



General Certificate of Secondary Education
2012–2013

Double Award Science: Biology

Unit B1

Foundation Tier

[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)**.

Centre Number

71

Candidate Number

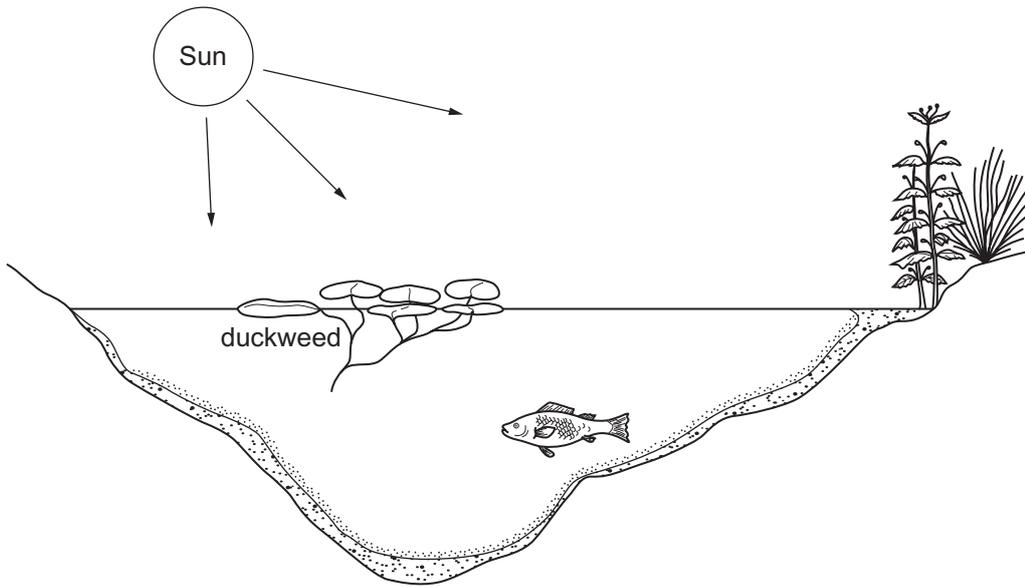
For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	

Total
Marks



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]

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Marks	Remark

- (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.

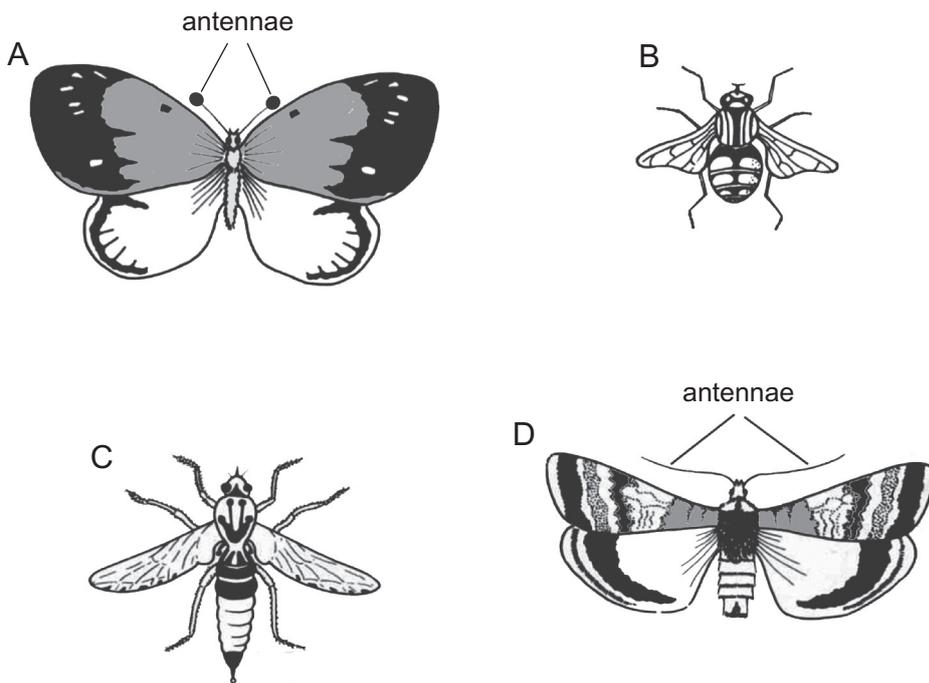
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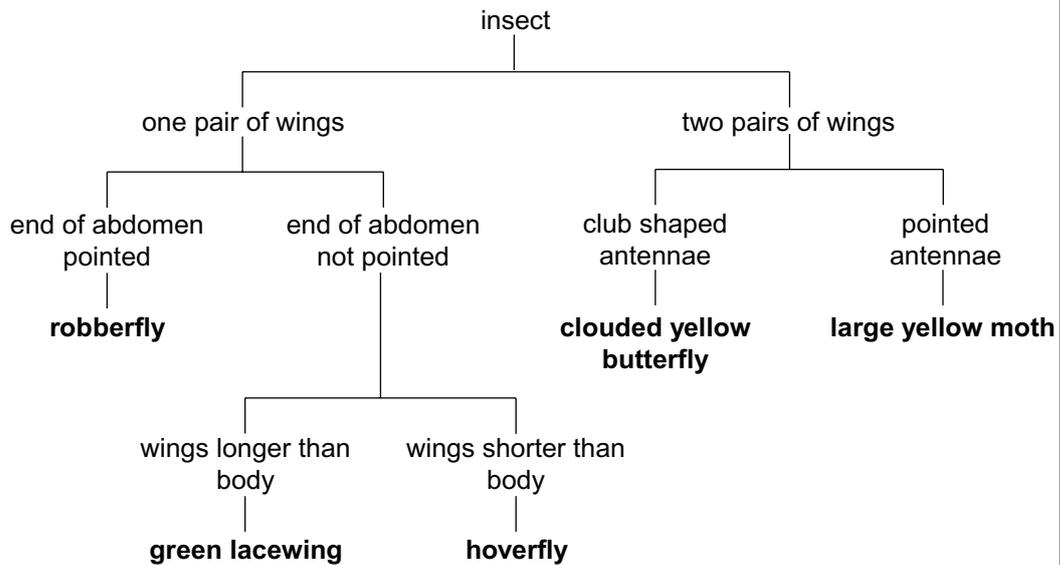
Remark

