New Specification

Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
2011–2012

Double Award Science: Biology

Unit B1

Foundation Tier

[GSD11]

GSD11

TUESDAY 8 NOVEMBER 2011
1.30 pm–2.30 pm

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.

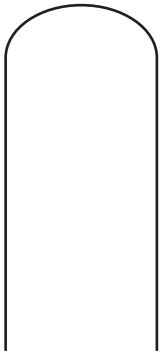
INFORMATION FOR CANDIDATES

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 **questions requiring extended answers**.

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

Examiner Only	
Marks	Remark

1 The diagram shows a shoot tip of a plant before an experiment is carried out. Shoot tips respond to light by growing towards it. A hormone is produced in the tip that causes growth. Bending towards the light occurs because there is more hormone on the shaded side. This causes the cells to become more elongated.



shoot tip before experiment

shoot tip after experiment

(a) Use your knowledge and the information above to draw another shoot tip to show:

(i) its growth (after one week) with light coming from one direction. Mark the light direction on your diagram with an arrow. [2]

(ii) inside your drawn shoot tip, show two plant cells, one on each side of the shoot tip. [2]

(b) Name the hormone that causes this growth response.

_____ [1]

Examiner Only	
Marks	Remark

2 **(a)** The list below gives some of the steps that are used to test a leaf for starch but they are not in the correct order.

A add iodine onto the leaf to test for starch

B put the leaf in boiling alcohol

C leaf placed in hot water

D leaf placed in boiling water

E leaf spread out on a white tile

(i) Use the letters to give the correct order for the steps when carrying out the starch test.

_____ _____ _____ _____ _____ [1]

(ii) Why is the leaf placed in boiling alcohol?

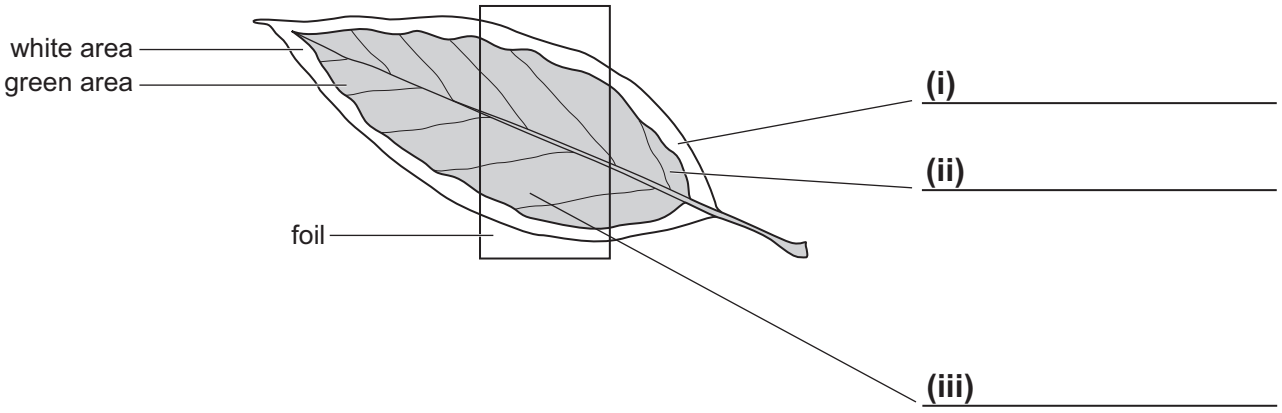
_____ [1]

(iii) Why is the Bunsen burner switched off during step B?

_____ [1]

(b) The diagram shows a variegated leaf used to show that light and chlorophyll are needed for photosynthesis.

Write on the answer lines the colours you would expect when the starch test has been carried out on this variegated leaf from a plant that had been exposed to sunlight for several days.



[3]

