Centre No.						Paper Reference (complete below)							Surname	Initial(s)
Candidate No.										/			Signature	

Paper Reference(s)

4325/03 4437/07

London Examinations IGCSE

Biology – 4325

Paper 3

Science (Double Award) – 4437

Paper 7

Foundation and Higher Tiers

Friday 10 November 2006 – Afternoon

Time: 1 hour 15 minutes

Examiner's use only

Team Leader's use only

Question Number	Leave Blank
1	
2	
3	
4	
5	
6	
7	
Total	

Materials required for examination
Ruler, pencil and eraser

Items included with question papers
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 references are shown above. 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 total mark for this paper is 50. The marks for parts of questions are shown in round brackets: e.g. **(2)**.
There are 16 pages in this question paper. Any blank pages are indicated.

Advice to Candidates

Write your answers neatly and in good English.

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Turn over

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1. The table is about food tests. Complete the table using words from the lists.

Test solution	**Colour of positive result**
water and ethanol	cloudy white
iodine solution	red
Benedict's solution	purple

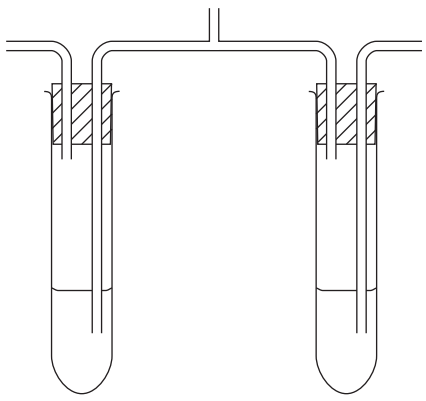
Food type	**Test solution**	**Colour of positive result**
glucose		
lipid		

Q1

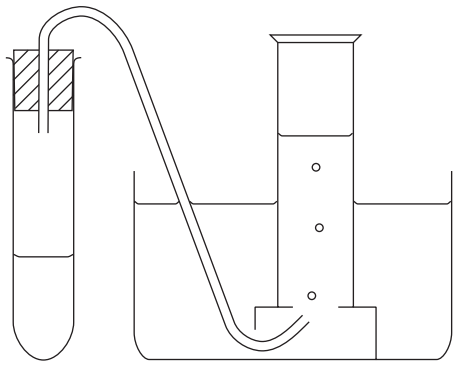
(Total 4 marks)

Leave blank

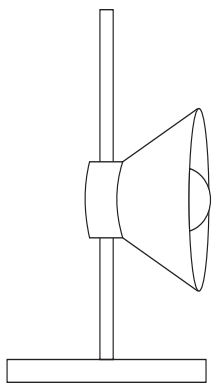
2. The sets of apparatus (A, B, C and D) are used to carry out four different experiments.



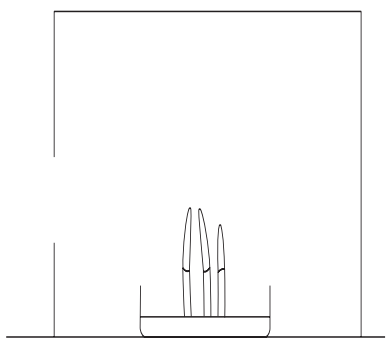
A

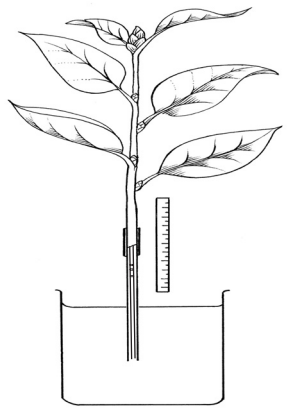


B



C





D

Complete the table by writing the letter of the apparatus you would use for each experiment.

