| Candidate No. | | | | | | | | | | | / | | | Signature | |

Examiner's use only

London Examinations IGCSE

Team Leader's use only

Biology – 4325

Paper 3

Question Number	Leave Blank
1	
2	
3	
4	
5	

Science (Double Award) – 4437

Paper 7

Foundation and Higher Tiers

Friday 12 June 2009 – Morning

Time: 1 hour 15 minutes

Materials required for examination	**Items included with question papers**
Ruler, pencil and eraser	Nil

Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initial(s), the paper reference and your signature.
The paper reference is shown at the top of this page.   Write the one for which you have been entered.
Check that you have the correct question paper.
Answer **ALL** the questions in the spaces provided in this question paper.
Show all the steps in any calculations and state the units.
Calculators may be used.

Information for Candidates

The marks for individual questions and the parts of questions are shown in round brackets: e.g. **(2)**.
There are 5 questions in this question paper.   The total mark for this paper is 50.
There are 16 pages in this question paper.   Any blank pages are indicated.

Advice to Candidates

Write your answers neatly and in good English.

| Total | |

Turn over

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1. Students were asked to measure the amount of dead plant material in the soil found in different places (woodland, grass lawn and sandy beach). They obtained six soil samples from each place and dried the soil in an oven. The soil samples were then burnt using the apparatus shown in the diagram.
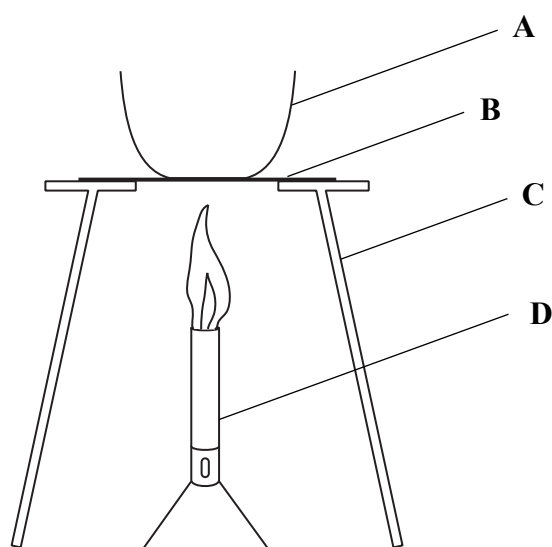
(a) (i) Use the label letters from the diagram to complete the table below.

Name of apparatus	Letter of apparatus
Bunsen burner	
Tripod	
Crucible	
Gauze	

(4)

(ii) Suggest why the students put goggles on when burning the soil samples.

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(1)

(b) Suggest how the students could have made sure the soil was completely dry before they burnt it.

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(2)

(c) The students calculated the percentage of dead plant material in the dry soil. They used the formula below.

$$\text{percentage of dead plant material} = \frac{\text{mass of dry soil} - \text{mass of burnt soil}}{\text{mass of dry soil}} \times 100$$

Calculate the percentage of dead plant material in a soil sample that weighed 2.0 g when dry and 1.9 g after being burnt. Show your working.

Answer = ...%

(2)

(d) The results obtained by the students are shown in the table.

Soil sample	Percentage of dead plant material in dry soil in each place		
	woodland	grass lawn	sandy beach
1	5.9	3.4	0.4
2	6.6	3.6	0.2
3	6.4	4.1	0.6
4	5.8	3.2	0.2
5	5.9	4.0	2.4
6	6.0	4.0	0.3

(i) **One** result in the table is anomalous. Put a circle around this result.

(1)

(ii) Suggest **one** possible cause for this anomalous result.

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....

(1)

(iii) Suggest why soil from the woodland had the highest percentage of dead plant material.

