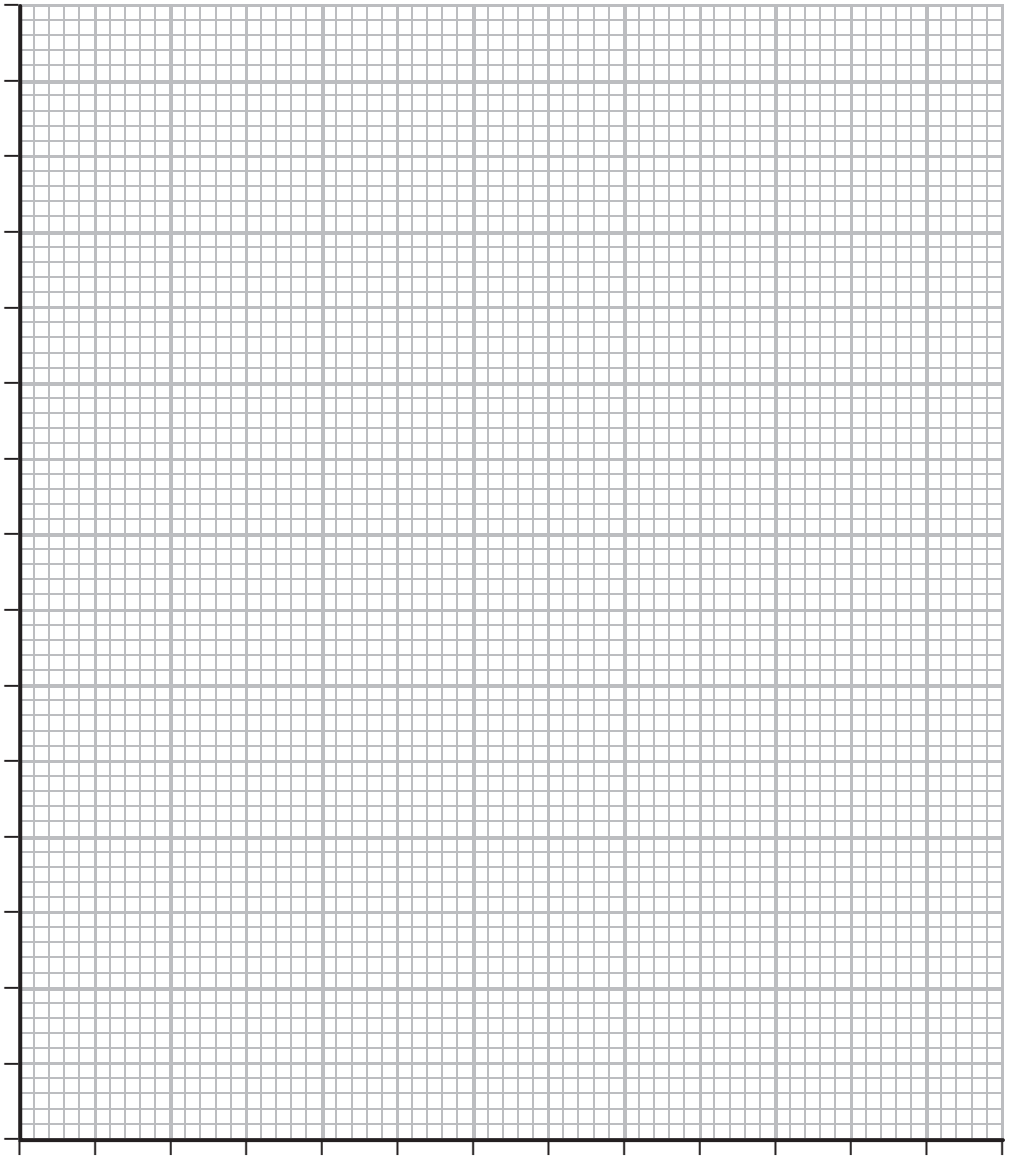
1 The data show the mean temperature in central England during thirteen periods of 25 years. The midpoint of each period is shown.

Midpoint of period	Mean temperature in °C
1695	8.63
1720	9.33
1745	9.10
1770	9.17
1795	9.03
1820	9.13
1845	9.08
1870	9.19
1895	9.08
1920	9.31
1945	9.58
1970	9.49
1995	10.05

(a) Plot the data on the grid, using straight lines to join the points.