Experiment	Apparatus letter
Measuring the rate of water loss from a leafy shoot	
Comparing the amount of carbon dioxide in inhaled and exhaled air	
Measuring the rate of anaerobic respiration in yeast	
Demonstrating that shoots respond to the direction of light	

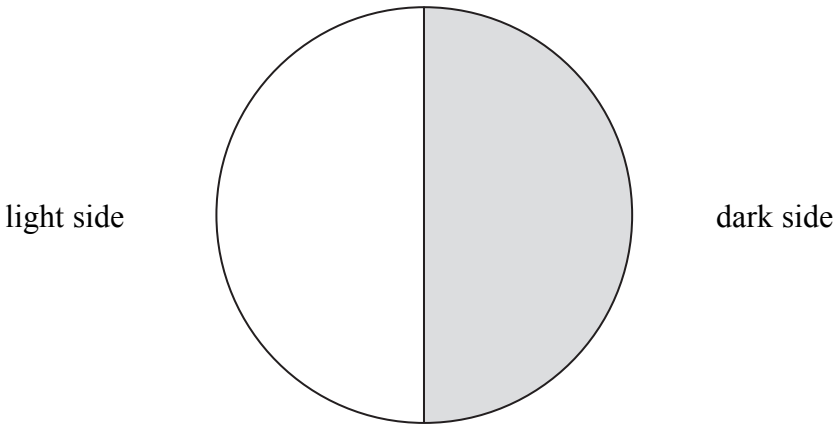
Q2

(Total 3 marks)

Leave blank

3. Bethany set up an investigation to find out about the effect of light on the behaviour of insect larvae.

She used a simple choice chamber as shown below. This consisted of a transparent plastic dish with a lid. One half of the lid is dark and lets no light through, but the other half is clear and lets light through.



She put 10 larvae in the chamber and left it for five minutes.
She then removed the lid and counted the number of larvae in each side of the chamber.
She did the experiment three times.

(a) State a suitable prediction for Bethany's investigation.

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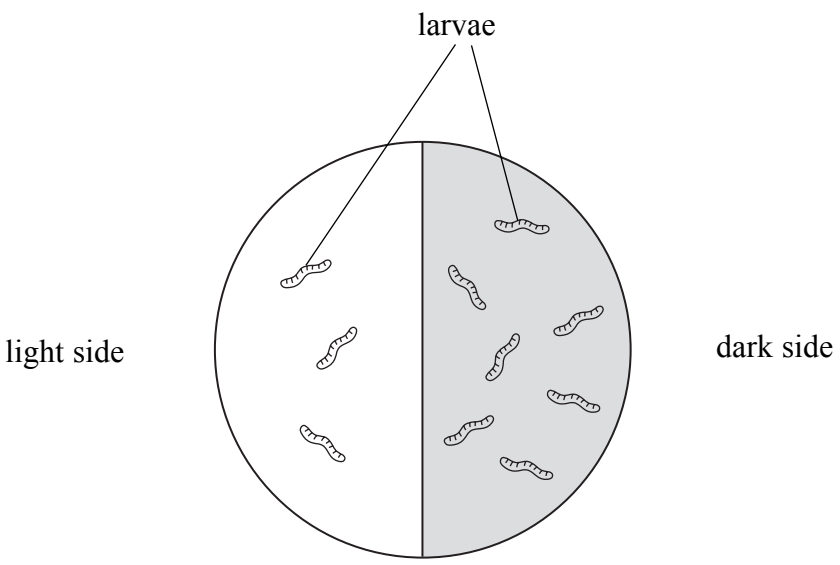
(1)

(b) Her results are shown below.

Experiment 1



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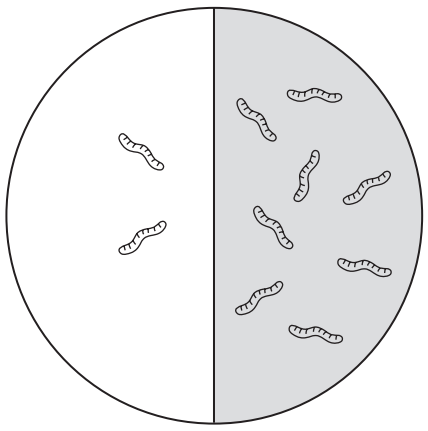
Experiment 2

