Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME	

CENTRE NUMBER						CANDIDATE NUMBER				

2003404614

BIOLOGY **0610/51**

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	
3	
Total	

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

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1 Cooking fruit and vegetables in water reduces their vitamin C content. The vitamin C is transferred from the fruit and vegetables to the water by diffusion. DCPIP can be used to estimate the concentration of vitamin C. The blue DCPIP solution reacts with the vitamin C solution and becomes colourless.

You are going to investigate the effect of cooking time on the vitamin C content of the water.

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 Label the test-tubes **1**, **2**, and **3**. Place the test-tubes in the test-tube rack.

Step 2 Wrap the piece of foil around the beaker containing the piece of citrus fruit, ensuring that the sides of the beaker are covered. Do **not** cover the top of the beaker.

Step 3 Raise your hand when you are ready for hot water to be added to your beaker. The water should cover the piece of citrus fruit. If it does not, use the forceps to adjust the position of the piece of citrus fruit.

Step 4 Start the stop-clock and wait for one minute.

Step 5 After one minute, use the 1 cm^3 syringe to remove a 1 cm^3 sample of the liquid from the beaker. Put this sample into test-tube **1**.

Step 6 Wait for one more minute.

Step 7 Use the 1 cm^3 syringe to remove another 1 cm^3 sample of the liquid from the beaker. Put this sample into test-tube **2**.

Step 8 Repeat steps 6 and 7 with test-tube **3**.

Step 9 Fill the 5 cm^3 syringe with 5 cm^3 of the **DCPIP** solution. Ensure that there are no air bubbles in the syringe.

Step 10 Add one drop of the blue **DCPIP** solution to the liquid in test-tube **1**. Shake the test-tube gently to mix the contents. Wait five seconds.

Step 11 After five seconds, hold the white card behind the test-tube to help you identify if the blue colour remains in test-tube **1**. If the contents of the test-tube are blue continue to step 13.

Step 12 If the contents of test-tube **1** are **not** blue after five seconds repeat step 10.
Continue adding drops of DCPIP solution until either the blue colour remains or the syringe is empty.

Step 13 Record the volume of DCPIP solution remaining in the syringe in your table in **1(a)(i)**.

Step 14 Repeat steps 9 to 13 with test-tubes **2** and **3**.

Step 15 Calculate the total volume of DCPIP solution that you have added to each test-tube using this equation:

volume of DCPIP added = 5 – volume remaining in the syringe in step 13

Record these volumes in your table in **1(a)(i)**.

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

[5]

(ii) State a conclusion for your results.

.....

.....

..... [1]

(b) **(i)** State the independent variable in this investigation.

..... [1]

(ii) State the purpose of wrapping the beaker in foil in step 2.

.....

.....

..... [1]

(iii) Explain why it was important to remove the air bubbles from the syringe in step 9.

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..... [1]

[Total: 9]

2 Plan an investigation to determine the effect of light intensity on photosynthesis in an aquatic plant.

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..... [6]

3 **(a)** Fig. 3.1 is a photograph of a cross-section of a persimmon fruit.

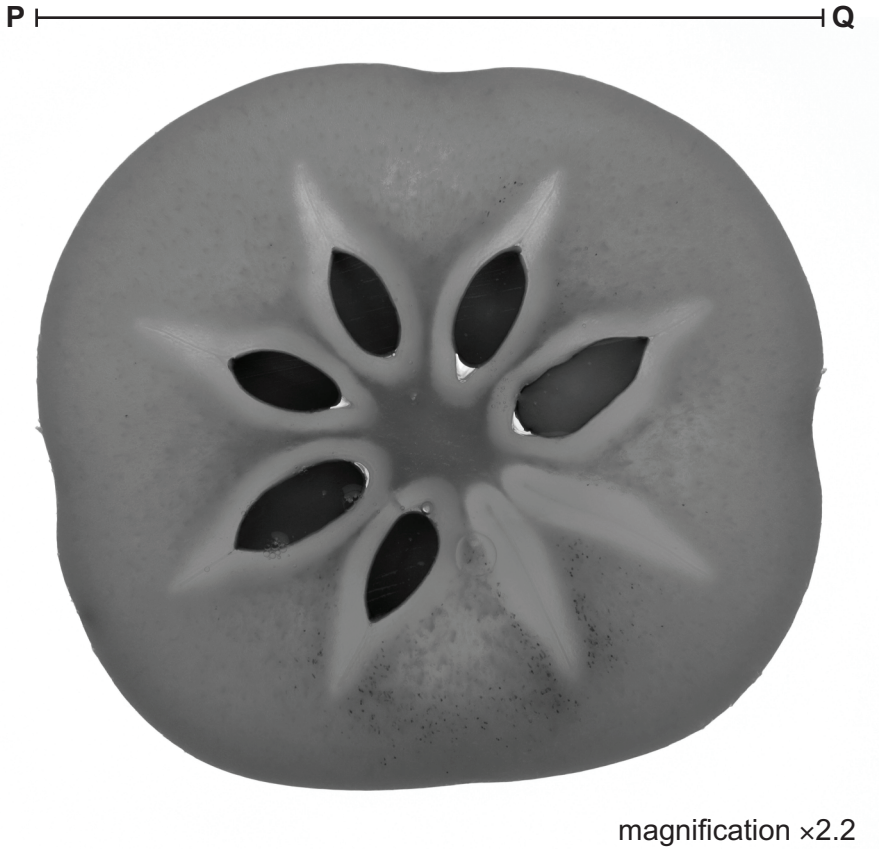

Fig. 3.1

(i) Draw a large diagram of the persimmon fruit shown in Fig. 3.1.