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



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

KEY



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

A _____ B _____
 C _____ D _____

[2]

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- 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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Marks	Remark

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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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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]

Examiner Only

Marks Remark

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

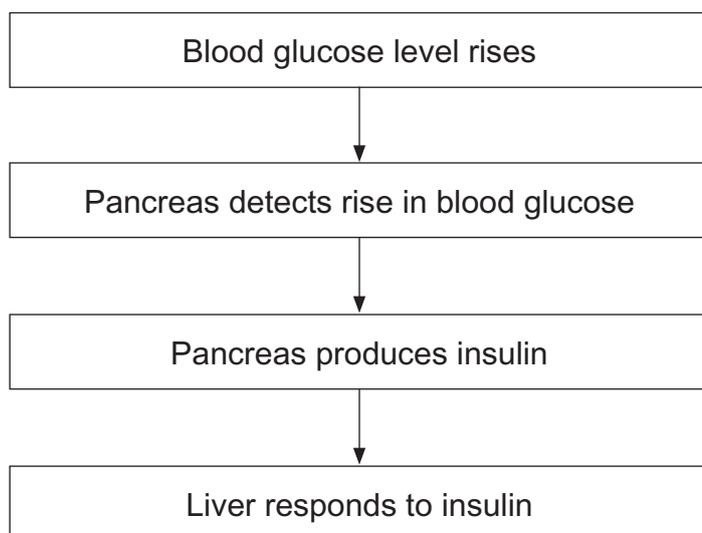
_____ [1]

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

_____ [1]

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?

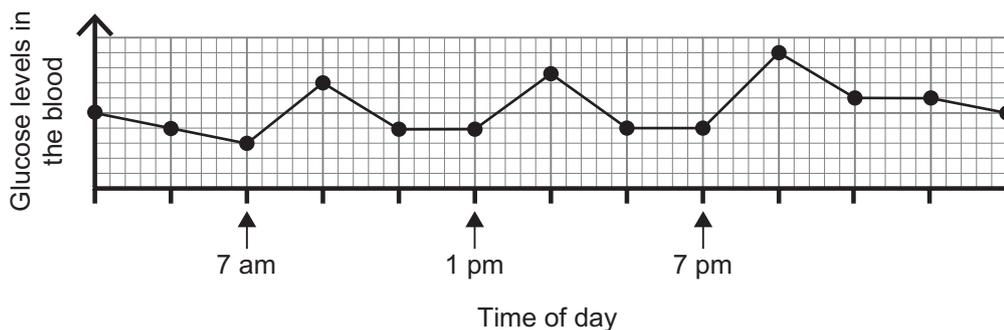
_____ [1]

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

 _____ [2]

Examiner Only	
Marks	Remark

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



- (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.