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(1)

Q1

(Total 12 marks)

2. Peter wanted to find out how his heart rate changed when he did some exercise. First he measured his heart rate at rest by counting his pulse for one minute.
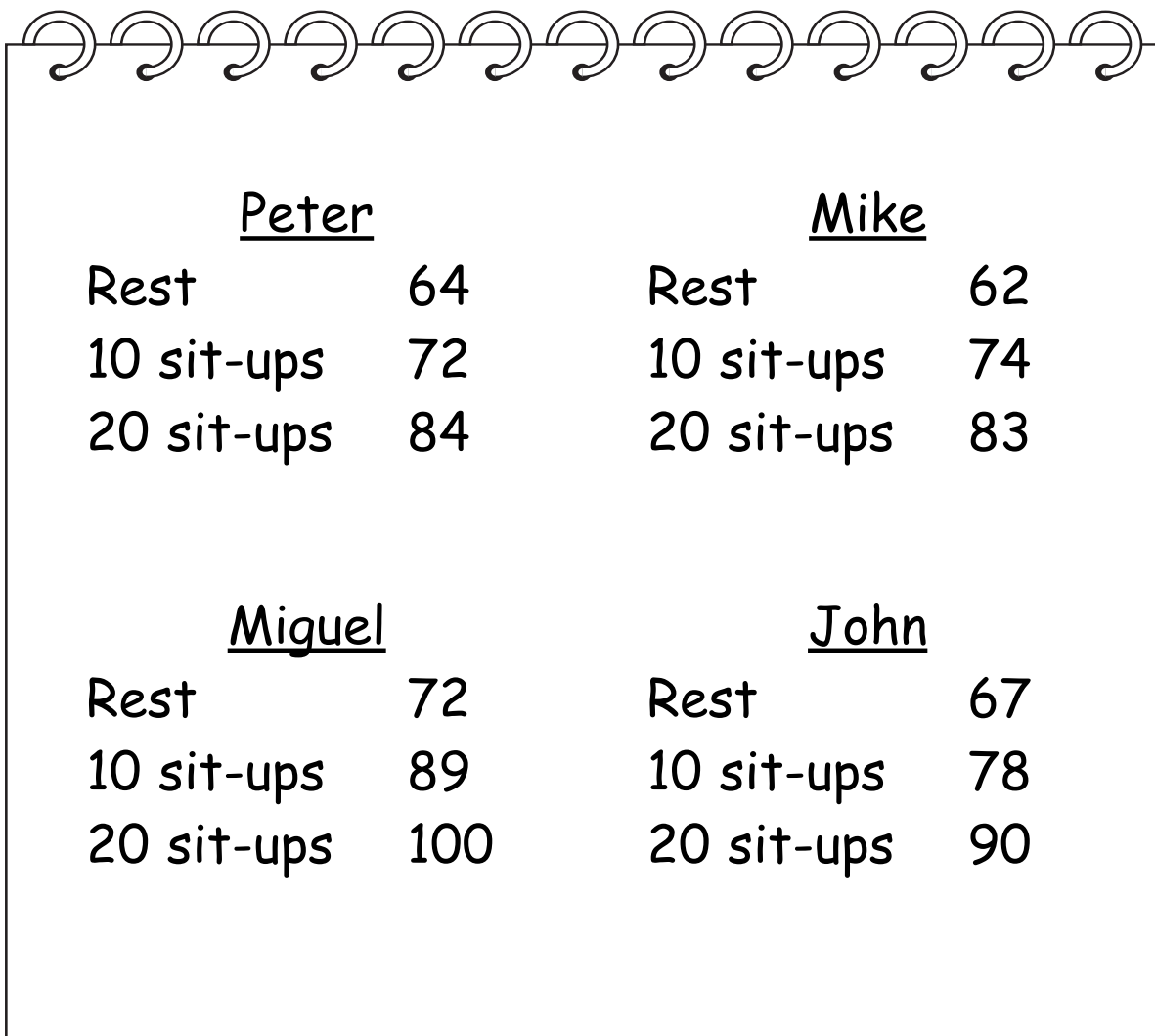
(a) Describe how Peter would count his pulse for one minute.

