Cambridge Assessment International Education

Cambridge IGCSE™ (9–1)

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

2922908263O

BIOLOGY **0970/62**

Paper 6 Alternative to Practical **October/November 2023**

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.

[Turn over

1 Students investigated the effect of temperature on the activity of amylase.

Amylase is an enzyme that catalyses the breakdown of starch to form reducing sugars.

The students used this method:

Step 1 Use a pen to label a spotting tile as shown in Fig. 1.1.

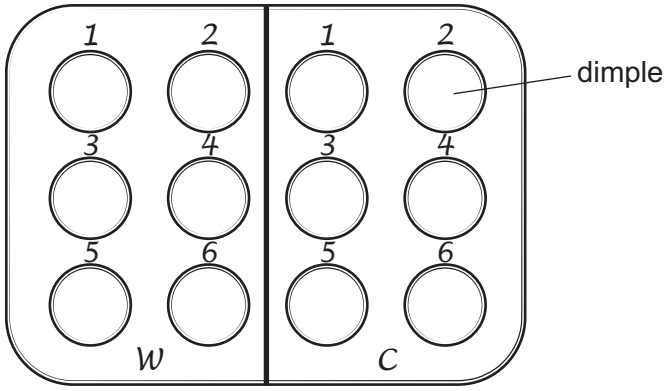

Fig. 1.1

Step 2 Put one drop of iodine solution into each of the dimples on the spotting tile.

Step 3 Put 2 cm^3 of 2% amylase solution into two test-tubes.

Step 4 Label a third test-tube **W** and a fourth test-tube **C**.

Step 5 Put 2 cm^3 of starch suspension into test-tube **W** and into test-tube **C**.

Step 6 Label a beaker **W** and put approximately 200 cm^3 of warm water into beaker **W**.

Step 7 Put test-tube **W** and one of the test-tubes containing 2 cm^3 of 2% amylase solution into beaker **W**. Leave both test-tubes in beaker **W** for three minutes.

Step 8 After three minutes, pour the 2% amylase solution into test-tube **W** and start the stop-clock.

Step 9 Wait for 30 seconds and then use a pipette to remove a sample of the liquid from test-tube **W**. Put two drops of this sample into the dimple labelled **W1** on the spotting tile. Record the colour of the liquid in dimple **W1**.

Step 10 Repeat step 9 using dimple **W2**. Continue taking and testing samples of liquid from test-tube **W** at 30-second intervals, using the remaining dimples **W3**, **W4**, **W5** and **W6**. Record the colour of the liquid in each dimple. Stop the stop-clock and reset it to zero.

Step 11 Label a beaker **C** and put approximately 200 cm^3 of cold water into beaker **C**.

Step 12 Put test-tube **C** and the other test-tube containing 2 cm^3 of 2% amylase solution into beaker **C**. Leave both test-tubes in beaker **C** for three minutes.

Step 13 After three minutes, pour the 2% amylase solution into test-tube **C** and start the stop-clock.

Step 14 Repeat step 9 and step 10 with test-tube **C** and the dimples labelled **C1**, **C2**, **C3**, **C4**, **C5** and **C6**.

The results of the investigation are shown in Fig. 1.2.

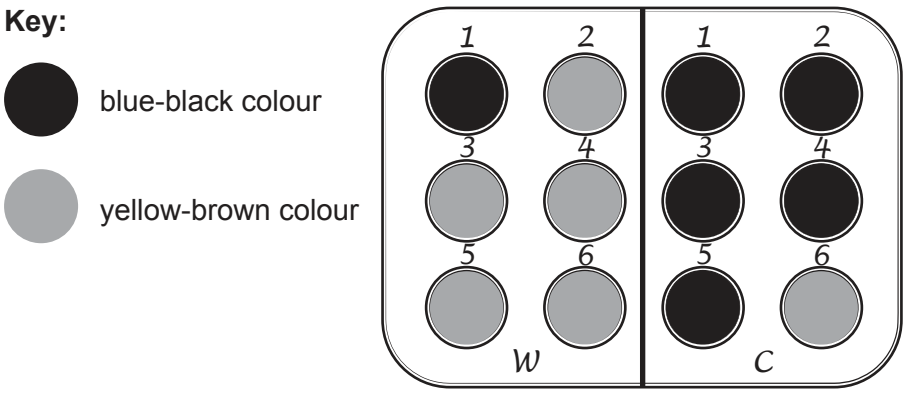

Fig. 1.2

(a) (i) Prepare a table and record the results shown in Fig. 1.2.

[3]

(ii) State a conclusion for the results shown in Fig. 1.2.

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.....

..... [1]

(iii) State the independent variable in this investigation.

..... [1]

(iv) State **three** variables that were kept constant in this investigation.

1 .....

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2 .....

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3 .....

.....

[3]

(b) (i) Explain why the method used in this investigation does **not** allow the students to obtain an accurate time for the breakdown of starch.