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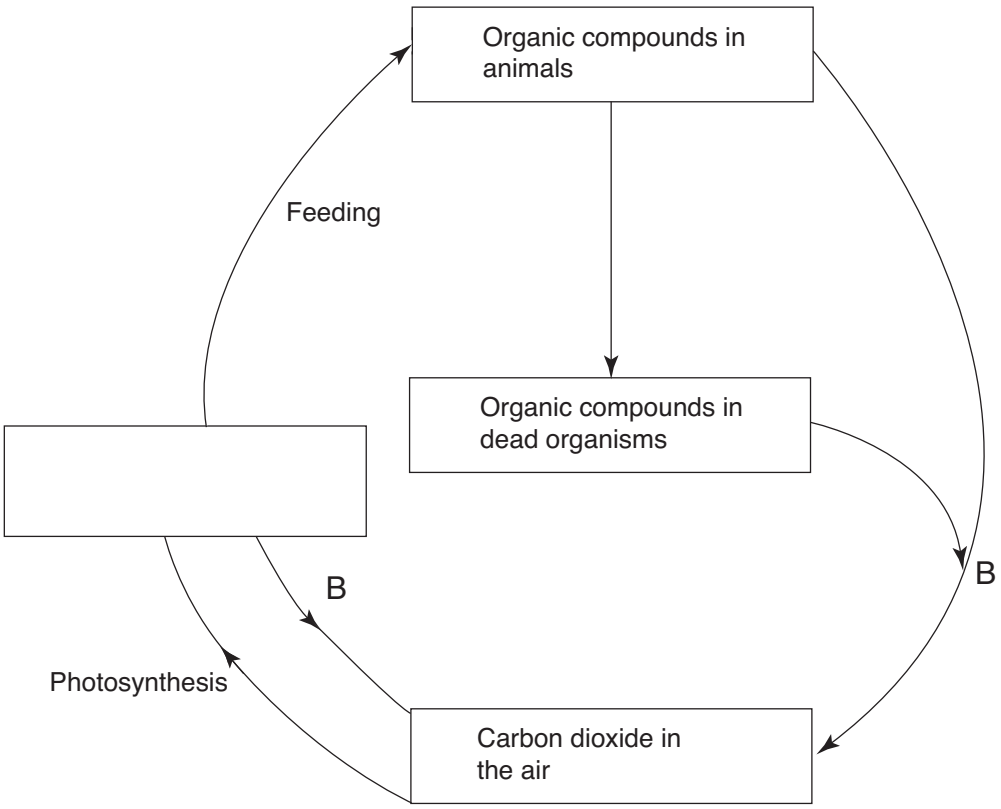
3 **(a)** The diagram shows a carbon cycle.

Examiner Only	
Marks	Remark



(i) Complete the diagram by filling in the empty box. [1]

(ii) Name process B.

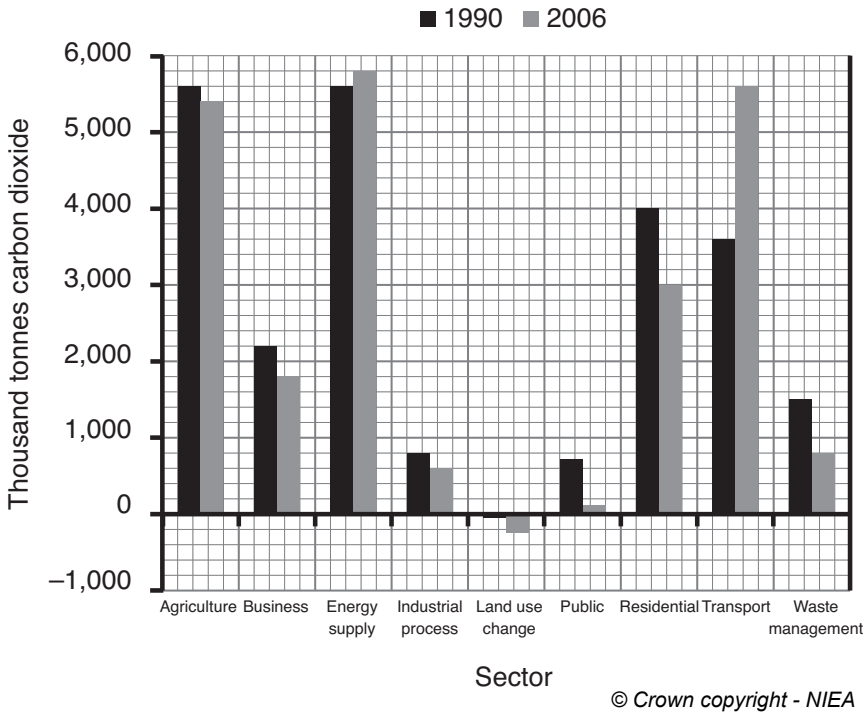
_____ [1]

(iii) Name **two** organic compounds found in a plant.

_____ and _____ [2]

Examiner Only	
Marks	Remark

(b) Carbon dioxide is a greenhouse gas. The graph shows the levels of greenhouse gas emissions from different sources in Northern Ireland in 1990 and 2006.