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(2)

(b) For his exercise, Peter chose to do some 'sit-ups'. This involved lying on the floor and then sitting up. He did 10 sit-ups and then counted his pulse. After a brief rest he did 20 sit-ups and then counted his pulse. Peter then asked three of his friends to do the same experiment.
He wrote all the results in rough in his notebook as shown below.

<u>Peter</u>

Rest	64
10 sit-ups	72
20 sit-ups	84

<u>Mike</u>

Rest	62
10 sit-ups	74
20 sit-ups	83

<u>Miguel</u>

Rest	72
10 sit-ups	89
20 sit-ups	100

<u>John</u>

Rest	67
10 sit-ups	78
20 sit-ups	90

(i) In the space below, draw a table to show Peter's results and those of his friends.

(4)

(ii) From his results, Peter came to the conclusion that heart rate increases with increasing exercise. Use your scientific knowledge to explain this conclusion.

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(3)

(c) Peter's teacher said that counting the pulse for one minute after the exercise had finished would give a result for the heart rate that is too low. It might be better to count for only 15 seconds after exercise and multiply by 4.

Suggest an explanation for this.

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**(2)**

Q2

(Total 11 marks)

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3. Mary wanted to find out if the concentration of a protease enzyme affected the time taken to digest protein. She used a protein jelly and, as the enzyme digested the protein, the jelly became liquid.

She put the same mass of protein jelly into five different beakers, **A**, **B**, **C**, **D** and **E**. She poured a different concentration of enzyme solution into each beaker. She then mixed the jelly and enzyme solution together to make a paste. After a time, she poured the paste into a funnel as shown.

funnel

jelly and enzyme paste
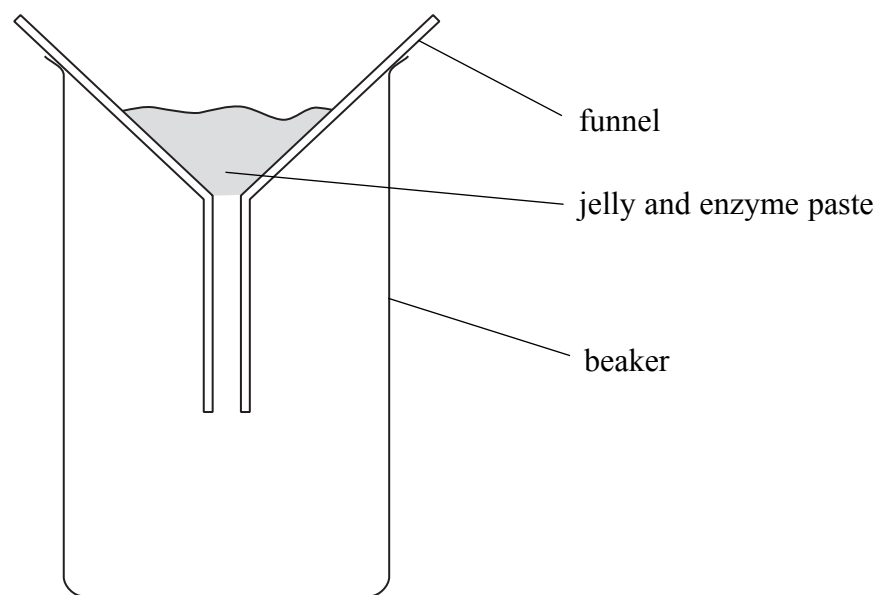
beaker

Mary measured the time taken for the jelly and enzyme paste to flow out of the funnel. The results are shown in the table.