.....

.....

..... [1]

(ii) The temperature of the water in the beakers during the investigation was a source of error.

Describe how you could improve the method to reduce this error.

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..... [1]

(iii) The test-tubes were left in the beakers of warm or cold water for three minutes in step 7 and step 12 before the amylase solution was poured into the starch suspension.

Explain why the test-tubes were left in the beakers for three minutes.

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..... [1]

[Total: 11]

2 **(a)** Milk contains fats. The enzyme lipase catalyses the breakdown of fats to form fatty acids and glycerol. The fatty acids cause the pH of the milk to decrease.

Plan an investigation to determine the effect of lipase concentration on the breakdown of fats in milk.

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..... [6]

(b) The emulsion test is used to test a sample of food for fat.

Describe the method you would use to do the emulsion test.

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..... [2]

[Total: 8]

3 Fig. 3.1 is a photograph of a type of seaweed called bladder wrack. The bladders help the seaweed float in water.

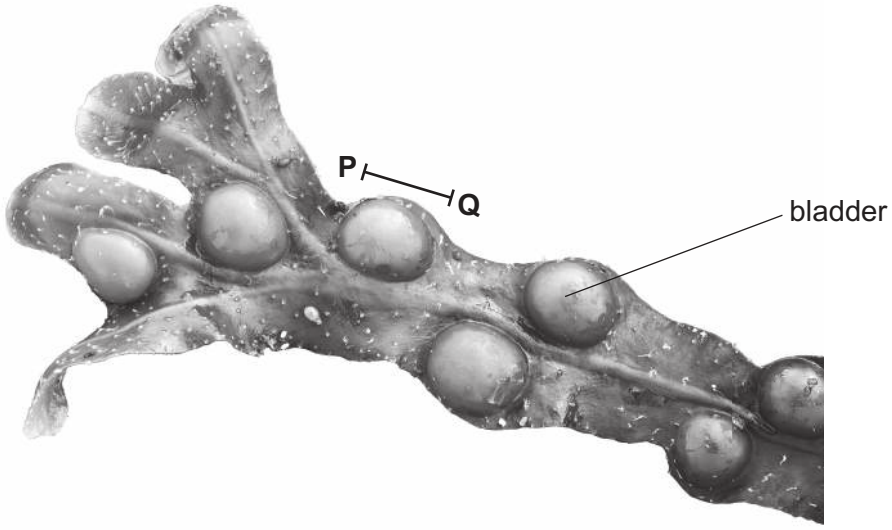


Fig. 3.1

(a) (i) Draw a large diagram of the bladder wrack seaweed shown in Fig. 3.1.

[4]

(ii) Line **PQ** on Fig. 3.1 represents the length of one bladder on the bladder wrack seaweed.

The actual length of the bladder is 19 mm.

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

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

Calculate the magnification of the photograph using the formula and your measurement.

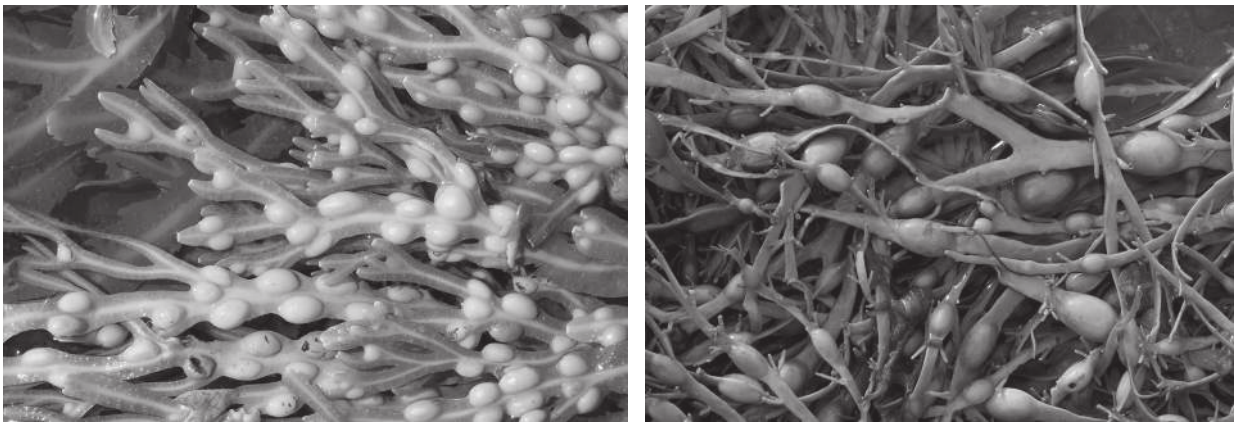
$$\text{magnification} = \frac{\text{length of line } \mathbf{PQ}}{\text{actual length of the bladder}}$$

Give your answer to **two** decimal places.

Space for working.