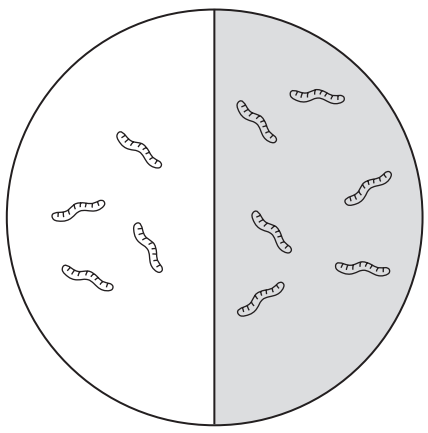
light side



dark side

Experiment 3

light side



dark side

(i) Draw a suitable table to show the results of the three experiments.

(3)

QUESTION 3 CONTINUES ON THE NEXT PAGE

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(ii) Write a suitable conclusion for Bethany's investigation.

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(1)

(c) Suggest **one** way that Bethany could improve her investigation.

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(1)

Q3

(Total 6 marks)

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4. A student wanted to investigate the effect of acid rain on the germination of seeds. He placed 25 seeds on filter paper in each of three dishes. He added 2 cm^3 of distilled water to each dish. He then set up three dishes in a similar way, but used very weak acid instead of distilled water. He then set up another three dishes using weak acid instead of distilled water.

After three days he counted the number of seeds that had germinated in each dish. His results are shown in the table below.

Solution	**Number of seeds germinated**				**Percentage germinated (%)**
	Dish 1	**Dish 2**	**Dish 3**	**Total**	
distilled water	24	23	24	?	?
very weak acid	20	19	22	61	81.3
weak acid	11	5	7	23	30.7

(a) (i) Calculate the total number of seeds that germinated in dishes 1, 2 and 3 in distilled water.

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(1)

(ii) Calculate the percentage of seeds that germinated in distilled water.
Show your working.

Answer .....%

(2)

(b) Why did the student set up three dishes for each solution?

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(1)

Leave blank

(c) Describe the effect of increasing the acidity of the solution on the percentage of seeds that germinated.

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(1)

(d) Name **one** condition that the student would need to keep constant in his experiment. Suggest how he could do this.

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(2)

Q4

(Total 7 marks)

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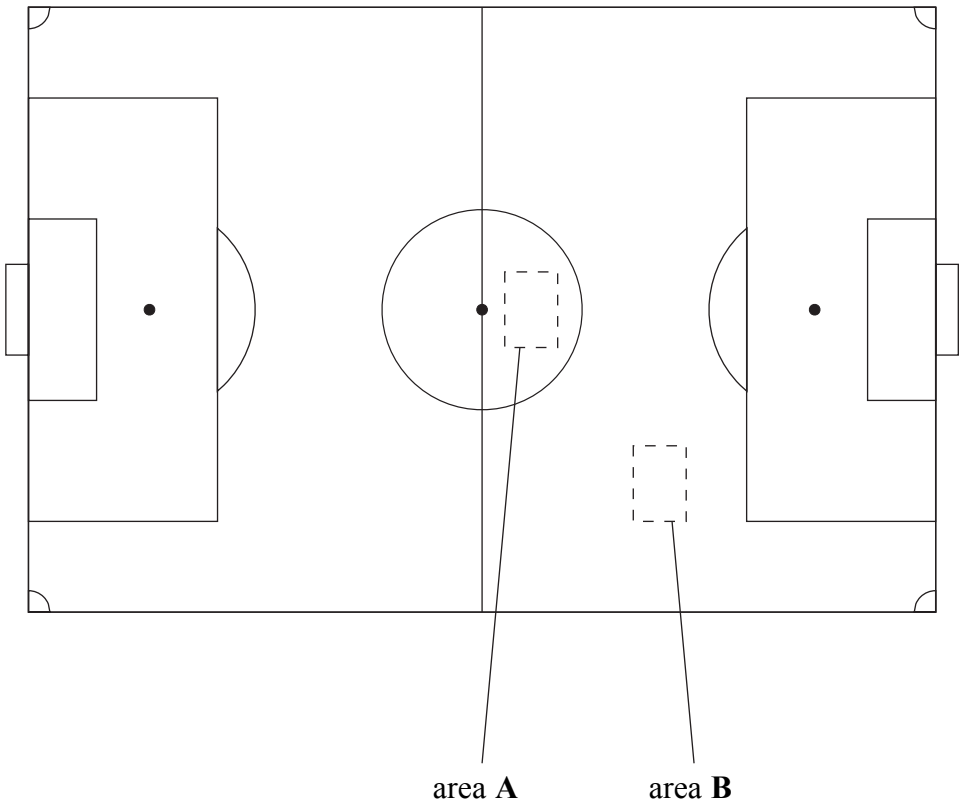
5. A student wanted to study the distribution of plants in different parts of the football pitch shown in the diagram.



