Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

BIOLOGY **0610/61**

Paper 6 Alternative to Practical **May/June 2024**

1 hour

You must answer on the question paper.

No additional materials are needed.

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 [ ].

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.

A student investigated the effect of cooking time on the vitamin C content of the water.

Step 1 A piece of foil was wrapped around a beaker so that the base and sides of the beaker were covered. The top of the beaker was not covered.

Step 2 A piece of citrus fruit was put into the beaker.

Step 3 Hot water was added to the beaker so that the piece of citrus fruit was covered.

Step 4 A stop-clock was started.

Step 5 1 cm^3 samples of the liquid in the beaker were taken every minute for five minutes. Each sample was put into a separate test-tube.

Step 6 A 5 cm^3 syringe was filled with DCPIP solution. Any air bubbles present in the syringe were removed.

Step 7 One drop of the blue DCPIP solution was added to the test-tube containing the first sample. The test-tube was shaken for five seconds to mix the contents. The colour of the sample in the test-tube was observed.

Step 8 The student repeated step 7 until the sample remained blue. The volume of DCPIP solution remaining in the syringe was recorded.

Step 9 The syringe was refilled with 5 cm^3 of DCPIP solution.

Step 10 Steps 7 to 9 were repeated with the rest of the samples.

Fig 1.1 shows the student's notebook, where they recorded their results and calculated values.

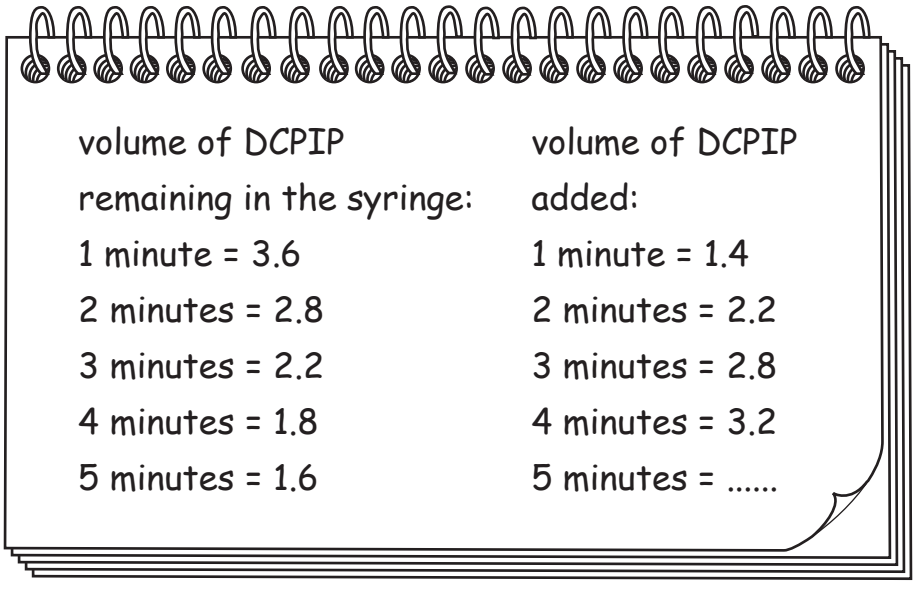

Fig. 1.1

(a) **(i)** Using the equation, calculate the volume of DCPIP added to the sample taken at 5 minutes.

View solution

volume of DCPIP added = starting volume of DCPIP in the syringe – volume of DCPIP remaining in the syringe

..... cm^3 [1]

(ii) Prepare a table and record the results shown in Fig. 1.1 and your answer to **1(a)(i)**.

View solution

[3]

(iii) State a conclusion for the results.

View solution

.....

.....

..... [1]

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

..... [1]

(ii) State the purpose of wrapping the beaker in foil in step 1.

View solution

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..... [1]

(iii) Explain why it was important to remove the air bubbles from the syringe in step 6.

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..... [1]

[Total: 8]

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

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..... [6]

