Centre No.						Paper Reference						Surname	Initial(s)
Candidate No.						4	4	3	7	/	0	7	Signature

Paper Reference(s)

4437/07

Examiner's use only

London Examinations IGCSE

Science (Double Award)

Team Leader's use only

Paper 7

Common to both tiers

Specimen Paper

Time: 1 hour 15 minutes

Question Number	Leave Blank
1	
2	
3	
4	
5	
6	
Total	

Materials required for examination
Nil

Items included with question papers
Nil

Instructions to Candidates

In the boxes above, write your centre number and candidate number, your surname, initial(s) and signature.
The paper reference is shown at the top of this page. Check that you have the correct question paper.
Answer **ALL** the questions in the spaces provided in this question paper.

Information for Candidates

There are 13 pages in this question paper. All blank pages are indicated.
The total mark for this paper is 50. The marks for the various parts of questions are shown in round brackets: e.g. (**2**).

Advice to Candidates

You are reminded of the importance of clear English and careful presentation in your answers.

Printer's Log. No.

Specimen

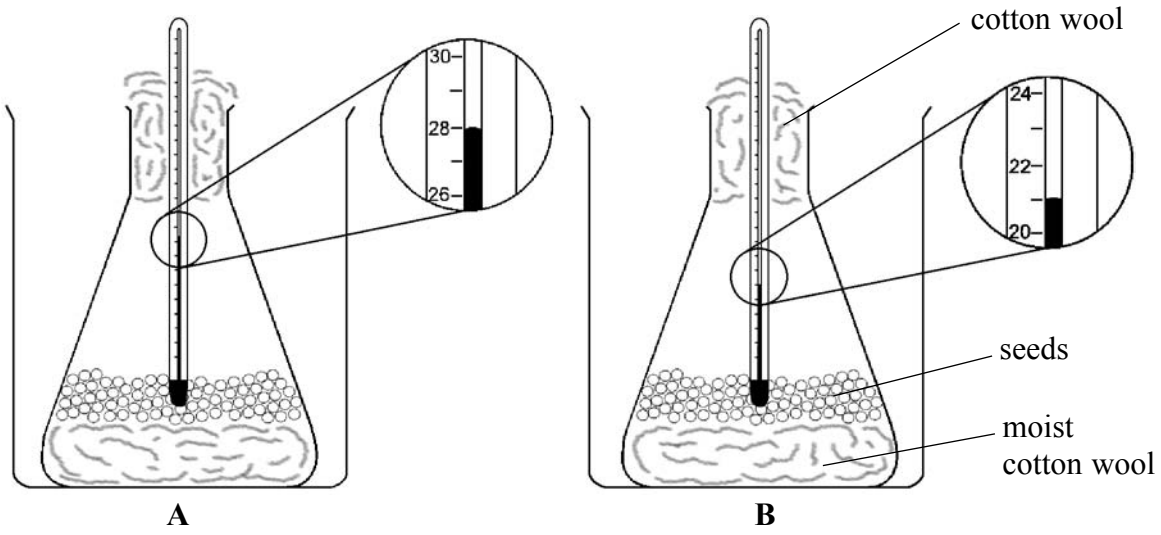
Turn over

edexcel INTERNATIONAL

1. The diagram below shows an experiment used to find out if living seeds release heat when they respire.

Leave blank

One flask contains living seeds and the other contains dead seeds.



(a) (i) On diagram **A** label the **beaker**.

(1)

(ii) On diagram **A** label the **flask**.

(1)

(b) Look carefully at the thermometers. In the spaces below write down the temperature reading for each.

A .....

B .....

(2)

(c) Which flask was set up with living seeds? Explain your answer.

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(2)

Q1

(Total 6 marks)

2. The following steps describe the procedure used to show that a green leaf contains starch.

Leave blank

The steps are **not** in the correct order.

- Add iodine solution
- Immerse in boiling water for 1 minute
- Heat leaf in boiling ethanol
- Place plant in bright sunshine for 12 hours
- Place plant in darkness for 24 hours
- Remove leaf from plant

(a) Fill in the table below to show these steps in the correct order. Then, in the table, give a reason why each step is carried out. Some parts of the table have been filled in for you.

Step	Reason why carried out
1. Place plant in darkness for 24 hours	
2.	Allows photosynthesis to occur
3. Remove leaf from plant	
4.	Kills leaf
5.	
6.	Shows the presence of starch

(7)

(b) In one of the steps the leaf is boiled in ethanol. Describe how you could carry this out safely.