.....
[3]

(iii) Seaweeds are species of algae that live in the sea. Fig. 3.2 shows photographs of bladder wrack seaweed and a different species of seaweed called egg wrack. The photographs are the same magnification.



bladder wrack egg wrack

Fig. 3.2

State **two** ways, visible in Fig. 3.2, that bladder wrack is different from egg wrack.

1 .....

.....

2 .....

.....

[2]

(b) Bladder wrack is found on the seashore and is exposed to the air when it is not covered by water at certain times of day.

Students investigated how rapidly bladder wrack lost water. They used this method:

- Three samples of bladder wrack were collected.
- The samples were blotted with tissue to remove any water on the surface of the seaweed.
- The initial mass of each sample was recorded.
- The samples were hung from a piece of string stretched between two stands.
- The mass of each sample was recorded every 30 minutes for the first two hours and then every hour for a further three hours.

(i) Suggest **two** variables that the students should keep constant during their investigation to ensure that the results are valid.

1 .....

2 .....
[2]

Table 3.1 shows the initial masses recorded by the students and the final masses recorded after five hours.

Table 3.1

sample	initial mass of the bladder wrack / g	final mass of the bladder wrack / g
1	178	82
2	184	144
3	167	70
mean	176	76

(ii) One of the final masses recorded is anomalous.

State what is meant by an anomalous result.

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..... [1]

(iii) Describe how the students calculated the mean value for the final mass of the bladder wrack.

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..... [1]

(iv) Using the information in Table 3.1, calculate the mean percentage decrease in the mass of the bladder wrack samples after five hours.

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

Space for working.

..... %
[2]

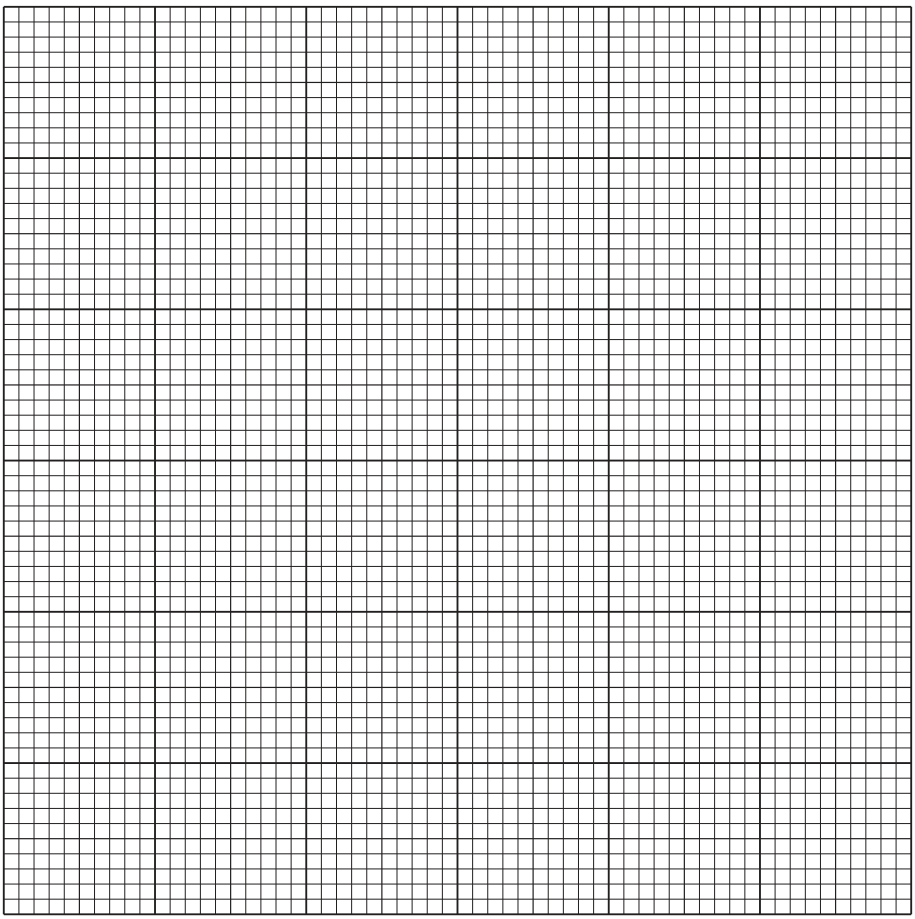
(c) The students repeated their investigation using egg wrack seaweed.

Table 3.2 shows the mean percentage decrease in the mass of the egg wrack samples throughout the investigation.

Table 3.2

time / minutes	mean percentage decrease in the mass of the egg wrack
30	0
60	13
90	22
120	27
180	38
240	46
300	51

Using the data in Table 3.2, plot a line graph on the grid to show the effect of time on the mean percentage decrease in the mass of the egg wrack.



[4]

(d) Many people eat seaweed.

State the names of the reagents that can be used to test seaweed for protein and vitamin C.

protein .....

vitamin C .....
[2]

[Total: 21]

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