Beaker	Concentration of enzyme solution (%)	Time for paste to flow out in seconds
A	0.00	32
B	0.25	29
C	0.50	25
D	0.75	19
E	1.00	16

(a) Plot a line graph on the grid below to show the time taken for the paste to flow out at each enzyme concentration. Use a ruler to join the points.
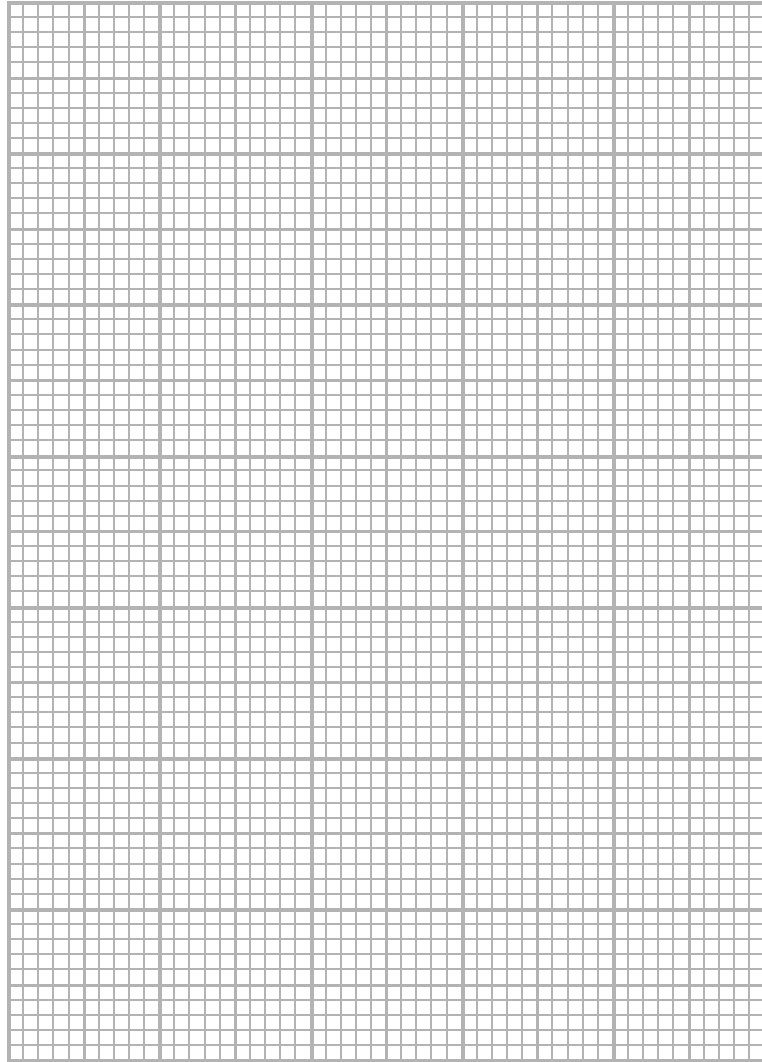
(5)

(b) (i) Describe the pattern shown by these results.

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(1)

(ii) Explain why the time taken for the paste to flow out is affected by enzyme concentration.

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(2)

(c) Name **two** factors that need to be kept the same for each beaker for the results to be valid.

1 ....

2 ....

(2)

