stop flooding/rainwater from entering the trap	[1]	
	(c) (i)	50 × 45; ÷ 5; = 450	[3]	
	(ii)	So that they were not more noticeable/conspicuous to predators **Not** as well camouflaged	[1]	
	(iii)	Any **two** from: • Deaths/disease • Emigration • Predation • **Less** food available/lack of food • Change in weather • Hibernation	[2]	11

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					AVAILABLE MARKS
3	(a)	(i)	Iodine (solution)	[1]	
		(ii)	Blue-black or black	[1]	
		(iii)	Centre of leaf shaded	[1]	
	(b)	(i)	Water; chlorophyll/chloroplast; oxygen	[3]	
		(ii)	Any **two** from: • starch • respiration/energy • cellulose • oils/lipids/glycerol • amino acids/proteins • chlorophyll	[2]	
	(c)	(i)	40 arbitrary units/39	[1]	
		(ii)	Light; Temperature, Water	[2]	
		(iii)	Burning oil will produce heat/increase temperature/keep warm; increase the rate of photosynthesis/more growth	[2]	13
4	(a)	(i)	40°C; least amount of stain remaining/only 10% of the stain remains/ 90% removed	[2]	
		(ii)	Increase protease/enzyme/washing powder concentration; increase the washing/cycle time/longer wash/wash again/smaller load	[2]	
	(b)		Any **two** from: • stain/fat is not **broken down/digested**; • only lipase will break down fats; • protease only breaks down protein	[2]	6

			AVAILABLE MARKS
5	**(a)**	6 (million) [1]	
	(b)	They live/nest in long grass [1]	
	(c)	Any **two** from: • nests/eggs are destroyed • chicks are killed • adults are killed • destroys food • will leave • nowhere to hide • ruining habitat • eaten by predators • nowhere to lay eggs [2]	
	(d)	This allows the chicks/adults to escape (into other fields)/move habitat/ lays eggs at edge/birds not killed by machines [1]	
	(e)	Have a **backbone** [1]	6
6	**(a)**	**(i)** Starch [1]	
		(ii) Any **two** from: • large surface area • villi/microvilli • long/folds • good blood supply/diffusion gradient • (villus) wall one cell thick/thin wall • permeable [2]	
	(b)	**(i)** 3 or 4 points correctly plotted; Points joined by straight lines [2]	
		(ii) Any **two** from: • James up to 390, Richard 140 • James's level continues to rise for longer • James's blood glucose level is (always) higher • James's blood glucose takes longer to return to normal • James has a steeper increase • Times of peak (James 1.30, Richard 1) [2]	
		(iii) Any **three** from: • insulin is produced • in the pancreas • this hormone acts in the liver • and converts glucose into glycogen/stores as glycogen • and increases respiration of glucose [3]	
		(iv) Any **two** from: • eye damage/blindness • kidney failure/damage • heart disease/CHD/heart attack • stroke [2]	12

		AVAILABLE MARKS
7	**(a)** From bottom up and clockwise Plants, rabbits, blue tits, thrushes 4 correct – 3 marks 2/3 correct – 2 marks 1 correct – 1 mark [3]	
	(b) **(i)** Plants [1]	
	(ii) Hawk [1]	
	(c) Heat (from respiration)/movement/excretion/egestion/uneaten materials, e.g. feathers and bones [1]	
	(d)  Symmetrical shape; Labels in correct order [2]	8

		AVAILABLE MARKS
8	**Indicative content** **Method:** • Crush/crumble biscuit • Add biscuit to test tube • Heat in a **water bath** (or described) • Add Benedict's (to biscuit) **Controlled variables:** • Equal masses of the two biscuits • Biscuits crumbled to same extent • Same volume of Benedict's • Heated for same length of time **Conclusion:** • Brick red precipitate • Biscuit sample that gives the more intense brick red colour contains more sugar	

Band	Response	Mark
A	Candidates must use appropriate specialist terms throughout using at least five of the above points (must include one controlled variable and one conclusion) to describe how they would carry out this experiment and draw conclusions. They use good spelling, punctuation and grammar and the form and style are of a high standard.	[5]–[6]
B	Candidates must use some appropriate specialist terms throughout using three or four of the above points to describe how they would carry out this experiment and draw conclusions. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	[3]–[4]
C	Candidates describe how the experiment is carried out or draw conclusions using one or two of the above points. However, these are not presented in a logical sequence. They use limited spelling, punctuation and grammar and they have made little use of specialist terms.	[1]–[2]
D	Response not worthy of credit.	[0]

[6] 6

Total **70**

Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
2014–2015

Double Award Science: Biology

Unit B1

Foundation Tier

[GSD11]

GSD11

WEDNESDAY 12 NOVEMBER 2014, 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 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 Question **7(d)**.

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

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Examiner Only	
Marks	Remark

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



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

(ii) Name the producer in the food chain.

_____ [1]

(iii) What is the energy source for the producer?

_____ [1]

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

_____ [1]

(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]

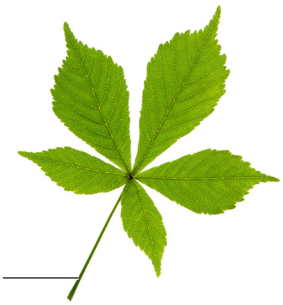
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2 The photographs show four different types of leaf.



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Leaf A



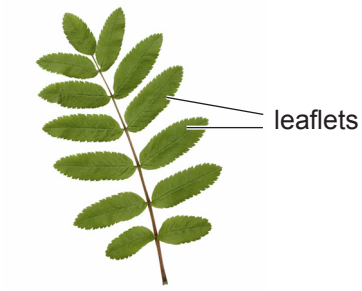
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Leaf B



© Bjorn Svensson/Science Photo Library

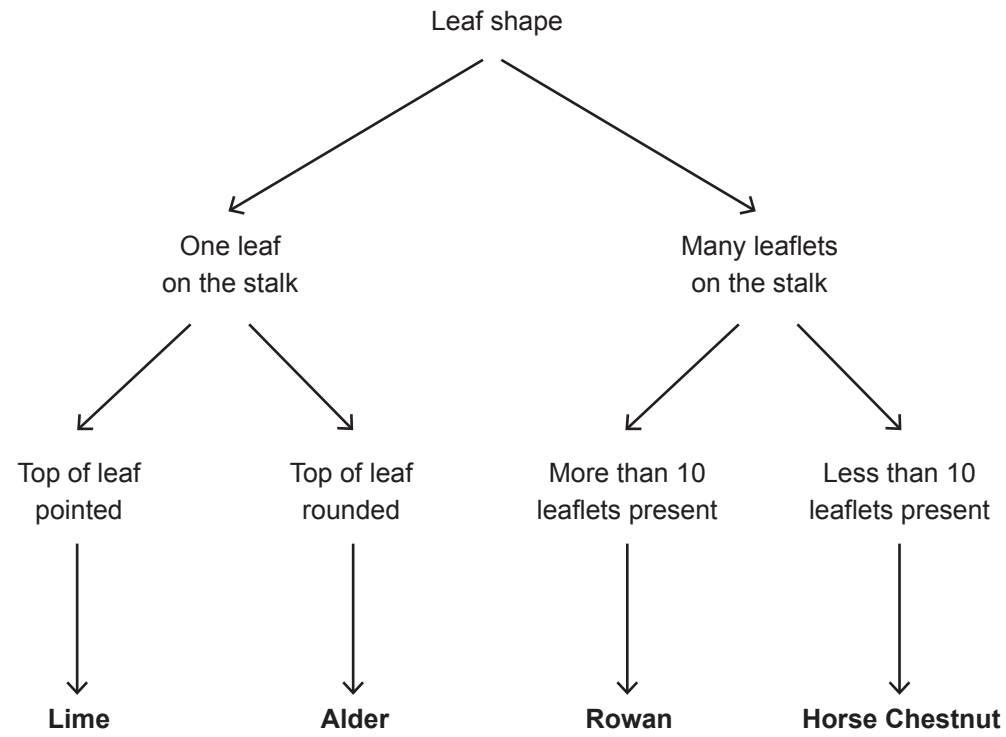
Leaf C



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Leaf D

The key below can be used to identify each leaf.



(a) Use the key to identify each leaf.

A _____

B _____

C _____

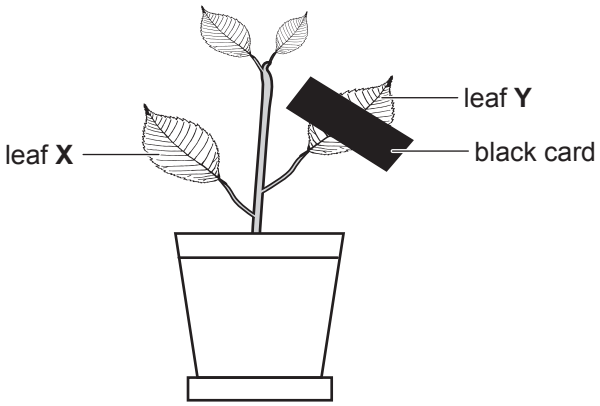
D _____ [3]

Examiner Only	
Marks	Remark

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Examiner Only	
Marks	Remark

(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?

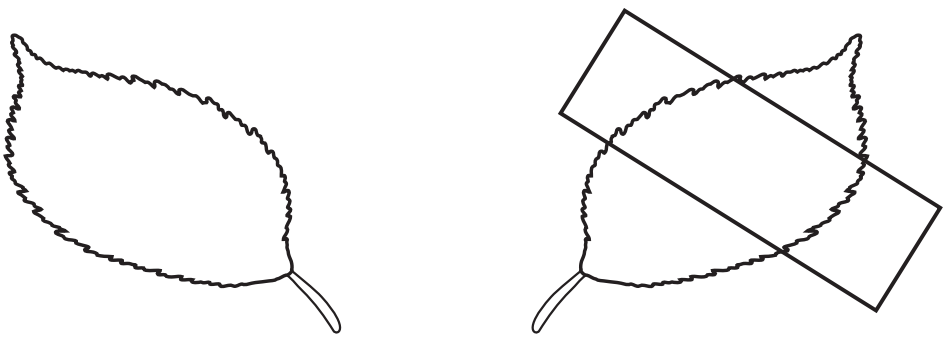
_____

_____ [1]

(ii) What is the function of the black card on leaf **Y**?

_____ [1]

(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.

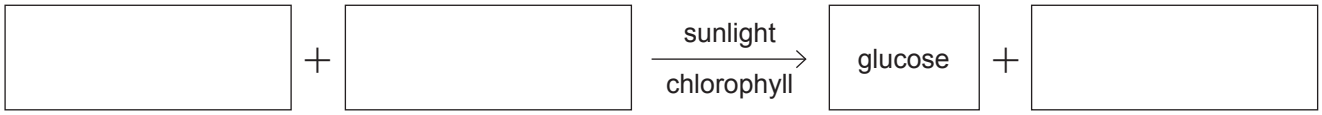


leaf **X** leaf **Y**

[2]

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(c) (i) Write in the boxes to complete the word equation for photosynthesis.



[3]

(ii) Plants produce glucose during photosynthesis.

Give **two** ways plants use glucose.

1. _____

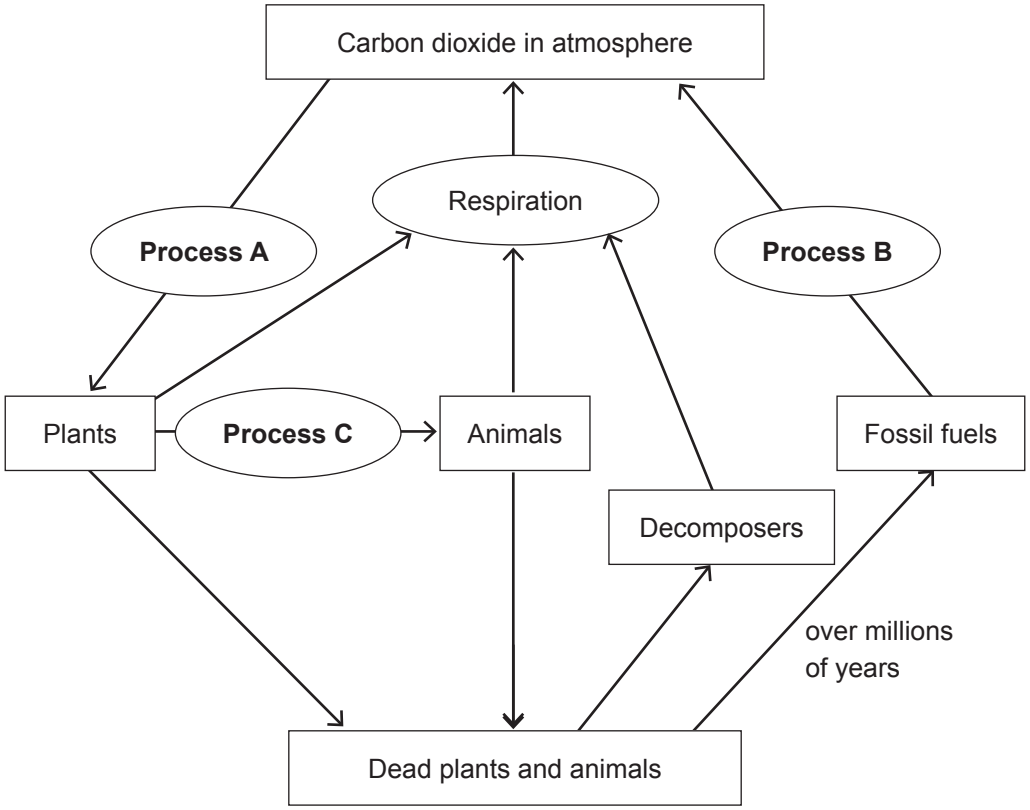
2. _____ [2]

Examiner Only	
Marks	Remark

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Examiner Only	
Marks	Remark

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



Name **Process A**, **Process B** and **Process C** in the diagram.

A _____

B _____

C _____ [3]

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

What is the function of respiration?

_____

_____ [1]

(ii) Name the **two** substances used in respiration.

1. _____

2. _____ [2]

Examiner Only	
Marks	Remark

(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.



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

_____

_____

_____

_____

_____ [3]

(ii) International treaties help to reduce global warming.

Give **one** way in which international treaties do this.

_____

_____ [1]

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Examiner Only	
Marks	Remark

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]

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

What type of chemical is adrenaline?

_____ [1]

(iii) Suggest how adrenaline is transported around the body.

_____ [1]

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

(i) Where is insulin made in the body?

_____ [1]

(ii) Describe how insulin lowers blood glucose levels.

_____

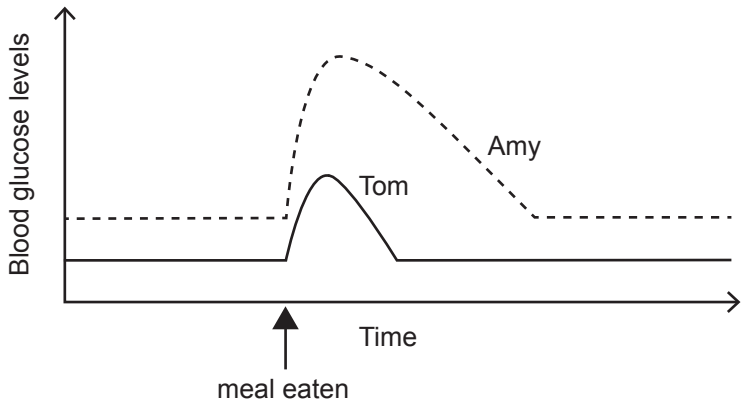
_____

_____ [2]

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(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.

1. _____

_____

2. _____

_____ [2]

Examiner Only

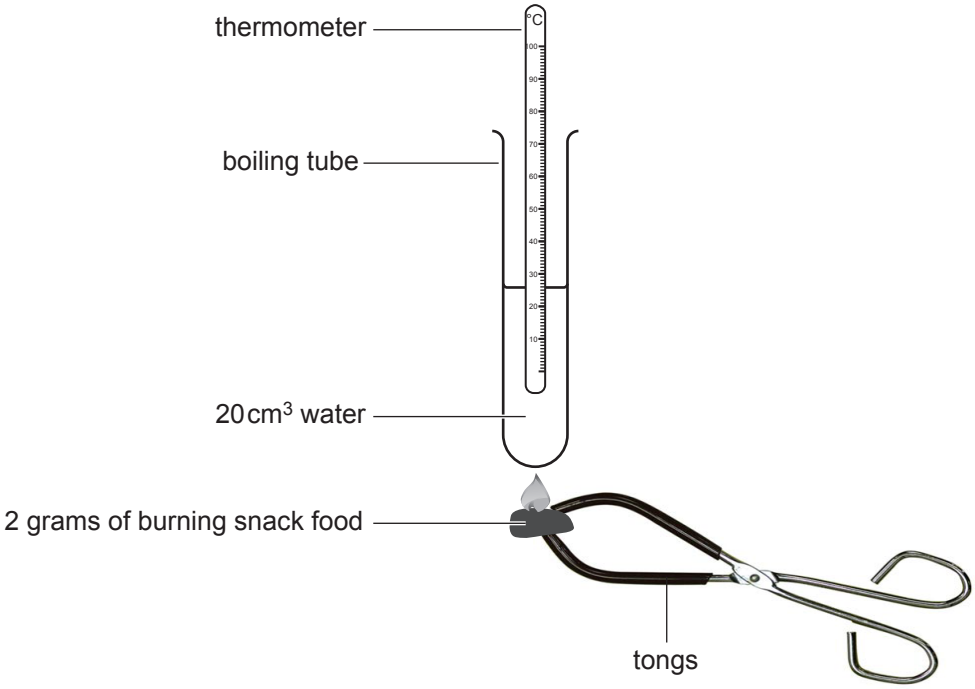
Marks	Remark

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Examiner Only	
Marks	Remark

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

The diagram shows how they carried out their investigation.



They measured the temperature of 20 cm^3 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 cm^3 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]

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

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

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

Show your working.

_____ J [3]

(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]

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

What is the advantage of doing this?

_____

_____ [1]

(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]

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

_____ [1]

Examiner Only

Marks	Remark

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Examiner Only	
Marks	Remark

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



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Read the following passage.

Line

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

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

Another suggestion is that oak seedling roots are eaten by voles, which are small animals living in the forest. 7

Any decrease in the size of oak forests will cause a problem for the timber industry, which uses the oak wood. It will also affect biodiversity, as a large wildlife population lives in oak forests. 9 11

(i) Read lines 1–6 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]

(ii) Read lines 7–8 of the passage.

What trophic level are the voles feeding at?

_____ [1]

(iii) Read lines 9–11 of the passage.

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

Economic _____

_____

Environmental _____

_____ [2]

(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]

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

_____

_____

_____

_____

_____

_____ [2]

Examiner Only	
Marks	Remark

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Examiner Only	
Marks	Remark

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.

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

[3]

(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]

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

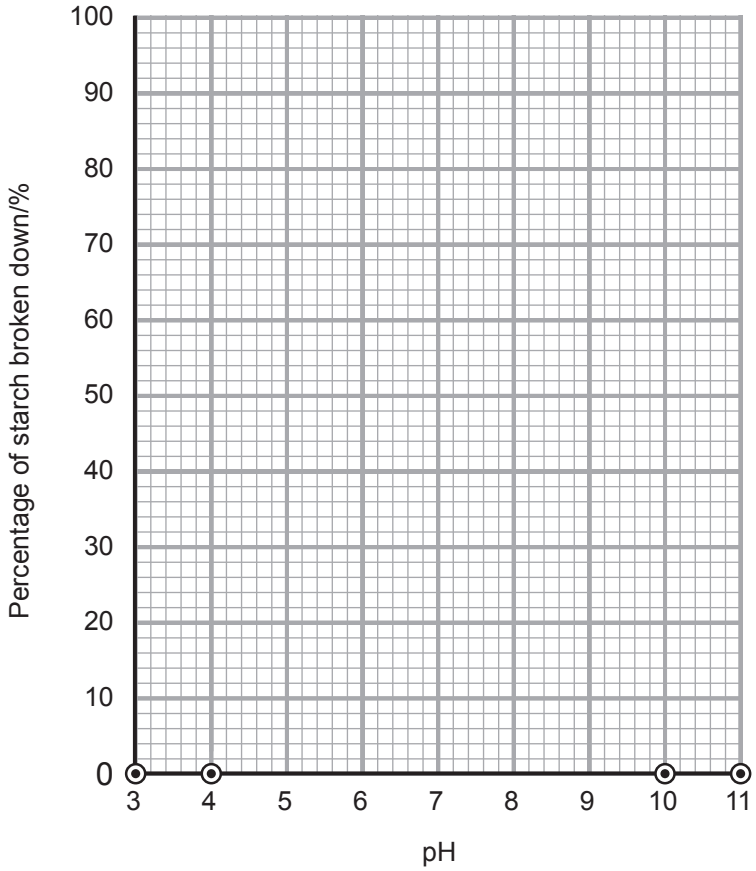
Another student investigated how pH affects the breakdown of starch.

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, using the data in the table opposite.

Four plots have been done for you.



[3]

(ii) What is the best pH for amylase to break down starch?

_____ [1]

(iii) Use **data** from the graph to describe the trend shown.

_____

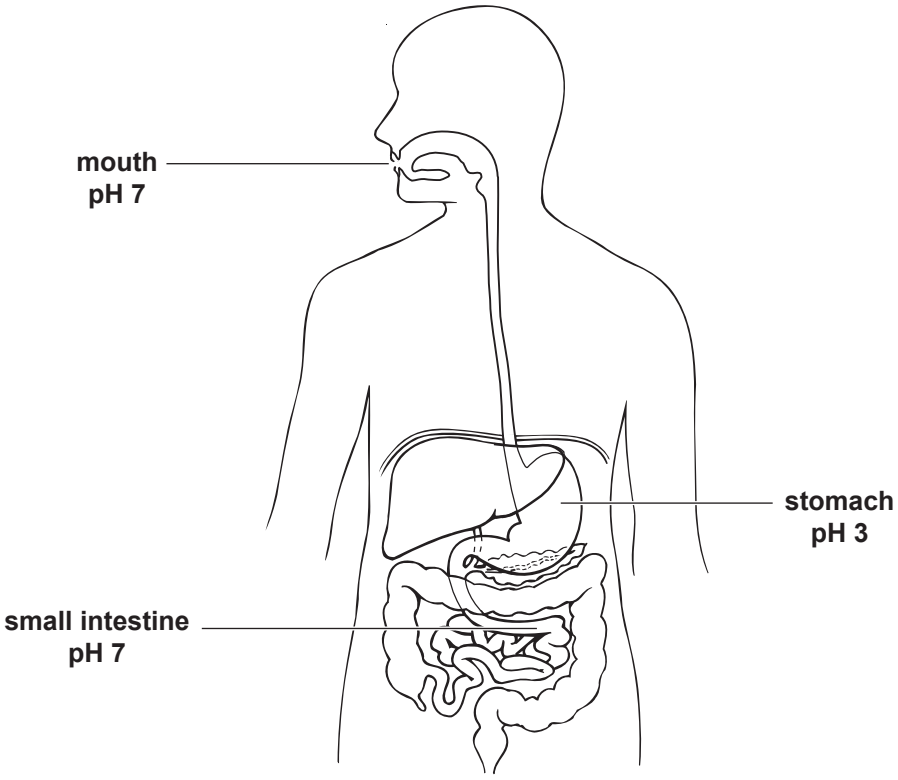
_____

_____

_____ [2]

Examiner Only	
Marks	Remark

(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.



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Use the graph on page 15, 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.