He suggested that area **A** (in the centre circle of the pitch) would contain a different distribution of plants compared to area **B**.

He thought that area **A** would have been trampled more than area **B**.

He used a 1 m × 1 m quadrat to sample the plants growing in each area. He counted the number of plants of four different species and used three quadrats in each area. The number of plants he found in area **A** are shown in the tally chart below.

Area A

Plant species	**Number of plants**			**Total in three quadrats**
	Quadrat 1	**Quadrat 2**	**Quadrat 3**	
plantain	𝍸 II	𝍸 𝍸	III	20
groundsel	II	III	II	7
dandelion	IIII	II	𝍸	11
daisy	𝍸	𝍸	II	12

Leave blank

(a) Estimate the density of plantains in plants per m^2 in area **A**.
Show your working.

Answer ..... plants per m^2
(2)

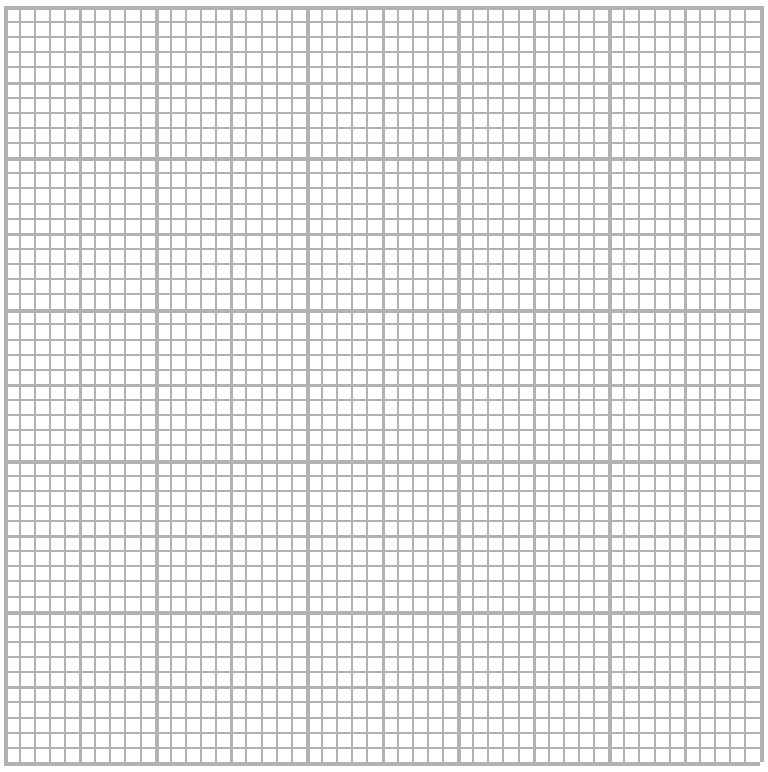
(b) Complete the empty boxes in the following tally chart for area **B**.

Area B

Plant species	Number of plants			Total in three quadrats
	Quadrat 1	Quadrat 2	Quadrat 3	
plantain	III	II	III	8
groundsel	𝍸	𝍸	𝍸 II	
dandelion	II	𝍸		9
daisy	III	𝍸	II	10

(2)

(c) Plot a bar chart of the results for area **A** and for area **B** on the grid provided.



(5)

QUESTION 5 CONTINUES ON THE NEXT PAGE

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(d) Use the results from areas **A** and **B** to comment on the effect of trampling on the distribution of plants.

