Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

BIOLOGY **0610/63**

Paper 6 Alternative to Practical **October/November 2021**

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 Catalase is an enzyme found in many plants. It speeds up the break down of hydrogen peroxide into water and oxygen, as shown in Fig. 1.1.

hydrogen peroxide $\longrightarrow$ water + oxygen

Fig. 1.1

The oxygen produced during the reaction forms a foam on the surface of the liquid. The height of the foam can be used as an indication of the activity of catalase.

(a) A student investigated the activity of catalase in three different types of plant tissue: seeds, roots and fruits.

The student used this method:

Step 1 Put one seed into a test-tube labelled **S1**.

Step 2 Cut a small piece of root and place it into a test-tube labelled **R1**.

Step 3 Cut a small piece of fruit and place it into a test-tube labelled **F1**.

Step 4 Put 5 cm^3 of 6% hydrogen peroxide solution into each test-tube.

Leave for three minutes.

Step 5 After three minutes, use a ruler to measure the height of the foam produced in each test-tube.

The student's results from step 5 are shown in Fig. 1.2.

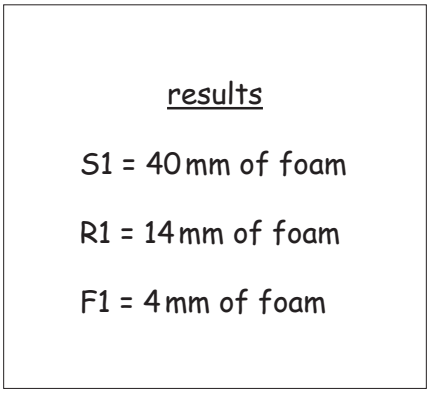

Fig. 1.2

Step 6 Repeat step 1 to step 5 with fresh plant tissues and fresh hydrogen peroxide solution to get a second set of results.

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Fig. 1.3 shows the second set of test-tubes from step 6 after three minutes.

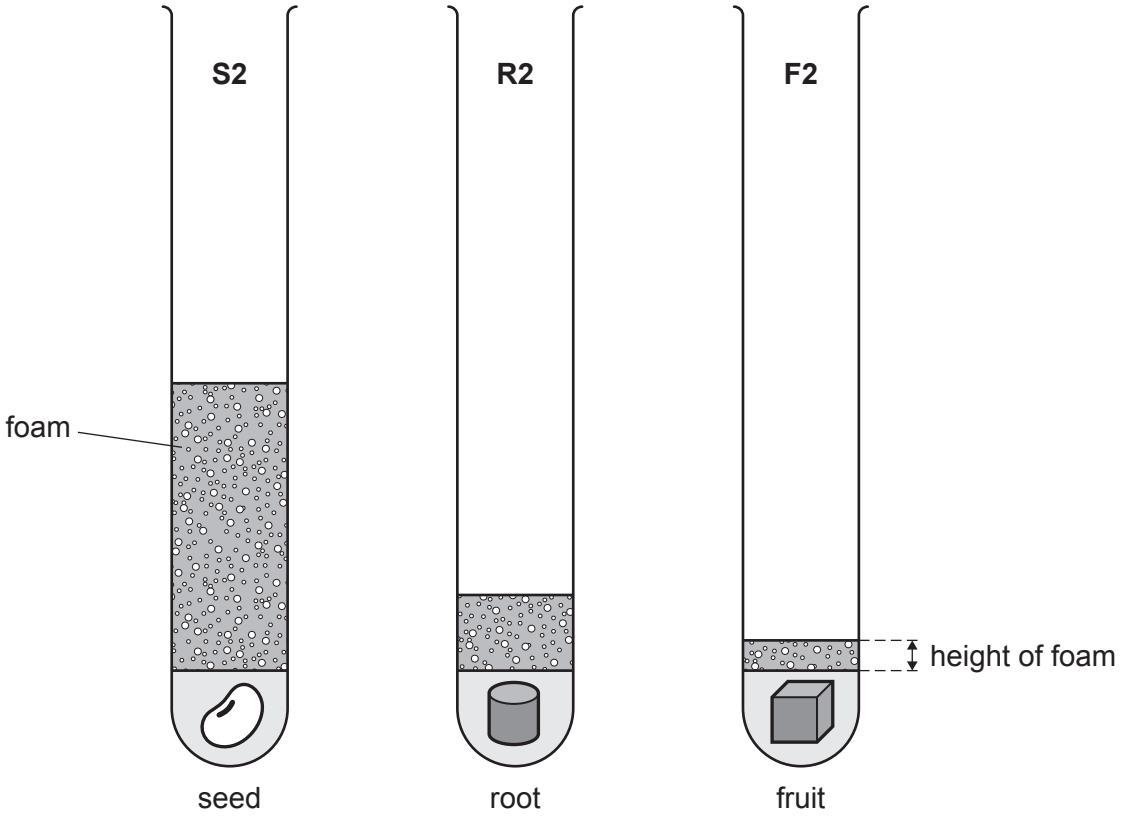

Fig. 1.3

(i) Prepare a table to record the **two** sets of results and the average height of the foam for each tissue. Measure the heights of the foams in the three test-tubes in Fig. 1.3. Calculate the average height of the foam for each tissue.