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

[6]

Examiner Only	
Marks	Remark

THIS IS THE END OF THE QUESTION PAPER

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113166

Rewarding Learning

General Certificate of Secondary Education
2014–2015

Double Award Science: Biology

Unit B1

Foundation Tier

[GSD11]

WEDNESDAY 12 NOVEMBER 2014, MORNING

MARK SCHEME

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General Marking Instructions

Introduction

Mark schemes are published to assist teachers and students in their preparation for examinations. Through the mark schemes teachers and students will be able to see what examiners are looking for in response to questions and exactly where the marks have been awarded. The publishing of the mark schemes may help to show that examiners are not concerned about finding out what a student does not know but rather with rewarding students for what they do know.

The Purpose of Mark Schemes

Examination papers are set and revised by teams of examiners and revisers appointed by the Council. The teams of examiners and revisers include experienced teachers who are familiar with the level and standards expected of students in schools and colleges.

The job of the examiners is to set the questions and the mark schemes; and the job of the revisers is to review the questions and mark schemes commenting on a large range of issues about which they must be satisfied before the question papers and mark schemes are finalised.

The questions and the mark schemes are developed in association with each other so that the issues of differentiation and positive achievement can be addressed right from the start. Mark schemes, therefore, are regarded as part of an integral process which begins with the setting of questions and ends with the marking of the examination.

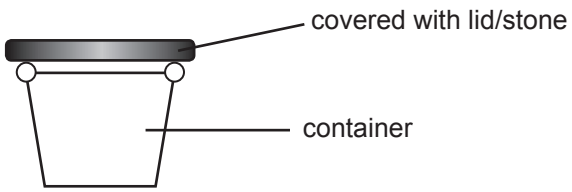
The main purpose of the mark scheme is to provide a uniform basis for the marking process so that all the markers are following exactly the same instructions and making the same judgements in so far as this is possible. Before marking begins a standardising meeting is held where all the markers are briefed using the mark scheme and samples of the students' work in the form of scripts. Consideration is also given at this stage to any comments on the operational papers received from teachers and their organisations. During this meeting, and up to and including the end of the marking, there is provision for amendments to be made to the mark scheme. What is published represents this final form of the mark scheme.

It is important to recognise that in some cases there may well be other correct responses which are equally acceptable to those published: the mark scheme can only cover those responses which emerged in the examination. There may also be instances where certain judgements may have to be left to the experience of the examiner, for example, where there is no absolute correct response – all teachers will be familiar with making such judgements.

					AVAILABLE MARKS
1	**(a)**	**(i)**	Two arrows, pointing to RHS	[1]	
		(ii)	Grass	[1]	
		(iii)	Sun/light	[1]	
		(iv)	Increase	[1]	
	(b)		(If food source runs out) animals will die or starve/population decrease; population extinct/species dies out/no population left	[2]	6
2	**(a)**		A = Lime B = Horse Chestnut C = Alder D = Rowan All four correct = 3 marks Two or three correct = 2 marks One correct = 1 mark	[3]	
	(b)	**(i)**	So no starch present/to destarch plant	[1]	
		(ii)	To block out light/to stop photosynthesis/no photosynthesis	[1]	
		(iii)	All of leaf X shaded; Leaf Y section covered by card unshaded and two ends of leaf Y shaded	[2]	
	(c)	**(i)**	**water** H_2O + **carbon dioxide** CO_2 $\xrightarrow[\text{chlorophyll}]{\text{sunlight}}$ glucose + **oxygen** O_2	[3]	
		(ii)	Any **two** from: Starch; Cellulose/cellwall; Respiration/energy/active uptake; Proteins; Oils/lipids/fats Reproduction/seeds; Growth; Also chlorophyll	[2]	12

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					AVAILABLE MARKS
3	**(a)**		A = Photosynthesis B = Combustion/burning C = Eating/ingestion/consumption/feeding	[3]	
	(b)	**(i)**	Release energy/produce energy/make energy	[1]	
		(ii)	Glucose; Oxygen	[2]	
	(c)	**(i)**	Polar ice caps melt/glaciers melting/icebergs/water expands; Sea levels rise/ocean levels rise; Islands are low-lying/only 2.4 metres above sea level/flood at highest point	[3]	
		(ii)	Reduce carbon dioxide/GHG emissions/set targets to reduce GHG; Help reduce amount of fossil fuels used/burned; Helps monitoring pollution/encourages alternative fuel sources/ makes people recycle more	[1]	10
4	**(a)**	**(i)**	Nervous/nerve <u>system</u>	[1]	
		(ii)	Hormone	[1]	
		(iii)	By the circulatory system/in blood/plasma	[1]	
	(b)	**(i)**	Pancreas	[1]	
		(ii)	• More or greater/<u>increased</u> respiration; • (Conversion of) glucose to glycogen/stores/turns it into glycogen.	[2]	
	(c)		Any **two** from: • Amy's blood glucose was high<u>er</u> before the meal/resting/normally; • After eating, Amy's blood glucose rises to a high<u>er</u> level; **or** • Amy's blood glucose is higher • Amy's blood glucose takes a long<u>er</u> time to return to normal/fall/ to decrease; • Amy's blood glucose rises fast<u>er</u> after eating.	[2]	8

					AVAILABLE MARKS
5	**(a)**	**(i)**	18	[1]	
		(ii)	(21 × 20 × 4.2); ÷ 2; = 882 J 3 marks on own 2 marks with working: 18 → 756; 28 → 1176; 35 → 1470	[3]	
		(iii)	Raised water temperature the most/temp goes highest	[1]	
		(iv)	Reliability/calculate average/identify anomolies	[1]	
	(b)		Heat energy lost to surroundings/environment/tongs/glass tube in classroom experiment/or converse/fat drips off nothing to stop heat escaping (to environment)	[1]	
	(c)		Obesity/CHD/diabetes/stroke/high blood pressure/high cholesterol/ overweight/heart attack	[1]	8
6	**(a)**	**(i)**	Light/sunlight	[1]	
		(ii)	Trophic Level 2/2nd	[1]	
		(iii)	Economic: Timber industry will lose its supply of oak/no profit/lose jobs Environmental: Biodiversity reduced/loss habitat/food source lost/ wildlife reduced Max. 1 if wrong way round	[2]	
	(b)	**(i)**	 1 mark = container + lid (any) drawn 1 mark = container + lid labelled	[2]	
		(ii)	Any **two** from: • A container is buried underground • Allow insects in (or an animal small enough to fall in) • Left for 24 hours/a time period	[2]	8

AVAILABLE MARKS

7 **(a)** Iodine (solution)
Starch: Blue/black or Black;
Protein: Blue [3]

(b) Any 2 from 3 of first three points
1st 2 marks:
Make a suspension of food sample/mix some sandwich in water/add water/ make solution
Add ethanol/alcohol;
Mix/shake;
3rd mark:
Observe a white emulsion (nothing else) if fat is present [3]

(c) **(i)** All 5 points plotted correctly for 2 marks (3 correct for 1 mark)
Straight line from point to point drawn/smooth curve acceptable [3]

(ii) pH 7 [1]

(iii) Activity increases from pH 4–7;
from pH 7–10, activity decreases
- higher as it goes to neutral = 1 mark
  lower as it goes away from neutral = 1 mark
- increases then decreases with no data = 1 mark
- goes up to max. 96% = 1 mark
  goes back down to zero = 1 mark

If answer states 'starch' rather than breakdown % then max. 1
maximum at pH7 on own = 0 mark
goes to a maximum of pH7 = 1 mark [2]

(d) Indicative content – Any 6 points

- Amylase works in the mouth
- Amylase does not work in stomach
- Amylase works in the small intestine
- Starch digestion incomplete in mouth
- Amylase is destroyed in the stomach (by acid conditions)
- So amylase needs to work again in the small intestine/by pancreas to complete the digestion of starch
- Amylase digests starch into glucose

Band	Response	Mark
A	Candidates use appropriate terms throughout to explain the activity of amylase in the various regions of the intestine using **five to six** points from the indicative content. They use good spelling, punctuation and grammar. Form and style are of a high standard.	[5–6]
B	Candidates use appropriate terms throughout to explain the activity of amylase in the various regions of the intestine using **three to four** points from the indicative content. They use satisfactory spelling, punctuation and grammar. Form and style are of a satisfactory standard.	[3–4]
C	Candidates use **one to two** points from the indicative content to explain the activity of amylase in the intestine. They use limited spelling, punctuation and grammar. They make limited use of specialist science terms.	[1–2]
D	Response not worthy of credit.	[0]

[6] 18

Total **70**

AVAILABLE MARKS

Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
2013–2014

Double Award Science: Biology

Unit B1

Foundation Tier

[GSD11]

GSD11

TUESDAY 13 MAY 2014, 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 eight** 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 Question **8(b)**.

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

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Examiner Only	
Marks	Remark

1 Several food tests were carried out on a sample of milk.
Three different test reagents were used.

The table shows the colour of each test reagent at the end of the test.

Substance tested for	Colour of test reagent at the end of the test	Substance	
		Present	Absent
glucose (sugar)	brick red		
protein	purple		
vitamin C	blue		

(a) Complete the table by adding a tick (✓) in the correct box to show if the substance is present or absent in milk. [3]

(b) Describe how the food test for glucose (sugar) is carried out.

_____

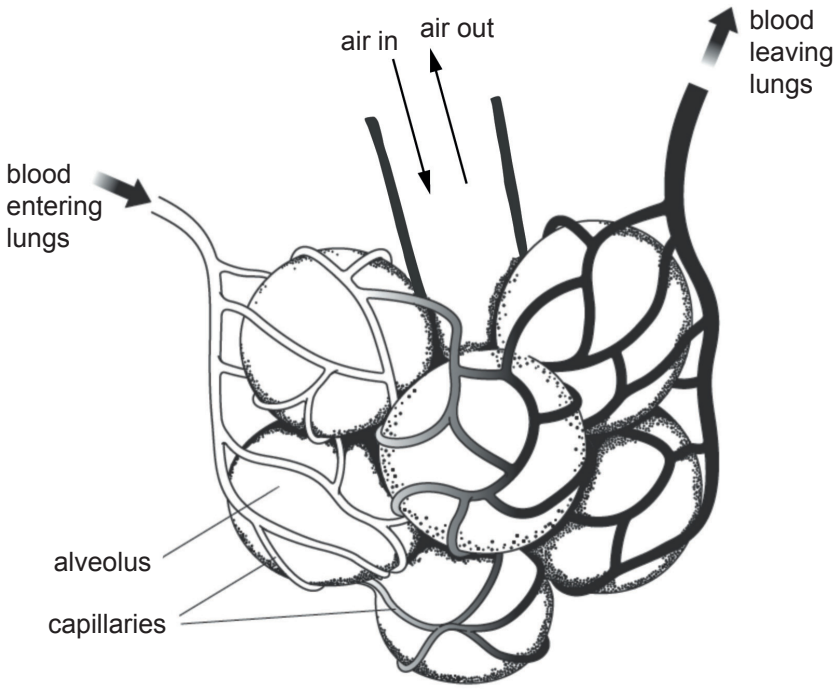
_____ [2]

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Examiner Only	
Marks	Remark

2 Alveoli are small air sacs in the lungs.
Gas exchange occurs across the surface of each alveolus.

The diagram shows a number of alveoli.



Source: Chief Examiner

Using the diagram and your knowledge, answer the following questions.

(a) (i) Give two adaptations of alveoli that help in gas exchange.

1. _____

2. _____ [2]

(ii) Suggest two differences between the composition of blood leaving the lungs and blood entering the lungs.

1. _____

2. _____ [2]

(b) Complete the equation for aerobic respiration.

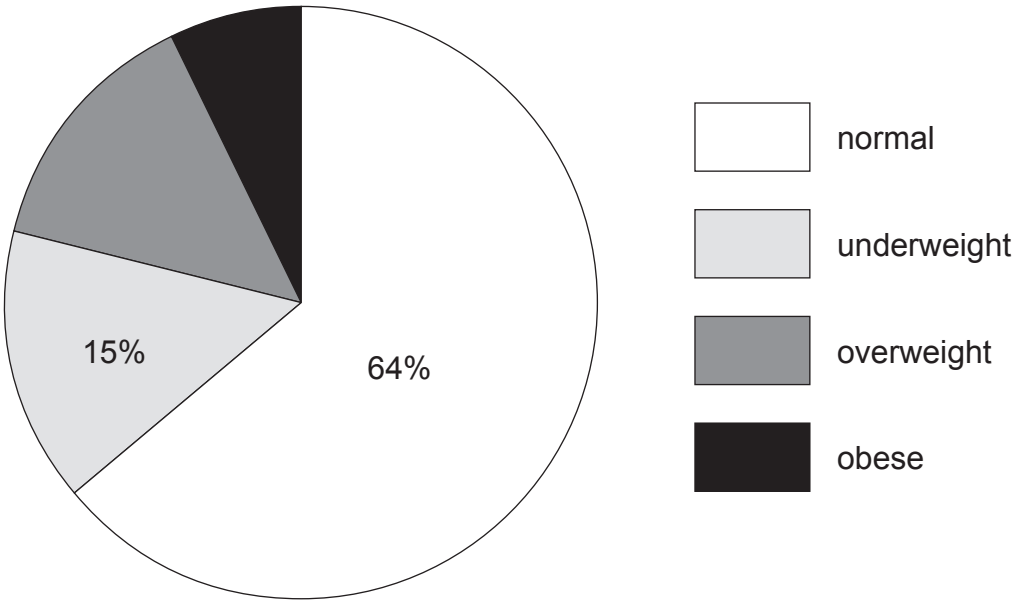
Glucose	+		→		+		+	Energy

[2]

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Examiner Only	
Marks	Remark

3 Body Mass Index (BMI) gives a measure of a person's body fat.
The BMI can be used to group people as **normal**, **underweight, overweight** and **obese**.
The pie chart shows the percentages of these groups for the world population in 2008.



There were twice as many overweight people as obese people in the world population in 2008.

(a) (i) Using this information and the pie chart, calculate the percentage of obese people.

Show your working.

_____ % [2]

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(ii) The world's population was 7 billion in 2008.
Calculate how many people were obese.

Show your working.

_____ billion [2]

(b) The percentage of obese people in the world has increased in the past 30 years.

Suggest **one** reason for this.

_____ [1]

(c) Give **one** effect obesity can have on health.

_____ [1]

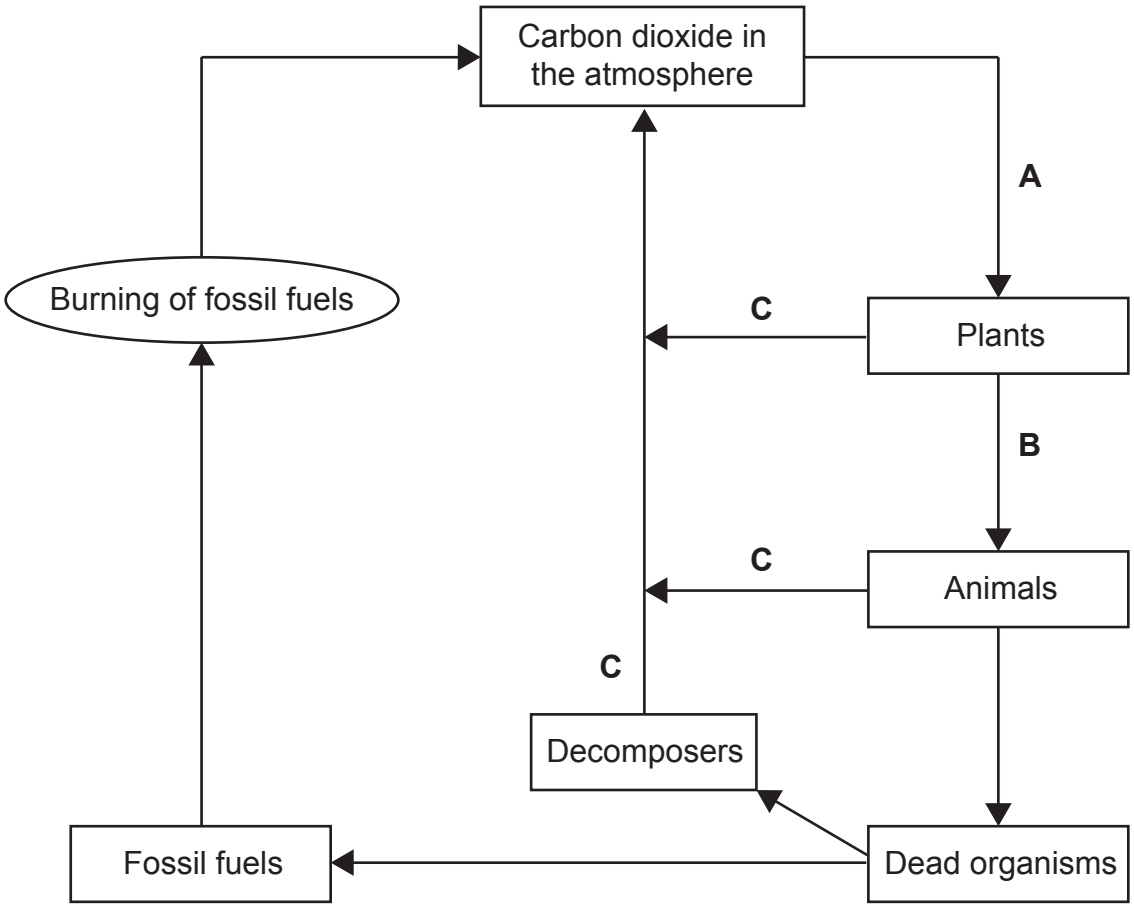
Examiner Only

Marks	Remark

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Examiner Only	
Marks	Remark

4 **(a)** The diagram shows a carbon cycle.



(i) Name processes **A**, **B** and **C**.

A _____

B _____

C _____ [3]

(ii) Name **one** type of organism that brings about decomposition.

_____ [1]

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Examiner Only	
Marks	Remark

(b) (i) The increased burning of fossil fuels has led to an increase in carbon dioxide levels in the atmosphere.

Explain **how** this change can cause global warming.

_____

_____

_____

_____

_____ [2]

(ii) Give **one** result of global warming.

_____ [1]

(iii) The 18th international annual climate change talks took place in Doha, Qatar in 2012.
The talks provided little agreement among countries on how to solve the problem of global warming.

Suggest **one** reason why it is difficult to get international agreement about solving the problem of global warming.

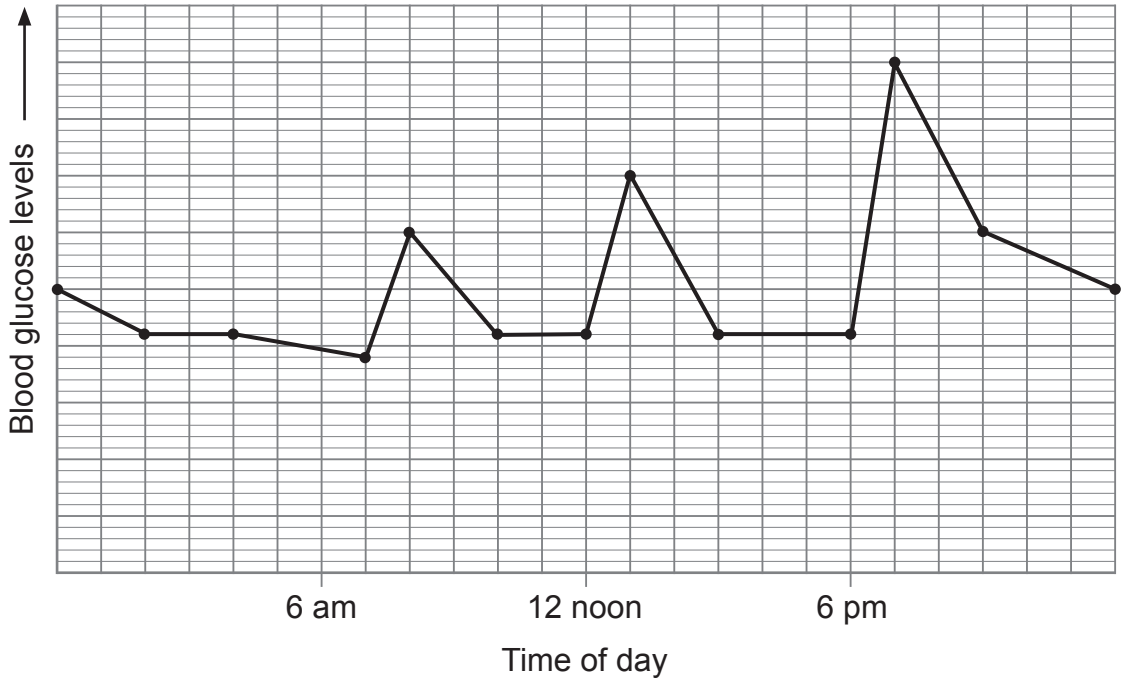
_____

_____ [1]

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Examiner Only	
Marks	Remark

5 **(a)** The graph shows how blood glucose levels changed in Jane's body over the course of a day.



(i) Give **one** reason for the **increases** in blood glucose levels during the day.

_____ [1]

(ii) Insulin lowers blood glucose levels.

Using the graph above, state the number of times Jane would need to produce insulin, during the 24 hour period, to lower her blood glucose levels.

_____ [1]

(iii) Name the target organ for insulin.

_____ [1]

(iv) Give two ways that insulin lowers blood glucose levels.

1. _____

2. _____ [2]

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Examiner Only	
Marks	Remark

(b) (i) Name the condition that occurs when the body does not produce insulin.

_____ [1]

(ii) Give **one** lifestyle factor that could make a person more likely to develop this condition.

_____ [1]

(c) (i) Hormones are present in plants and animals.

Name the hormone produced in the shoot tip of a plant that causes a growth response to light.

_____ [1]

(ii) The diagram shows a shoot tip that has responded to light coming from one direction.

On the diagram, draw an arrow to show the direction the light has come from.



[1]

(iii) Describe and explain what has happened to the cells on the left hand side of the shoot tip to bring about this growth response.

_____

_____

_____

_____

_____

_____ [3]

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Examiner Only

Marks	Remark

6 **(a)** Photosynthesis is a process requiring energy.

(i) What is the source of energy for photosynthesis?

_____ [1]

(ii) Name the green pigment, found in plant leaves, that traps this energy.

_____ [1]

(b) A grower investigated the effects of carbon dioxide and light intensity on the yield of his tomato crops.

He set up an investigation using four glasshouses of similar size **A**, **B**, **C** and **D**, each containing the same number of tomato plants.

Over a period of several months, April–July, the tomatoes produced were collected and weighed.

The grower recorded the yield (total weight) in kilograms (kg), of tomatoes produced from each glasshouse.

The table below shows the results.

Glasshouse	Conditions	Yield/kg	Increase in yield in kilograms compared to A
A (control)	• normal carbon dioxide • normal light	117	0
B	• increased carbon dioxide • normal light	137	20
C	• normal carbon dioxide • increased light	137	20
D	• increased carbon dioxide • increased light	177	

(i) Complete the table by calculating the increase in yield of tomatoes grown in glasshouse **D** compared to glasshouse **A**. [1]

(ii) Explain the result for glasshouse **D**.

_____

_____

_____

_____ [2]

(iii) Give **one** other factor that should be kept constant in the glasshouses during this investigation.

_____ [1]

(iv) Give **one** economic factor that the grower would need to consider if he was going to make a profit when growing tomatoes.

