Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

BIOLOGY **0610/52**

Paper 5 Practical Test **May/June 2024**

1 hour 15 minutes

You must answer on the question paper.

You will need: The materials and apparatus listed in the confidential instructions

INSTRUCTIONS
- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.
- You should show all your working and use appropriate units.

INFORMATION
- The total mark for this paper is 40.
- The number of marks for each question or part question is shown in brackets [ ].

For Examiner's Use	
1	
2	
Total	

This document has **12** pages. Any blank pages are indicated.

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1 You are going to investigate the effect of acid concentration on the rate of diffusion.

Bromothymol blue is an indicator that turns yellow in the presence of an acid.

Read all the instructions but DO NOT DO THEM until you have drawn a table for your results in the space provided in 1(a)(iii).

You should use the safety equipment provided while you are doing the practical work.

Step 1 Label three beakers **A1**, **A2** and **A3**.

Step 2 Add 20 cm^3 of 1 mol per dm^3 hydrochloric acid solution to beaker **A1**.

Step 3 Add 2 cm^3 of 1 mol per dm^3 hydrochloric acid solution to beaker **A2**.

Step 4 Add 18 cm^3 of distilled water to the hydrochloric acid solution in beaker **A2** and mix well.

Step 5 Use a clean syringe to transfer 2 cm^3 of the solution from beaker **A2** to beaker **A3**.

Step 6 Add 18 cm^3 of distilled water to beaker **A3** and mix well.

Table 1.1 shows the final concentrations of the hydrochloric acid solution in each beaker.

Table 1.1

beaker	final concentration of the hydrochloric acid solution / mol per dm^3	final volume of the solution / cm^3
A1	1.00	20
A2	0.10	.....
A3	0.01	20

(a) (i) Complete Table 1.1 by calculating the final volume of the solution in beaker **A2**.

View solution

Write your answer in Table 1.1. [1]

You are provided with three test-tubes containing bromothymol blue indicator in agar jelly.

Step 7 Label the three test-tubes **A1**, **A2** and **A3**.

Step 8 Use a clean syringe to transfer 5 cm^3 of the hydrochloric acid solution from beaker **A1** to test-tube **A1**.

Step 9 Use a clean syringe to transfer 5 cm^3 of the hydrochloric acid solution from beaker **A2** to test-tube **A2**.

Step 10 Use a clean syringe to transfer 5 cm^3 of the hydrochloric acid solution from beaker **A3** to test-tube **A3**.

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Step 11 Raise your hand when you are ready for warm water to be poured into the beaker labelled **water-bath**.

Step 12 Place the three test-tubes into the warm water-bath and start the stop-clock.

Leave the test-tubes in the water-bath for 20 minutes.

While you are waiting continue with the other questions.

Step 13 After 20 minutes, remove the test-tubes from the water-bath and place them in the test-tube rack.

(ii) Record the temperature of the water in the water-bath.

temperature ..... °C [1]

Step 14 Remove the hydrochloric acid solution from each test-tube by pouring the solution in each test-tube into the beaker labelled **waste**.

Step 15 For each test-tube, measure the distance between the top of the agar and the point at which the blue agar has become yellow. Fig. 1.1 shows where to take the measurement.

Record your measurements in your table in **1(a)(iii)**.

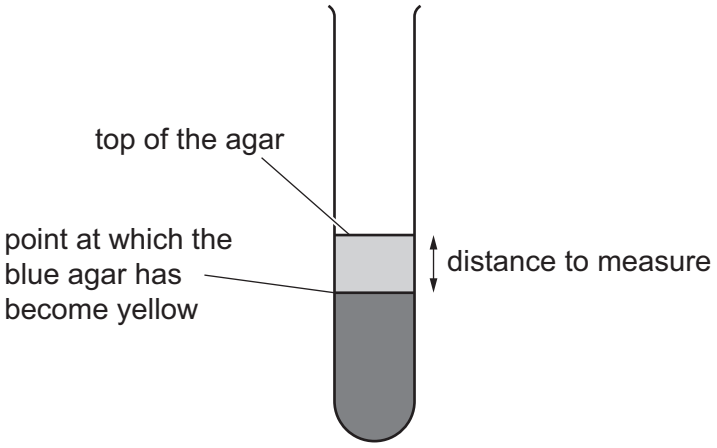

Fig. 1.1

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(iii) Prepare a table and record your results in the space provided.

