Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

BIOLOGY **0610/52**

Paper 5 Practical Test **October/November 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 **16** pages. Any blank pages are indicated.

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1 Photosynthesis occurs in chloroplasts. You are going to investigate the effect of light intensity on the rate of photosynthesis in a chloroplast suspension.

The blue dye DCPIP can be used to investigate photosynthesis. During photosynthesis, the dark-blue colour of the DCPIP changes and eventually disappears so that it becomes colourless.

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)(i).

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

Step 1 Tear the leaves into small pieces and place them into the mortar (bowl).

Step 2 Pour the ice-cold solution from the beaker labelled **isolation medium** into the mortar (bowl).

Step 3 Use the pestle (or spoon) to grind the leaves in the isolation medium for one minute.

Step 4 Place three layers of muslin cloth into the funnel. Put the funnel into the empty beaker labelled **chloroplast suspension**, as shown in Fig. 1.1.

Step 5 Carefully hold the edges of the muslin cloth to prevent it slipping. Pour the crushed leaves and isolation medium mixture into the funnel lined with muslin cloth. Allow the mixture to filter for three minutes. Place the muslin cloth and funnel in the container labelled **waste**.

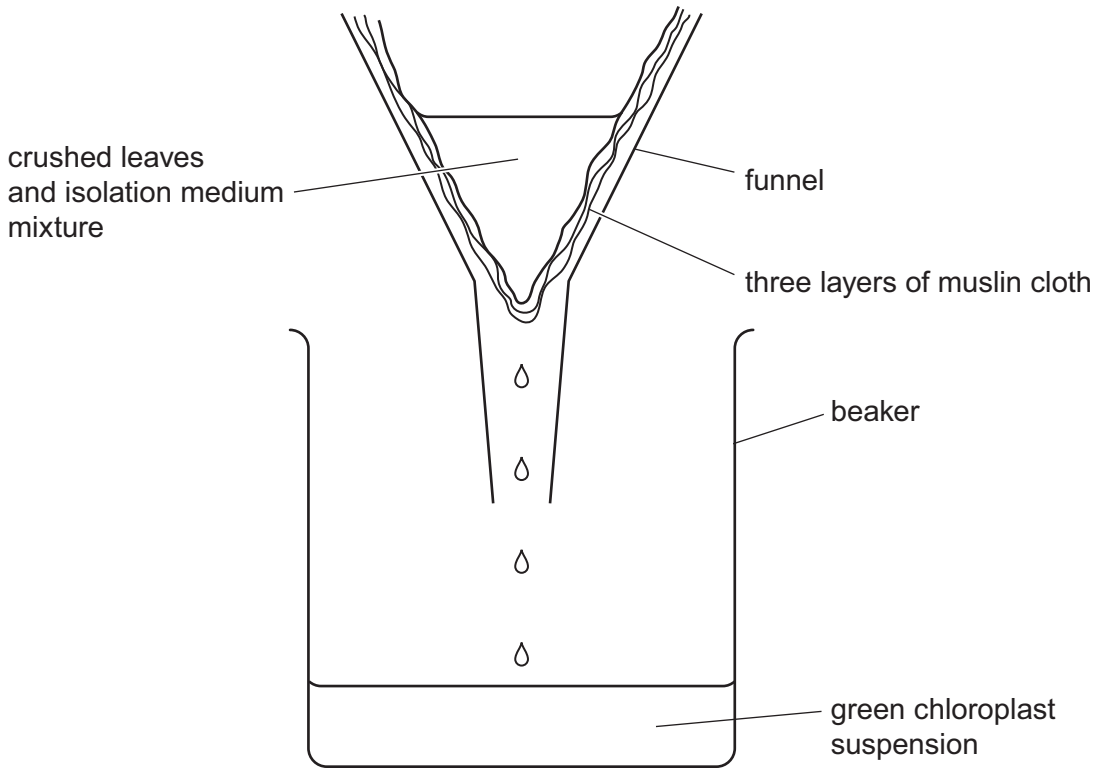

Fig. 1.1

Step 6 Label one test-tube **A** and the other test-tube **B**.

Step 7 Raise your hand when you are ready for ice-cold water to be added to the beaker labelled **water-bath**.

Step 8 Use the small syringe to put 1 cm^3 of the green chloroplast suspension into test-tube **A** and into test-tube **B**.

Step 9 Put test-tubes **A** and **B** into the water-bath and wait for two minutes before starting step 10.

Step 10 Use the large syringe to put 2.5 cm^3 of the blue **DCPIP** solution into test-tube **A**. Put test-tube **A** into the test-tube rack. Place the test-tube rack 10 cm from the lamp. Position the lamp so that the light from the lamp will shine directly onto the test-tube when you switch the lamp on.

Step 11 Switch the lamp on and start the stop-clock.

Step 12 Measure the time taken for the blue liquid in test-tube **A** to return to a green colour.

Record the time taken in seconds in your table in **1(a)(i)**.