_____

_____ [1]

Examiner Only	
Marks	Remark

7 Read the passage below carefully and answer the questions that follow.

Line

Coral reefs protect shallow coastal regions and provide livelihoods for hundreds of millions of people. They are the most biodiverse regions of the ocean. 1 3

Corals are animals and it is their skeletons that form the structure of the reef. **Corals feed on plankton** (tiny floating plants). The corals also have algae that live inside them. These algae carry out photosynthesis and the corals benefit from this by gaining sugar and oxygen. This enables the corals to make their skeletons and grow. 5 7



© Georgette Douwma/Science Photo Library

There are several factors that can affect coral reefs. 9

Increasing sea temperatures destroy the algae in the corals. The corals then die. 11

In some places the numbers of starfish which eat the corals have gone up due to overfishing of the Triton fish that eat the starfish. 13

This has resulted in the starfish killing large sections of the reefs.

(a) What is meant by biodiversity?

_____ [1]

(b) Give the abiotic factor named in the passage. (line 10)

_____ [1]

Examiner Only

Marks	Remark

(c) (i) Using the information in the passage, complete the food chain below.

	corals		

[2]

(ii) Draw a pyramid of biomass for this food chain. Label the organisms on the pyramid.

[3]

(d) (i) Explain how increasing sea temperatures damage corals.

[2]

(ii) Suggest **one** reason why it is important to protect coral reefs.

[1]

(iii) Other than those mentioned in the passage, suggest **one** other cause of coral reef damage.

[1]

(iv) What name is given to a species that is used to monitor the state of an ecosystem?

[1]

Examiner Only

Marks	Remark

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(e) (i) What apparatus would scientists use to measure water temperatures on the reef?

_____ [1]

(ii) Explain why these measurements would need to be repeated several times in each location.

_____ [1]

Examiner Only	
Marks	Remark

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(Questions continue overleaf)

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Examiner Only	
Marks	Remark

8 Digestion is carried out by enzymes.

(a) **(i)** Explain why food needs to be digested.

_____

_____ [2]

(ii) Name the digestive enzyme found in the small intestine that breaks down proteins and give the product of the breakdown.

Enzyme _____

Product _____ [2]

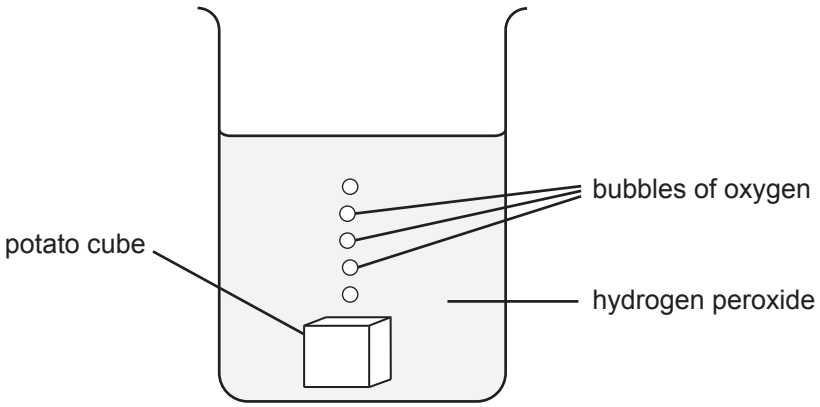
(iii) Give two ways the small intestine is adapted for its function.

1. _____

2. _____ [2]

(b) Hydrogen peroxide is a waste product formed by cells. It is harmful to all cells, including skin cells. The enzyme catalase works very quickly to break down the hydrogen peroxide into water and oxygen. It is found in many types of living tissue.

The bubbles of oxygen produced can be seen coming off the cells if the tissue is placed in a beaker containing hydrogen peroxide solution.



Describe how you would carry out an experiment to compare the **rate** of catalase action in potato and liver tissues.

Your account should include:

- how you would measure the rate of catalase action
- one variable that you would keep constant
- one safety precaution you should take when carrying out the experiment.

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

[6]

Examiner Only	
Marks	Remark

THIS IS THE END OF THE QUESTION PAPER

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113166

Rewarding Learning

General Certificate of Secondary Education
2013–2014

Double Award Science: Biology

Unit B1

Foundation Tier

[GSD11]

TUESDAY 13 MAY 2014, MORNING

MARK SCHEME

STEMUP.CO.UK

General Marking Instructions

Introduction

Mark schemes are published to assist teachers and students in their preparation for examinations. Through the mark schemes teachers and students will be able to see what examiners are looking for in response to questions and exactly where the marks have been awarded. The publishing of the mark schemes may help to show that examiners are not concerned about finding out what a student does not know but rather with rewarding students for what they do know.

The Purpose of Mark Schemes

Examination papers are set and revised by teams of examiners and revisers appointed by the Council. The teams of examiners and revisers include experienced teachers who are familiar with the level and standards expected of students in schools and colleges.

The job of the examiners is to set the questions and the mark schemes; and the job of the revisers is to review the questions and mark schemes commenting on a large range of issues about which they must be satisfied before the question papers and mark schemes are finalised.

The questions and the mark schemes are developed in association with each other so that the issues of differentiation and positive achievement can be addressed right from the start. Mark schemes, therefore, are regarded as part of an integral process which begins with the setting of questions and ends with the marking of the examination.

The main purpose of the mark scheme is to provide a uniform basis for the marking process so that all the markers are following exactly the same instructions and making the same judgements in so far as this is possible. Before marking begins a standardising meeting is held where all the markers are briefed using the mark scheme and samples of the students' work in the form of scripts. Consideration is also given at this stage to any comments on the operational papers received from teachers and their organisations. During this meeting, and up to and including the end of the marking, there is provision for amendments to be made to the mark scheme. What is published represents this final form of the mark scheme.

It is important to recognise that in some cases there may well be other correct responses which are equally acceptable to those published: the mark scheme can only cover those responses which emerged in the examination. There may also be instances where certain judgements may have to be left to the experience of the examiner, for example, where there is no absolute correct response – all teachers will be familiar with making such judgements.

				AVAILABLE MARKS
1	(a)	sugar present; protein present; vit C absent	[3]	

Present	Absent
✓	
✓	
	✓

	(b)	add Benedicts; heat	[2]

5

2	(a)	(i)	Any **two** from: • large surface area • thin barrier/wall is one cell thick/thin • moist • permeable • good blood supply/good diffusion gradient/lots of capillaries	[2]
		(ii)	**more** oxygen **less** CO_2	[2]
	(b)		oxygen carbon dioxide **and** water	[2]

6

3	(a)	(i)	100 – 79 = 21; 21/3 = 7 (7% = 2 marks)	[2]
		(ii)	7 × 7; ÷ 100; = 0.49 Apply CM from (i)	[2]
	(b)		too much fast food/too much food/lack of activity	[1]
	(c)		CHD/strokes/high blood pressure/diabetes/joint problems	[1]

6

4	(a)	(i)	A – photosynthesis B – feeding/eating/ingestion/consumption C – respiration	[3]
		(ii)	bacteria/fungi/microbe/decomposer/micro-organism	[1]
	(b)	(i)	**less** sun's radiation escapes/**more** trapped in atmosphere/**less** heat escapes/**more** heat reflected; Earth heats up/temp rises	[2]
		(ii)	flooding/(polar) ice caps melt/desertification/extreme weather/ drought/rising sea levels/more storms/loss of habitat	[1]
		(iii)	may affect economy/jobs/development of the country/cost of alternative fuels/country may not have alternative/renewable fuels	[1]

8

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					AVAILABLE MARKS
5	**(a)**	**(i)**	eating /meal/drinking	[1]	
		(ii)	3 times	[1]	
		(iii)	liver	[1]	
		(iv)	glucose converted to glycogen; increased respiration of glucose	[2]	
	(b)	**(i)**	diabetes	[1]	
		(ii)	lack of exercise/too much sugar in diet	[1]	
	(c)	**(i)**	auxin	[1]	
		(ii)	arrow pointing to left towards the shoot tip	[1]	
		(iii)	Any **three** from: • **more** hormone on left hand side/side away from light/shaded side • causes **cells** to elongate more (on l.h.s.); • causes tip to grow/bend towards light	[3]	12
6	**(a)**	**(i)**	sun/sunlight	[1]	
		(ii)	chlorophyll	[1]	
	(b)	**(i)**	177 – 117 = 60	[1]	
		(ii)	highest rate of photosynthesis/maximum yield; as both light **and** carbon dioxide were increased	[2]	
		(iii)	temperature/water/minerals/named mineral/soil pH	[1]	
		(iv)	cost of increased CO_2 /cost of lighting/cost of other named factor	[1]	7

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AVAILABLE MARKS

7 **(a)** (**different**)/(all) **types** of living organisms/**types** of animals and plants/ **variety** of living organisms/**number** of species [1]

(b) temperature [1]

(c) **(i)** plankton → (corals) → starfish → triton/fish (in correct places); arrows correct [2]

(ii)



1 shape and symmetrical and must be largest at bottom;
1 plankton at bottom, largest and labelled;
1 coral, starfish and triton/fish in correct order [3]

(d) **(i)** no photosynthesis/algae die;
less O_2 dissolved in water
reduced sugar or oxygen for respiration/less sugar or oxygen so cannot make skeletons/less sugar or oxygen so cannot grow [2]

(ii) species diversity/livelihood for people/fishing/protects land/ conservation/recreation/tourism/habitat for organisms/as a food source for other organisms/biodiversity/prevents extinction [1]

(iii) (water) pollution/sewage/silage/fertiliser/fishing boats/industrial waste/ divers/tourists/coral being collected [1]

(iv) indicator [1]

(e) **(i)** temperature probe/thermometer; [1]

(ii) increase reliability/obtain averages [1] 14

AVAILABLE MARKS

8 (a) (i) Any **two** from:
- so the molecules are soluble
- so that the molecules are small enough
- to be absorbed (into the blood)/pass into the blood [2]

(ii) protease;
amino acids [2]

(iii) Any **two** from:
- long
- large surface area
- villi/folds/microvilli
- thin (epithelial layer)/1 cell thick
- good blood supply/**lots of** capillaries
- lacteal
- permeable [2]

(b) Indicative content
- carry out with both tissues/carry out with potato and liver
- count bubbles/collect gas/measure foam or described/volume of gas
- in a given time
- repeat for reliability/repeat to get averages
- same weight/mass/amount of tissue in each/same temperature/ same pH add same volume of H_2O_2 /same concentration of H_2O_2
- wear goggles/wear gloves [6]

Response	Marks
Candidates use appropriate terms throughout to give at least three points about how to carry out the experiment giving one variable to be controlled and one safety point about how to carry out the experiment. They use good spelling, punctation and grammar. Form and style are of a high standard.	5–6
Candidates use appropriate terms throughout to give at least three or four points from the indicative content. They use satisfactory spelling, punctation and grammar. Form and style are of a satisfactory standard.	3–4
Candidates use appropriate terms throughout to give 1 or 2 points from the indicative content. They use limited spelling, punctuation and grammar and have made little use of specialist terms.	1–2
Response not worthy of credit.	0

	12
Total	**70**

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Rewarding Learning

Centre Number	
71	

Candidate Number

General Certificate of Secondary Education
2013–2014

Double Award Science: Biology

Unit B1

Foundation Tier

[GSD11]

GSD11

MONDAY 24 FEBRUARY 2014, 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 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 question **7(c)**.

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

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Examiner Only	
Marks	Remark

1 Insulin is a substance that prevents blood glucose levels from becoming too high.

(a) What type of substance is insulin?

_____ [1]

(b) Insulin is produced in one organ. It is then carried in the blood to its target organ where it takes effect.

Complete the sentence below by writing the correct name of each organ in the spaces.

Choose from the list below:

liver **heart** **pancreas** **stomach**

Insulin is produced in the _____ and takes effect in its target organ, the _____. [2]

(c) Describe how insulin lowers blood glucose levels.

_____

_____

_____ [2]

(d) Suggest why people with diabetes need to check their blood glucose levels more than once during the day.

_____

_____

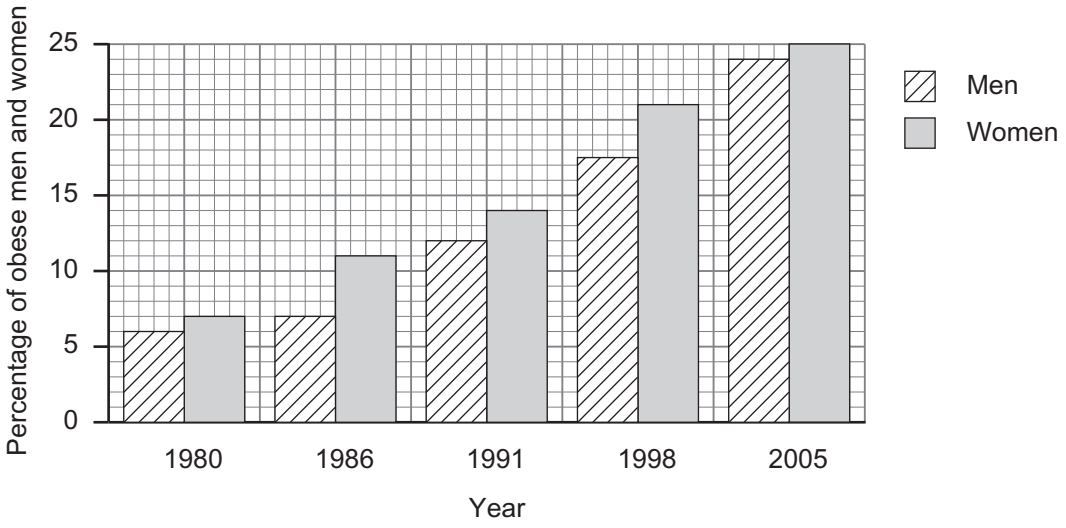
_____

_____ [2]

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Examiner Only	
Marks	Remark

2 **(a)** The bar chart shows the percentage of obese men and women in the UK population between 1980 and 2005.



© P Zaninotto et al. University College London

(i) Using the bar chart, give the general trend for the percentage of obese men and women between 1980 and 2005.

_____ [1]

(ii) Suggest **one** change in eating patterns in the UK population that might explain this general trend.

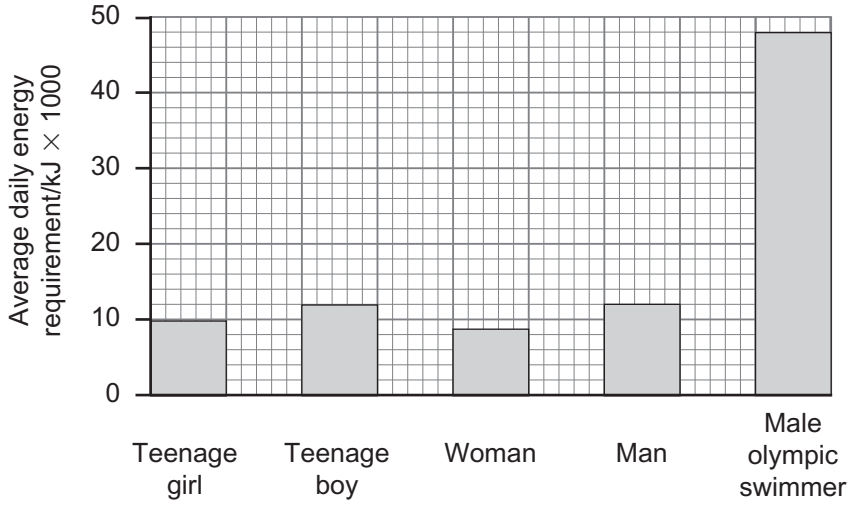
_____ [1]

(iii) Obesity can cause harmful effects on the body.

Give **one** harmful health effect of obesity.

_____ [1]

(b) The bar chart gives the average daily energy requirements for different groups of people in thousands of kilojoules (kJ) per day.



Adapted from: Big Picture issue 14 Summer 2011 © Wellcome Trust www.bigpictureeducation.com

(i) How many **times** higher is the energy requirement of the male olympic swimmer compared to the teenage boy?

Show your working.

_____ [2]

(ii) Using this information and your knowledge, explain how physical activity can help prevent obesity.

_____

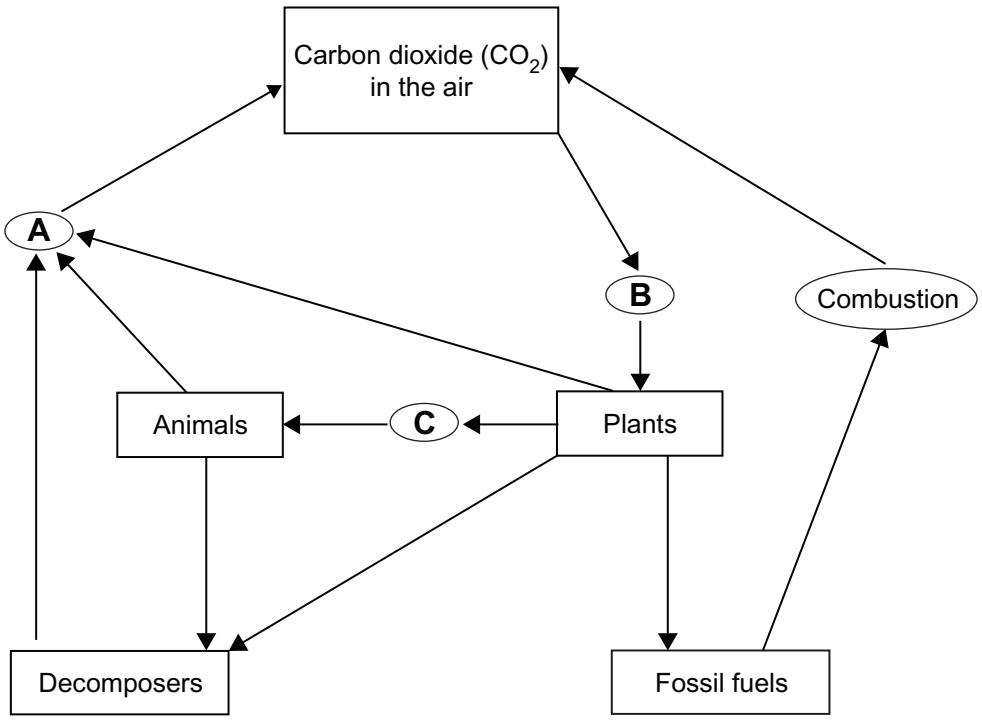
_____ [1]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

3 The diagram shows the carbon cycle.



Source: Principal Examiner

(a) Name processes **A**, **B** and **C**.

A _____

B _____

C _____ [3]

(b) Plants make a substance with the carbon dioxide taken in from the air in process **B**.

Name this substance.

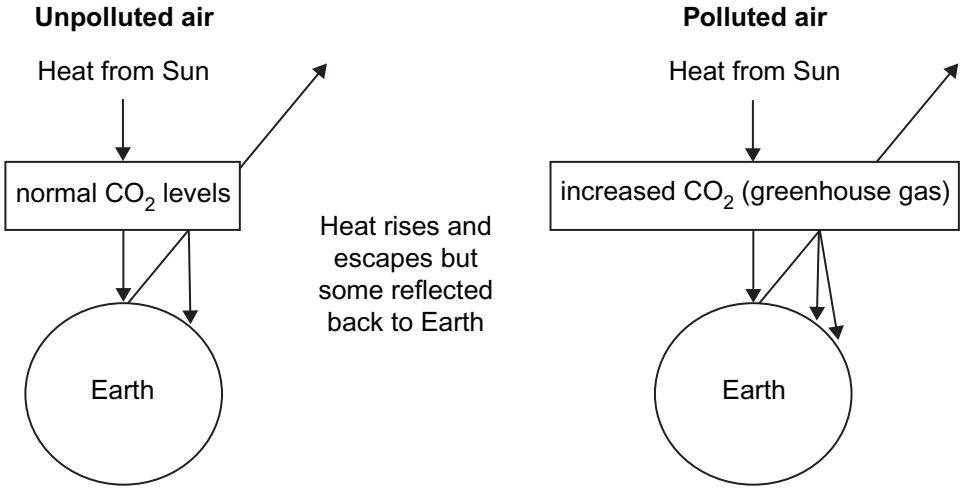
_____ [1]

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(c) Carbon dioxide (CO_2) is a greenhouse gas.

One source of carbon dioxide is from the burning of fossil fuels.

The diagram below shows what happens to heat from the sun in unpolluted air (normal levels of carbon dioxide) and air polluted with increased levels of carbon dioxide.



Source: Principal Examiner

(i) Using the diagram and your knowledge, explain how global warming occurs.

_____

_____

_____

_____

_____ [3]

(ii) Suggest **one** reason why there has been an increase in the burning of fossil fuels over the past thirty years.

_____ [1]

(iii) Give two environmental effects of global warming.

1. _____

2. _____ [2]

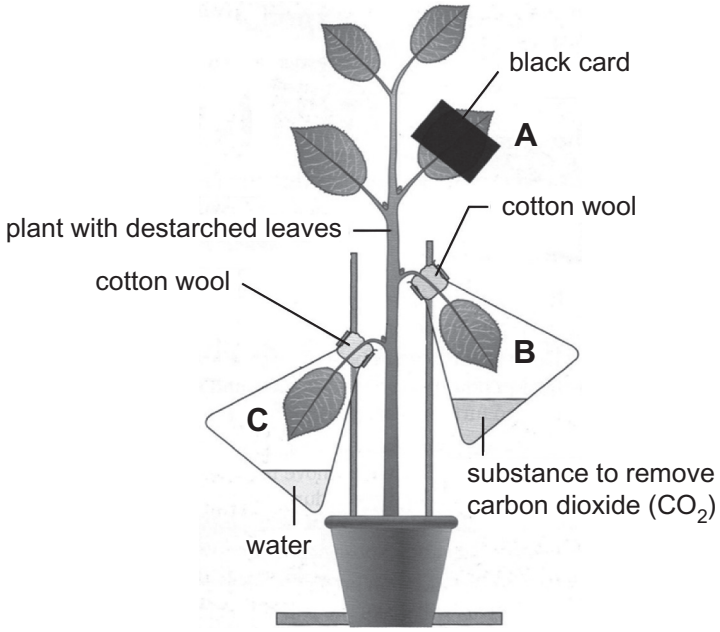
Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

4 **(a)** An experiment was carried out to investigate two factors needed for photosynthesis.

The plant was destarched and set up as shown in the diagram below.



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The plant was then left in light for two days before the starch test was carried out on leaves **A**, **B** and **C**.

(i) Apart from water, name the two chemicals used when testing a leaf for starch.

1. _____

2. _____ [2]

(ii) Describe and explain the results when the starch test was carried out on leaf **A**.

_____

_____

_____

_____

_____

_____ [3]

(iii) Leaves **B** and **C** were tested for starch.

Starch was found in leaf **C**.

Explain why there was no starch found in leaf **B**.

_____

_____ [1]

(b) Before being placed in the light, the plant was destarched.

(i) How was the plant destarched?

_____ [1]

(ii) Why was the plant destarched?

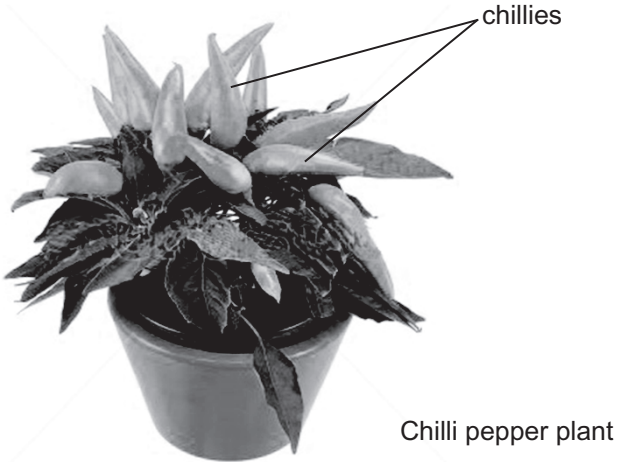
_____ [1]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

(c) A grower carried out growth trials on three different varieties of chilli pepper plants. Chillies are the fruits of the plant and are used in cooking.