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

(i) What are the **three** main sectors that contributed to greenhouse gas emissions in 2006?

_____ _____ _____ [1]

(ii) What is the general trend for greenhouse gas emissions in the time period from 1990 to 2006? Give any examples of exceptions to this trend.

_____

_____

_____ [2]

(iii) Suggest **one** reason why it is difficult to reduce greenhouse gas emissions.

_____ [1]

(iv) Why is it important to monitor greenhouse gas emissions?

_____ [1]

(v) Explain **one** harmful consequence of global increases in greenhouse gases on:

climate _____ [1]

plants _____

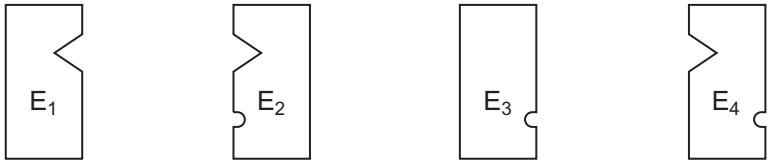
_____ [1]

Examiner Only	
Marks	Remark

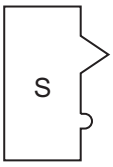
Examiner Only	
Marks	Remark

4 **(a)** The diagrams show a substrate along with several enzymes and possible products. The letters E, S and P refer to enzyme, substrate and product respectively.

Enzymes:



Substrate:



Possible products:

(i) From the diagrams pick the enzyme that would react with the substrate.

_____ [1]

(ii) Choose from the diagram the products that would be formed when the substrate reacted with the enzyme.

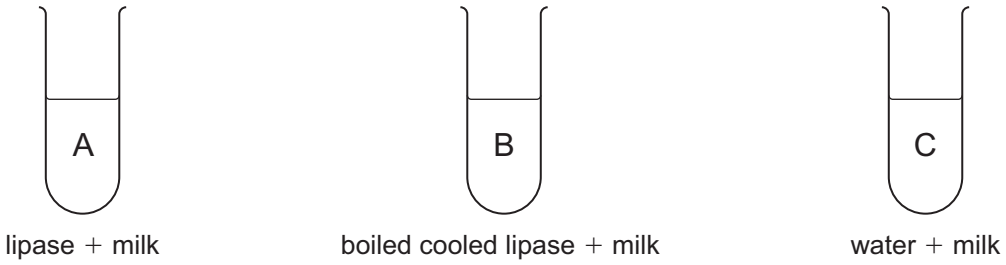
_____ and _____ [2]

(iii) Name this model of enzyme action.

_____ [1]

(b) Louise carries out an experiment to test the effect of lipase on the fat in milk.

Three test tubes were placed in a water bath at 30 °C for 20 minutes and then samples were removed from the test tubes and their pH tested. The results are shown in the table.



Results

A	B	C
pH 5	pH 7	pH 7

Describe and account for Louise's results for test tubes **A**, **B** and **C**.

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

[6]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

5 **(a)** The table gives figures for Conor's blood glucose levels during part of a day.

Time	Blood glucose level/mg/100 ml
7 am	90
9 am	120
10 am	90
11 am	110
12 am	90
2 pm	140

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

(i) What is Conor's normal (resting) blood glucose level?

_____ mg/100 ml blood [1]

(ii) Suggest an explanation for Conor's blood glucose levels at 9 am and at 2 pm.

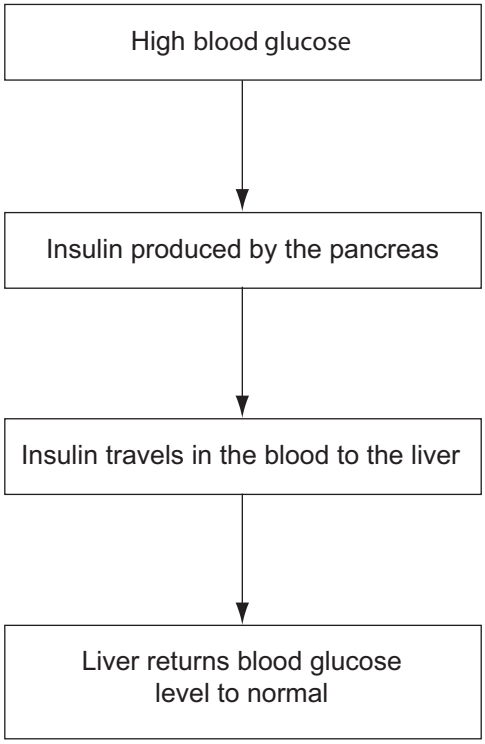
9 am _____

_____

2 pm _____

_____ [2]

(b) The diagram shows the mechanism for controlling blood glucose levels.