[4]

(ii) Line **PQ** on Fig. 3.1 represents the diameter of the persimmon fruit.

Measure the length of line **PQ** on Fig. 3.1.

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

Calculate the actual diameter of the persimmon fruit using the formula and your measurement.

$$\text{magnification} = \frac{\text{length of line } \mathbf{PQ} \text{ in Fig. 3.1}}{\text{actual diameter of the persimmon fruit}}$$

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

Space for working.

..... mm
[3]

(b) Plants can make fats, starch and proteins.

(i) State the names of the reagents that can be used to test samples of plant tissue for starch and protein.

starch .....

protein .....
[2]

(ii) Describe the method you would use to test a sample of plant tissue for fat.

.....

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.....

.....

..... [2]

(c) The enzyme pectinase is used to produce apple juice. Pectinase breaks down the cell walls in apple tissue. This increases the volume of juice that can be extracted from the apples.

A student investigated the effect of the concentration of pectinase on the volume of juice extracted from chopped apples.

- The masses of seven samples of chopped apple were measured. The samples were then put into different beakers.
- 50 cm^3 of pectinase solution was added to **six** of the beakers. The concentration of pectinase solution was different in each beaker.
- The beakers were kept in a thermostatically-controlled water-bath set at 37 °C for 30 minutes.
- The contents of each beaker were filtered through filter paper and the liquid was collected in a measuring cylinder.
- The volume of liquid in each measuring cylinder was recorded.

(i) State the dependent variable in the investigation described in **3(c)**.

..... [1]

(ii) State **one** variable that was kept constant in this investigation.

..... [1]

(iii) Identify a hazard in the method described in **3(c)** and suggest a safety precaution to reduce the hazard.

hazard .....

.....

precaution .....

.....

.....
[2]

(iv) The student did **not** repeat the investigation and only collected one set of results.

Explain why it is better to collect several sets of results.

.....

.....

..... [1]

(v) The seventh beaker of chopped apple did **not** contain the pectinase solution.

State what should have been added to this beaker to make it a control experiment.

.....

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..... [1]

(d) The results of the pectinase investigation are shown in Table 3.1.

Table 3.1

percentage concentration of pectinase solution	volume of liquid collected / cm^3 per g of chopped apple
0.2	0.69
0.4	0.77
0.5	0.81
0.6	0.85
0.8	0.92
1.0	0.92

(i) A sample of 150 g of chopped apple was placed in a beaker with the 0.8% pectinase solution.

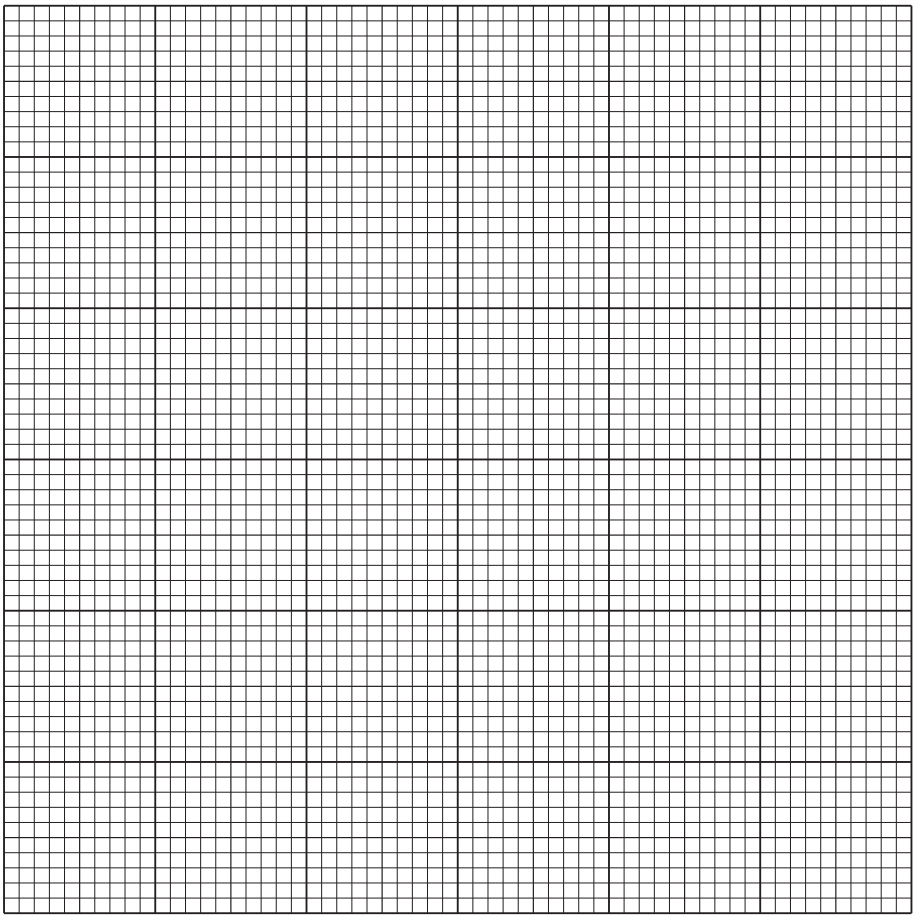
Using the information in Table 3.1, calculate the volume of liquid collected in the measuring cylinder.

Include the unit.

Space for working.

.....
[2]

(ii) Plot a line graph on the grid of the data in Table 3.1.



[4]

(iii) Describe the relationship between the volume of liquid collected from the chopped apple and the concentration of pectinase solution.

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..... [2]

[Total: 25]

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