(6)



(b) Between which two neighbouring periods was the change in mean temperature the greatest?

(1)

.....

.....

(c) Some scientists think that the release of greenhouse gases has contributed to these changes in temperature.

(i) Name a greenhouse gas.

(1)

.....

(ii) What is meant by the term **greenhouse gas**?

(1)

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(iii) Suggest how human activities could be responsible for the change in temperature between 1970 and 1995.

(3)

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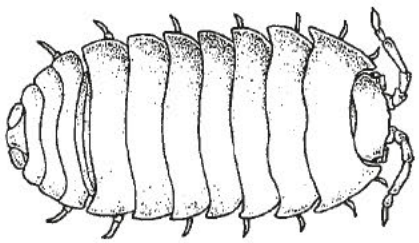
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(Total for Question = 12 marks)

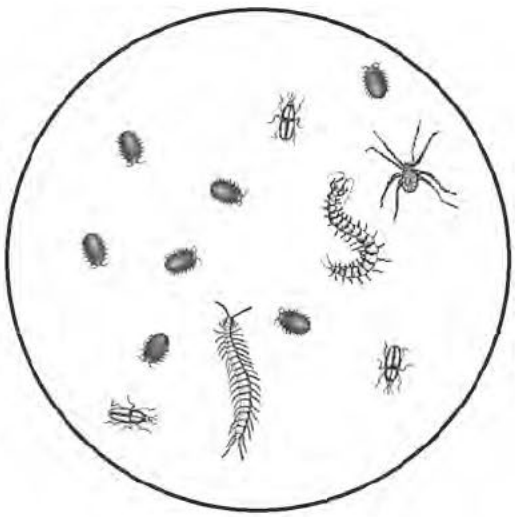
2 A student wanted to investigate the factors that influence the activity of soil organisms in a woodland. She decided to study one species of woodlouse, a small animal found under stones and rotting wood in damp and dark places.



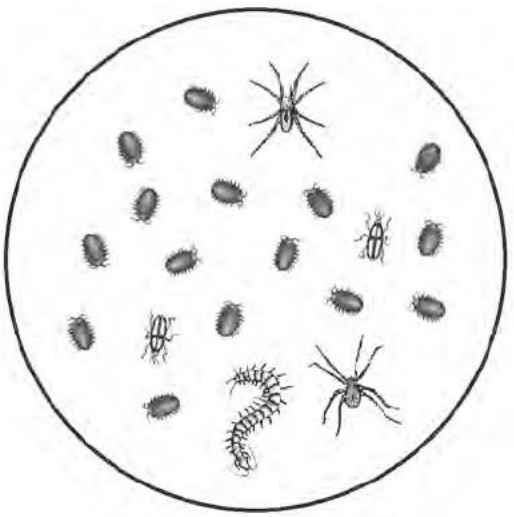
She used a trap to collect organisms in the woodland during the day time and during the night time.

She counted the organisms collected before releasing them.

Day time sample



Night time sample



From the day time sample she produced a table of results.