(i) Use the diagram and your knowledge to explain how high or rising blood glucose levels are controlled by the body.

_____

_____

_____

_____

_____ [3]

(ii) Diabetes is a condition in which the blood glucose control mechanism fails. Give two symptoms of diabetes.

1. _____

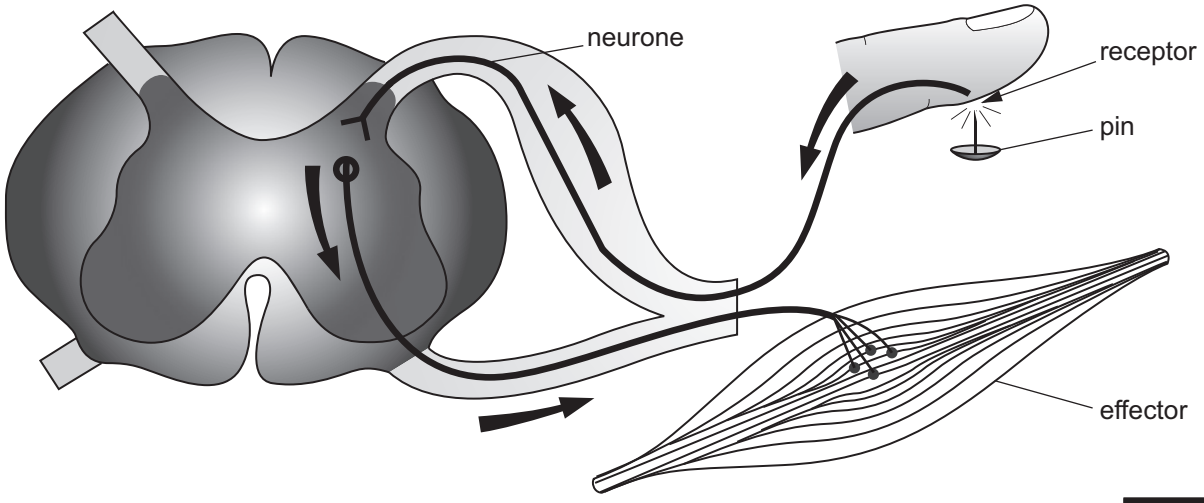
2. _____ [2]

Examiner Only

Marks	Remark

(c) The diagram shows the body's response to a finger touching a sharp object.

Use the diagram and your knowledge to answer the questions that follow.



Examiner Only	
Marks	Remark

(i) What body system is involved in this process?

_____ [1]

(ii) Name the effector in the diagram.

_____ [1]

(iii) What part of the body coordinated the response to this stimulus?

_____ [1]

(iv) Compare and contrast the body's response to the pin and to high blood glucose levels.

_____

_____

_____ [2]

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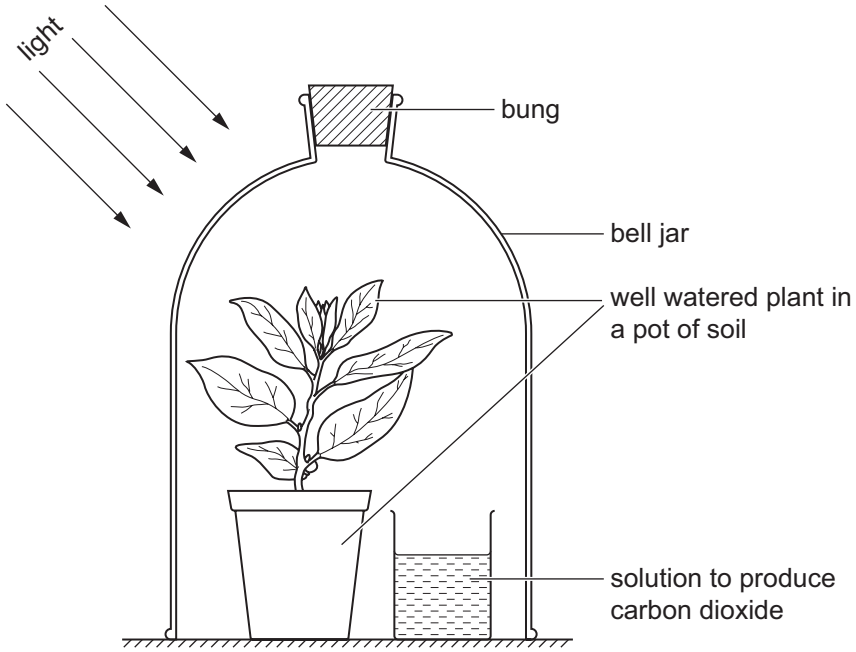
(Questions continue overleaf)

Examiner Only	
Marks	Remark

6 The diagram shows an investigation into how carbon dioxide levels affect plant growth.

The apparatus was set up with six plants of the same size and mass (75 g) but the plants were given different levels of carbon dioxide.