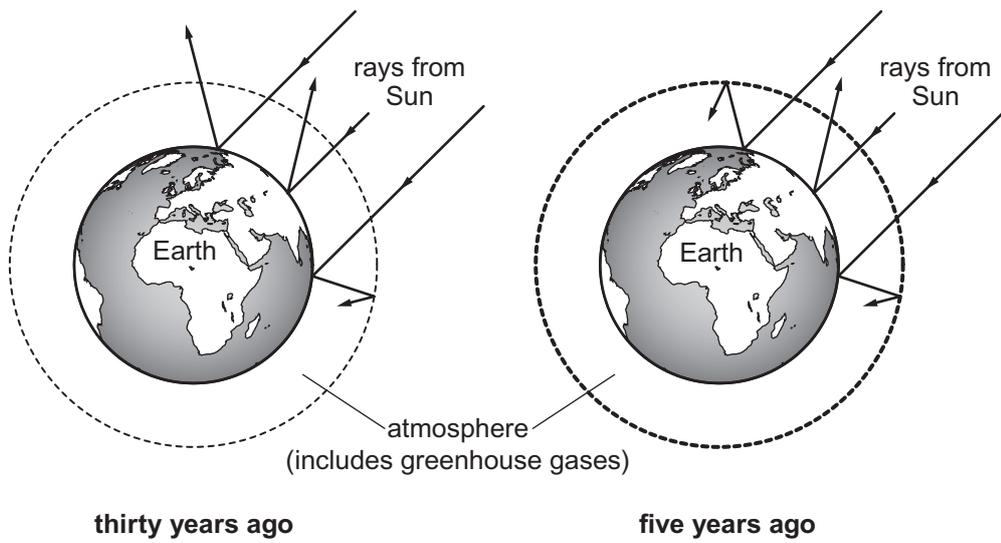
_____ [1]

- (ii) Give two other symptoms of diabetes.

1. _____

2. _____ [2]

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



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

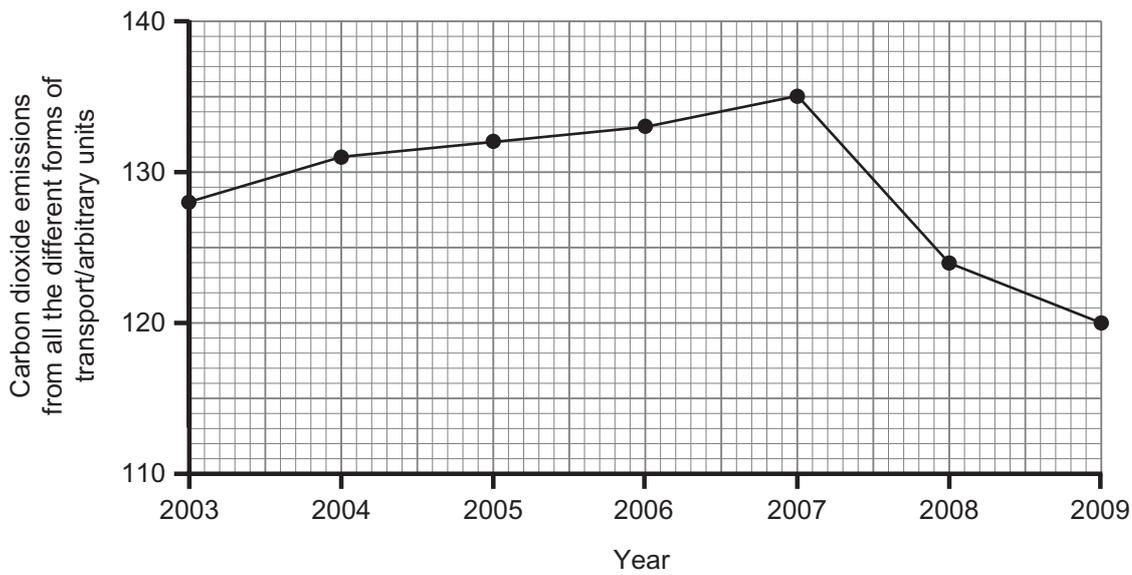
[2]

(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.