(d) Mary was given the enzyme as a powder. To make the 1.00% concentration of enzyme solution she dissolved 1g of powder in 100 cm^3 of water. Suggest how she would make the 0.50% concentration of enzyme solution.
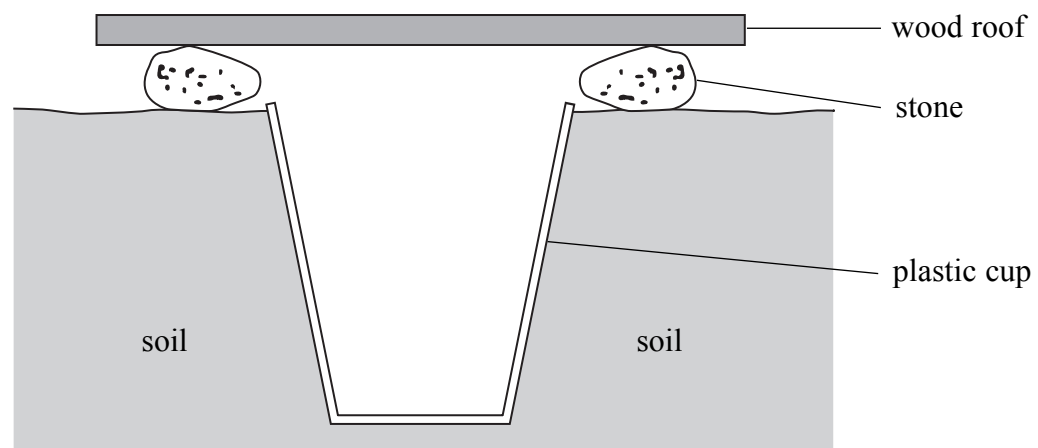
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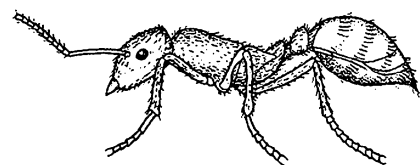
(1)

Q3

(Total 11 marks)

4. A student wanted to find out about the numbers and types of small animals moving around in a field during the day and during the night.

The student used a pitfall trap to catch the small animals. The diagram shows a pitfall trap.
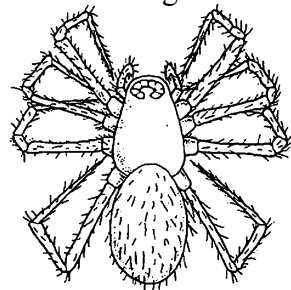

The key shows the different types of animal caught.

ant

slug

beetle

spider
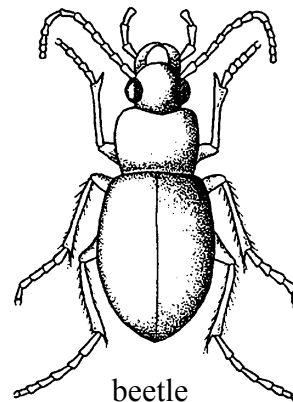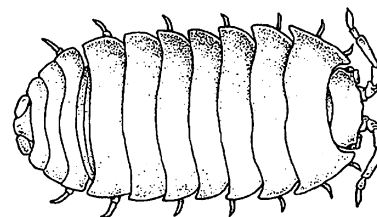
woodlouse

(not to scale)

The diagram shows the total number of the different types of animal caught in ten traps during the day.

(not to scale)

The student produced a table of the results for the catch during the day.

Catch during the day

Type of animal	Tally	Total number caught
ant	~~IIII~~ ~~IIII~~ ~~IIII~~ I	16
beetle	I	1
slug		0
spider	I	1
woodlouse	~~IIII~~ ~~IIII~~	10