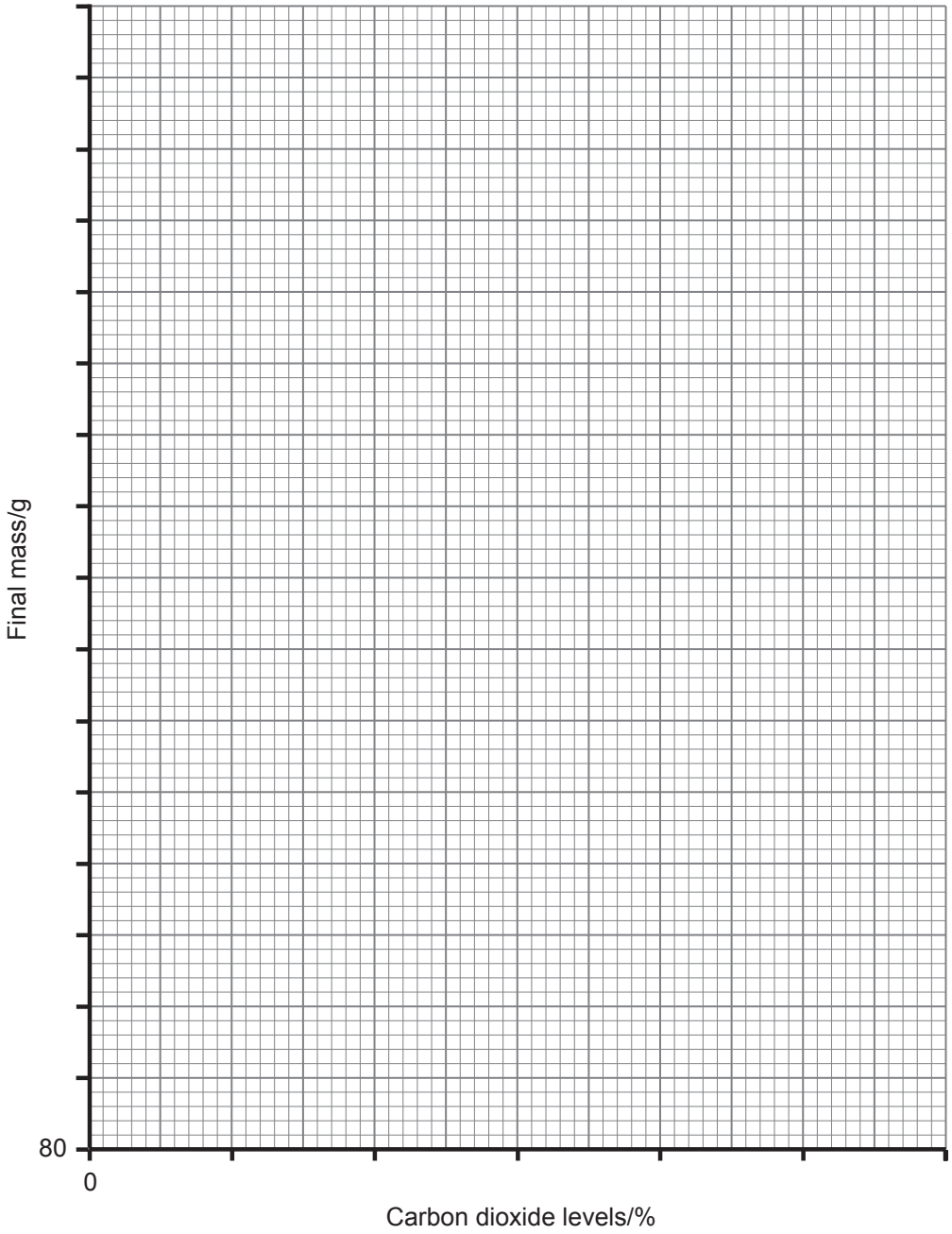


After one week the plants were reweighed and they all had increased in mass. The final mass of each plant was recorded as shown in the table.