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(1)

Q2

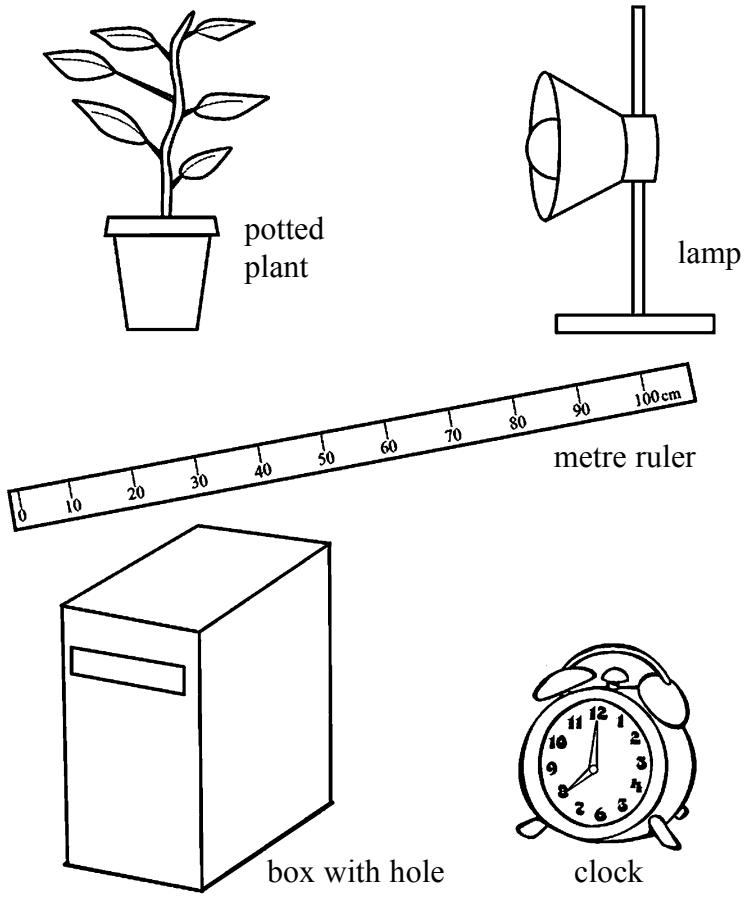
(Total 8 marks)

Turn over

Leave blank

3. (a) You are asked to do an experiment to show how light from one side affects the growth of a plant.

For this you are given the pieces of apparatus shown in the diagram below.



(i) Draw a diagram to show how you would set up this apparatus for your experiment.

(3)

(ii) Write a brief method to say what you would do.

Leave blank

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(1)

(b) Describe how you could set up a control to make sure that the response of the plant was due to the light coming from one side.

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(1)

Q3

(Total 5 marks)