If the contents of the test-tube remain blue after 10 minutes, stop timing and record **>600** in your table in **1(a)(i)**.

Step 13 Reset the stop-clock to zero.

Step 14 Move the test-tube rack so that it is 30 cm from the lamp.

Step 15 Use the large syringe to put 2.5 cm^3 of the blue **DCPIP** solution into test-tube **B.**

Put test-tube **B** into the test-tube rack and start the stop-clock.

Step 16 Measure the time taken for the blue liquid in test-tube **B** to return to a green colour.

Record the time taken in seconds in your table in **1(a)(i)**.

If the contents of the test-tube remain blue after 10 minutes, stop timing and record **>600** in your table in **1(a)(i)**.

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(a) (i) Prepare a table and record your results.

View solution

[4]

(ii) State a conclusion for your results.

View solution

.....

.....

..... [1]

(iii) State the dependent variable in this investigation.

..... [1]

View solution

(iv) Identify the possible source of error present in steps 12 and 16.

Suggest an improvement to the method to reduce this error.

View solution

error .....

.....

.....

improvement .....

.....

.....

[2]

(b) DCPIP can be used in food testing.

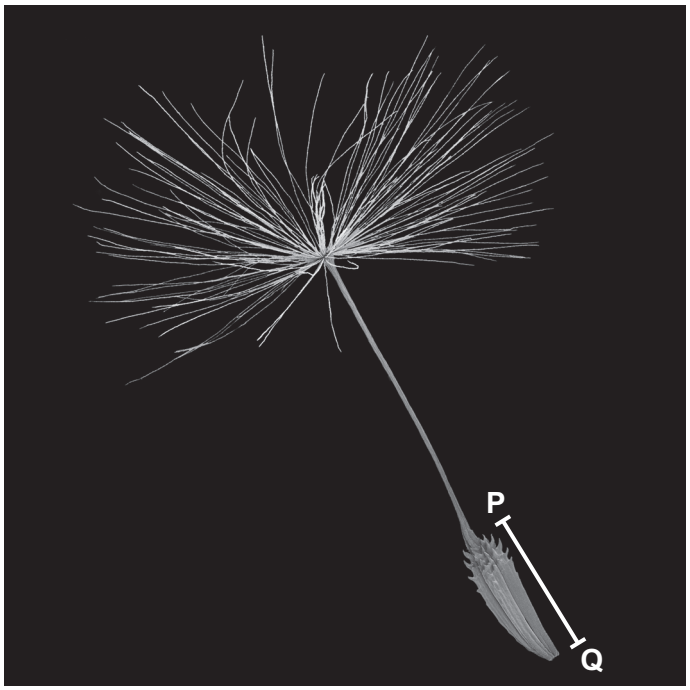
View solution

State which substance present in food can be identified using DCPIP.

..... [1]

(c) Fig. 1.2 is a photograph of a seed from a dandelion plant, *Taraxacum officinale*.

View solution



magnification ×15

Fig. 1.2

(i) Draw a large diagram of the whole dandelion seed shown in Fig. 1.2.

[4]

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(ii) Line **PQ** in Fig. 1.2 represents the length of the achene of the dandelion seed.

View solution

Measure the length of line **PQ** in Fig. 1.2.

length of **PQ** ..... mm

Calculate the actual length of the achene, using the formula and your measurement.

$$\text{magnification} = \frac{\text{length of line } \mathbf{PQ} \text{ in Fig. 1.2}}{\text{actual length of the achene}}$$

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

Space for working.

..... mm
[3]

(d) Fig. 1.3 shows photographs of a dandelion seed and a seed taken from a milk thistle plant, *Silybum marianum*. The magnifications of the photographs are **not** the same.

View solution



dandelion



milk thistle

Fig. 1.3

State **one** similarity and **two** differences, visible in Fig. 1.3, between the two seeds.

Do **not** include references to size in your answer.

similarity .....

.....

difference 1 .....

.....

difference 2 .....

.....

[3]

(e) Dandelion roots are used to flavour drinks.

Students tested a sample of a colourless drink for starch and reducing sugar. They found that the drink did **not** contain starch but did contain reducing sugar.

(i) State the expected colour of the iodine solution after it was mixed with a sample of the drink.

..... [1]

(ii) Describe how the students should test the sample of the drink for reducing sugar.

View solution

.....

.....

.....

.....

..... [2]

(f) Some types of weedkiller prevent seeds from germinating.

Plan an investigation to determine the effect of weedkiller concentration on the germination of seeds.

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.....

.....

..... [6]

[Total: 28]

View solution

2 **(a)** A student investigated the effect of carbon dioxide concentration on the rate of photosynthesis in leaf discs.

As photosynthesis takes place, the leaf discs start to float. Sodium hydrogencarbonate is used as a source of carbon dioxide.