Most people in the UK prefer hot, rather than very hot chillies.



Source: Principal Examiner

At the start of February equal numbers of seeds of the three varieties were planted.

By mid-May, they had developed into seedlings and were placed in a glasshouse.

In mid-August the total number of chillies that had been produced by each variety of plant was recorded as shown in the table below.

Plant variety	Heat of chillies	Number of chillies picked by mid-August
Etna	very hot	18
Fiesta	very hot	56
Demon Red	hot	366

(i) If the grower wanted a second crop of chillies ready by mid-September, suggest in which month he would have planted the seeds.

Month _____ [1]

(ii) Using the information in the table, suggest two reasons why you would recommend the grower uses the Demon Red variety.

1. _____

2. _____ [2]

(iii) Suggest two factors that could affect the growth of the chilli pepper plants.

1. _____

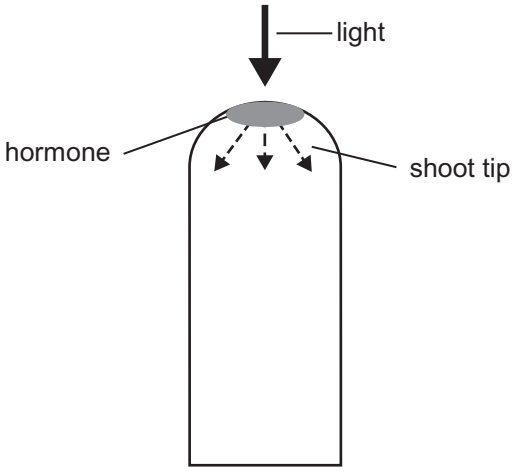
2. _____ [2]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

5 A hormone is produced in the shoot tip of a plant, as shown in the diagram below.

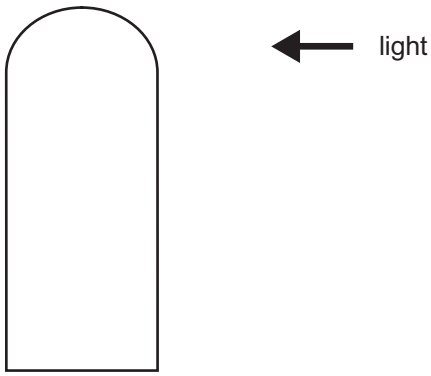
The hormone travels down the shoot tip as shown by the arrows when the light is shone from above.



(a) Name the hormone produced in the shoot tip.

_____ [1]

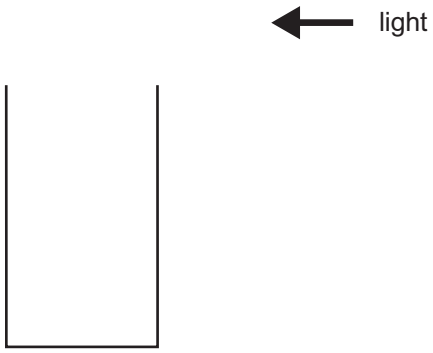
(b) Draw an arrow on the diagram below, to give the direction the hormone moves in the shoot tip when light shines from the direction shown.



[1]

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(c) Complete the diagram below to show the growth of the shoot tip in part **(b)** after a few days.



[1]

(d) Explain how the hormone brings about this growth response in the shoot tip.

_____

_____ [1]

(e) Explain the advantage to the plant of this growth response.

_____

_____ [1]

(f) Name this growth response in plants.

_____ [1]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

6 It is thought that the barn owl, once a common bird in Northern Ireland, is now reduced to fewer than 50 breeding pairs.



© Linda Wright / Science Photo Library

The following passage is from a news article written by a reporter who visited a farm where barn owls were nesting in an old barn.

'Soon the bird appeared, and what a bird! With its silent flight we never heard it arrive. The owl turns its head so that its sensitive ears can find the faint sounds we make. This is one way the owl finds its prey but also explains why it has difficulty hunting in snow or heavy rain. Grasping old beams with its large talons, it turns its very large eyes on us, eyes that are perfect for night time hunting of rodents, e.g. mice.'

Using the information given and your knowledge, answer the following questions.

(a) Apart from having very large eyes, describe and explain two ways in which the barn owl is adapted for hunting.

1. _____

_____

2. _____

_____ [4]

(b) Suggest why the barn owl has difficulty hunting in snow or heavy rain.

_____ [1]

Many farmers use poisons to limit rodent numbers. The owls eat these poisoned rodents and then die themselves. To give owls a chance of increasing their numbers there are now schemes run by the government to encourage farmers to:

1. leave old barns standing.
2. use cage traps to limit the number of rodents.
3. plant crops such as canola near the edges of woodland. This encourages the rodents that eat the canola to come out into areas where they are clearly visible.

(c) Suggest how **each** of the three measures described above could help increase the barn owl population.

1. _____

_____

2. _____

_____

3. _____

_____ [3]

(d) **(i)** Using the above information, draw a food chain that includes the barn owl.

[2]

(ii) In the space below, sketch a pyramid of biomass for the food chain you have drawn. Label your sketch with the names of the organisms.

[2]

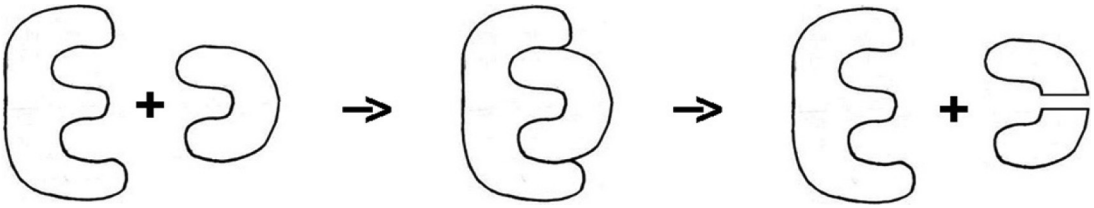
Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

7 **(a)** Enzymes speed up chemical reactions in the body. The diagram below shows how an enzyme works.

(i) Label the diagram with the letter:

- E for the enzyme molecule
- S for the substrate molecule
- P for a product molecule



Source: Principal Examiner

[3]

(ii) Name the model of enzyme action shown by the diagram.

_____ [1]

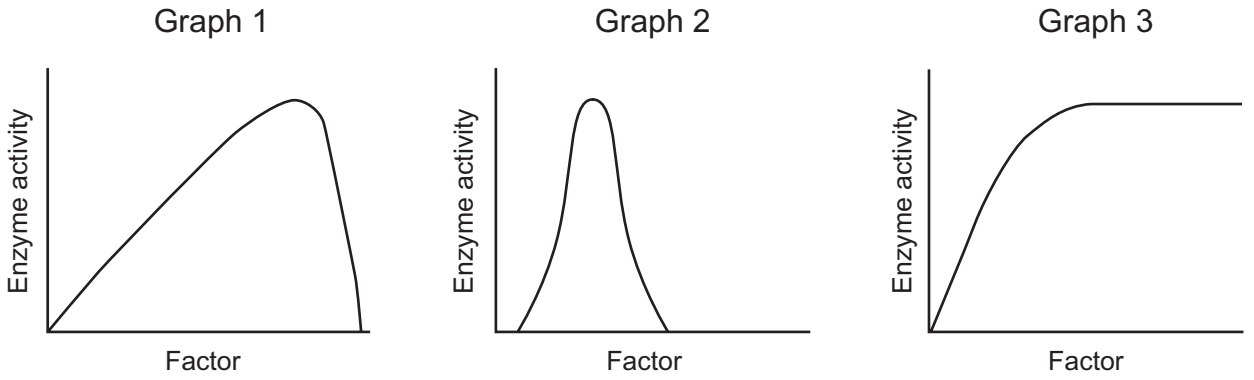
(iii) Using the information in the diagram, describe what happens to the substrate molecule during the reaction.

_____ [1]

(iv) How would this enzyme differ from one with a different specificity?

_____ [1]

(b) The graphs show how enzyme activity in stomach protease varies with three different factors.



Source: Principal Examiner

Examiner Only	
Marks	Remark

(i) Match each graph to the correct factor from the list below.

pH : enzyme concentration : temperature

Graph 1 _____

Graph 2 _____

Graph 3 _____ [2]

(ii) Name the substrate for protease.

_____ [1]

(iii) Apart from the stomach, where else in the digestive system would protease be found?

_____ [1]

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(c) The lining of the small intestine in mammals is adapted for absorption of digested food molecules by having villi.

A disease in cows causes the lining of the small intestine to become smooth and flat. Cows with this disease lose weight and die.

Describe how villi are adapted for their role and explain why cows with this disease die.

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

[6]

Examiner Only

Marks	Remark

THIS IS THE END OF THE QUESTION PAPER

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114851

Rewarding Learning

General Certificate of Secondary Education
2013–2014

Double Award Science: Biology

Unit B1

Foundation Tier

[GSD11]

MONDAY 24 FEBRUARY 2014, MORNING

MARK SCHEME

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General Marking Instructions

Introduction

Mark schemes are published to assist teachers and students in their preparation for examinations. Through the mark schemes teachers and students will be able to see what examiners are looking for in response to questions and exactly where the marks have been awarded. The publishing of the mark schemes may help to show that examiners are not concerned about finding out what a student does not know but rather with rewarding students for what they do know.

The Purpose of Mark Schemes

Examination papers are set and revised by teams of examiners and revisers appointed by the Council. The teams of examiners and revisers include experienced teachers who are familiar with the level and standards expected of students in schools and colleges.

The job of the examiners is to set the questions and the mark schemes; and the job of the revisers is to review the questions and mark schemes commenting on a large range of issues about which they must be satisfied before the question papers and mark schemes are finalised.

The questions and the mark schemes are developed in association with each other so that the issues of differentiation and positive achievement can be addressed right from the start. Mark schemes, therefore, are regarded as part of an integral process which begins with the setting of questions and ends with the marking of the examination.

The main purpose of the mark scheme is to provide a uniform basis for the marking process so that all the markers are following exactly the same instructions and making the same judgements in so far as this is possible. Before marking begins a standardising meeting is held where all the markers are briefed using the mark scheme and samples of the students' work in the form of scripts. Consideration is also given at this stage to any comments on the operational papers received from teachers and their organisations. During this meeting, and up to and including the end of the marking, there is provision for amendments to be made to the mark scheme. What is published represents this final form of the mark scheme.

It is important to recognise that in some cases there may well be other correct responses which are equally acceptable to those published: the mark scheme can only cover those responses which emerged in the examination. There may also be instances where certain judgements may have to be left to the experience of the examiner, for example, where there is no absolute correct response – all teachers will be familiar with making such judgements.

			AVAILABLE MARKS
1	**(a)** hormone/protein/chemical messenger [1]		
	(b) pancreas; liver [2]		
	(c) glucose converted to glycogen; **more/increased** respiration. [2]		
	(d) Any two from: blood glucose levels change/fluctuate; drinking/eating/activity changes blood glucose; so they can check how much insulin they need/food (glucose) needed. [2]		7
2	**(a)** **(i)** increase [1]		
	(ii) more processed food/fast food/more food/eating too much [1]		
	(iii) diabetes/CHD/stroke/high blood pressure/joint damage/ heart attack/heart failure [1]		
	(b) **(i)** 48 and 12; 4 [2]		
	(ii) activity uses up more energy/burns off fat or energy [1]		6
3	**(a)** A – Respiration B – Photosynthesis C – Feeding/Eating/Ingestion/Consumption [3]		
	(b) glucose/sugars/starch/carbohydrates [1]		
	(c) **(i)** **more** carbon dioxide in the atmosphere/**more** greenhouse gases/ thicker CO_2 blanket; **more heat** trapped/**less heat** radiated away from the Earth/**more heat** reflected back in; causes increase in Earth's temperature [3]		
	(ii) more transport/greater energy requirement/increased population/**more** factories or industry [1]		
	(iii) any two from ● ice caps melt ● coastal flooding ● rising sea levels ● changing weather patterns/droughts/more storms/more rainfall/climate change/more extreme weather ● increased desertification ● loss of species (e.g. polar bears) [2]		10

					AVAILABLE MARKS
4	**(a)**	**(i)**	alcohol/ethanol; iodine (in either order)	[2]	
		(ii)	uncovered parts – blue/black/starch present; middle covered part – yellow/brown/no starch; light couldn't get to covered part/light could get to uncovered parts	[3]	
		(iii)	(there was no CO_2) so no **photosynthesis**	[1]	
	(b)	**(i)**	in the dark for 48 hours	[1]	
		(ii)	**no** starch left/all the starch is formed during the expt;	[1]	
	(c)	**(i)**	March	[1]	
		(ii)	• produces most chillies; • hot fruits are preferred	[2]	
		(iii)	Any two from: • light/sun • carbon dioxide • minerals/named mineral/fertiliser • temperature/heat • water • pH of soil • time of year when crop planted	[2]	13
5	**(a)**		auxin	[1]	
	(b)		arrow starting in shoot tip and to left	[1]	
	(c)		tip bent towards the light	[1]	
	(d)		more auxin causes cell elongation on left side	[1]	
	(e)		more light for photosynthesis	[1]	
	(f)		phototropism	[1]	6

AVAILABLE MARKS

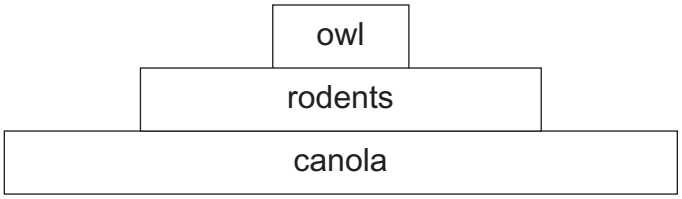
6 **(a)** Any two from:
- sensitive hearing; hear prey or faint sounds;
- silent flight; so prey do not hear predator/owl;
- talons; for grasping/carrying prey/killing prey;
- turn head; to see prey. [4]

(b) cannot hear rodents/prey or prey stay hidden [1]

(c) 1. so that nesting sites/living areas are available/habitat;
2. birds not poisoned;
3. easier to hunt rodents/more rodents caught/helps owls find food. [3]

(d) **(i)** canola → rodent → owl [2]

(ii)



1 for shape of pyramid with 3 levels and symmetrical with largest at base;
1 for labels in correct order from bottom to top [2] 12

7 **(a)** **(i)** 1 for enzyme
1 for substrate
1 for product molecule [3]

(ii) lock and key [1]

(iii) broken down [1]

(iv) different shape (at active site) [1]

(b) **(i)** Graph 1 – temperature
Graph 2 – pH
Graph 3 – enzyme concentration
All three correct – 2 marks Two or one correct – 1 mark [2]

(ii) protein [1]

(iii) small intestine/ileum/pancreas [1]

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(c) Indicative content

- villi give a large surface area;
- villi have a good blood supply/capillary presence;
- cows with disease have no villi;
- less surface area in these cows' intestines;
- less absorption of food in these cows' intestines;
- cows with the disease starve/malnutrition/use up stores or reserves of energy or glycogen;

Additional indicative content for 7(c) allowed if given:

- presence of microvilli;
- wall is one cell thick/thin wall;
- permeable;
- lacteals.

Response	Mark
Candidates use appropriate terms throughout to describe at least 5 or 6 points from the indicative content. At least 1 point must be about the cows. They use good spelling, punctuation and grammar. Form and style are of a high standard.	[5–6]
Candidates use appropriate terms throughout to describe at least 3 or 4 points from the indicative content. They use satisfactory spelling, punctuation and grammar. Form and style are of a satisfactory standard.	[3–4]
Candidates describe 1 or 2 points from the indicative content. They use limited spelling, punctuation and grammar and have made little use of specialist terms.	[1–2]
Response not worthy of credit.	[0]

[6] 16

Total **70**

AVAILABLE MARKS

Rewarding Learning

Centre Number	
71	

Candidate Number

General Certificate of Secondary Education
2013–2014

Double Award Science: Biology

Unit B1

Foundation Tier

[GSD11]

GSD11

WEDNESDAY 13 NOVEMBER 2013, AFTERNOON

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 eight** 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 Question **7(a)**.

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

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Examiner Only	
Marks	Remark

1 **(a)** Diabetes is a condition leading to blood glucose (sugar) levels becoming too high. The table below shows the percentage of the population by age group that has diabetes in Northern Ireland.

Age group/years	Percentage of population that has diabetes
16–24	0.5
25–34	2.8
35–44	5.6
45–54	12.4
55–64	22.6
65–74	30.0

Source: www.diabetes.org.uk/Documents/Reports/Diabetes-in-the-UK-2012.pdf

(i) In which age group is diabetes most common?

_____ years [1]

(ii) Suggest a reason for diabetes being most common in this age group.

_____ [1]

(b) Some people with diabetes have to inject a hormone into their blood to lower their blood glucose levels.

(i) Name this hormone.

_____ [1]

(ii) This hormone is a protein and must be injected into the blood.

Explain why this hormone would not work if swallowed.

_____

_____ [2]

(iii) Give **one** way that this hormone lowers blood glucose levels.

_____ [1]

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(iv) Two long-term effects and two symptoms of diabetes are given in the list below.

glucose in the urine : kidney failure : stroke : thirst

Complete the table below by writing in the two **long-term effects** of diabetes from the list above.

Long-term effects of diabetes

[2]

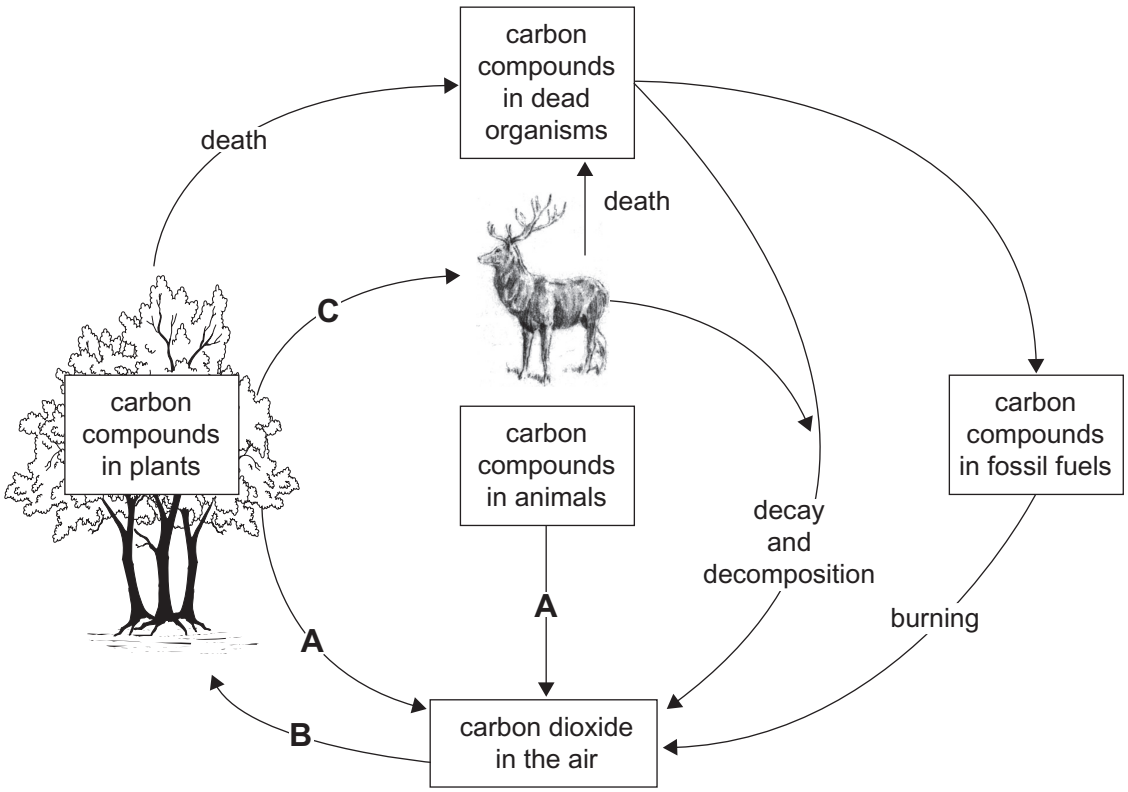
Examiner Only

Marks	Remark

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Examiner Only	
Marks	Remark

2 The diagram below shows the carbon cycle.



Source: CCEA

(a) Name the processes labelled **A**, **B** and **C** in the diagram.

A _____

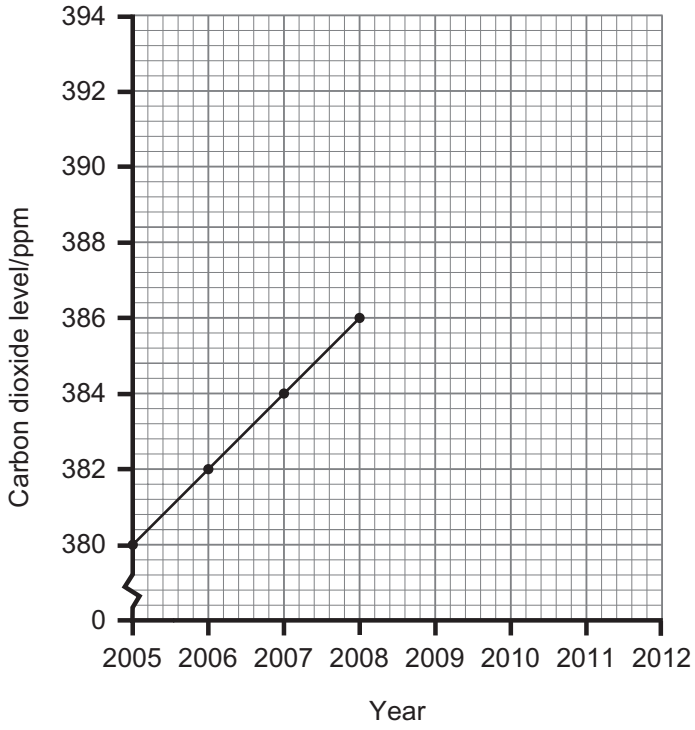
B _____

C _____ [3]

(b) The table below gives information on the levels of carbon dioxide in the air between 2005 and 2012.

Year	Carbon dioxide level in parts per million/ppm
2005	380
2006	382
2007	384
2008	386
2009	388
2010	390
2011	392
2012	394

(i) Complete the line graph on the grid below, by plotting the data in the table for the years 2009 to 2012.



[2]

(ii) Describe the trend shown in the graph.

_____

_____ [1]

(iii) Suggest **one** reason to explain the trend shown in the graph.

_____ [1]

(c) Increased levels of carbon dioxide can lead to global warming.

Explain how global warming may lead to flooding in some low-lying countries like Bangladesh.

_____

_____

_____

_____ [2]

Examiner Only

Marks	Remark

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Examiner Only	
Marks	Remark

3 **(a)** Respiratory surfaces have adaptations for efficient gas exchange.

(i) Give three adaptations of respiratory surfaces in animals.