Final mass/g	80	84	88	90	95	80
Carbon dioxide levels/%	0.01	0.02	0.03	0.04	0.05	0.06

(a) (i) Plot these results and draw a line graph on the grid opposite.

(You will need to complete the scales in both axes.)



[4]

(ii) Using evidence from the graph state the optimum (best) carbon dioxide level for plant growth.

_____ [1]

(iii) Normal atmospheric levels of carbon dioxide are 0.04%. Comment on the plant's growth at atmospheric levels of carbon dioxide.

_____ [1]

Examiner Only	
Marks	Remark

(b) **(i)** Name **one** factor that should have been kept constant during the experiment.

_____ [1]

(ii) Why could you only use this apparatus for a limited period of time?

_____ [1]

(iii) Explain why the plants have increased in mass during the experiment.

_____

_____ [2]

Examiner Only	
Marks	Remark

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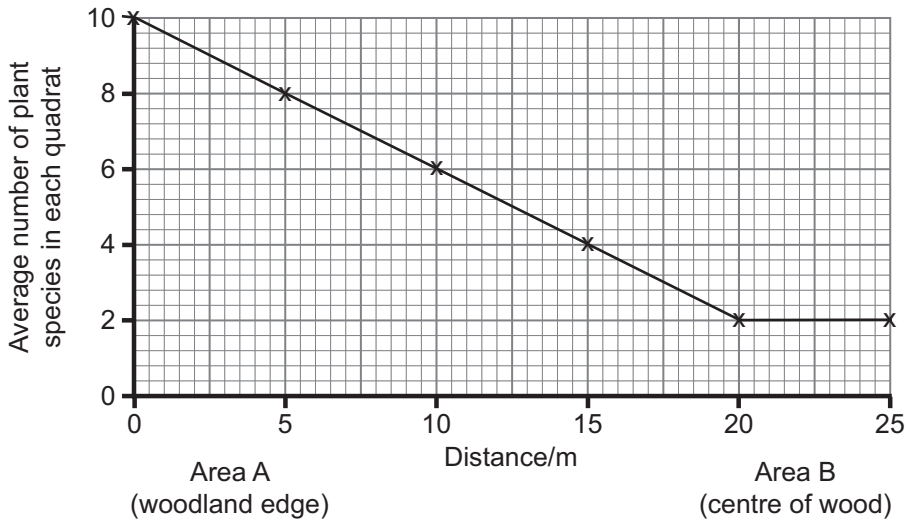
Examiner Only	
Marks	Remark

7 The graph shows the results obtained by a class during a woodland investigation.



(a) The pupils sampled plants across an area of woodland from Area A (woodland edge) to Area B (centre of wood) and then calculated the average number of plant species/quadrat at 5 m intervals.

(i) Describe the trend shown on the graph from Area A to Area B.

_____ [1]

(ii) Suggest **one** environmental condition that could account for the difference in the results between Area A and Area B.

_____ [1]

(b) Describe how the pupils would have carried out this investigation and explain how they would have obtained these results.

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

_____

_____

_____

_____

_____

_____

Examiner Only

Marks	Remark

_____

_____

_____

_____ [6]

(c) The table gives the numbers of organisms from a woodland food chain.

Plants ⟶ Aphids ⟶ Spiders ⟶ Beetles

Name of organism	Numbers
Beetles	6
Spiders	50
Aphids	2000
Plants	10

(i) Sketch a pyramid of biomass for this food chain in the space below. Label each trophic level with the name of the organism.

[2]

(ii) Suggest **one** problem in obtaining accurate numbers of animals in this food chain.

_____ [1]

Examiner Only	
Marks	Remark

(d) To obtain the total number of spiders their numbers were recorded in an area of 0.25 m^2 and the process repeated ten times across the woodland.

The results were as follows:

Sample number	1	2	3	4	5	6	7	8	9	10
Numbers of spiders/0.25 m^2	5	3	2	1	8	7	10	4	6	4

(i) Calculate the average number of spiders per 0.25 m^2. Show your working.

_____ per 0.25 m^2 [1]

(ii) Using this information calculate the average number of spiders per m^2.

_____ per m^2 [1]

(iii) In a similar study two months later the spider population was found to be four per m^2.

Suggest two environmental factors which could account for the change in the population size.

1. _____

2. _____ [2]

THIS IS THE END OF THE QUESTION PAPER

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