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(2)

Q5

(Total 11 marks)

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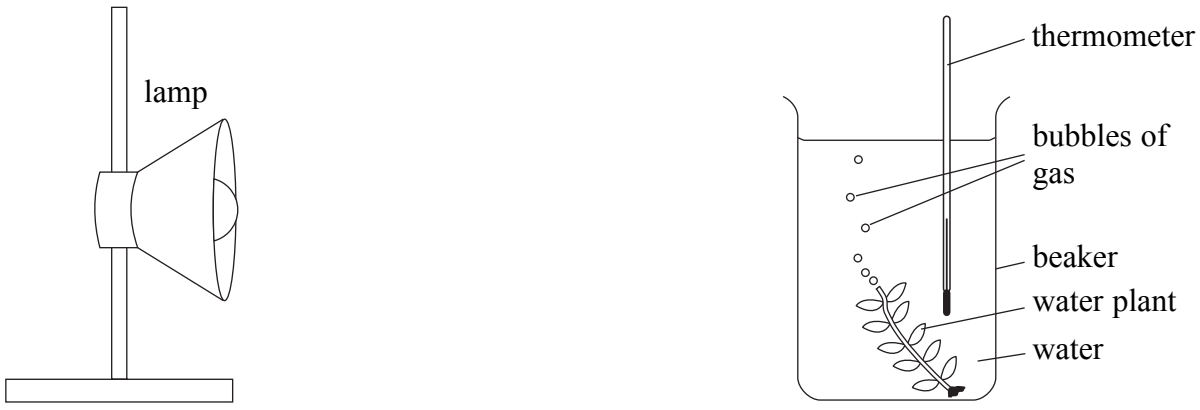
6. Adam wanted to investigate the effect of temperature on the rate of photosynthesis in the water plant *Elodea*. He used the apparatus shown in the diagram.

He decided to use five different temperatures (15 °C, 20 °C, 25 °C, 30 °C and 35 °C).



He adjusted the temperature of the water to 15 °C and checked it using a thermometer.

He counted the bubbles given off by the water plant in one minute. He did this three times. He repeated this procedure for each of the other temperatures.

(a) Adam predicted that increasing the temperature from 15 °C to 35 °C would increase the rate of photosynthesis. Justify his prediction using your scientific knowledge and understanding.

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(1)

QUESTION 6 CONTINUES ON THE NEXT PAGE

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(b) He recorded his results in Table 1.

Table 1

Temperature in °C	Number of bubbles given off each minute		
	1st time	2nd time	3rd time
15	3	5	4
20	4	11	9
25	15	13	14
30	22	25	25
35	21	20	22

He calculated the mean (average) number of bubbles given off for each temperature. He recorded the results for this calculation in Table 2.

Table 2

Temperature of water in °C	Mean (average) number of bubbles per minute
15	4
20	8
25	
30	24
35	21

Calculate the mean (average) number of bubbles released per minute for the results at 25 °C. Write your value in the space in Table 2.

(1)

(c) (i) Using the data from Table 2, write a suitable conclusion for Adam's experiment.

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(2)

Leave blank

(ii) Do these results support Adam's prediction? Give a reason for your answer.

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(2)

(d) Identify any unexpected results in Table 1.

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(1)

(e) (i) Suggest and explain **one** way that this experiment could be modified to improve the accuracy of the measurements made.

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(2)

(ii) Suggest a further experiment you could carry out and explain how it would provide more information on the effect of temperature on photosynthesis.

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(2)

(f) (i) Adam's experiment looked at the effect of different temperatures on the rate of photosynthesis. Name **one** other key factor that could affect the rate of photosynthesis.

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(1)

(ii) For the factor you have named, suggest how you could ensure that it does not affect the rate of photosynthesis in this experiment.

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(1)

(Total 13 marks)

Q6

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7. Describe an investigation you could carry out to find out the effect of changing the concentration of the enzyme amylase on the rate of starch digestion.

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Q7

(Total 6 marks)

TOTAL FOR PAPER: 50 MARKS

END