Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

BIOLOGY **0610/53**

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	
Total	

This document has **16** pages. Any blank pages are indicated.

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1 Catalase is an enzyme that catalyses the breakdown of hydrogen peroxide to form water and oxygen.

You are going to investigate the activity of catalase in tissues from two different plants.

The oxygen produced during the breakdown of hydrogen peroxide forms a foam.

The height of the foam can be used as a measure of the activity of the catalase present in plant tissue.

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 one test-tube **P** and the other test-tube **A**.

Step 2 Put the potato cylinder onto the white tile. Use the scalpel and ruler to measure and cut the potato cylinder so that it is 2 cm in length.

Step 3 Cut the 2 cm cylinder into five equal pieces. Each piece should be approximately 4 mm in length, as shown in Fig. 1.1.

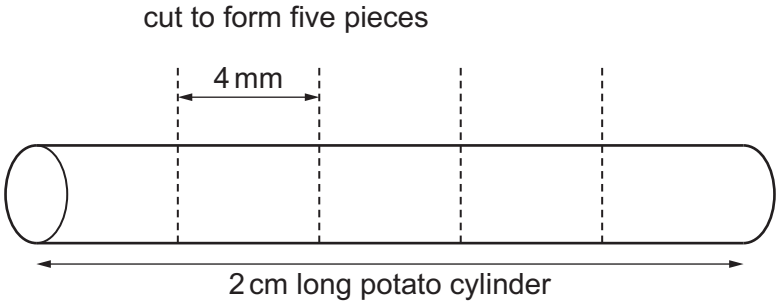

Fig. 1.1

Step 4 Put all five potato pieces into test-tube **P**. Place the test-tube in the test-tube rack.

Step 5 Repeat steps 2 to 4 using the apple cylinder and the test-tube labelled **A**.

Step 6 Use the syringe to put 15 cm^3 of hydrogen peroxide solution into test-tube **P**.

Step 7 Start the stop-clock and wait for five minutes.

Step 8 After five minutes, place the ruler against the outside of test-tube **P**.

Measure the height of the foam. Record this measurement in your table in **1(a)(i)**.

Step 9 Repeat steps 6 to 8 with test-tube **A**.

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(a) (i) Prepare a table to record your results.

View solution

[4]

(ii) State a conclusion for your results.

.....

.....

..... [1]

(iii) State the independent variable in this investigation.

.....

..... [1]

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

1 .....

2 .....

[2]

(v) Identify **one** possible source of error in step 8 and describe an improvement to the method that would eliminate this error.

error in step 8 .....

.....

.....

improvement .....

.....

.....

[2]

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

safety hazard .....

.....

.....

method of reducing risk .....

.....

.....

[2]

(b) Describe how you could test samples of potato and apple to determine if vitamin C is present.

Give the result of a positive test.

View solution

test .....

.....

result .....

.....

[2]

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

Plan an investigation to determine the effect of temperature on the rate of breakdown of starch by amylase.

.....

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.....

..... [6]

[Total: 20]

View solution

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2 Fig. 2.1 is a photomicrograph of part of an egg case from a species of stick insect, *Acrophylla titan*.

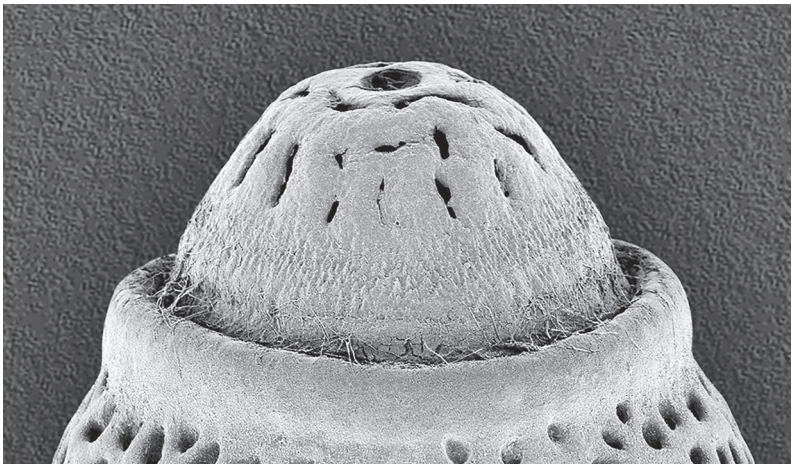


Fig. 2.1

(a) (i) Draw a large diagram of the part of the egg case shown in Fig. 2.1.

View solution

[4]

(ii) Line **PQ** on Fig. 2.2 represents the length of the whole egg case.

