Paper Reference(s)

4325/03   4437/07

London Examinations IGCSE

Biology – 4325

Paper 3

Science (Double Award) – 4437

Paper 7

Foundation and Higher Tiers

Wednesday 26 May 2010 – 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.
Some questions must be answered with a cross in a box (☒). If you change your mind about an answer, put a line through the box (☒) and then mark your new answer with a cross (☒).
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 7 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.

Turn over

edexcel
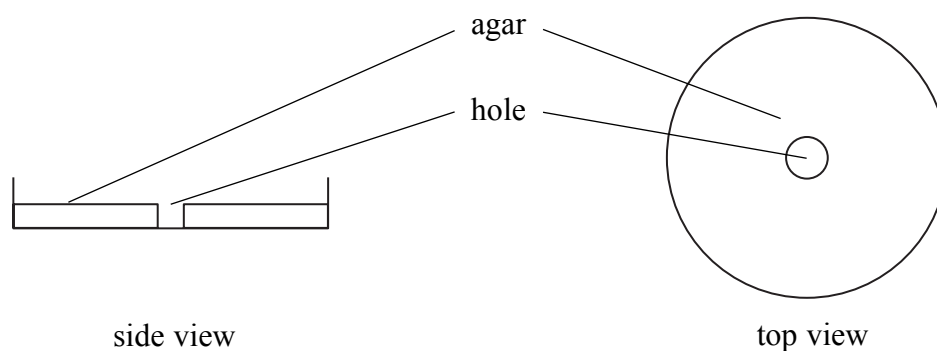advancing learning, changing lives

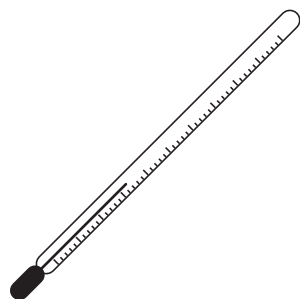**Answer ALL the questions.   Write your answers in the spaces provided.**

1. Marie investigated the diffusion of a dye (coloured liquid) through agar (jelly).
    Her teacher gave her a plate filled with agar.
    The plate had a hole cut out of the middle of the agar.

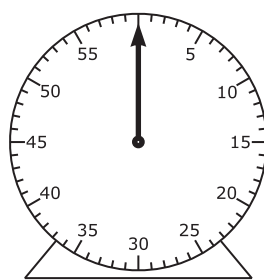   The diagram shows the side view and the top view of the agar plate.

    side view   top view

    Marie put five drops of the dye into the hole in the middle of the plate. She found out how long it took for the dye to diffuse to the outer edge of the plate.
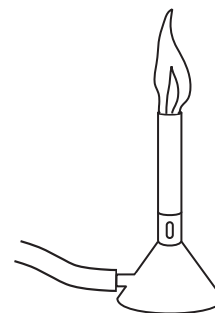
    (a) Choose **two** pieces of apparatus that Marie used.
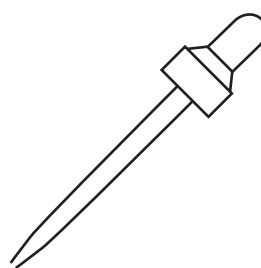

    State the letter of each piece.

    1 ....

    2 ....

    (2)

(b) Marie wore plastic gloves when putting the drops of dye into the hole in the middle of the plate.

Complete the sentence with the correct word from the list

accurate   **reliable**   **safe**

This was to make the experiment ....

(1)

(c) What would happen if Marie had used a dye with a higher concentration?

The rate of diffusion would

☒   **be faster**

☒   **stay the same**

☒   **be slower**

(1)

Q1

(Total 4 marks)

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2. Sunil wants to test some foods.

(a) He has the following reagents available.

Benedict's   biuret   ethanol   iodine

Choose the reagent he should use to test for

(i) starch..

(1)

(ii) glucose...

(1)

(b) Put a cross (☒) in the correct box to show the colour of the reagent at the end of the test

(i) if the result is **positive** for starch

A ☒ yellow

B ☒ red

C ☒ orange

D ☒ green

E ☒ blue-black

(1)

(ii) if the result is **negative** for glucose

A ☒ blue

B ☒ green

C ☒ orange

D ☒ red

E ☒ yellow

(1)

(Total 4 marks)

N 3 6 8 6 2 A 0 5 1 6

3. The diagram shows apparatus that was used in an experiment to measure the rate of water loss from a leafy shoot. The experiment was carried out at 20 °C.