Organism	Tally	Number
woodlice	𝍸 ||	7
spiders	|	1
centipedes	||	2
beetles	|||	3

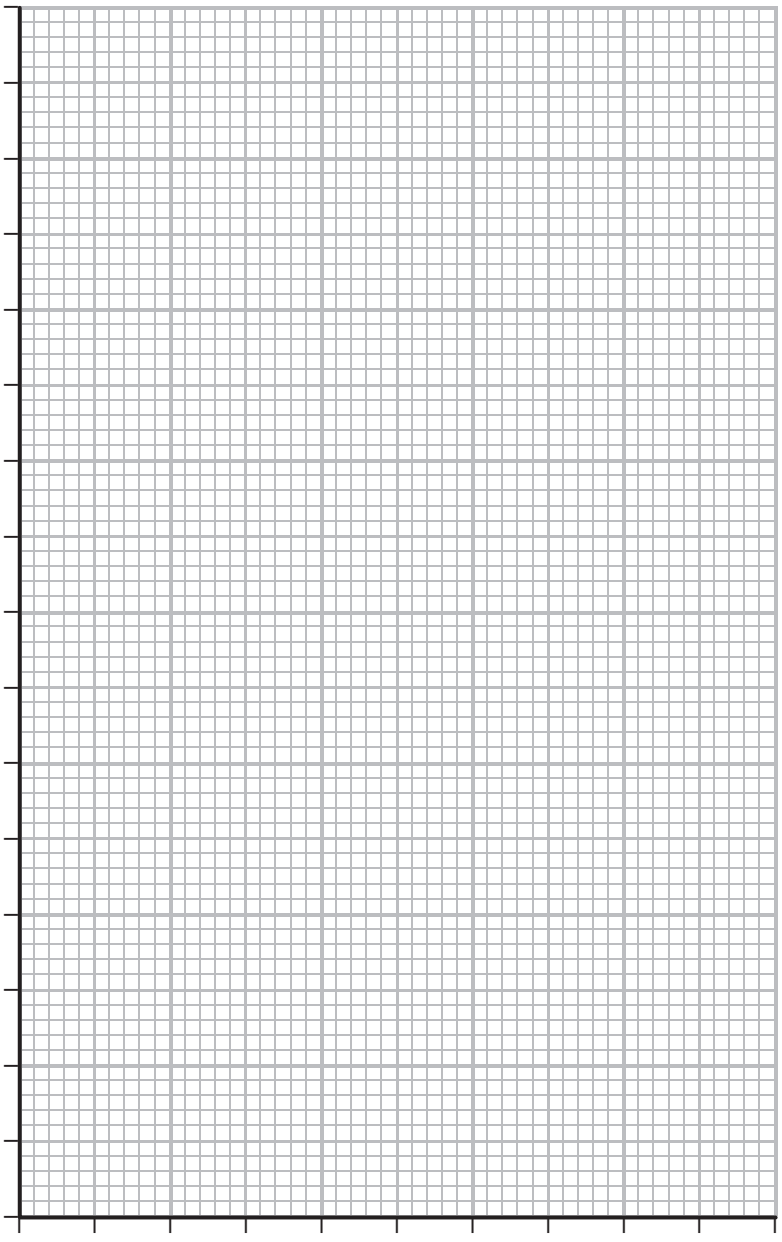
(a) Complete the table below to show the results for the night time sample.

(2)

Organism	Tally	Number
woodlice		
spiders		
centipedes		
beetles		

(b) Use the data from the day time and night time samples to draw a bar chart to compare the number of organisms collected.

(5)



(c) (i) Compare the number of organisms collected during the day time and during night time.

(3)

(ii) Suggest an explanation for the change in the numbers of woodlice.

(2)

(d) The organisms caught in the trap remained there for up to 10 hours before being counted.

Suggest how this might affect the results obtained.

(2)

(e) Ecology involves the study of organisms in their environment.

With reference to the investigation in this question, explain the terms

(i) population

(1)

.....

.....

.....

(ii) community

(1)

.....

.....

.....

(iii) habitat

(1)

.....

.....

.....

(Total for Question = 17 marks)

3 Methods of fish farming have changed as more countries become involved in the industry.

(a) Suggest two reasons why more of our fish are supplied by fish farming rather than from traditional fishing.

(2)

1 .....

.....

2 .....

.....

(b) This photograph shows a new type of fish farm which has been developed in Denmark.



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Fish farm in Denmark

This new type of fish farm differs from traditional fish farms because

- it uses water from under the ground instead of from rivers
- it uses fewer antibiotics

(i) Suggest one advantage of using water from under the ground rather than from rivers.

(1)

.....

.....

(ii) Suggest the advantage of using fewer antibiotics in fish farms.

(2)

.....

.....

.....

.....

(c) Another advantage of the new type of fish farm is the reduction in waste discharge.

The figures for a new type of fish farm and a traditional fish farm are shown in the table.

Nutrient waste	Mass of discharge in kg per tonne of fish produced		Discharge from new type of fish farm as a percentage of discharge from traditional farm
	traditional fish farm	new type of fish farm	
total nitrate	31.2	20.0	64.1
total phosphate	2.9	1.1	

(i) Calculate the total phosphate in the waste from the new type of farm as a percentage of the total phosphate in the waste from the traditional farm.

Show your working.

(2)

percentage = ... %

(ii) If waste from fish farms is released into rivers it will cause pollution.

Design an investigation to compare the pollution caused by waste released from the new type of fish farm with waste released from a traditional fish farm.

Your answer should include experimental details and be written in full sentences.

(6)

(Total for Question = 13 marks)