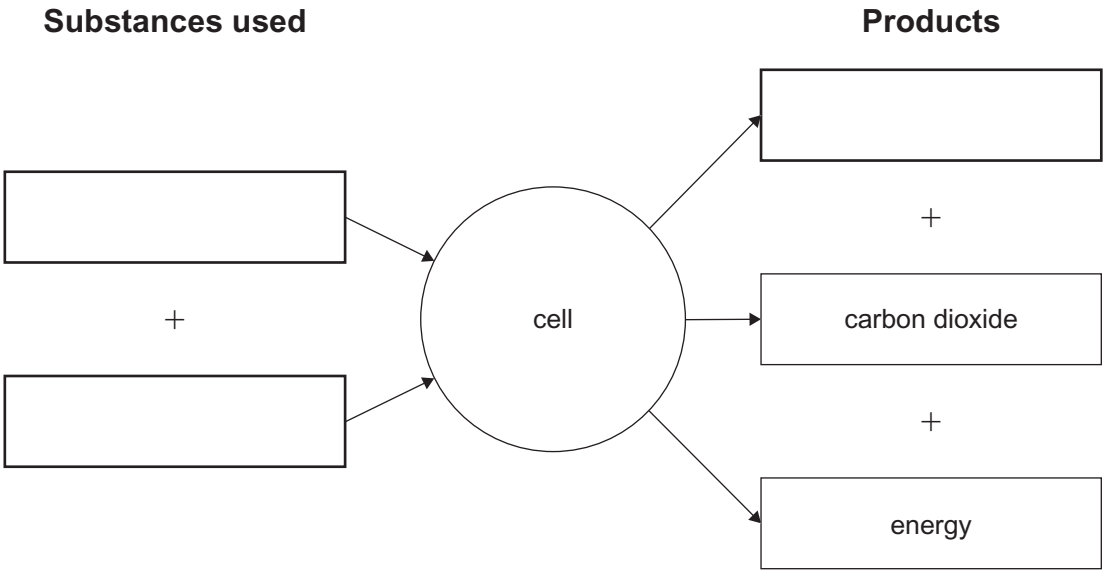
1. _____

2. _____

3. _____ [3]

(ii) The purpose of aerobic respiration is to release energy in cells.

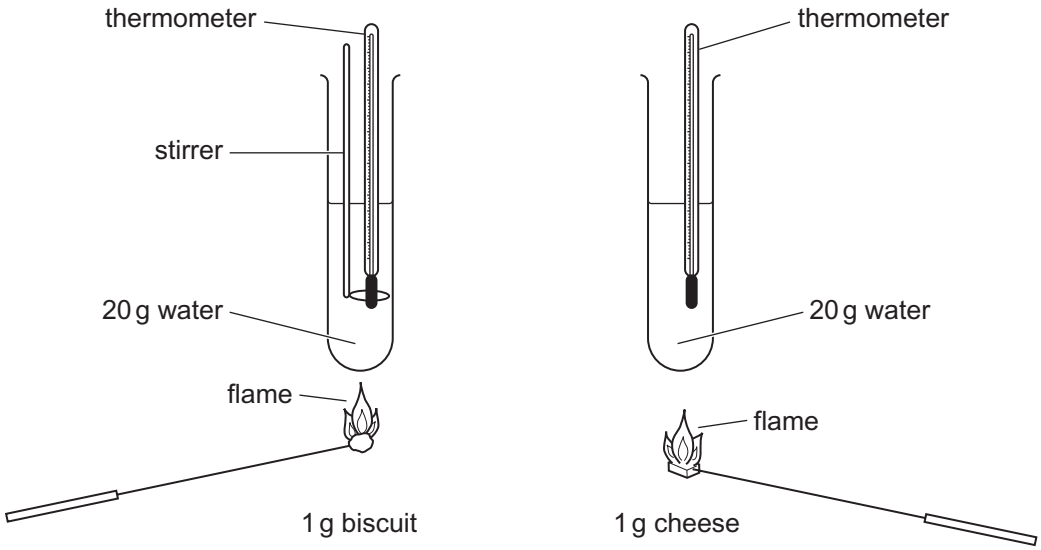
Complete the diagram below to show the substances used and the missing product in aerobic respiration.



[3]

Examiner Only	
Marks	Remark

(b) Paula, a Year 11 student, carried out an experiment to compare the amount of energy released when one gram (g) of biscuit and one gram (g) of cheese were burned, as shown in the diagram below.



(i) Using only the information in the diagram, give two reasons why Paula's experiment was not a fair test.

1. _____

_____

2. _____

_____ [2]

The heat energy released from the burning food raised the temperature of the water in the test tubes.

The amount of energy released when one gram of food is burned is calculated using the following equation:

Energy released in joules/J	=	Mass of water/g	×	Rise in temperature of water/°C	× 4.2

(ii) When the biscuit was completely burned, the temperature of the water increased by 20 °C.
Using the equation above, calculate the amount of energy released by burning the biscuit.
Show your working.

_____ J [2]

(iii) Paula used a biscuit containing only carbohydrate.
She read in a textbook that one gram of carbohydrate contains 17 000 J of energy.

Suggest **one** reason why the energy value Paula obtained for her biscuit was less than 17 000 J.

_____ [1]

Examiner Only

Marks	Remark

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Examiner Only	
Marks	Remark

4 The photographs show two types of squirrel, red and grey, found in the United Kingdom (UK).



Red squirrel
© Simon Fraser / Science Photo Library



Grey squirrel
© David Aubrey / Science Photo Library

(a) Squirrels are chordates. Give **one** characteristic of all chordates.

_____ [1]

Read the following passage carefully.

Red squirrels were once found over much of the UK, but their numbers have gone down rapidly during the past 50 years. Reasons for this include disease and loss of habitat. However, the most important reason is that they find it difficult to compete with the introduced American grey squirrel.

The red squirrel's food includes hazelnuts, acorns and pine cones. These are collected in the summer and autumn and stored under the soil surface for later use. While the nuts and other food is being carried in the squirrel's mouth, chemicals from scent glands in its cheeks are transferred to the food.

While the red squirrel numbers in Ireland and England have gone down in recent years, the numbers in Scotland have gone up slightly. This is probably due to more trees having been planted. It is estimated that there are 120 000 red squirrels in Scotland, which is 75% of the total number in the UK.

Using the information in the passage and your knowledge, answer the following questions.

Examiner Only	
Marks	Remark

(b) What is the habitat of the red squirrel?

_____ [1]

(c) Give three reasons why the numbers of red squirrels have gone down.

1. _____

2. _____

3. _____ [3]

(d) *Read lines 6–8.*
Suggest at what time of the year the stored hazelnuts, acorns and pine cones are used by the squirrels.

_____ [1]

(e) *Read lines 8–10.*
Suggest a reason why chemicals from a red squirrel's scent glands need to be transferred to the food.

_____ [1]

(f) *Read lines 13–15.*
Calculate the estimated number of red squirrels in the UK.
Show your working.

_____ [2]

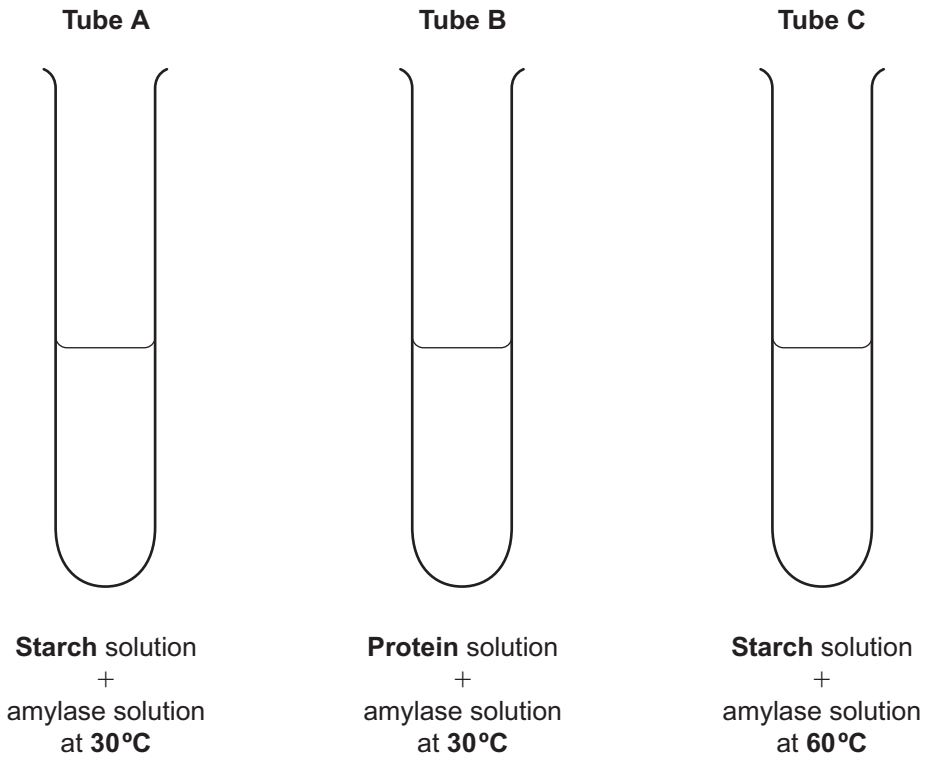
(g) Birds of prey, e.g. hawks, feed on red squirrels.

Using this information and the information in the passage, draw a food chain which includes the red squirrel.

[2]

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5 The diagram below 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.

The table below shows the results of the tests on the samples.

Tube	Colour of tube contents	
	At start	After 60 minutes
A	Blue-black	Yellow-brown
B	Yellow-brown	Yellow-brown
C	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) Name the model that explains how enzymes work.

_____ [1]

Examiner Only

Marks	Remark

6 (a) The diagram shows the instructions for carrying out a starch test on a leaf.

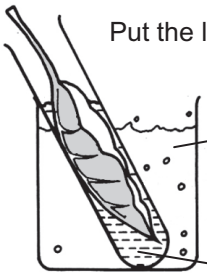


Remove a leaf from a plant kept in bright light for 24 hours.

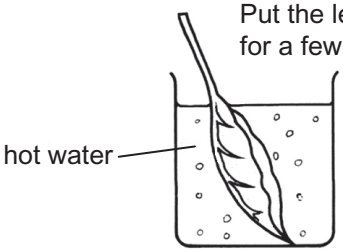
Step 1



Step 2

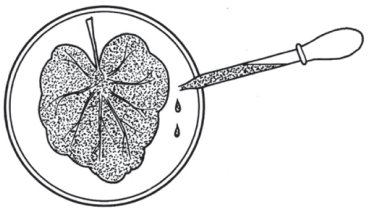


Step 3



Step 4

Add iodine solution to the leaf.



Step 5

Source: Principal Examiner

(i) Describe and explain what is happening at **Step 2**.

_____

_____ [2]

(ii) Give a reason for **Step 3**.

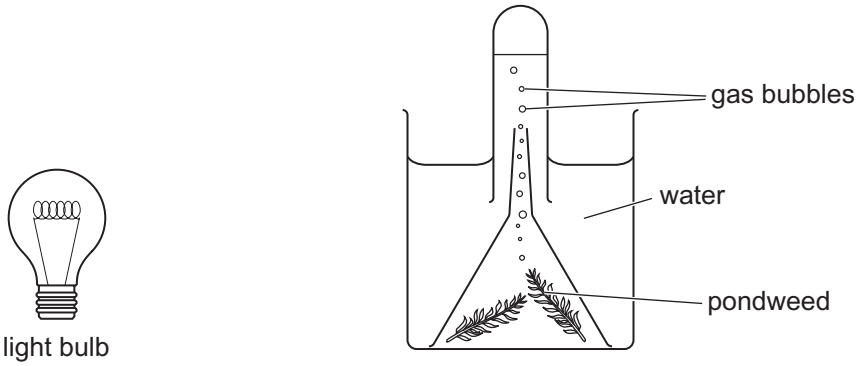
_____ [1]

(iii) When iodine solution was added at **Step 5**, the leaf turned blue-black, showing that starch was present.
Using the information in the diagram, explain why starch was present in the leaf.

_____ [1]

Examiner Only	
Marks	Remark

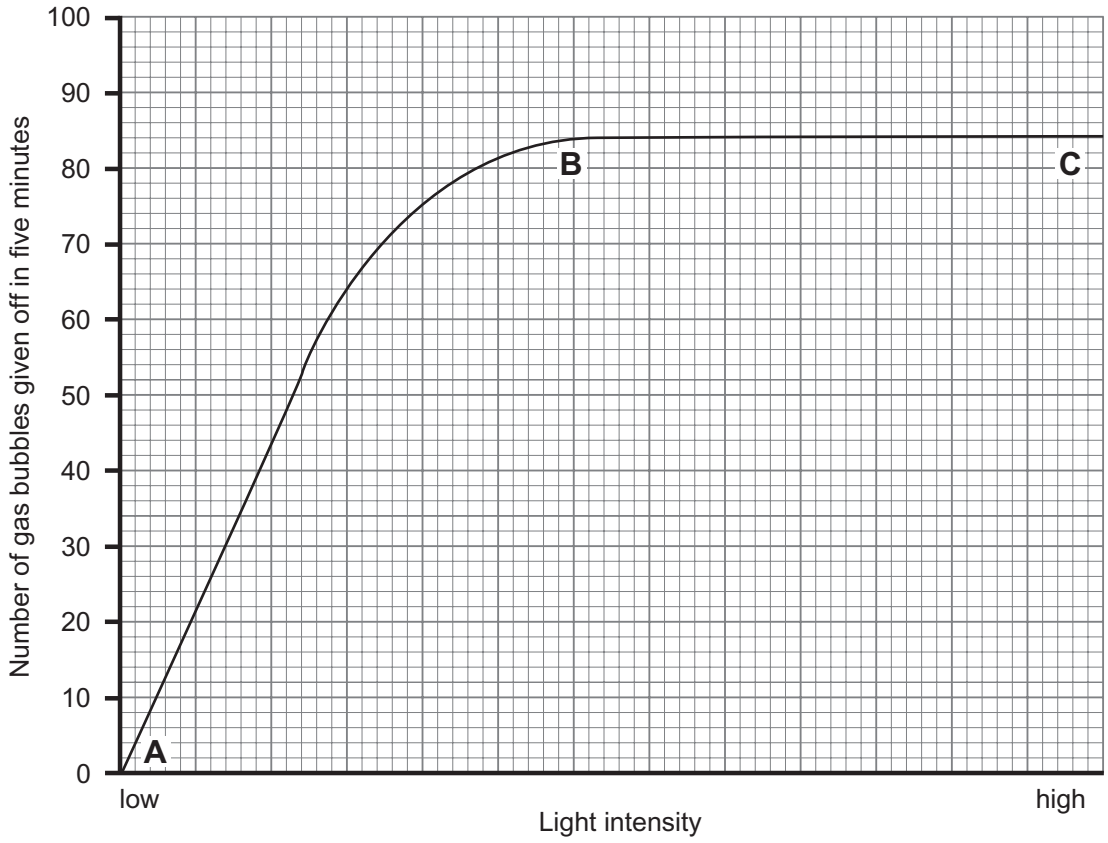
(b) The diagram below shows how a pupil set up an experiment to investigate the effect of light intensity on the rate of photosynthesis in pondweed.



Light intensity was changed by moving the light bulb closer to or further away from the pondweed.

The rate of photosynthesis was measured by counting the number of gas bubbles given off by the pondweed in a five minute period.

The results of the experiment are shown in the graph below.



(i) Name the gas given off by the pondweed.

_____ [1]

(ii) The number of gas bubbles given off did not increase between light intensities **B** and **C**. Explain why.

_____

_____

_____ [2]

(iii) How would the pupil have ensured that the results of this experiment were reliable?

_____ [1]

(iv) Suggest why, each time the position of the light bulb was changed, the pupil waited for two minutes before counting the number of gas bubbles.

_____ [1]

Examiner Only	
Marks	Remark

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Examiner Only	
Marks	Remark

7 The photograph shows an area of grassland with many plant species present.



© Gustoimages / Science Photo Library

(a) Describe how you would sample this grassland to find the **average number** of plant species per square metre.

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

[6]

(b) Grasslands like the one shown in the photograph often have large numbers of butterflies.

Name the apparatus that is used to capture butterflies.

[1]

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(Questions continue overleaf)

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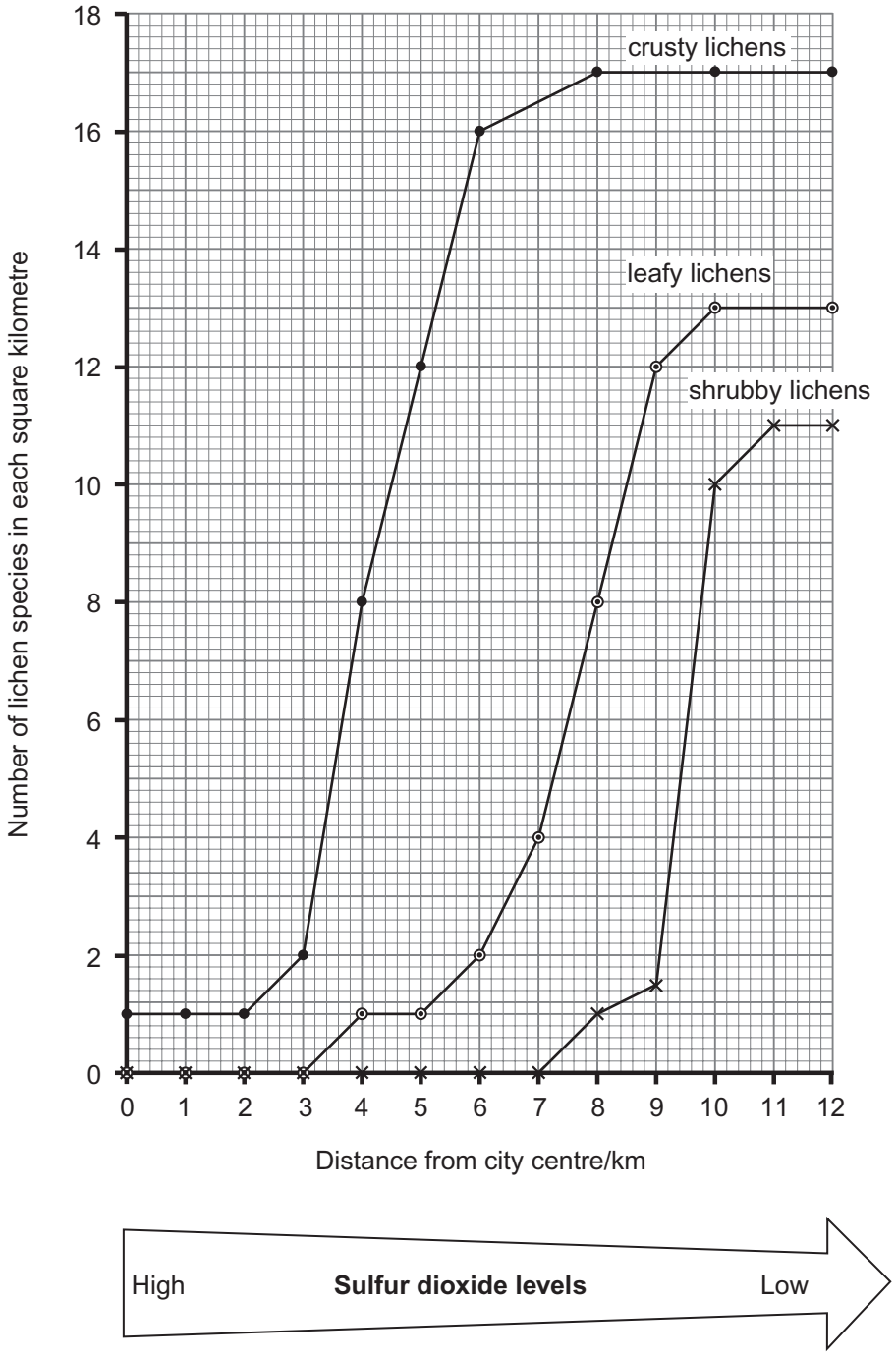
8 Lichens are organisms that are sensitive to the amount of sulfur dioxide (air pollution) in the air.

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



Examiner Only	
Marks	Remark

(a) **(i)** Using the graph, state how many **leafy** lichen species are present 8 km from the city centre.

_____ [1]

(ii) Using **data** from the graph, describe fully the trend for the **leafy** lichens.

_____

_____

_____

_____ [3]

(b) Sulfur dioxide levels are highest in the city centre.

Using this information and the graph, state and explain which one of the three types of lichen is **least** able to survive sulfur dioxide pollution.

Type _____

Explanation _____

_____ [2]

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

_____ [1]

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

_____ [1]

(d) Name an indicator species that can be used to monitor **water pollution**.

_____ [1]

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THIS IS THE END OF THE QUESTION PAPER

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113970

Rewarding Learning

General Certificate of Secondary Education
2013–2014

Double Award Science: Biology

Unit B1

Foundation Tier

[GSD11]

WEDNESDAY 13 NOVEMBER 2013, AFTERNOON

MARK SCHEME

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General Marking Instructions

Introduction

Mark schemes are published to assist teachers and students in their preparation for examinations. Through the mark schemes teachers and students will be able to see what examiners are looking for in response to questions and exactly where the marks have been awarded. The publishing of the mark schemes may help to show that examiners are not concerned about finding out what a student does not know but rather with rewarding students for what they do know.