Circle **A** shows the position of an air bubble at the start of the experiment and circle **B** shows the air bubble after 15 minutes.
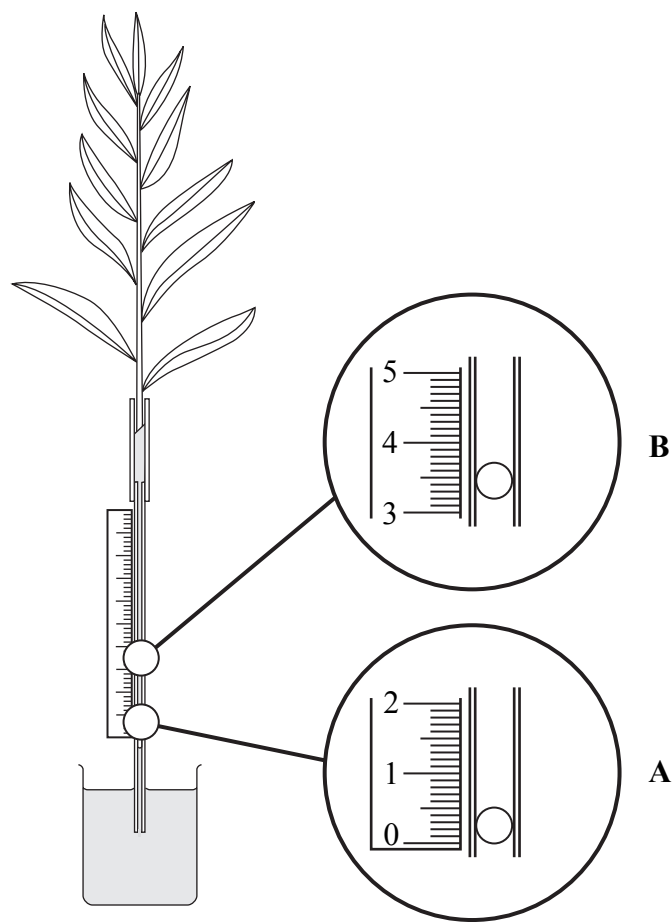
(a) (i) How far did the air bubble move in the first 15 minutes of the experiment?

Answer .... cm

(1)

(ii) How far would the air bubble move in 30 minutes, assuming that the rate of transpiration is constant?

Answer .... cm

(1)

N 3 6 8 6 2 A 0 6 1 6

(b) Describe and explain how the results would differ if the experiment was carried out at 30 °C instead of at 20 °C.

....

....

....

....

....

....

(2)

(c) Name **two** factors, other than temperature, that affect the rate of water loss from plants.

1 ....

2 ....

(2)

(Total 6 marks)

Q3

4. Cress is a plant that can be long-stemmed or short-stemmed as shown in the diagram.

long-stemmed cress plant   **short-stemmed cress plant**

The length of the stem is controlled by a single gene with two alleles. The allele for a long stem is dominant to the allele for a short stem.

(a) Omar set up a cross between homozygous long-stemmed plants and homozygous short-stemmed plants. He found that all the offspring plants had long stems.

He then set up a cross between two of these offspring plants and the results are shown below.
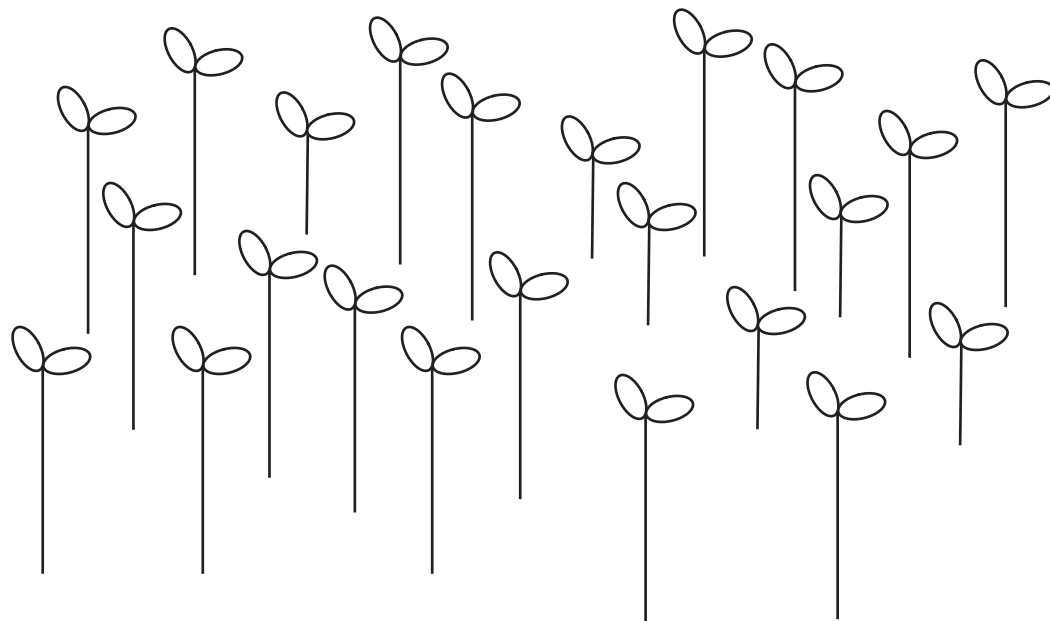
(i) Complete the table below to show the tally and number of each type of cress plant.