View solution

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

View solution

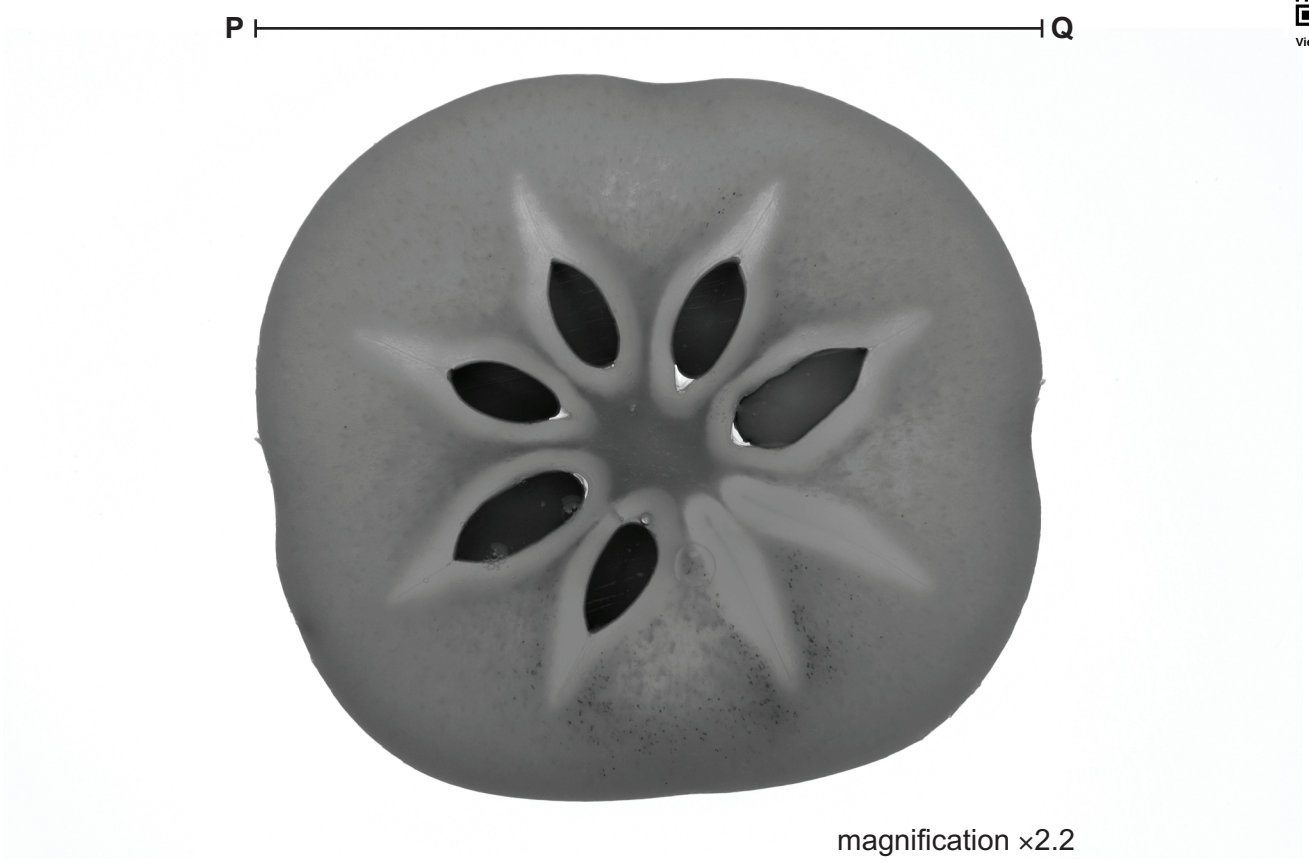

Fig. 3.1

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

[4]

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

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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.

View solution

.....

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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.

View solution

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

..... [1]

(ii) State **two** variables that were kept constant in this investigation.

1 .....

2 .....

[2]

(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.

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..... [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.

View solution

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]

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

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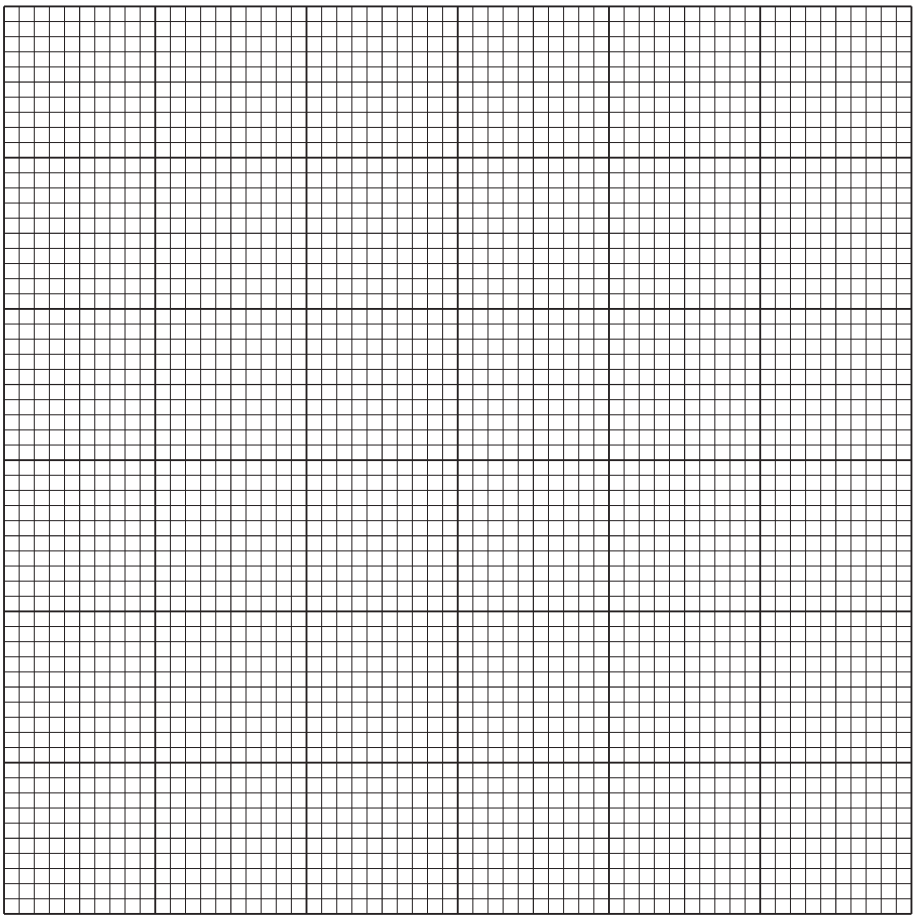

[4]

(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: 26]

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