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					AVAILABLE MARKS
1	**(a)**	**(i)**	65–74	[1]	
		(ii)	Unhealthy diet/e.g. too much sugar/fat in diet/obese/lack of exercise/lack of activity/liver or pancreas not working/ not enough insulin produced	[1]	
	(b)	**(i)**	Insulin	[1]	
		(ii)	Any **two** from: • Insulin would be digested/broken down • by protease/pepsin/enzymes • in the stomach	[2]	
		(iii)	Converts glucose to *glycogen/more respiration* of glucose	[1]	
		(iv)	Kidney failure Stroke	[2]	8
2	**(a)**		A – Respiration B – Photosynthesis C – Feeding/eating/ingestion/consumption	[3]	
	(b)	**(i)**	All 4 points correctly plotted; Points joined by straight line;	[2]	
		(ii)	As time progresses, the carbon dioxide levels increase	[1]	
		(iii)	Increased burning of fossil fuels/deforestation/more cars/lorries/ more electricity *generated*	[1]	
	(c)		Ice-*caps* melt/thermal expansion; so *sea* levels rise; **or** climate change; leading to more rainfall/precipitation/sea levels rise	[2]	9

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				AVAILABLE MARKS
3	(a)	(i)	Any **three** from: • Large surface area/walls are one cell thick • Thin/one cell thick • Moist • Permeable • Presence of a diffusion gradient • Good blood supply/capillary network [3]	
		(ii)	Glucose; oxygen (any order); water (product) [3]	
	(b)	(i)	Burning flame sample held at *different distances* from boiling tube; stirrer present only in the biscuit tube [2]	
		(ii)	20 × 20 × 4.2 ; = 1680 Joules [2]	
		(iii)	Heat/energy/is lost to the air/atmosphere/heating up the glass/ conducted away by the mounted needle [1]	11
4	(a)		Have a backbone [1]	
	(b)		Trees/forest/woodland [1]	
	(c)		Loss of habitat/woodland/not enough trees being planted; Disease; Competition with grey squirrel Lack of food; Predators/predation [3]	
	(d)		Winter/November to March/when food is scarce/snow on ground [1]	
	(e)		Act as markers that allow squirrel to find stored food [1]	
	(f)		1600 = 1%/120 000/3 = 40,000; Total = 160 000 [2]	
	(g)		Hazel tree/hazelnuts/oak tree/ acorns/pine tree/pine cones → red squirrel → hawk/bird of prey 1 mark for three correct names in correct order; one mark for arrows pointing in correct direction [2]	11

			AVAILABLE MARKS
5	**(a)**	*No starch* present/iodine does not test for protein/only tests for starch [1]	
	(b)	Starch is completely broken down in tube A/no starch in A; 30 °C is correct temperature for amylase to function; Starch is *not* broken down/remains in tube C/incompletely broken down/starch still present; Amylase denatured/destroyed/shape damaged in tube C [4]	
	(c)	Lock and key [1]	6
6	**(a)**	**(i)** *Leaf* placed in *boiling* water; to kill leaf/stop reactions/stop photosynthesis [2]	
		(ii) Remove chlorophyll/decolourise leaf [1]	
		(iii) Plant had been in light/had photosynthesised [1]	
	(b)	**(i)** oxygen/O_2 [1]	
		(ii) Any two from: • Light no longer limits the rate of photosynthesis; • some other factor (e.g. carbon dioxide or temperature) now limits the rate [2]	
		(iii) Repeat measurements (at each light intensity) [1]	
		(iv) Equilibrate/acclimatise/adjust to the light intensity/allow bubbles to be produced at steady rate [1]	9

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7 (a) Indicative content

- Q • Place quadrats (in the grassland)
- S • Randomly/use coordinates or two tape measures set at right angles
- I • Identify the plant species
- K • Use key/plant identification book
- C • Count the number of plant *species* in quadrat
- R • Record/write down results (in the field)
- A • Divide total number of species in all quadrats by number of quadrats
- RQ • Repeat several times

Response	Mark
Candidates must use appropriate specialist terms throughout using at least five of the above points to describe how they would carry out this grassland survey. They use good spelling, punctuation and grammar and the form and style are of a high standard.	[5–6]
Candidates must use some appropriate specialist terms throughout using three or four of the above points to describe how they would carry out the grassland survey. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	[3–4]
Candidates describe how the grassland survey is carried out using one or two of the above points. However, these are not presented in a logical sequence. They use limited spelling, punctuation and grammar and they have made little use of specialist terms.	[1–2]
Response not worthy of credit	[0]

[6]

(b) Sweep net/net [1]

AVAILABLE MARKS

7

		AVAILABLE MARKS
8 **(a)** **(i)**	Eight [1]	
(ii)	2 trends from – no species near city centre; – steady increase in number of species; – plateau; 1 data – no species up to *3 km* – 1 at *4–5 km;* – Max 13 species recorded; – Increase between *5–10 km* – No increase from *10–12 km* [3]	
(b)	Shrubby lichens; Explanation: are found where sulfur dioxide levels are low/are present far from the city centre/after 7–8 km from city centre [2]	
(c) **(i)**	Less coal being burned/less burning of fossil fuels Scrubbers/filters remove sulfur/desulfurisation use of renewable sources/named/electric cars [1]	
(ii)	Some sulfur dioxide remains there/it takes these types some time to recolonise the city centres/they are very small in size and are not seen/recorded /sulfur dioxide levels still too high in city centres [1]	
(d)	bloodworm [1]	9
	Total	**70**

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Rewarding Learning

Centre Number	
71	

Candidate Number

General Certificate of Secondary Education
2012–2013

Double Award Science: Biology

Unit B1

Foundation Tier

[GSD11]

GSD11

TUESDAY 14 MAY 2013, 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 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 Question **6(a)(i)**.

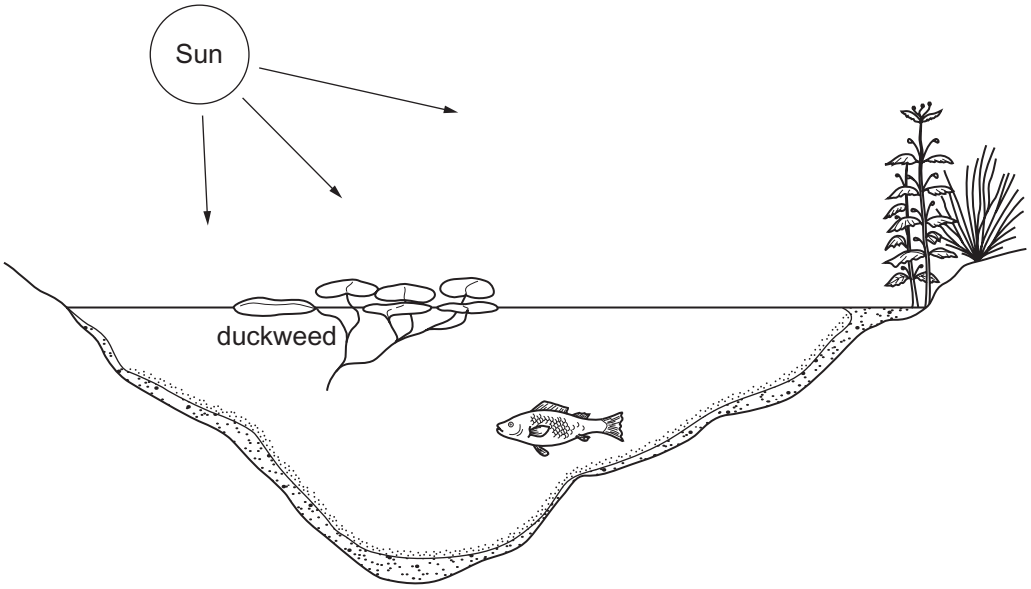
For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
Total Marks	

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Examiner Only	
Marks	Remark

1 The diagram shows a pond and surrounding area.

Duckweed is a type of plant.



Source: Principal Examiner

(a) What is the energy source for the living organisms in the pond?

_____ [1]

(b) Name the process carried out by the duckweed and fish that produces carbon dioxide.

_____ [1]

(c) Name the process carried out by the duckweed that produces oxygen.

_____ [1]

(d) (i) Name **one** type of organism, present in the pond and surrounding soil, that breaks down decaying matter.

_____ [1]

(ii) These organisms return minerals to the soil. One mineral is nitrate.

What do plants use nitrates for?

_____ [1]

(iii) Name the cells in plants that take up minerals from the soil.

_____ [1]

(e) (i) What apparatus would pupils use to sample organisms from a pond?

_____ [1]

(ii) Give **one** abiotic factor that may influence the numbers and types of animals living in a pond.

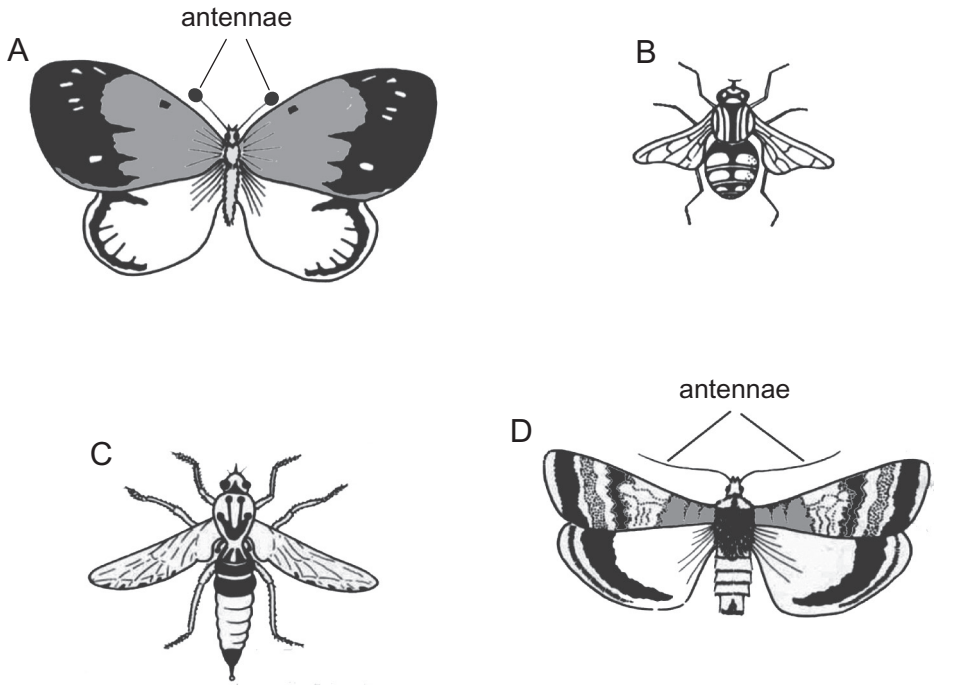
_____ [1]

Examiner Only	
Marks	Remark

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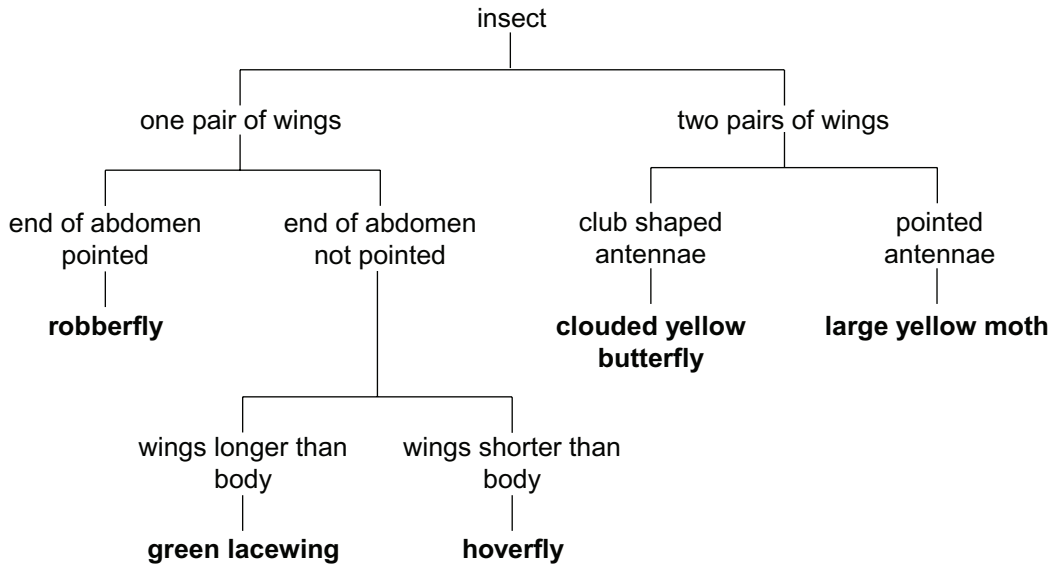
The diagram shows four insects pupils found during their study of the area around the pond.

Examiner Only	
Marks	Remark



© Diagram of four insects sourced from Basic Biology Questions for GCSE by C & B Rouan, published by Stanley Thornes, 1994. ISBN 0859505510

KEY



(f) Use the key to identify each of the insects shown in the diagram.

A _____ B _____

C _____ D _____

[2]

Examiner Only	
Marks	Remark

2 The table shows the energy content for food eaten by a man for his breakfast.

Food type	Energy content/kJ
Milk	280
Cereal	1500
Coffee with sugar	1680
Bacon	2090
Toast with butter	1050

(a) (i) Calculate the man's total energy intake from this breakfast.

_____ kJ [1]

(ii) The recommended energy intake for an average man is 10 450 kJ per day. The man's lunch and dinner each has a similar energy content to his breakfast.

Give **one** long term consequence if he continues with this diet.

Explain your answer.

_____

_____

_____ [2]

(b) Milk contains carbohydrates, fats and proteins.

(i) Name the test used to show the presence of protein in milk.

Give the colour of a positive result.

Test _____

Colour _____ [2]

(ii) Name **one** other substance in milk that contributes to a balanced diet.

_____ [1]

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Examiner Only	
Marks	Remark

3 **(a)** When plant leaves carry out photosynthesis they produce starch.

The list gives the stages **(A–E)** in carrying out a starch test on a leaf in an investigation on photosynthesis, but they are **not** in the correct order.

A Add iodine solution to a leaf.

B Dip the leaf in hot water to soften it.

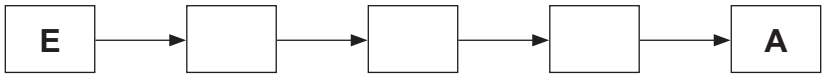
C Place the leaf in boiling water for 1–2 minutes.

D Place the leaf in boiling alcohol for several minutes.

E Put the plant in light for 12 hours and then remove a leaf.

(i) Place the letters in the correct order to carry out a starch test.

Stages **E** and **A** have been done for you.



[2]

(ii) What is the purpose of step **D**?

_____ [1]

(iii) What colour will the iodine solution turn when it is added to the leaf if the leaf contains starch?

_____ [1]

(b) Why is it necessary to destarch the plant before carrying out this investigation?

_____

_____ [1]

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Examiner Only	
Marks	Remark

(c) A market gardener wanted to increase his yield of lettuces by increasing the concentration of carbon dioxide in his glasshouse.

However, he had read that high concentrations of carbon dioxide may harm humans. He researched this and found the two tables below which gave him the information he required.

The table below shows how different concentrations of carbon dioxide affect the yield of lettuces in a glasshouse at 35 °C.

Carbon dioxide concentration in glasshouse/ppm	Yield of lettuces/%
700	100
950	100 + extra 25
1250	100 + extra 35

The table below shows how different concentrations of carbon dioxide could affect the health of humans.

Carbon dioxide concentration in glasshouse/ppm	Effect on health of humans
700–999	None
1000–1250	Possible dizziness and appearance of symptoms for people with asthma or respiratory conditions

(i) Using the information in both tables, give the most suitable concentration of carbon dioxide to grow lettuces in the glasshouse. Explain your choice.

Concentration _____ ppm

Explanation _____

_____ [3]

(ii) Suggest **one** environmental factor, other than carbon dioxide, that helps the growth of lettuces in a glasshouse.

_____ [1]

(iii) Give **one** economic factor the market gardener should consider when growing his lettuces in a glasshouse.

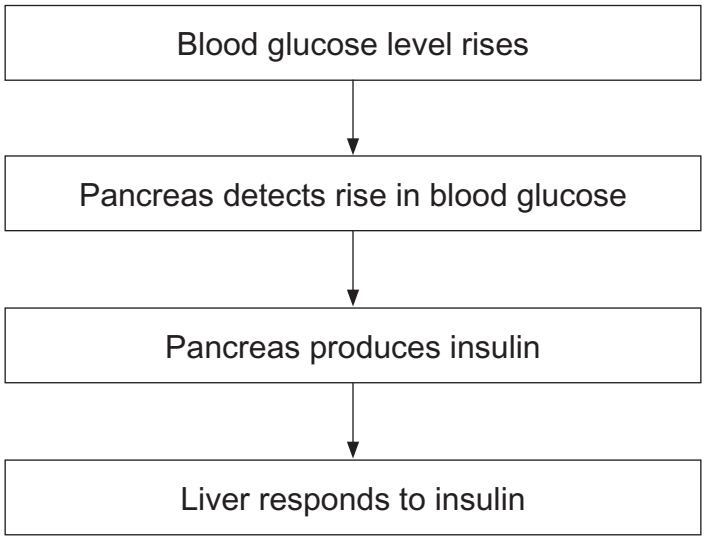
_____ [1]

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Marks	Remark

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Examiner Only	
Marks	Remark

4 **(a)** The diagram shows some of the stages involved in the control of blood glucose levels.



(i) How does insulin travel from the pancreas to the liver?

_____ [1]

(ii) How does insulin affect blood glucose levels?

_____ [1]

(iii) Describe **two** ways in which the liver responds to insulin.

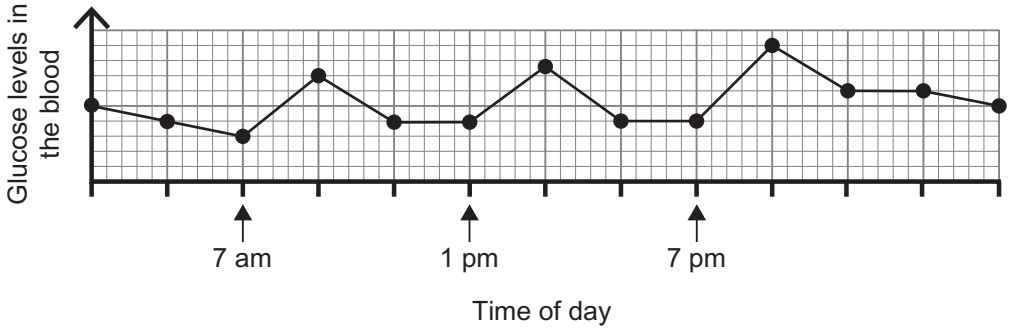
_____

_____

_____ [2]

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(b) The graph shows typical blood glucose levels found in a person without diabetes over the period of a day.



Source: Principal Examiner

(i) Using the graph and your knowledge, suggest why there are peaks in blood glucose levels during the day.

_____ [1]

(ii) People with Type 1 diabetes may need to inject themselves with insulin several times a day.

Using the graph and your knowledge, suggest why they need to inject themselves with insulin several times a day.

_____

_____ [1]

(c) One symptom of diabetes is the presence of glucose in the urine.

The table gives results of glucose tests carried out on urine samples from two people.

Name	Initial colour	Final colour
John	Blue	Brick red
Anne	Blue	Blue

(i) Explain how these results suggest that John has diabetes.

_____ [1]

(ii) Give two other symptoms of diabetes.

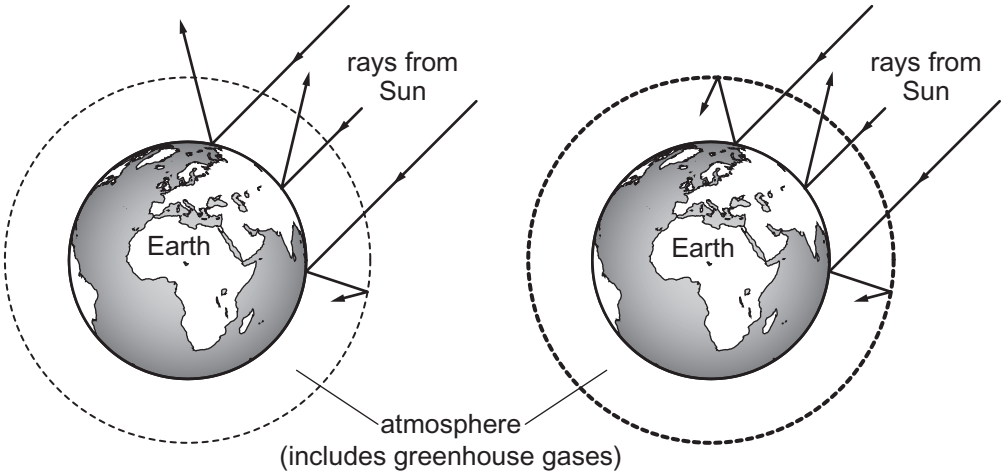
1. _____

2. _____ [2]

Examiner Only

Marks	Remark

5 The diagram represents what happened to rays of sunlight when they entered the Earth's atmosphere thirty years ago and five years ago.



thirty years ago **five years ago**

Source: Principal Examiner

(a) (i) Use the diagram, and your knowledge, to explain how global warming occurs.

_____

_____

_____

_____ [2]

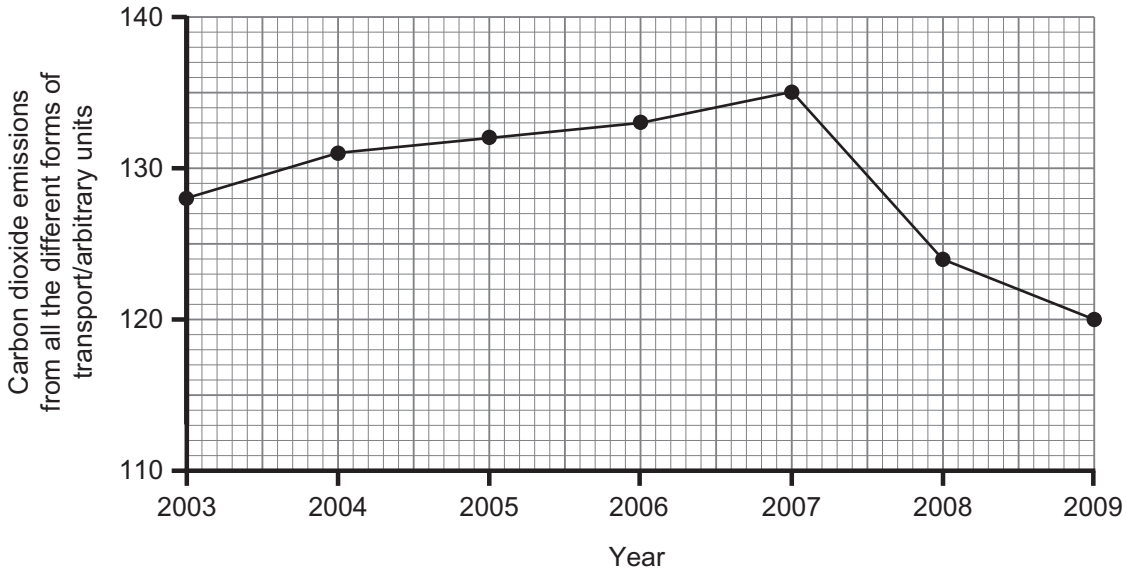
(ii) Give **one** environmental consequence of global warming.

_____ [1]

Examiner Only

Marks	Remark

The graph shows carbon dioxide emissions from all the different forms of transport in the UK during the period 2003–2009.



© Crown copyright – Department of Energy and Climate Change

(b) Describe the trend in carbon dioxide emissions from transport between 2003–2009.

Use evidence from the graph to support your answer.

_____

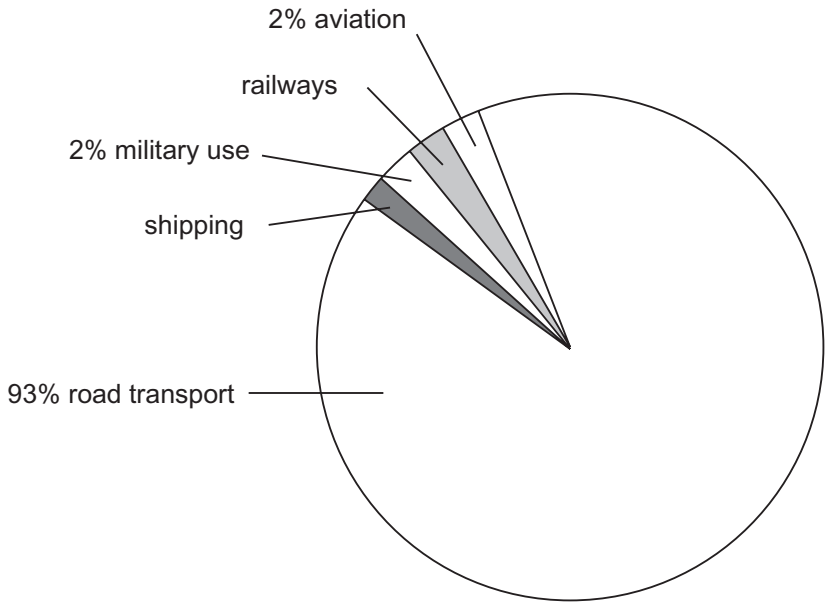
_____

_____ [2]

Examiner Only

Marks	Remark

The pie chart shows the percentage of carbon dioxide emissions from each of the different forms of transport in the UK in 2009.



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(c) Railways produce twice the amount of carbon dioxide emissions than shipping does.

Use this information and the pie chart to calculate the percentage of carbon dioxide emissions produced by the railways.

Show your working.

_____ % [3]

(d) **(i)** Suggest **one** way of reducing the carbon dioxide levels produced by road transport.

_____ [1]

(ii) Give **one** other source of carbon dioxide emissions apart from those produced by transport.