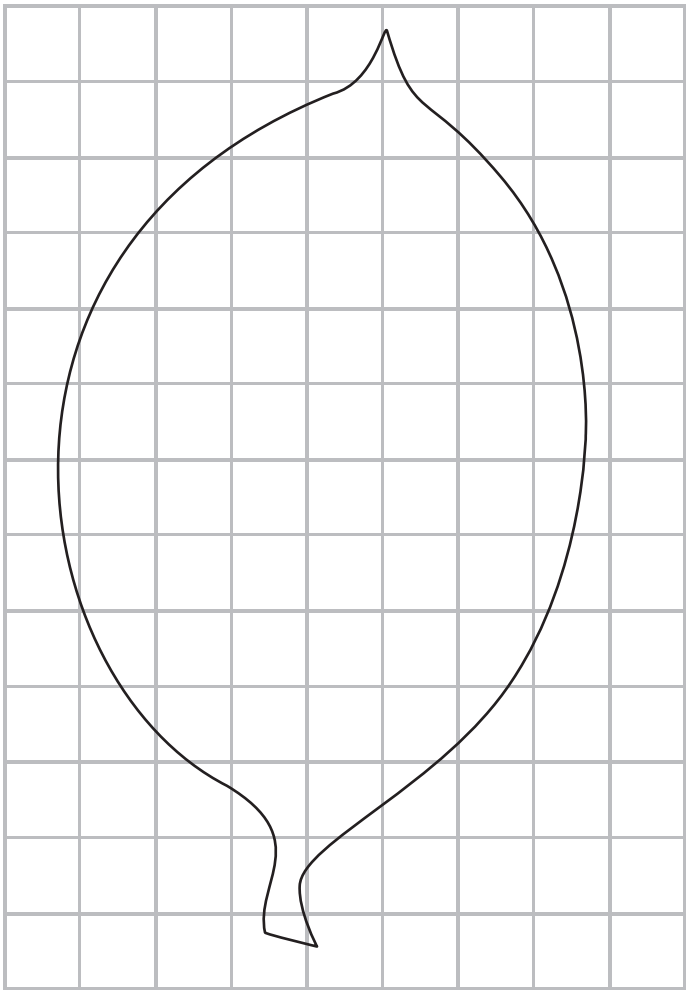
Turn over

4. A student looked at some leaves growing on plants in the light and in the shade. She wanted to investigate whether the leaves grow to different sizes in the light and the shade.

Leave blank

She collected 20 leaves from a plant growing in the shade and 20 from the same kind of plant growing in full sunlight.

To measure the area of a leaf she drew round it on squared paper, as shown below.



She counted up the squares. The area of each square was 1 cm^2.

(a) Estimate the area of this leaf using the same method. Show your working.

(2)

(b) She realised that this method would take a very long time if she used it for all her leaves. Her teacher suggested she use the following formula to estimate the area of the other leaves.

Leave blank

$$\text{Leaf area} = \tfrac{2}{3} \times (\text{maximum length} \times \text{maximum width})$$

Measure the length of the leaf shown.

Measure the width of the leaf shown.

Use the formula above to calculate the area of this leaf.

Show your working.

Write your results in the table below.

Length of leaf	cm
Width of leaf	cm
Area of leaf	cm^2

(3)

QUESTION 4 CONTINUES ON THE NEXT PAGE

Turn over

(c) She decided to use this method and collected the following data.

Leave blank

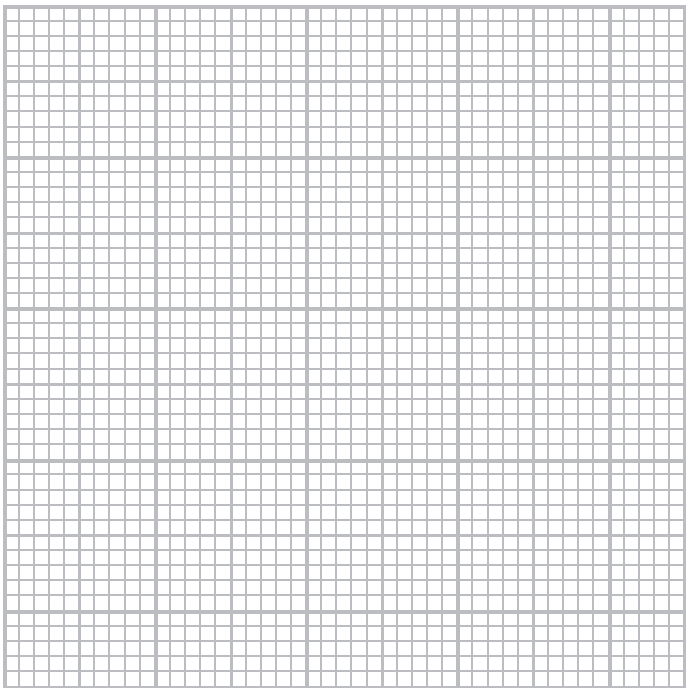
Area of leaves growing in the shade in cm^2.

11.2 22.0 76.5 51.6 29.6 32.7 46.6 53.9 69.5
66.1 53.5 55.7 38.8 43.9 32.8 42.0 49.8 46.4
43.8 46.1

She grouped the data for the shade leaves into categories and produced a tally chart.

Leaf area in cm^2	Tally	Total
11 to 20	/	1
21 to 30	//	2
31 to 40	///	3
41 to 50	///// //	7
51 to 60	////	4
61 to 70	//	2
71 to 80	/	1

(i) Plot a histogram on the grid provided to show the distribution of **shade** leaves.



(3)

(ii) From the histogram, what is the mode of these data?

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(1)

(d) She then examined the leaves she collected from full sunlight and estimated the following leaf areas.

Leave blank

Area of leaves growing in full sunlight, in cm^2.

17.6	18.2	11.0	22.0	26.1	43.1	22.0	18.6	29.2	61.1
72.2	43.0	34.0	44.6	57.0	33.0	63.0	41.0	38.0	24.3

(i) She again decided to produce a tally chart for these data. Complete the chart which has been started below.

Leaf area in cm^2	Tally	Total
11 to 20		

(5)

(ii) Does her data suggest that there is a difference in size between leaves from the shade and those from the light? Explain your answer.