Include the final concentration of hydrochloric acid in your table.

[4]

(iv) State a conclusion for your results.

.....

.....

..... [1]

(v) Suggest why the temperature of the water-bath did **not** need to be maintained during the investigation.

.....

.....

..... [1]

(vi) Suggest why the hydrochloric acid was removed from the test-tube in step 14 before measuring the distance of the yellow colour.

.....

.....

..... [1]

(vii) Identify the independent variable and the dependent variable in this investigation.

independent variable .....

.....

dependent variable .....

.....

[2]

(viii) Explain why suitable eye protection should be worn when doing this investigation.

…… .....……

.....

..... [1]

(b) In an experiment, a student cut different-sized cubes of agar containing bromothymol blue indicator. The student placed the cubes in hydrochloric acid and measured the time taken for each cube to become yellow.

View solution

The results are shown in Table 1.2.

Table 1.2

length of the cube sides / mm	volume of the cube / mm^3	time taken for the cubes to become yellow / s
2	8	35
4	.....	60
6	216	170
8	512	275
10	1000	445

(i) Complete Table 1.2 by calculating the volume of the 4 mm cube.

Write your answer in Table 1.2. [1]

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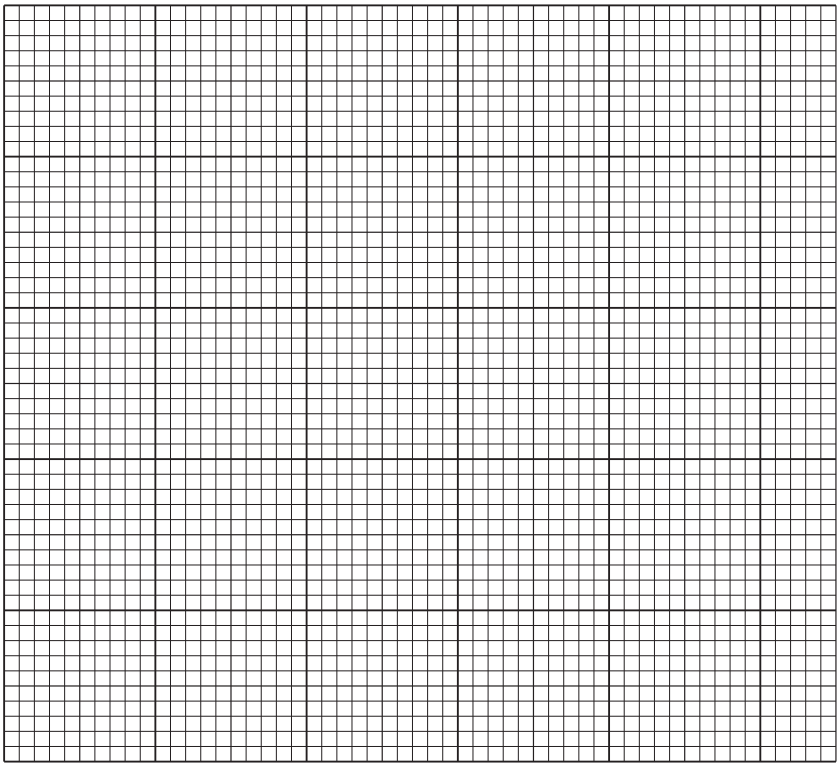
(ii) Plot a line graph on the grid of the length of the cube sides against the time taken for the cubes to become yellow.

View solution



[4]

(iii) Use your graph to estimate the time taken for a cube with a side length of 3 mm to become yellow.

Show on your graph how you obtained your answer.

View solution

..... s

[2]

(iv) State **two** variables that should have been kept constant in this investigation.

View solution

1 .....

.....

2 .....

.....

[2]

[Total: 21]

View solution

2 **(a)** When a seed germinates it grows into a seedling.

Fig. 2.1 is a photograph of a seedling.

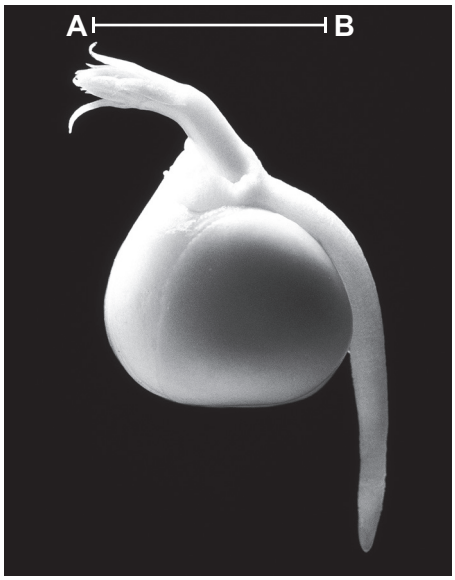


Fig. 2.1

(i) Make a large drawing of the seedling shown in Fig. 2.1.