_____ [1]

Examiner Only

Marks	Remark

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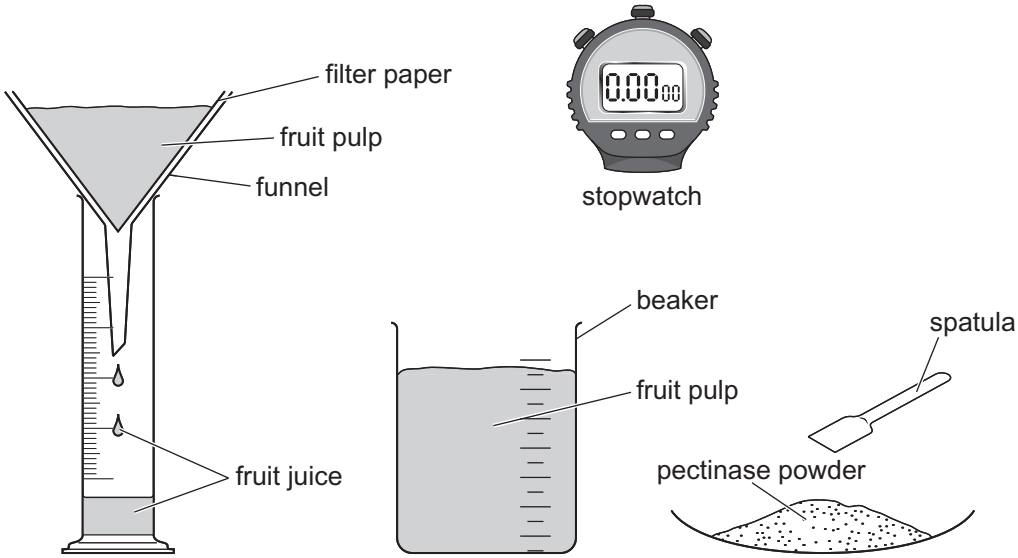
(Questions continue overleaf)

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Examiner Only	
Marks	Remark

6 **(a)** Fruit juice is normally obtained from fruit pulp. Fruit pulp is obtained by squeezing the fruit. The pulp is then treated by adding the enzyme pectinase, which breaks down pectin in the walls of fruit cells. This allows the fruit juice to be released more quickly from the cells.

The diagram shows some of the apparatus you may need.



Source: Principal Examiner

(i) Describe how you would carry out an investigation to compare how quickly fruit juice is released from fruit pulp with **and** without pectinase.

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

[6]

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Examiner Only	
Marks	Remark

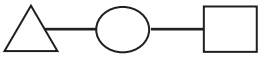
(ii) Give **one** other factor that could be investigated to see if it would cause the release of more fruit juice from the fruit pulp.

_____ [1]

(iii) Pectinase is used commercially by fruit juice manufacturers. Give **one** other commercial use of enzymes.

_____ [1]

(b) **(i)** Enzymes speed up digestion in the body. Complete the diagram with the name of the appropriate enzyme and **draw** the products produced when this protein molecule is broken down in the digestive system.

Protein molecule	Name of enzyme	Products	
	_____	_____	[3]

(ii) Where in the digestive system does digestion of proteins take place?

_____ and _____ [2]

(iii) Where in the digestive system does absorption of digested food take place?

_____ [1]

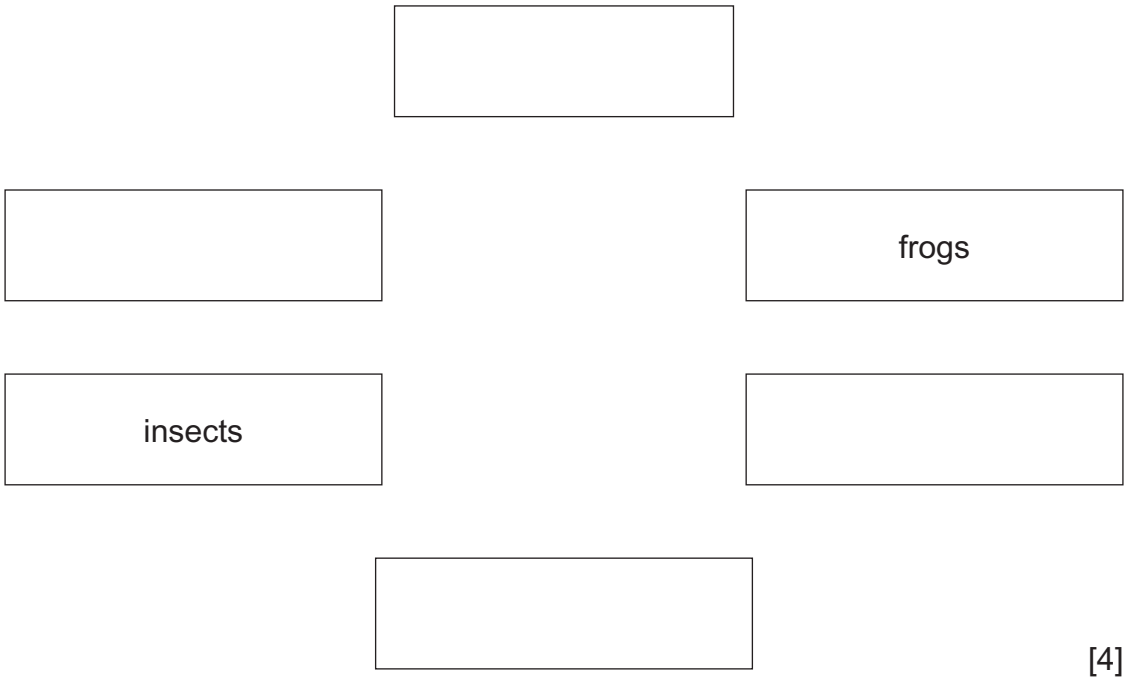
(iv) State **one** way that the digestive system is adapted for absorption.

_____ [1]

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7 **(a)** Using the information below, complete the food web.

- Earthworms are eaten by frogs and hawks.
- Frogs are eaten by hawks.
- Insects are eaten by spiders which in turn are eaten by hawks.
- Insects eat plants.
- Earthworms eat plants.



[4]

Examiner Only

Marks	Remark

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(b) Using the information in part **(a)** opposite, draw a labelled pyramid of numbers for the food chain that contains insects.

[3]

(c) Give two ways in which insects lose energy.

1. _____

2. _____ [2]

(d) Give **one** advantage to the hawk of having several food sources.

_____ [1]

Examiner Only	
Marks	Remark

THIS IS THE END OF THE QUESTION PAPER

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113168

Rewarding Learning

General Certificate of Secondary Education
2012–2013

Double Award Science: Biology

Unit B1

Foundation Tier

[GSD11]

TUESDAY 14 MAY 2013, MORNING

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				AVAILABLE MARKS
1	**(a)**	sun/light	[1]	
	(b)	respiration	[1]	
	(c)	photosynthesis	[1]	
	(d)	**(i)** bacteria/fungi/microbes/microorganisms	[1]	
		(ii) amino acids/proteins	[1]	
		(iii) root hair cells	[1]	
	(e)	**(i)** net/sweep net/plankton net	[1]	
		(ii) temperature/pH/oxygen/CO_2/minerals/fertilisers named minerals	[1]	
	(f)	each two correct = 1 mark A Clouded yellow butterfly B Hoverfly C Robberfly D Large yellow moth	[2]	10
2	**(a)**	**(i)** 6600 kJ	[1]	
		(ii) ● early death/angina/heart attack/obesity/CHD/strokes/high blood pressure/diabetes ● intake is much *greater* than recommended 10 450 kJ/too much food intake (19 800 kJ)	[2]	
	(b)	**(i)** Biuret; purple	[2]	
		(ii) calcium/minerals/vitamins	[1]	6

					AVAILABLE MARKS
3	**(a)**	**(i)**	C D B – 1 mark for 1 correct 2 marks for all	[2]	
		(ii)	decolourise/remove green colour or chlorophyll	[1]	
		(iii)	blue/black	[1]	
	(b)		show that starch has been produced during the experiment	[1]	
	(c)	**(i)**	950–999 ppm; increases yield by 25% OR by quarter/yield 125%; any higher causes health problems	[3]	
		(ii)	temperature/light/minerals/water/sun/fertiliser/protection from weather e.g. frost	[1]	
		(iii)	cost of adding carbon dioxide/fuel/heating/greenhouse/fertiliser/ lighting/how much profit	[1]	10
4	**(a)**	**(i)**	in the blood/plasma/bloodstream	[1]	
		(ii)	lower/reduced/decreases	[1]	
		(iii)	Any **two** from: ● more respiration of glucose ● faster uptake of glucose ● glucose converted to (or stored as) glycogen ● glucose converted to (or stored as) fat	[2]	
	(b)	**(i)**	eating/(sugary) drink	[1]	
		(ii)	levels change throughout the day/ eat several times per day	[1]	
	(c)	**(i)**	brick red colour shows the presence of glucose/ positive Benedict's test/urine contains glucose	[1]	
		(ii)	lethargy/thirst/urinate more often; any **two**	[2]	9

AVAILABLE MARKS

5 **(a)** **(i)** Any **two** from:
- more greenhouse gases;
- radiation trapped/more rays trapped;
- earth's atmosphere warms up/earth's temp increases [2]

(ii) more storms/changing weather conditions/sea levels rising/polar ice melting/climate change/desertification [1]

(b) emissions up, emissions down;
up until 2007/up to max 135/
2009 level is lower than 2003 [2]

(c) 93 + 2 + 2 = 97%; 100 − 97 = 3%;
railways + shipping = 3% railways twice shipping railways 2% [3]

(d) **(i)** use public transport/use railways/more efficient engines/hybrid or electric cars/walk/cycle/drive more economically/car pool [1]

(ii) electricity generation/domestic heating/agriculture (animals)/ factories/industry/waste management/burning fossil fuels/landfill [1]

10

AVAILABLE MARKS

6 (a) (i) Indicative Content:

- Use the same amount of fruit pulp
- Add no pectinase (control)
- Add pectinase to other
- Stir/mix pectinase with fruit pulp
- Put pulp/mixture in funnel/into filter
- Measure the time taken to produce a certain volume of fruit juice/how much produced in given time
- Repeat for reliability/repeat the experiments
- Keep temperature/pH same/mixing/stirring

Response	Mark
Candidates use appropriate terms throughout and give at least five points from the indicative content to describe how to carry out an investigation to see how quickly fruit juice is released from fruit pulp with and without pectinase. They use good spelling, punctuation and grammar skills. Form and style are of a high standard.	[5–6]
Candidates use some appropriate terms throughout to partially describe how to carry out an investigation to see how quickly fruit juice is released from fruit pulp with and without pectinase. They use satisfactory spelling, punctuation and grammar. Form and style are of a satisfactory standard.	[3–4]
Candidates give one or two points and partially describe how to carry out an investigation to see how quickly fruit juice is released from fruit pulp with and without pectinase. They use limited spelling, punctuation or grammar skills.	[1–2]
Response not worthy of credit.	[0]

[6]

(ii) temperature/pH/stirring/amount or conc. pectinase [1]

(iii) washing powders/other commercial uses (named) [1]

(b) (i) protease/peptidases/pepsin;
molecules separate;
all three different types;
(amino acids allowed for 1 mark) [3]

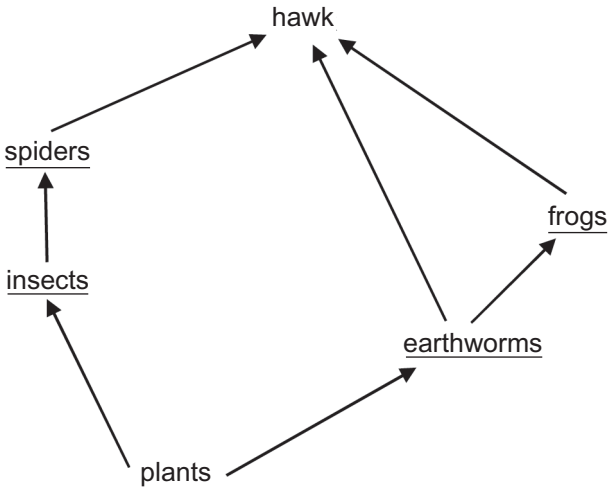
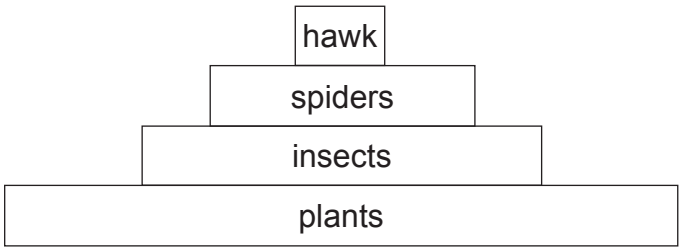
(ii) stomach and small intestine 1 mark each (ileum/duodenum as alternatives to s. intestine) [2]

(iii) small intestine/ileum/at villi [1]

(iv) (presence of) villi/large surface area/thin (epithelium)/ permeable (walls)/good blood supply/(presence of) lacteals [1]

15

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		AVAILABLE MARKS
7 **(a)**		
	1 mark for all 7 links; 1 mark for arrows correct direction away from plants; 2 marks for organisms correct (plants bottom and hawk at top [1] earthworms on right, spiders on left [1]) [4]	
(b)		
	● plants at the bottom; ● insects, spiders and hawks in correct order; ● correct shape [3]	
(c)	movement/respiration or heat/excretion/reproduction any **two** [2]	
(d)	if there is a problem with one they have an alternative source of food [1]	10
	Total	**70**

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Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
2012–2013

Double Award Science: Biology

Unit B1

Foundation Tier

[GSD11]

GSD11

MONDAY 25 FEBRUARY 2013, 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 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 Question **5(b)**.

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

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Examiner Only	
Marks	Remark

1 The table gives information on carbon dioxide (CO_2) emissions from two sources in Northern Ireland in 1990 and 2006.

Source of CO_2 emissions	Amount of CO_2 emissions/thousand tonnes	
	1990	**2006**
Residential	4000	3000
Waste management	1500	800

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(a) Describe the trend shown by carbon dioxide emissions from these two sources from 1990 to 2006.

_____ [1]

(b) Suggest a reason for this trend in the

residential source. _____

_____

waste management source. _____

_____ [2]

(c) Give one result of an **increase** in carbon dioxide emissions.

_____ [1]

(d) Suggest why it is necessary to have **international** treaties on carbon dioxide emissions.

_____

_____ [1]

(e) Suggest why it is **not** easy to get agreement on these international treaties.

_____

_____ [1]

(f) Most of the electricity supply in Northern Ireland is generated using fossil fuels which produce carbon dioxide.

Give **another** source of electricity generation that could help reduce carbon dioxide emissions.

_____ [1]

Examiner Only	
Marks	Remark

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Examiner Only	
Marks	Remark

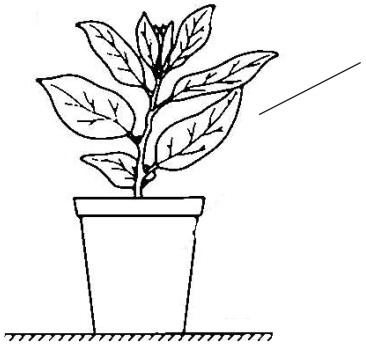
2 A Year 11 pupil investigated the effect of temperature on the growth of plants in a greenhouse.

He grew each of seven plants of the same type at a different temperature.

The plants were of equal mass at the start and were grown for six weeks.

They were equally well watered during this period.

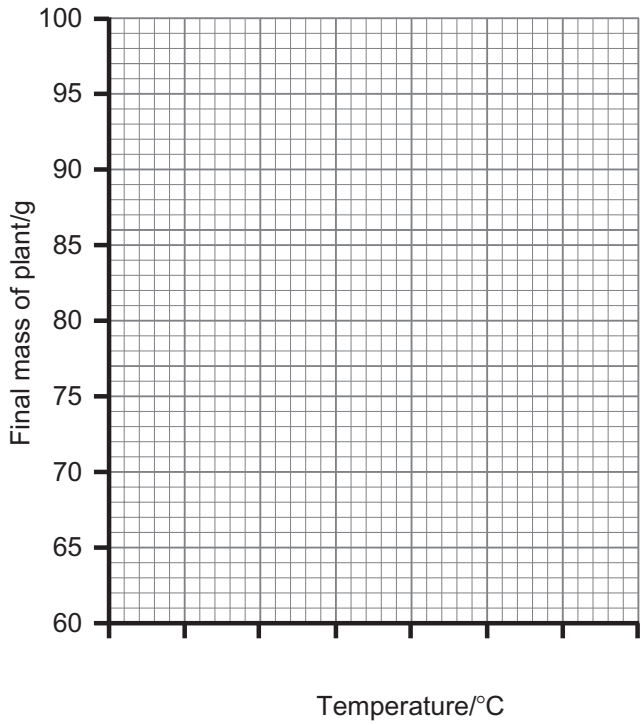
The table shows the final masses of the plants after six weeks.



Temperature/°C	5	10	15	20	25	30	35
Final mass of plant/g	70	72	75	80	87	96	74

(a) (i) Complete the scaling, plot these results and draw a line graph on the grid below.

The Y axis has been scaled for you.



[4]

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(ii) Using the information provided give the best temperature for the plants' growth.

_____ °C [1]

(iii) Suggest an explanation for the result at 35 °C.

_____

_____ [2]

(b) (i) Name **one** other factor, apart from temperature, that would affect the rate of growth.

_____ [1]

(ii) Name a substance produced by photosynthesis that causes the increase in mass in plants.

_____ [1]

(iii) Plants require minerals for healthy growth.

Complete the table, giving the functions of the two minerals.

Mineral	Function
magnesium	
calcium	

[2]

Examiner Only

Marks	Remark

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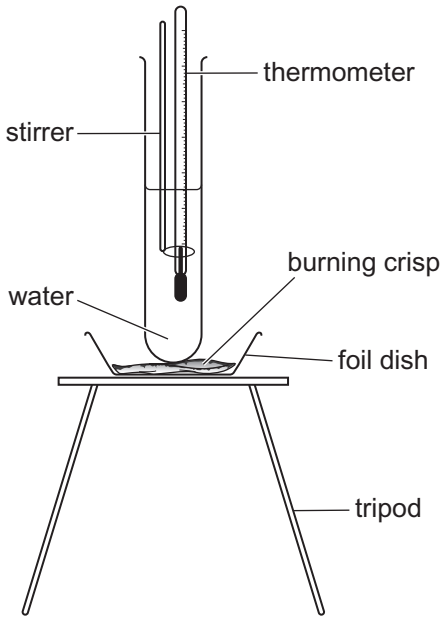
Examiner Only	
Marks	Remark

3 (a) As part of an 'Eat Healthy' project, a Year 11 pupil carried out an investigation to compare the energy content of baked potato crisps and fried (normal) potato crisps.

Both types of crisps used had the same mass.

The diagram shows the apparatus she used.

Each crisp was completely burned and the initial and final temperatures of the water were recorded.



Source: R McIlwaine / CCEA

The table shows the results obtained by the pupil.

Type of potato crisp	Initial temperature of water/°C	Final temperature of water/°C	Rise in temperature of water/°C
baked	23	29	6
fried (normal)	20	31	11

The energy content/kJ of each crisp is calculated by the following equation.

Energy in crisp/kJ = 20 × 4.2 × Rise in water temperature/°C

Using this equation, the pupil calculated the energy content of the baked crisp to be 504 kJ.

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(i) Using the equation, calculate the energy content of the fried (normal) crisp. Show your working.

_____ kJ [2]

(ii) Fried (normal) crisps are cooked in oil but baked crisps are cooked without any oil.

Suggest a reason for the difference in energy content between the two types of crisp.

_____ [1]

(iii) Why are baked crisps a better choice for a person who is trying to lose weight?

_____

_____ [1]

(iv) Give **one** health benefit to overweight people if they lose weight.

_____ [1]

(v) The pupil noticed that if she calculated the energy content of the crisps (per gram) from her experiment results then the energy values were lower than those given (per gram) on the crisp packets.

Give two reasons for this.

1. _____

2. _____ [2]

(b) Aerobic respiration provides energy for the body. It takes place in the cells.

Complete the equation for aerobic respiration.

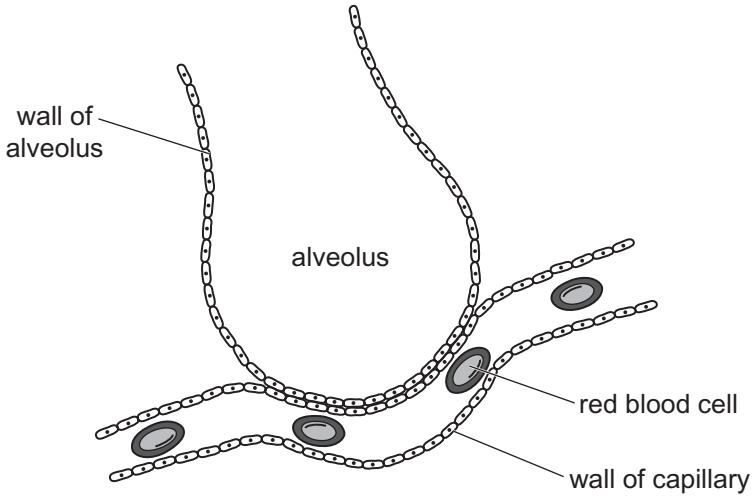
_____ + oxygen → _____ + water + energy
[2]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

(c) The diagram shows an alveolus and a blood capillary. Gas exchange takes place in the lungs between alveoli and capillaries.



Source: R McIlwaine / CCEA

Using the diagram, give three ways in which the alveolus and blood capillary are adapted for the process of gas exchange.

1. _____

2. _____

3. _____ [3]

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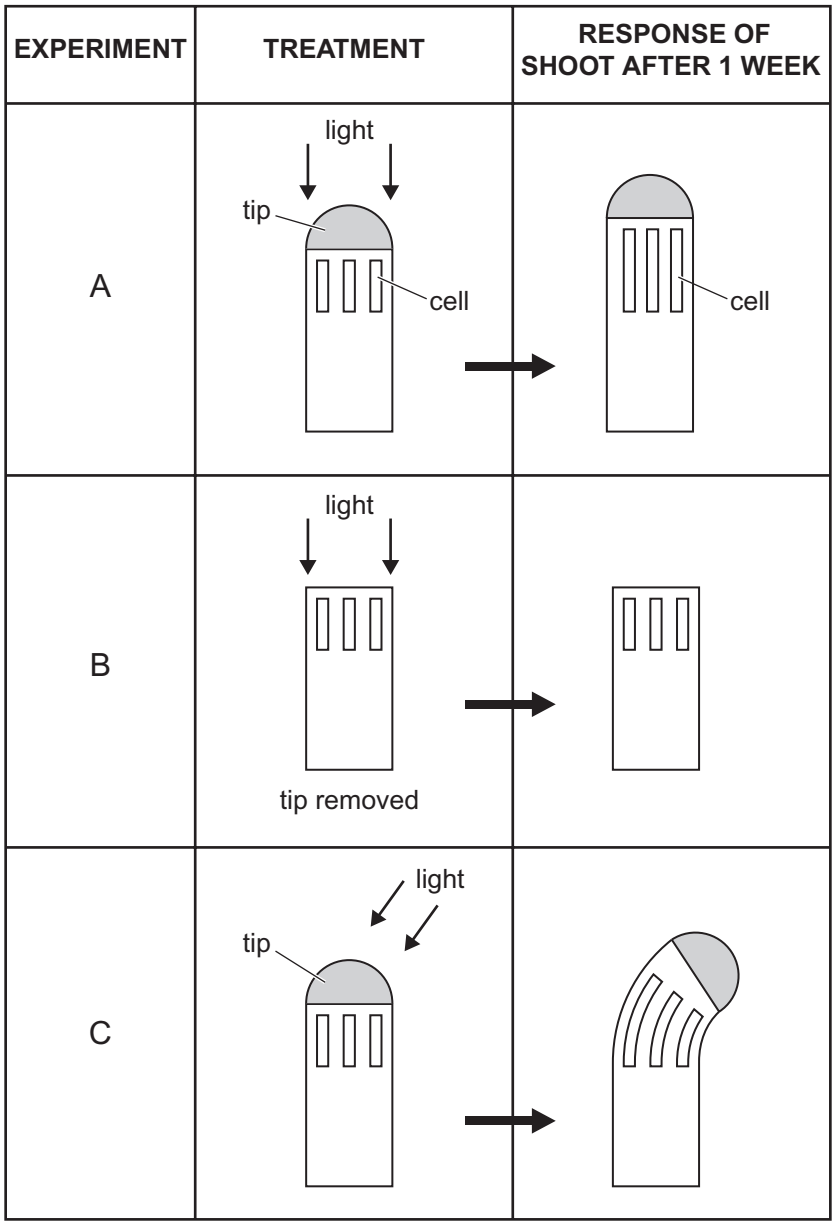
(Questions continue overleaf)

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Examiner Only	
Marks	Remark

4 The response of plants to light is controlled by a hormone produced in the shoot tip.

The diagram shows the results of three experiments, A, B and C in an investigation into the response of plants to light.