View solution

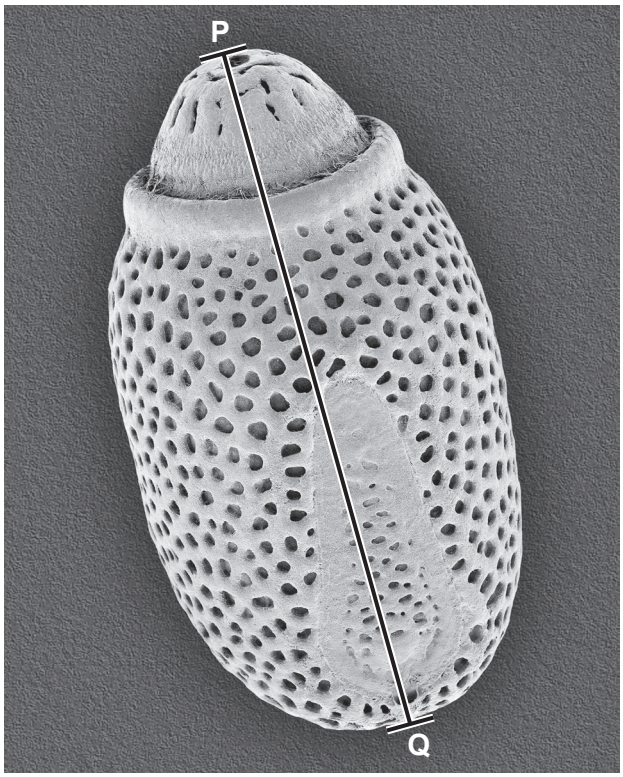


Fig. 2.2

The actual length of the egg case is 4.5 mm.

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

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

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

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

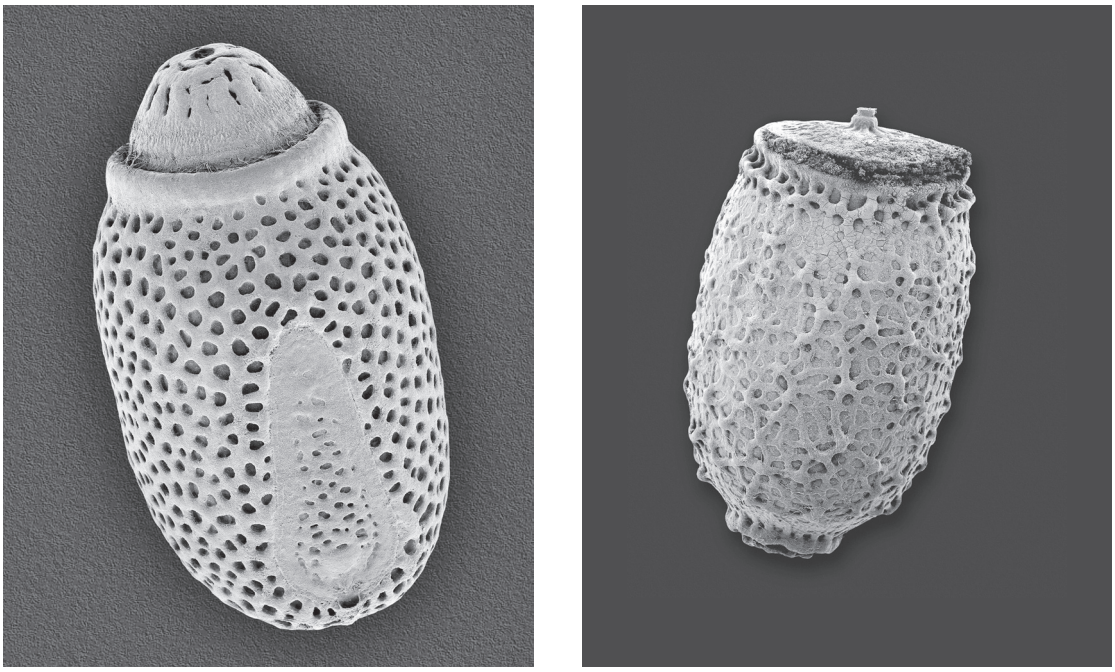
Give your answer as a whole number.

Space for working.

.....

[3]

(iii) Fig. 2.3 shows photomicrographs of the egg cases of *Acrophylla titan* and another species of stick insect, *Lonchodes amaurops*. The magnification of both photomicrographs is the same.



Acrophylla titan *Lonchodes amaurops*

View solution

Fig. 2.3

State **three** visible differences between the two egg cases shown in Fig. 2.3.

1 .....

.....

2 .....

.....

3 .....

.....

[3]

(b) The rate of respiration in a stick insect can be measured using a simple respirometer, as shown in Fig. 2.4.

As the stick insect respires the drop of coloured liquid moves along the capillary tube.