Type of cress plant	Tally of type of cress plant	Number of cress plants
Long-stemmed		
Short-stemmed		

(3)

(ii) Suggest why the ratio of long-stemmed cress plants to short-stemmed cress plants is not exactly 3:1.

....

....

....

(1)

(b) Omar left the cress plants close to light coming through a window. He noticed that something happened to them after a few hours.

In the space below, draw what one of the plants would look like after a few hours.

light
coming
through
window

plant before it
was placed at
the window
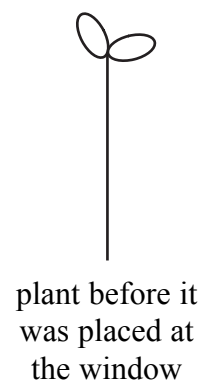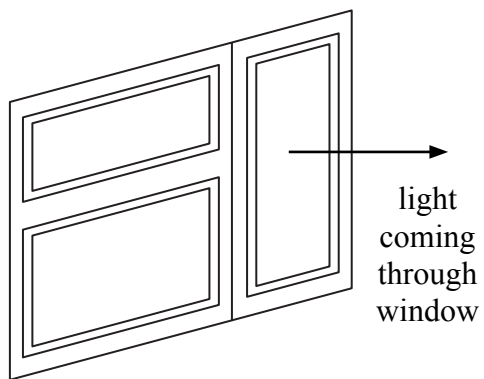
plant after a
few hours

(1) **Q4**

(Total 5 marks)

5. Neil investigated how breathing rate is affected by the length of time spent doing exercise. He used five of his friends. He measured the breathing rate of each friend at rest. He then measured the breathing rates after they had completed 2 minutes, 4 minutes, 6 minutes, 8 minutes, 10 minutes and 12 minutes of exercise.

He then calculated the average breathing rate of the five friends at rest and after they had completed 2 minutes, 4 minutes, 6 minutes, 8 minutes, 10 minutes and 12 minutes of exercise.

The averages he calculated are shown in the table below.

Length of time of exercise in minutes	Average breathing rate in breaths per minute
0	12
2	15
4	18
6	21
8	23
10	25
12	26

(a) Plot a graph on the grid below to show how breathing rate changes with the length of time spent doing exercise. Use a ruler to join the points with straight lines.

(5)
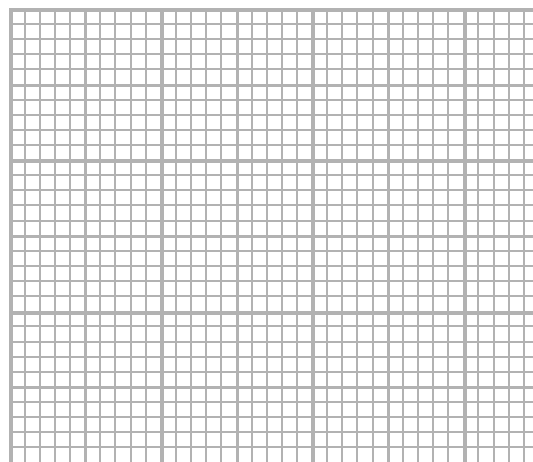
(b) (i) Describe how the breathing rate changes as the length of time spent doing exercise increases.