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(2)

Q4

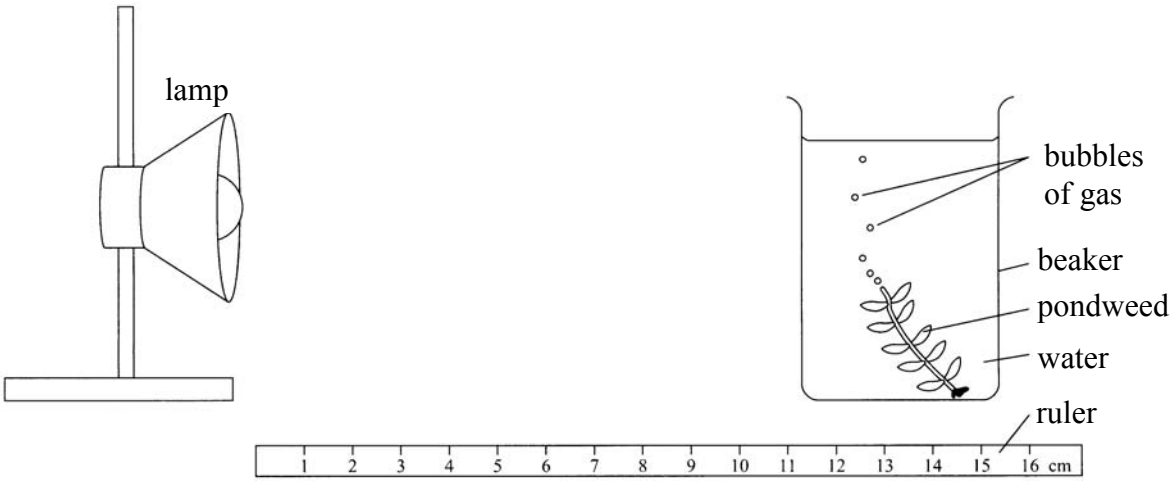
(Total 16 marks)

Turn over

Leave blank

5. Anna carried out an investigation into photosynthesis in which she varied the concentration of carbon dioxide available to a water plant. She added different masses of sodium hydrogencarbonate to the water. She was careful to control all other key factors that might affect the rate of photosynthesis. The apparatus she used is shown in the diagram below.

She predicted that increasing the carbon dioxide concentration would increase the rate of photosynthesis.



She observed the water plant and counted the bubbles coming off. She did this for 3 minutes for each concentration of sodium hydrogencarbonate.

Table 1

Number of bubbles of oxygen released each minute	**Mass of sodium hydrogencarbonate added to the beaker in g**				
	0	**1**	**1.5**	**2**	**2.5**
Minute 1	4	16	29	43	60
Minute 2	3	17	31	29	63
Minute 3	4	15	25	28	57

(a) She decided to calculate the average number of bubbles released for each mass of sodium hydrogencarbonate added.

She recorded her results for this calculation and these are given in table 2.

Table 2

Mass of sodium hydrogencarbonate in g	**Average number of bubbles released per minute**
0	3.67
1	16.00
1.5	28.33
2	
2.5	60.00

Calculate the average value for the 2.0 g data. Insert your value in the space in table 2.

(1)

(b) (i) Anna's experiment looked at the effect of different concentrations of carbon dioxide. Name **one** other key factor that could influence the rate of photosynthesis.

Leave blank

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(1)

(ii) For this factor state how Anna could ensure that it does not affect the rate of photosynthesis in her experiment.

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(1)

(c) (i) Using information in table 2, write a suitable conclusion for Anna's experiment. You should include the effect of increasing hydrogencarbonate concentration on the number of bubbles released.

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(1)

(ii) Give an explanation of these results using your scientific knowledge.

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(1)

(iii) Relate the results to Anna's prediction.

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(1)

QUESTION 5 CONTINUES ON THE NEXT PAGE

Turn over

(d) Comment on any unexpected results or pattern of results in table 1.

Leave blank

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(1)

(e) (i) Suggest **one** way that this experiment could be modified to improve the reliability or accuracy of the results. Explain how your modification could improve the results.

Modification .....

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Explanation .....

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(2)

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

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(2)

Q5

(Total 11 marks)

6. Describe an investigation you could carry out to find out what effect exercise has on breathing rate.

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You should include full experimental details in your account.

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Q6

(Total 4 marks)

TOTAL FOR PAPER: 50 MARKS

END