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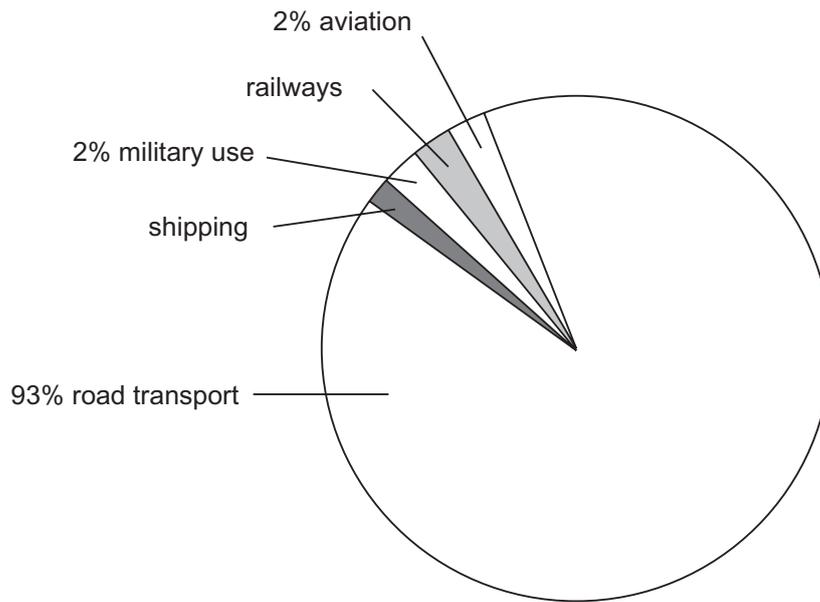
- (b) Describe the trend in carbon dioxide emissions from transport between 2003–2009.

Use evidence from the graph to support your answer.

[2]

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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]

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Marks	Remark

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(Questions continue overleaf)

- (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]

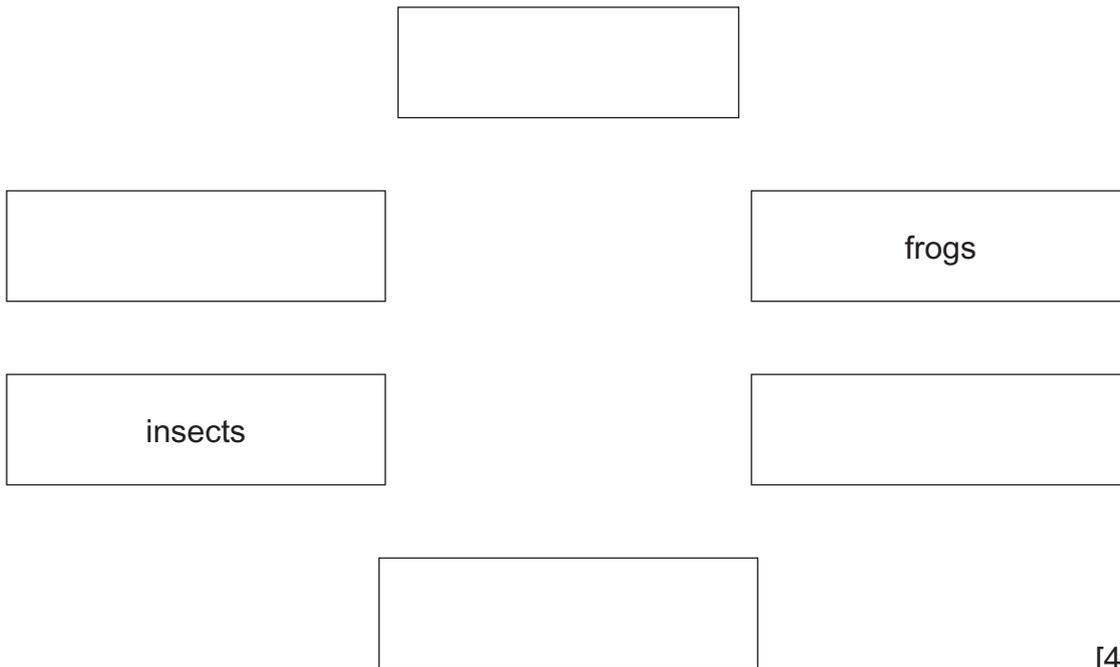
- (iv) State **one** way that the digestive system is adapted for absorption.

_____ [1]

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Marks	Remark

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]

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