View solution

Include in your table:

- the student's results from Fig. 1.2
- the heights of the foams you have measured from Fig. 1.3
- the average heights you have calculated.

[5]

(ii) State a conclusion for these results.

.....

.....

..... [1]

(iii) Identify **one** potential source of error in this investigation.

.....

.....

..... [1]

(iv) The student collected two sets of results for each plant tissue. Explain why it would have been better to have collected three sets of results.

.....

.....

..... [1]

(v) State **two** variables that should have been kept constant during this investigation.

1 .....

.....

2 .....

.....
[2]

(vi) State the variable that was measured (the dependent variable) in this investigation.

..... [1]

(vii) Identify **one** safety risk when carrying out this investigation and describe how the risk could be reduced.

risk .....

method of reducing risk .....

.....
[2]

(b) A student wanted to calculate the rate of gas production but could not do this using the height of the foam.

Describe how the student could change the method to collect the data they needed and state how they would calculate the rate of gas production.

change to method .....

.....

.....

how the rate would be calculated .....

.....

.....

[2]

(c) **(i)** The student added iodine solution to samples of the three types of plant tissue. The student observed the colour of the iodine solution on the plant tissue after a few minutes.

Their observations are shown in the table.

View solution

Complete the table by writing a conclusion for each observation.

plant tissue	observation	conclusion
seed	blue-black	
root	blue-black	
fruit	yellow-brown	

[2]

(ii) State the name of the reagent that would be used to test a seed for protein.

..... [1]

View solution

(d) A student stated that:

'Different types of plant tissue will lose different amounts of water by osmosis when immersed in a salt solution.'

View solution

Plan an investigation to find out if the student was correct.

.....

.....

.....

.....

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.....

.....

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.....

.....

.....

.....

..... [6]

[Total: 24]

2 Fig. 2.1 is a photograph of the cut surface of an apple.



Fig. 2.1

(a) Make a large drawing of the cut surface of the apple shown in Fig. 2.1.

View solution

[4]

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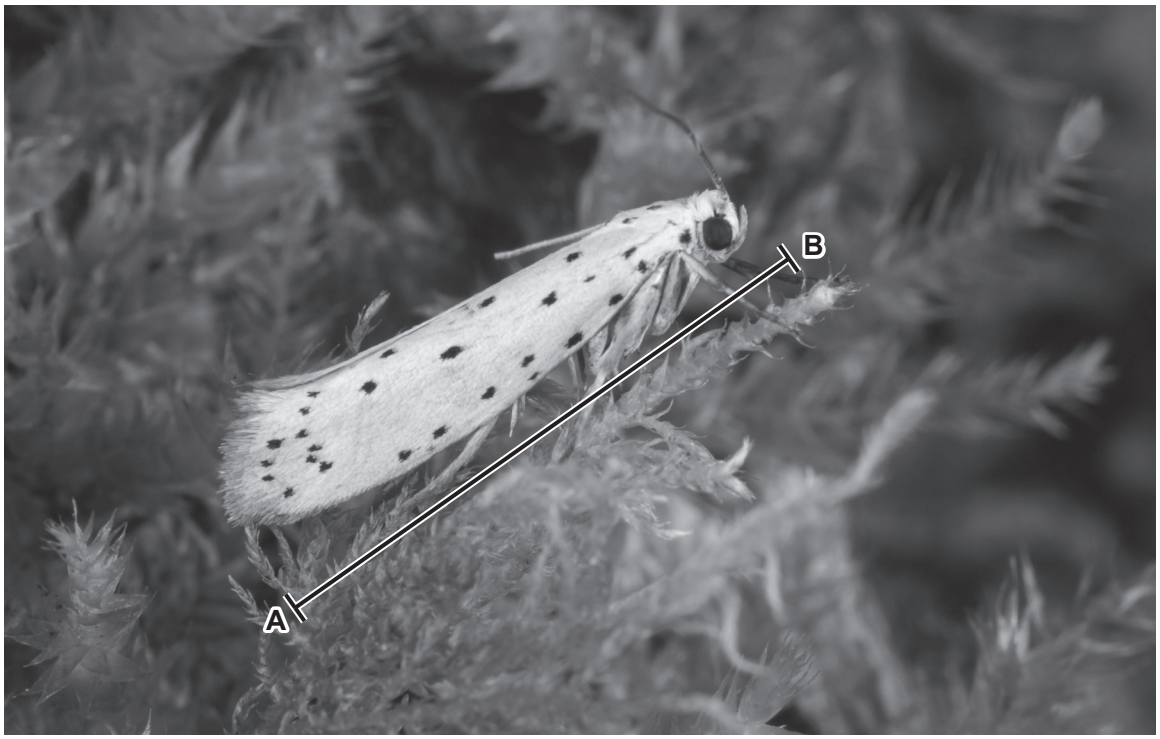
(b) Fig. 2.2 is a photograph of an apple ermine moth (*Yponomeuta malinellus*).