View solution

The student used this method:

- Take 5 leaves from the same plant and use a cork borer to cut 50 leaf discs from the leaves.
- Put 10 leaf discs into a syringe filled with 10 cm^3 of sodium hydrogencarbonate solution.
- Remove the air from the air spaces in the leaves so that the leaf discs sink to the bottom of the syringe.
- Position the syringe 5 cm from a lamp.
- Measure the time taken for at least 5 of the 10 leaf discs to float to the top of the syringe.
- Repeat the method with different concentrations of sodium hydrogencarbonate solution.

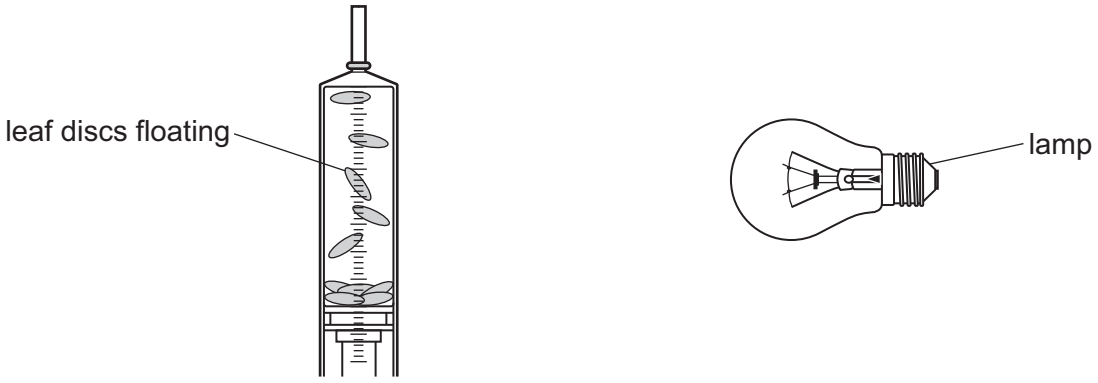

Fig. 2.1

(i) The apparatus the student used is shown in Fig. 2.1.

On Fig. 2.1, draw and label **one** additional piece of apparatus that could be used to reduce the heating effect of the lamp. [1]

(ii) State **two** variables, apart from the temperature, that were kept constant in this investigation.

1 .....

2 .....
[2]

(iii) State the independent variable in this investigation.

..... [1]

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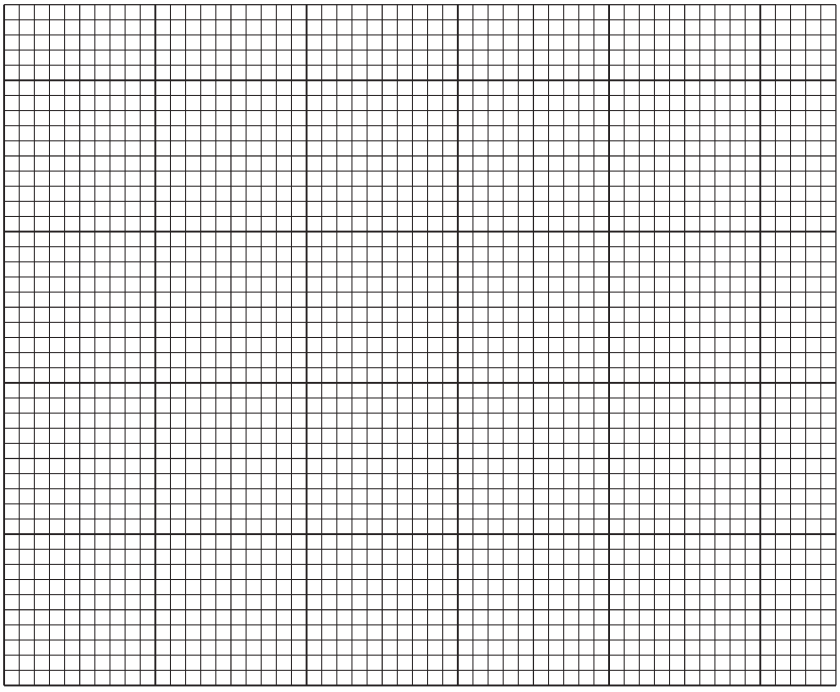
The results of the investigation described in **2(a)** are shown in Table 2.1.

Table 2.1

percentage concentration of sodium hydrogencarbonate solution	time taken for the leaf discs to float / minutes
0.2	20
0.4	17
0.6	14
0.8	10
1.0	7

View solution

(b) (i) Plot a line graph on the grid of the data in Table 2.1.



[4]

(ii) Estimate the sodium hydrogencarbonate concentration at which it took 12 minutes for the leaf discs to float.

Show **on the graph** how you obtained your estimate.

View solution

.....%
[2]

(iii) Using the information in Table 2.1, calculate the percentage change in the time taken for the leaf discs to float when the sodium hydrogencarbonate concentration is increased from 0.2% to 0.4%.

View solution

Space for working.

.....% [2]

[Total: 12]

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