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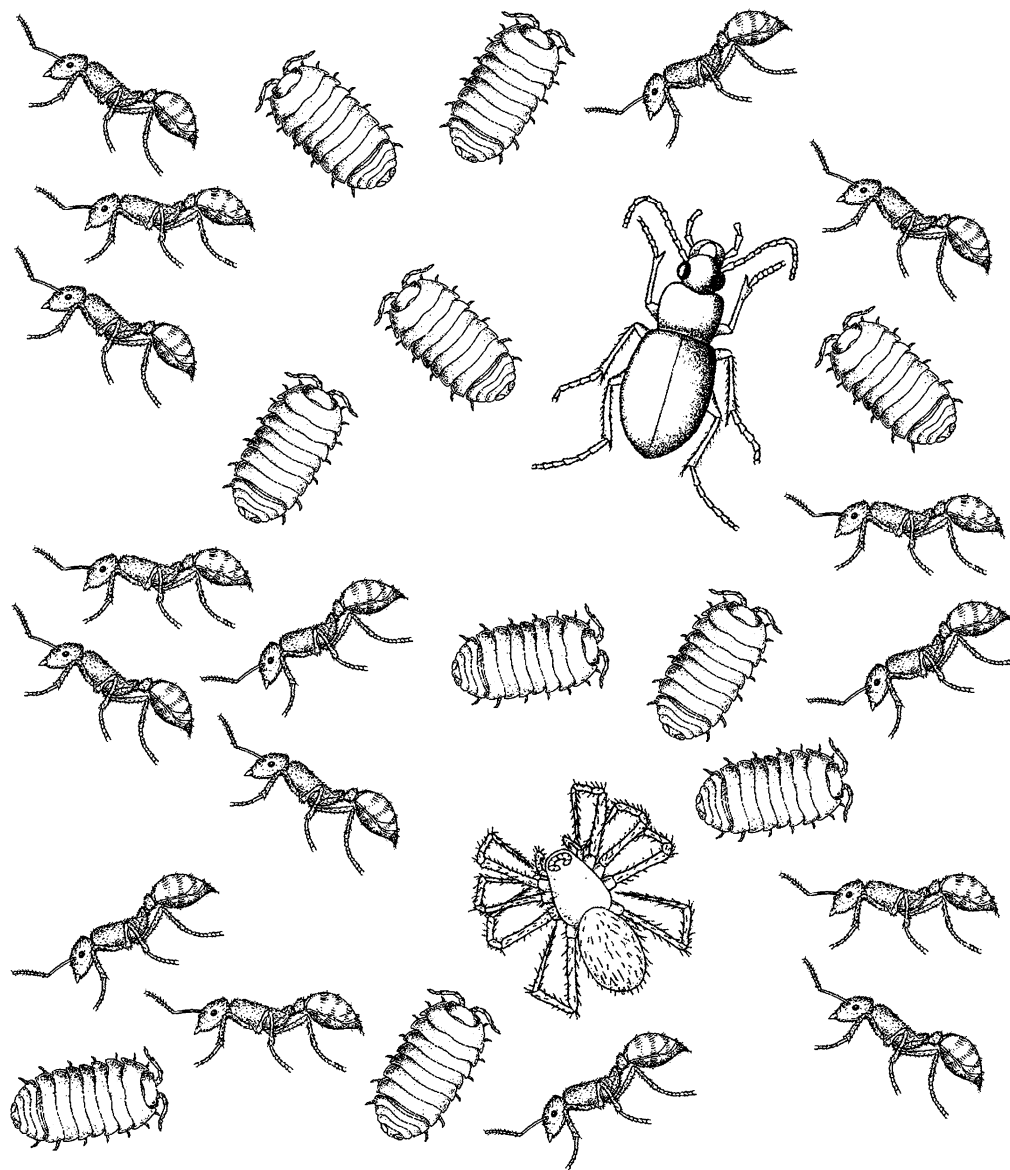
The diagram shows the total number of the different types of animal caught in ten traps during the night.
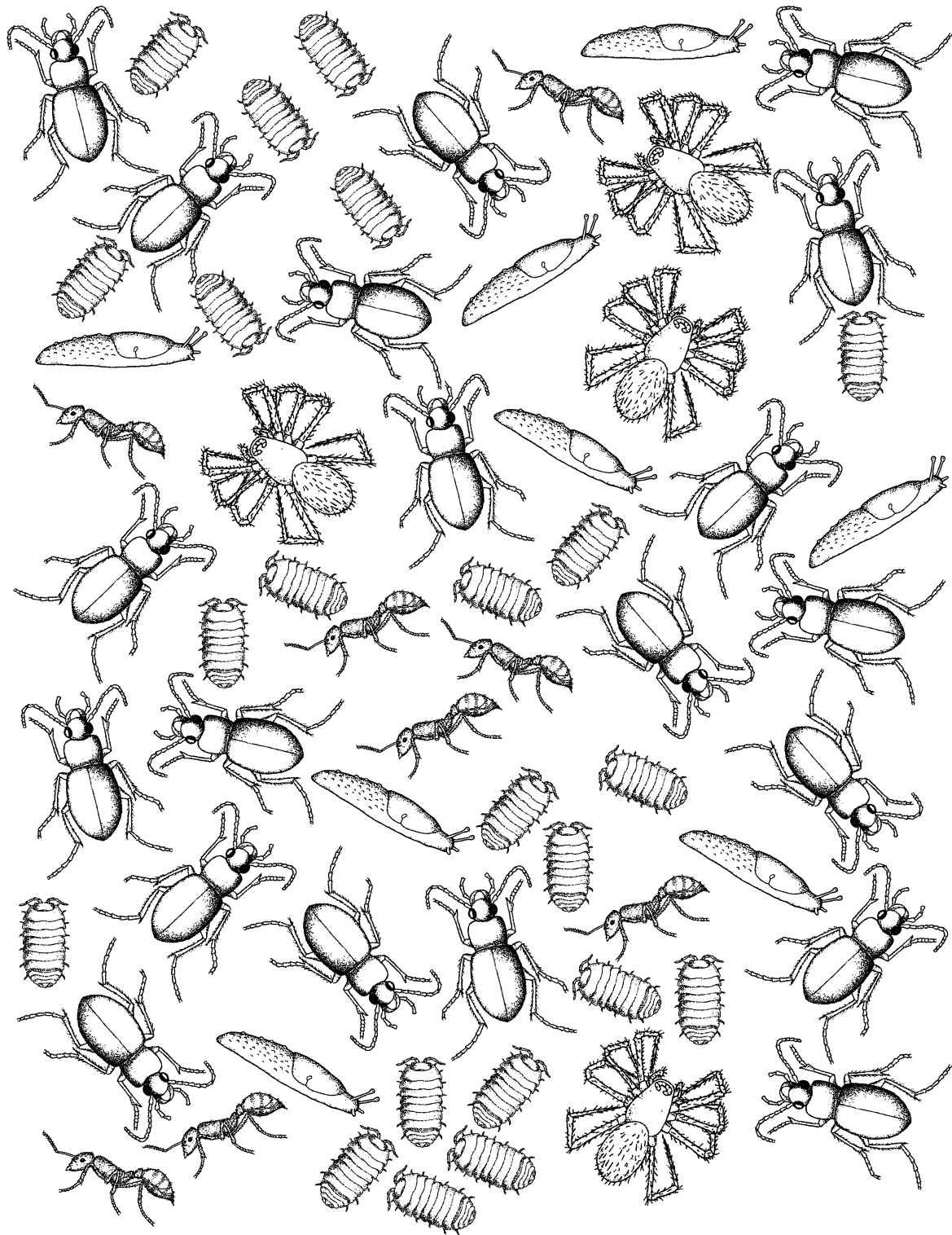
(not to scale)

(a) (i) Complete the table to show the results for the catch during the night.

Catch during the night

Type of animal	Tally	Total number caught
ant		
beetle		
slug		
spider		
woodlouse		

(6)

(ii) What did the student do to make the investigation reliable?

....

(1)

(iii) Suggest **two** reasons for the difference in the total number of beetles caught during the day and the total number of beetles caught during the night.

1 ....

2 ....

(2)

(b) Another student suggested repeating the investigation using liquid detergent placed at the bottom of the plastic cup. Liquid detergent kills animals. The student said that this would be a better way of doing the experiment.

Do you agree with this suggestion? Give a reason for your answer.

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(1)

(Total 10 marks)

5. The instructions on a packet of seeds read:

<div style="border:1px solid">

"to obtain the most growth
sow seeds 10 cm apart"

</div>

Design an investigation you could carry out to find out if the distance seeds are sown apart affects the growth of the young plants they produce.

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Q5

(Total 6 marks)

TOTAL FOR PAPER: 50 MARKS

END