View solution



magnification ×9

Fig. 2.2

(i) Line **AB** represents the length of the apple ermine moth.

Measure the length of line **AB** on Fig. 2.2.

length of line **AB** on Fig. 2.2 .....mm

Use your measurement and the formula to calculate the actual length of the apple ermine moth.

$$\text{magnification} = \frac{\text{length of line } \mathbf{AB} \text{ on Fig. 2.2}}{\text{actual length of the apple ermine moth}}$$

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

Space for working.

.....mm
[3]

(ii) Fig. 2.3 is a photograph of a bird-cherry ermine moth (*Yponomeuta evonymella*).

View solution



magnification ×9

Fig. 2.3

Identify **two** similarities and **one** difference between the apple ermine moth in Fig. 2.2 and the bird-cherry ermine moth in Fig. 2.3.

similarity 1 .....

.....

similarity 2 .....

.....

difference .....

.....

[3]

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(c) In a study, the number of apple ermine moths in one area was recorded every two weeks over a 12-week period.

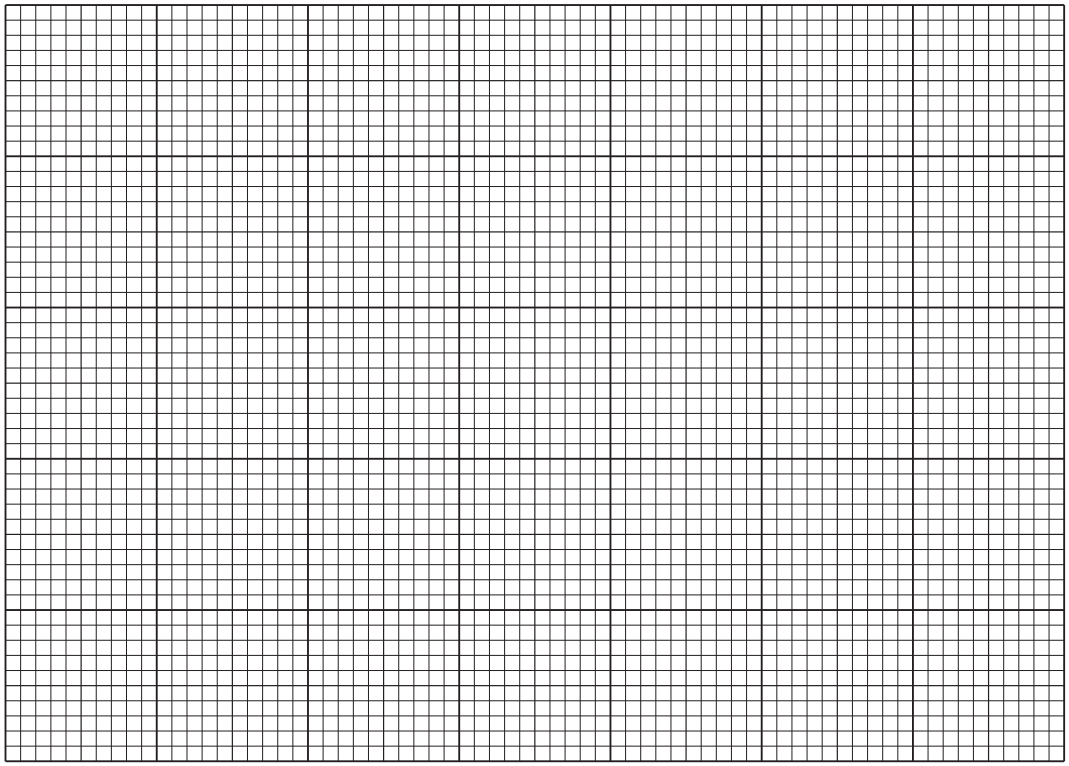
View solution

The results are shown in Table 2.1.

Table 2.1

week	number of apple ermine moths
0	0
2	0
4	11
6	22
8	22
10	18
12	4

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



[4]

(ii) Use your graph to estimate the number of moths in week 11.

Show on your graph where you took your readings.

View solution

.....
[2]

[Total: 16]

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