....

....

....

....

(2)

(ii) Explain the relationship between breathing rate and the length of time spent doing exercise.

....

....

....

....

....

....

....

(3)

(c) Suggest **one** way in which Neil could make his results more reliable.

....

....
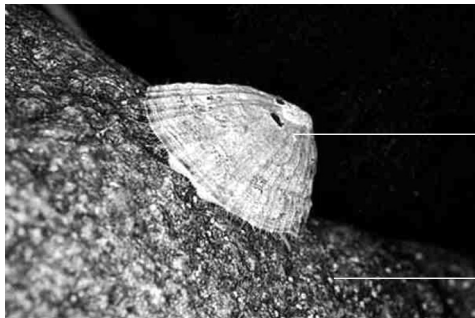
(1)

(Total 11 marks)

Q5

6. Limpets are animals that live on rocks found by the sea. They are attached to the rocks and do not move very much. A picture of a limpet attached to a rock is shown below.

limpet

rock

Design an investigation to find out if distance from the sea affects the population size of limpets found on the rocks.

....

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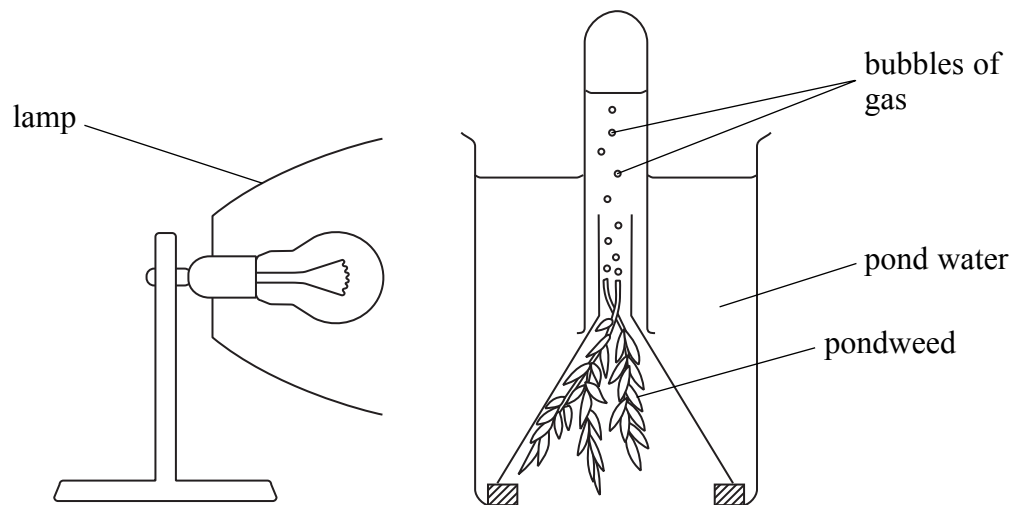
(Total 6 marks)

Q6

7. Patrick wanted to investigate the effect of light intensity on photosynthesis.

   He set up the apparatus shown in the diagram.

(a) Name the gas contained in the bubbles.

....

(1)

(b) Suggest how Patrick could change the light intensity in this investigation.

....

....

(1)

(c) Name **three** variables that Patrick would need to keep constant.

1 ....

2 ....

3 ....

(3)

(d) Patrick counted the number of bubbles of gas released in one minute at low, medium and high light intensities. He did the experiment three times at each light intensity and calculated an average. He forgot to calculate the average result for the medium light intensity. He wrote his results as shown below.

Low   first time 10 bubbles   second time 12 bubbles   third time 11 bubbles

Average 11 bubbles

High   first time 37 bubbles   second time 51 bubbles   third time 50 bubbles

Average 46 bubbles

Medium   first time 33 bubbles   second time 29 bubbles   third time 28 bubbles

(i) Calculate the average result for the medium light intensity.

....
(1)

(ii) In the space below draw a suitable table and use it to show Patrick's results.

(4)

(iii) Which result in the table is anomalous?

....
(1)

(e) Describe and explain the effect of light intensity on the numbers of bubbles of gas produced in Patrick's experiment.

....

....

....

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....

(2)

(f) Patrick measured the rate of gas production by counting the bubbles released in a minute. Suggest a more accurate way of measuring the rate of gas production.

....

....

....

(1)

Q7

(Total 14 marks)

TOTAL FOR PAPER: 50 MARKS

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