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	

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

(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

Examiner Only	
Marks	Remark

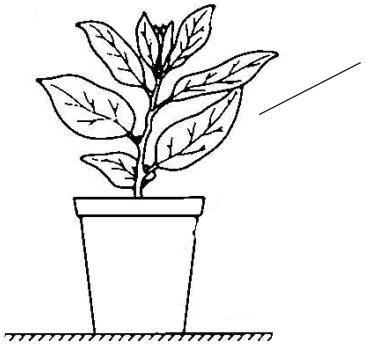
2 A Year 11 pupil investigated the effect of temperature on the growth of plants in a greenhouse.

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.

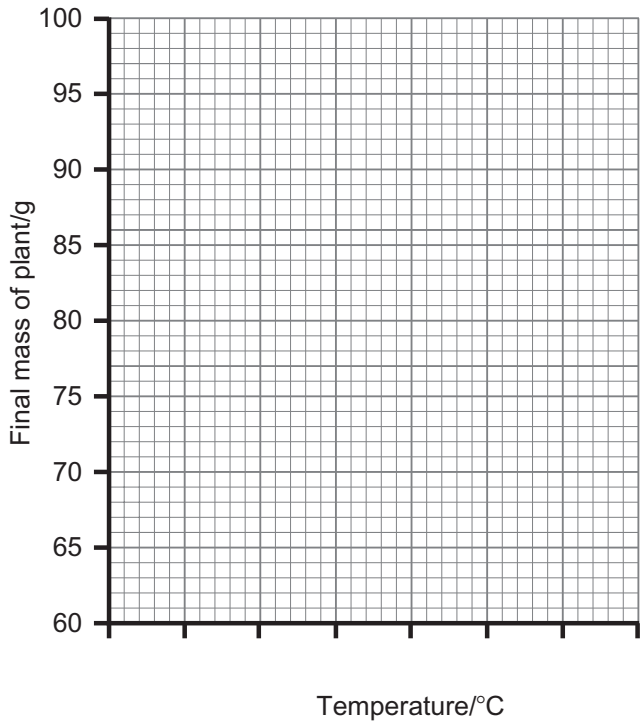
The table shows the final masses of the plants after six weeks.



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]

Examiner Only	
Marks	Remark

(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]

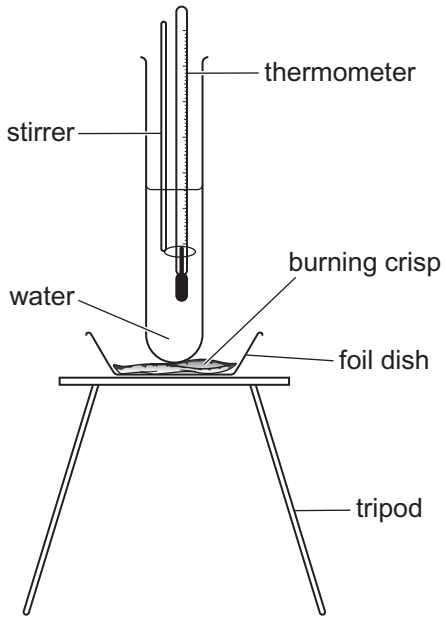
Examiner Only	
Marks	Remark

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.

Examiner Only	
Marks	Remark

(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]

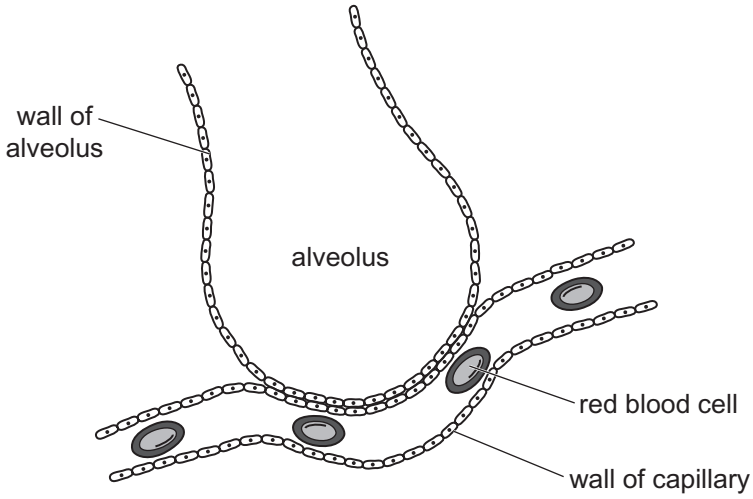
(b) Aerobic respiration provides energy for the body. It takes place in the cells.

Complete the equation for aerobic respiration.

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

Examiner Only	
Marks	Remark

(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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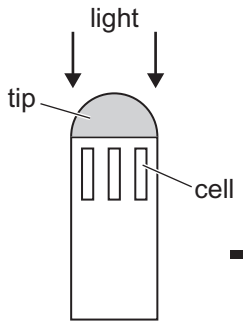
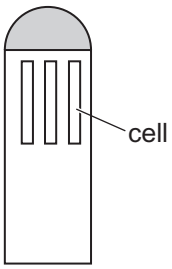
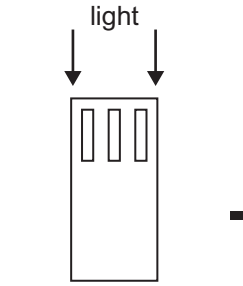
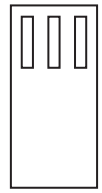
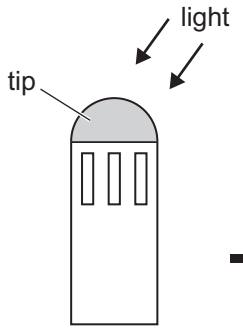
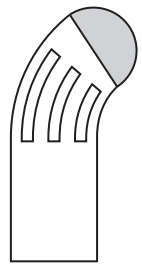
(Questions continue overleaf)

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.