Source: R McIlwaine / CCEA

(a) Name the plant response in experiment C.

_____ [1]

(b) Name the hormone involved.

_____ [1]

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(c) Describe and explain the results in

(i) experiment B.

_____

_____ [2]

(ii) experiment C.

_____

_____

_____

_____

_____ [4]

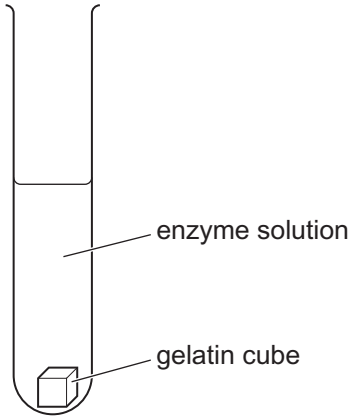
Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

5 **(a)** The diagram shows one test tube from an investigation into enzyme action on a cube of gelatin. The enzyme used is found in the stomach.

The investigation was carried out at seven different temperatures.

The enzyme breaks down the gelatin into amino acids.



The table shows the amount of amino acids present after three hours at each temperature.

Temperature/°C	5	15	25	35	45	55	65
Amount of amino acid produced after three hours/arbitrary units	45	53	110	260	220	100	62

(i) Use the information given to state what type of substance gelatin is.

_____ [1]

(ii) Name the enzyme used in this experiment.

_____ [1]

(iii) Give two variables that need to be controlled in this investigation.

1. _____

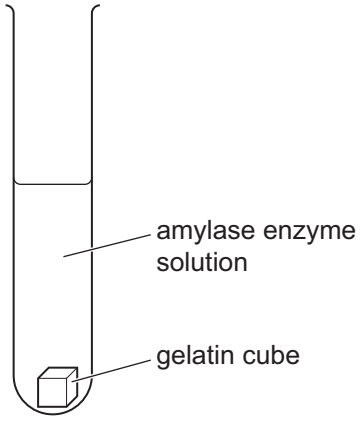
2. _____ [2]

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(b) The investigation was repeated using another enzyme, **amylase**, at 35 °C as shown in the diagram.

Using your knowledge of enzymes and their structure, describe and explain the results you would expect after 3 hours.

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



[6]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

6 The body has two communication systems, the nervous system and the hormonal system.

(a) Name the two main parts of the central nervous system.

_____ and _____ [1]

(b) Describe fully the role of the central nervous system.

_____

_____

_____ [2]

(c) How does the speed of response of the nervous system differ from that of the hormonal system?

_____ [1]

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(Questions continue overleaf)

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Examiner Only	
Marks	Remark

7 **(a)** Pupils collected animal samples from an area near their school during a fieldwork investigation.

(i) Name **one type** of animal they could have collected in a pitfall trap.

_____ [1]

(ii) Describe how the pupils would have used pitfall traps to collect animals.

_____

_____

_____

_____ [3]

(b) Earthworms burrow in damp soil. They feed on dead matter in the soil, partly digest it and pass most of it out as waste. This waste is then broken down by bacteria and fungi which increases the mineral content of the soil.

The earthworms' burrows help drainage and aeration in the soil and so improve soil structure.

(i) What process do bacteria and fungi in the soil carry out on the earthworms' waste?

_____ [1]

(ii) Earthworms belong to a group of animals called annelids.

Name two characteristic features of annelids.

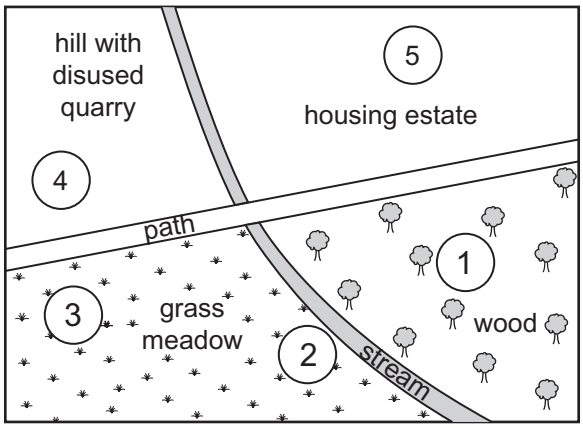
1. _____

2. _____ [2]

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(c) During their fieldwork investigation the pupils sampled earthworms in five locations around the school. The locations are marked 1–5 on the diagram below.

They encouraged the earthworms to move up out of their burrows to the surface by spraying washing up liquid on the ground in each area. This enabled the earthworms to be easily counted.



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The table shows their results.

Location	Number of earthworms counted/m^2
1	23
2	26
3	14
4	4
5	6

(i) Name the apparatus the pupils used to sample earthworms.

_____ [1]

(ii) Locations 2 and 3 are in the grass meadow area. Use the information in the table to work out the average number of earthworms sampled in the grass meadow.

_____ /m^2 [1]

(iii) How does the average number of earthworms sampled in the grass meadow compare with the number of earthworms sampled in the quarry?

_____ [1]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

(iv) Using the information about earthworms given in part **(b)** on page 16 of this question, suggest a reason for the difference in the numbers of earthworms sampled from the grass meadow and the quarry.

_____ [1]

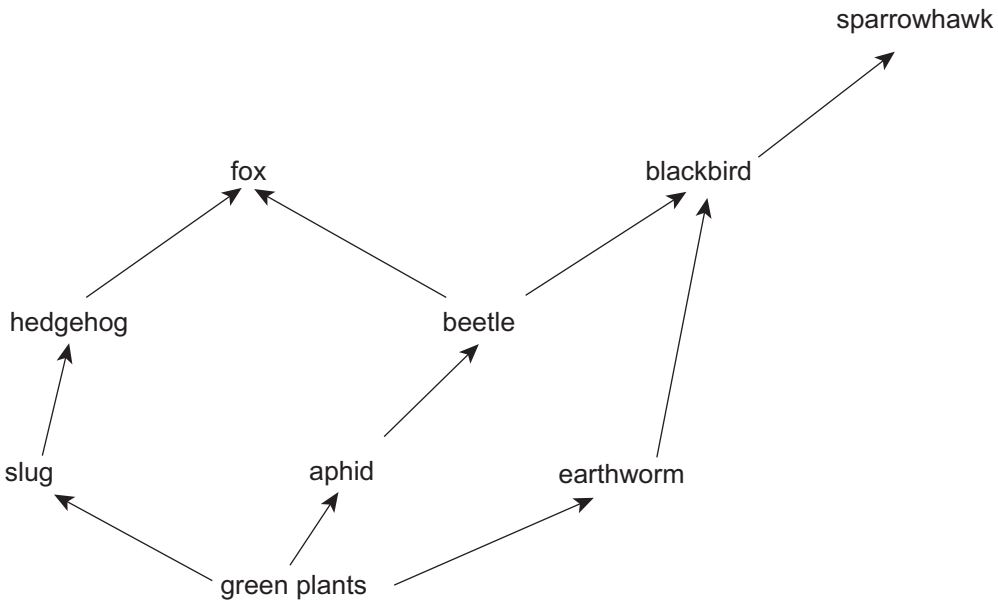
(v) How could the pupils have increased the reliability of their results?

_____ [1]

(vi) Give **one** reason why the actual number of earthworms in all the locations is likely to be greater than the numbers the pupils counted.

_____ [1]

(d) The diagram below shows a food web from the wood area.



Use this diagram and your knowledge to answer the following questions.

(i) Name the animal that is feeding at two trophic levels in this food web.

_____ [1]

(ii) If the number of beetles decreased in the wood area what effect would this have on the number of earthworms in this area? Explain your answer.

_____

_____ [2]

(iii) Draw a labelled pyramid of numbers diagram for the food chain containing the earthworm.

[2]

Examiner Only

Marks	Remark

THIS IS THE END OF THE QUESTION PAPER

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Rewarding Learning

General Certificate of Secondary Education
2012–2013

Double Award Science: Biology

Unit B1

Foundation Tier

[GSD11]

MONDAY 25 FEBRUARY 2013
9.30 am–10.30 am

MARK SCHEME

STEMUP.CO.UK

General Marking Instructions

Introduction

Mark schemes are published to assist teachers and students in their preparation for examinations. Through the mark schemes teachers and students will be able to see what examiners are looking for in response to questions and exactly where the marks have been awarded. The publishing of the mark schemes may help to show that examiners are not concerned about finding out what a student does not know but rather with rewarding students for what they do know.

The Purpose of Mark Schemes

Examination papers are set and revised by teams of examiners and revisers appointed by the Council. The teams of examiners and revisers include experienced teachers who are familiar with the level and standards expected of students in schools and colleges.

The job of the examiners is to set the questions and the mark schemes; and the job of the revisers is to review the questions and mark schemes commenting on a large range of issues about which they must be satisfied before the question papers and mark schemes are finalised.

The questions and the mark schemes are developed in association with each other so that the issues of differentiation and positive achievement can be addressed right from the start. Mark schemes, therefore, are regarded as part of an integral process which begins with the setting of questions and ends with the marking of the examination.

The main purpose of the mark scheme is to provide a uniform basis for the marking process so that all the markers are following exactly the same instructions and making the same judgements in so far as this is possible. Before marking begins a standardising meeting is held where all the markers are briefed using the mark scheme and samples of the students' work in the form of scripts. Consideration is also given at this stage to any comments on the operational papers received from teachers and their organisations. During this meeting, and up to and including the end of the marking, there is provision for amendments to be made to the mark scheme. What is published represents this final form of the mark scheme.

It is important to recognise that in some cases there may well be other correct responses which are equally acceptable to those published: the mark scheme can only cover those responses which emerged in the examination. There may also be instances where certain judgements may have to be left to the experience of the examiner, for example, where there is no absolute correct response – all teachers will be familiar with making such judgements.

			AVAILABLE MARKS
1	**(a)**	emissions reduce [1]	
	(b)	residential – using less electricity/using less energy more expensive/more insulation/more efficient heating/ alternative energy source/renewable energy being used/named waste source – less waste produced/more recycling [2]	
	(c)	Global temperature increase/melting of polar ice caps/flooding/global warming [1]	
	(d)	tackle problem worldwide/CO_2 levels have worldwide effects/to allow targets to be set/to control CO_2 emissions/allows monitoring of CO_2 produced worldwide [1]	
	(e)	may affect countries' development or described (economics/jobs)/ energy supply [1]	
	(f)	wind/solar/tidal/geothermal/hydroelectric/wave [1]	7
2	**(a)**	**(i)** six or seven points correctly plotted [2]; (four or five points correctly plotted [1];) correct scale on X axis written in [1]; points joined by straight lines [1]; [4]	
		(ii) 30 °C [1]	
		(iii) enzymes responsible (for photosynthesis); damaged (denatured) [2]	
	(b)	**(i)** light mineral level/CO_2 level/pH *of soil* [1]	
		(ii) glucose/starch/sugar [1]	
		(iii) chlorophyll [1] cell walls [1] [2]	11

					AVAILABLE MARKS
3	**(a)**	**(i)**	$20 \times 4.2 \times 11; = 924$ kJ;	[2]	
		(ii)	Fried contains *oil* which contains more *energy*/more kJ	[1]	
		(iii)	less energy/less fat/less calories/less kJ	[1]	
		(iv)	*less chance* of CHD/stroke/diabetes/cancer	[1]	
		(v)	heat lost to atmosphere/air heat lost to glass/foil dish;	[2]	
	(b)		glucose; carbon dioxide;	[2]	
	(c)		any three from: ● large surface area (for diffusion) large area of contact between the two surfaces; ● wall of alveolus one cell thick/thin/short diffusion distance; ● *capillary* one cell thick/thin; ● good blood supply lots of RBCs	[3]	12
4	**(a)**		photo*tropism*	[1]	
	(b)		auxin	[1]	
	(c)	**(i)**	No hormone/auxin produced/no shoot tip present; no growth/no cell elongation	[2]	
		(ii)	Any 4 from: shoot tip bends to light; hormone auxin moves to side away from light/shaded side; *cell elongation* on side away from light; more growth on side away from light/bends more on shaded side; shoot gets **more** light/can photosynthesise **more**;	[4]	8

AVAILABLE MARKS

5 **(a)** **(i)** protein [1]

(ii) protease/pepsin

(iii) any two from: [1]
- amount of enzyme/volume of enzyme solution;
- concentration of enzyme;
- pH of solution;
- same size/amount of gelatin cubes [2]

(b) Indicative content
- no **breakdown** of gelatin/cube stays intact
- no amino acids produced
- amylase *not* specific for **protein/amylase** is specific for **starch**
- **protease** is only enzyme that breaks down gelatin
- **lock and key** model of enzyme activity
- **shape** of amylase does not fit with protein (gelatin)
- **temperature** is **not** the cause 35 °C/35 °C is the optimum temperature for enzyme activity.

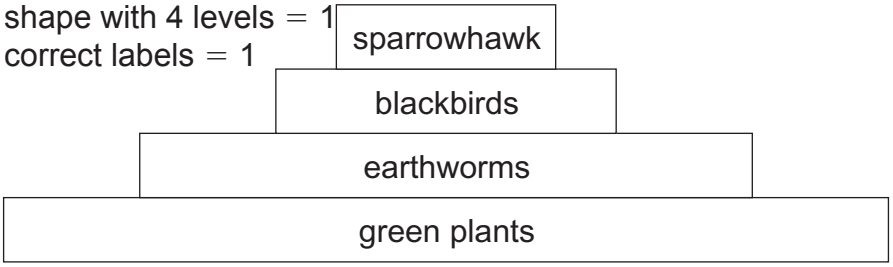
Response	**Mark**
Candidates use appropriate terms throughout to describe and explain in a logical manner what happens to the gelatin giving at least 5 points from the indicative content. They use good spelling, punctuation and grammar skills. Form and style are of a high standard.	[5–6]
Candidates use some appropriate terms throughout to partially describe and explain what happens to the gelatin giving 3 or 4 points from the indicative content. They use satisfactory spelling, punctuation and grammar. Form and style are of a satisfactory standard.	[3–4]
Candidates partially describe or explain what happens to the gelatin. They give 1 or 2 points from the indicative content. They use limited spelling, punctuation and grammar skills.	[1–2]
Response not worthy of credit.	[0]

[6] 10

6 **(a)** brain and spinal cord [1]

(b) Any two from:
co-ordination/or described e.g. controls movement through nerves;
send impulses/messages to brain/CNS;
response/action *to* body/muscles; [2]

(c) nervous system *faster* than hormones [1] 4

				AVAILABLE MARKS
7	(a)	(i)	invertebrates/insects/named examples [1]	
		(ii)	any three from: ● dig hole; ● put in jar/container; ● put cover on top; supported to allow invertebrate entry ● return after certain time/leave overnight ● identify/count organisms. [3]	
	(b)	(i)	decomposition/decay [1]	
		(ii)	any two from: ● segmented body; ● chaetae ● body temperature not constant [2]	
	(c)	(i)	quadrat [1]	
		(ii)	20 [1]	
		(iii)	more (in grass area)/fewer in quarry [1]	
		(iv)	not much soil in quarry/not much decaying matter/mostly rock/too dry or converse/damper near stream in a meadow [1]	
		(v)	repeat [1]	
		(vi)	not all worms come up to the surface/some remain underground [1]	
	(d)	(i)	blackbird/sparrowhawk [1]	
		(ii)	less earthworms; more eaten by blackbirds/because blackbirds have less/no beetles to eat or less earthworms; because more aphids/less green plants [2]	
		(iii)	shape with 4 levels = 1 correct labels = 1  [2]	18
			Total	**70**

New Specification

Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
2012–2013

Double Award Science: Biology

Unit B1

Foundation Tier

[GSD11]

GSD11

MONDAY 12 NOVEMBER 2012, AFTERNOON

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 eight** 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 Question **3(d)(i)**.

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

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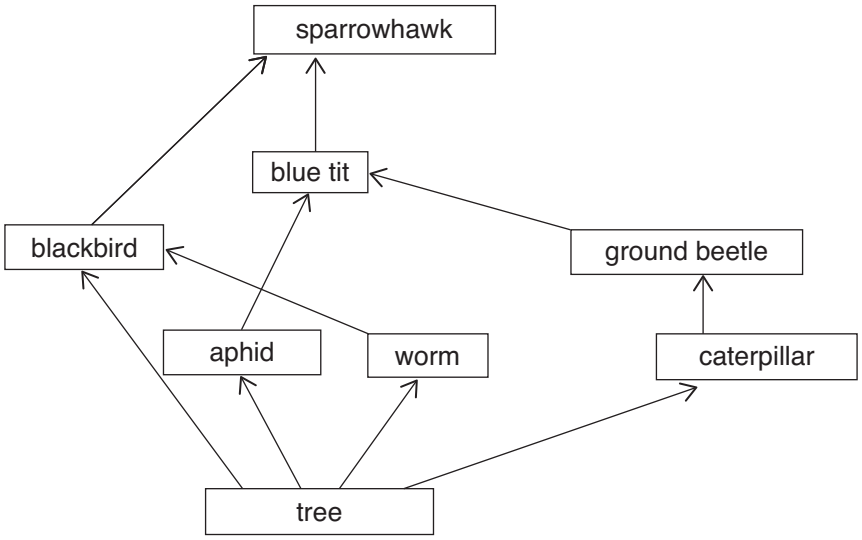
Examiner Only	
Marks	Remark

1 **(a)** What is the meaning of the term ecosystem?

_____

_____ [2]

(b) Part of a food web for a woodland ecosystem is shown below.



(i) What is the source of energy for this food web?

_____ [1]

(ii) Name the producer in the food web.

_____ [1]

(iii) Name a primary consumer in the food web.

_____ [1]

(iv) At what trophic level is the ground beetle feeding?

_____ [1]

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(c) In the spaces below, sketch and label pyramids of **numbers** for the following food chains.

Examiner Only	
Marks	Remark

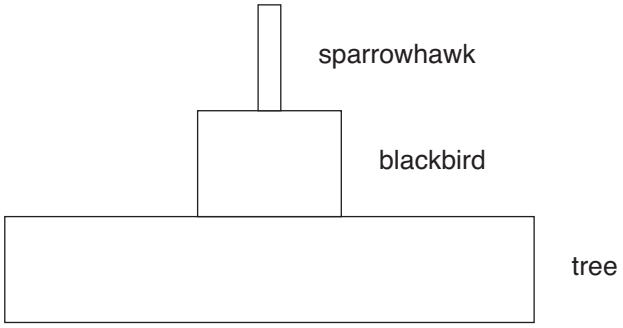
(i) An area of grassland with a very large number of individual plants, quite a few rabbits and a single fox.

[2]

(ii) A single rose bush supporting a large number of aphids on which a few ladybirds feed.

[2]

(d) A pyramid of energy is another way of representing the flow of **energy** in a food chain. The diagram below shows a pyramid of energy for a food chain in the food web shown in part **(b)**.



Give **two** reasons why there is less energy available to the sparrowhawk than is available to the blackbird in the food chain.

1. _____

_____

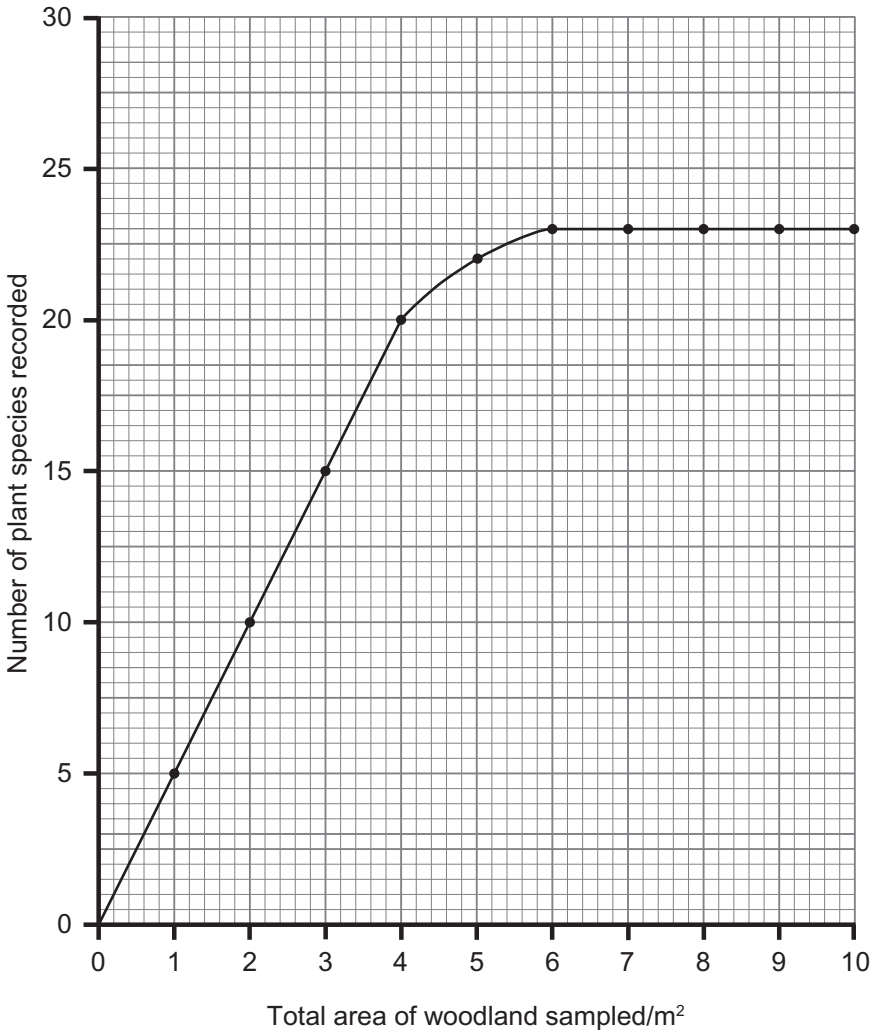
2. _____

_____ [2]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

2 Pupils carried out an experiment to find the average number of plant species in woodland. The graph shows the relationship between the number of plant species recorded and the total area of woodland sampled.



(a) Describe the trend shown in the graph.

_____

_____

_____ [2]

(b) Use the results in the graph to suggest the minimum area of woodland the pupils should sample to find the total number of plant species present in the woodland.

_____ m^2 [1]