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Cambridge Assessment International Education

Cambridge O Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

2988476210

BIOLOGY **5090/32**

Paper 3 Practical Test **October/November 2024**

1 hour 30 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.

[Turn over

In order to plan the best use of your time, read through all the questions on this paper carefully before starting work.

1 Carbohydrates are found in different plant organs in the form of starch and sugars (such as glucose and maltose).
You are going to test two different organs from two plants for the presence of starch and sugar.
You are provided with a piece of potato and a piece of apple.

(a) (i) State which reagent you will use for the test for **starch** and describe how you will use it. Details of possible results are **not** required.

.....

.....

.....

..... [2]

(ii) Carry out a test for starch on a piece of the apple and a piece of the potato. Record your observations and what you can conclude from them in Table 1.1.

Table 1.1

plant organ	observation	conclusion
apple		
potato		

[4]

(b) You are going to use Benedict's solution to test for sugar in the potato and apple.

Follow these instructions:

- Cut a 1 cm × 1 cm × 1 cm cube of potato.
- Cut the cube into small pieces and place these in a large test-tube.
- Label the test-tube.
- Add 4 cm^3 of distilled water and use a stirring rod to gently crush the pieces and mix them with the water.
- Clean your tile, cutting device and stirring rod.

Repeat this procedure with the apple using a clean test-tube.

- Add 8 cm^3 of Benedict's solution to both test-tubes.

Then raise your hand and the supervisor will add hot water to your water-bath.

Take care as the water will be hot.

(i) Record the temperature of the water-bath at the start.

temperature at start ..... [1]

Place both test-tubes in the water-bath and leave them for ten minutes.

(ii) Record your observations and your conclusions in Table 1.2 after the test-tubes have been in the water-bath for ten minutes.

Table 1.2

plant organ	observation	conclusion
apple		
potato		

[2]

(iii) Suggest why it was important to:

- use a 1 cm × 1 cm × 1 cm cube for each plant organ

  .....

  .....

- cut each cube up into small pieces

  .....

  .....

- crush the small pieces and mix them with water.

  .....

  .....

[3]

(iv) Explain why the tile, cutting device and stirring rod were cleaned after using them on the potato.

.....

..... [1]

(c) Describe how you would test the apple for protein, and state what you would observe if protein was present and not present.

test .....

.....

protein present .....

protein not present .....

[4]

[Total: 17]

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2 Photosynthesis in green plants can be summarised by the equation:

$$\text{carbon dioxide + water} \xrightarrow{\text{light and chlorophyll}} \text{carbohydrate + oxygen}$$

A student used the apparatus shown in Fig. 2.1 to investigate the rate of photosynthesis in an aquatic plant.

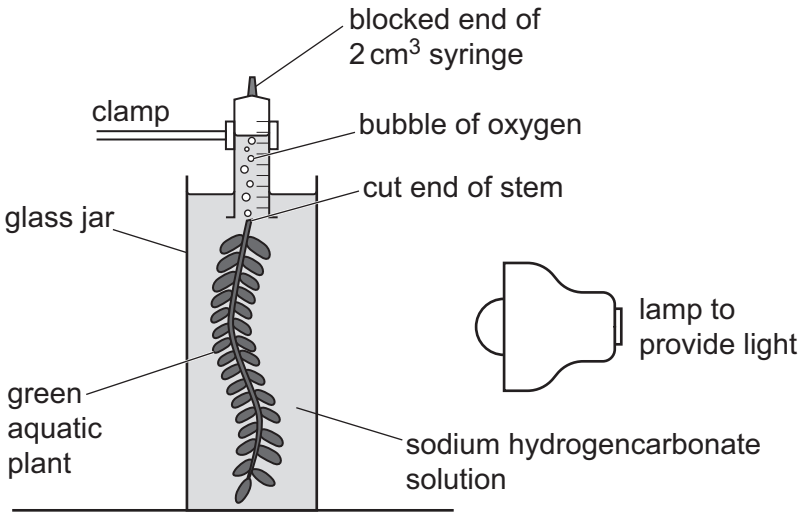

Fig. 2.1

When the student switched the lamp on, bubbles of oxygen formed and entered the syringe. The student recorded the volume of oxygen produced in ten minutes. The syringe was then refilled with sodium hydrogencarbonate solution and the oxygen collected for another ten minutes.