EXPERIMENT	TREATMENT	RESPONSE OF SHOOT AFTER 1 WEEK
A		
B		
C		

Source: R McIlwaine / CCEA

(a) Name the plant response in experiment C.

_____ [1]

(b) Name the hormone involved.

_____ [1]

(c) Describe and explain the results in

(i) experiment B.

_____

_____ [2]

(ii) experiment C.

_____

_____

_____

_____

_____ [4]

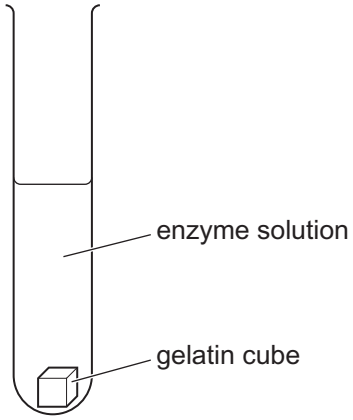
Examiner Only	
Marks	Remark

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. _____

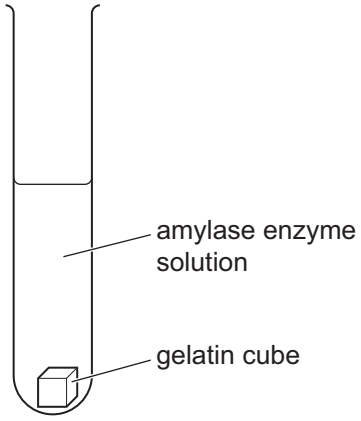
2. _____ [2]

Examiner Only	
Marks	Remark

(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

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)

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.

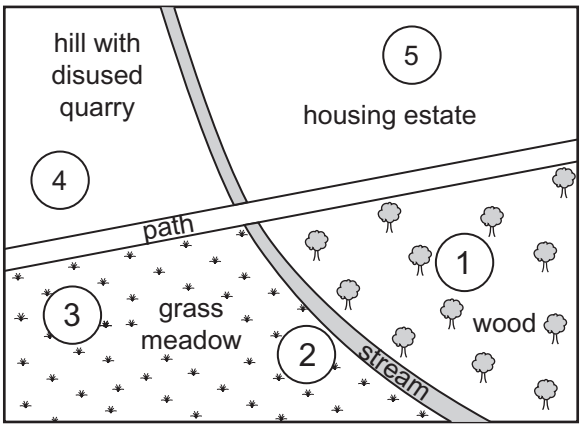
1. _____

2. _____ [2]

Examiner Only	
Marks	Remark

(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.



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

(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]

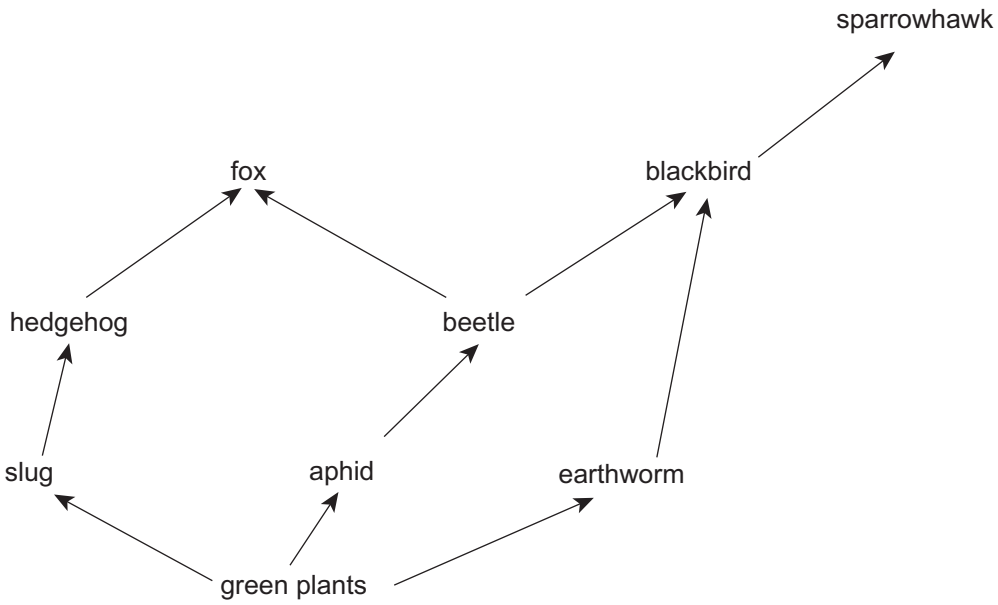
(v) How could the pupils have increased the reliability of their results?

_____ [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.

Examiner Only	
Marks	Remark

(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]

THIS IS THE END OF THE QUESTION PAPER

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