[4]

View solution

(ii) Line **AB** represents the width of the seedling.

Measure the length of line **AB** on Fig. 2.1.

length of line **AB** ..... mm

The actual width of the seedling is 9 mm.

Calculate the magnification of the seedling in Fig. 2.1 using the formula and your measurement.

$$\text{magnification} = \frac{\text{length of line } \mathbf{AB} \text{ in Fig. 2.1}}{\text{actual width of the seedling}}$$

Give your answer to **two** significant figures.

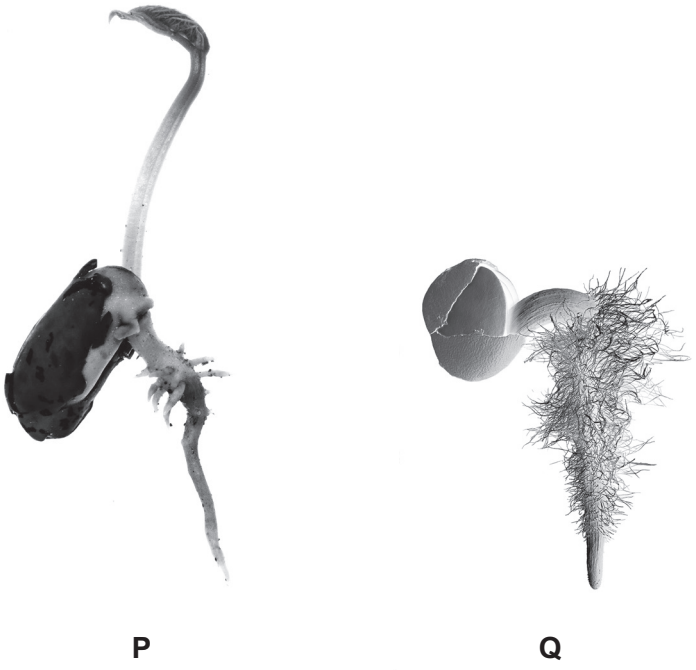
Space for working.

.....

[3]

View solution

(iii) Fig. 2.2 shows photographs of two different seedlings, **P** and **Q**.



P **Q**

Fig. 2.2

Describe **one** visible similarity and **two** visible differences between seedling **P** and seedling **Q** in Fig. 2.2.

similarity 1 .....

.....

difference 1 .....

.....

difference 2 .....

.....

[3]

View solution

(b) As seedlings grow, they change starch into reducing sugars.

Describe the methods you would use to test a sample of seedlings for starch and reducing sugars.

starch test .....

.....

.....

reducing sugar test .....

.....

.....

[3]

(c) When light shines from one side, seedlings grow towards the light.

Fig. 2.3 shows a diagram of a seedling growing towards a light source. The angle of growth is shown on the diagram.

View solution

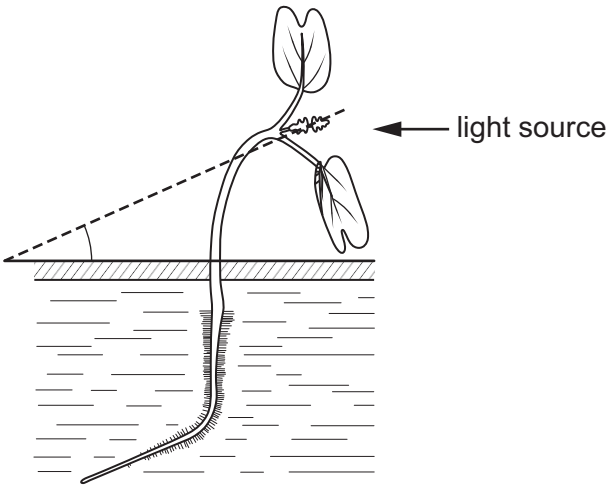


Fig. 2.3

Plan an investigation to find out how light intensity affects the angle at which the seedling grows.

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.....

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..... [6]

[Total: 19]

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