The student then decided to investigate the effect of different colours of light on the rate of photosynthesis. Leaving the same plant in the glass jar, a red transparent filter was wrapped around the glass jar so that the plant received only red light. The volume of oxygen produced in ten minutes was measured. This measurement was then repeated.

The red transparent filter was replaced by a green transparent filter and then by a blue transparent filter. For each filter, the volume of oxygen produced in ten minutes was also measured twice.

The measurements are shown in Table 2.1

Table 2.1

filter	volume of gas collected in ten minutes / cm^3		
	measurement 1	measurement 2	mean
no filter	1.1	1.3	1.2
red	0.7	0.9	0.8
green	0.3	0.3	0.3
blue	0.6		

The syringe at the end of ten minutes for measurement 2 with the blue filter is shown in Fig. 2.2.

Fig. 2.2

(a) (i) Record the volume of oxygen produced in measurement 2 with the blue filter in Table 2.1. [1]

(ii) Calculate the mean volume of oxygen produced with the blue filter and record it in Table 2.1. [1]

(iii) Using the mean value, calculate the rate of photosynthesis per minute when **no filter** was used.

..... [1]

(b) (i) Construct a bar chart on the grid to show the mean volume of gas collected with no filter and with the different coloured filters.

[4]

(ii) Use the data given and the bar chart to state **one** conclusion that can be made from the results of this investigation.

.....

..... [1]

(c) Plan an investigation that you could do to determine the effect of light intensity on the rate of photosynthesis, using the apparatus shown in Fig. 2.1.

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..... [6]

[Total: 14]

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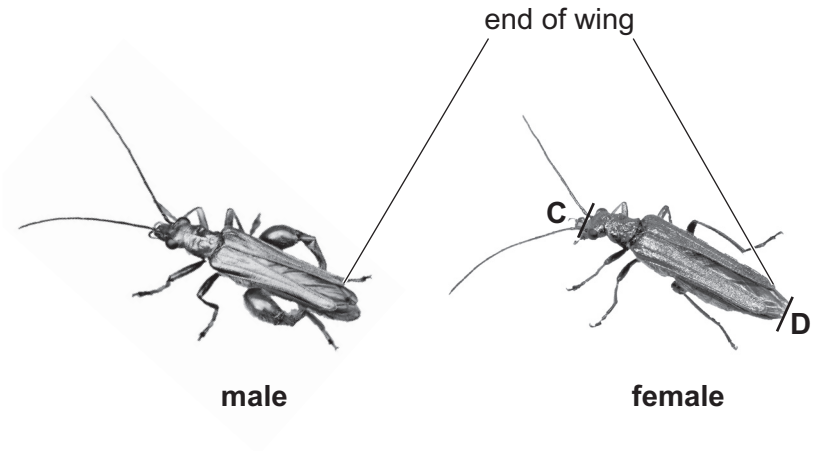
3 Fig. 3.1 shows photographs of a male and a female of an insect species. Both the male and female insects are green in colour.



magnification ×3.5

Fig. 3.1

(a) (i) State **one** visible difference between the male and female in Fig. 3.1.

.....

..... [1]

(ii) In the space below, make a large drawing of the **male** insect as it appears in Fig. 3.1.

[4]

(iii) **C** and **D** indicate the length of the female insect. **D** indicates the end of the abdomen. Draw a line to join **C** and **D** on the photograph.

Measure the length of the line and record it.

.....

Calculate the actual length of the insect and record it to the nearest whole number.

Space for working.

..... mm
[3]

(b) Use the key below to identify and record the name of the insect.

1 wings longer than abdomen ..... *Oedemera femoralis*

wings shorter than abdomen ..... go to 2

2 colour brown ..... *Oedemera barbara*

colour green or grey ..... go to 3

3 length 5–6.5 mm ..... *Oedemera lurida*

length 7–11 mm ..... *Oedemera nobilis*

name of insect ..... [1]

[Total: 9]

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