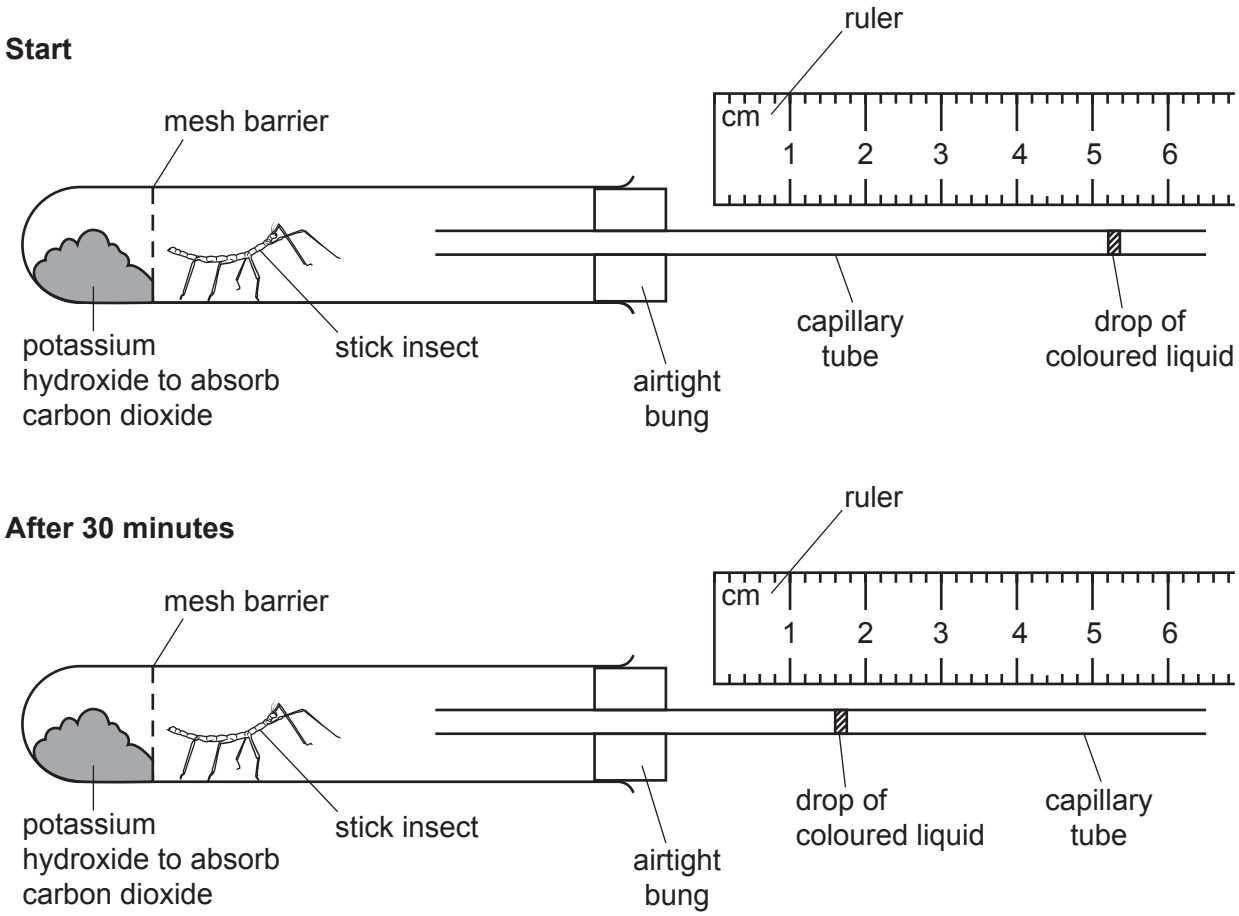


Fig. 2.4

(i) Record the position in mm of the drop of coloured liquid in the capillary tube shown in Fig. 2.4 at the **start** and **after 30 minutes**.

start ..... mm

after 30 minutes ..... mm

[1]

(ii) The capillary tube has an internal radius of 0.25 mm.

Using the information in **2(b)(i)**, calculate the volume of oxygen used by the stick insect in 30 minutes.

Use a value for π of 3.14.

Space for working.

..... mm^3

[2]

(iii) Using your answer to **2(b)(ii)**, calculate the rate of oxygen use by the stick insect.

View solution

..... mm^3 per minute [1]

(c) Scientists used a respirometer to investigate the effect of temperature on the rate of oxygen use by stick insects.

The results of the investigation are shown in Table 2.1.

Table 2.1

temperature / °C	rate of oxygen use / mm^3 per mg per minute
10	0.58
15	0.96
20	1.10
25	1.24
30	1.30

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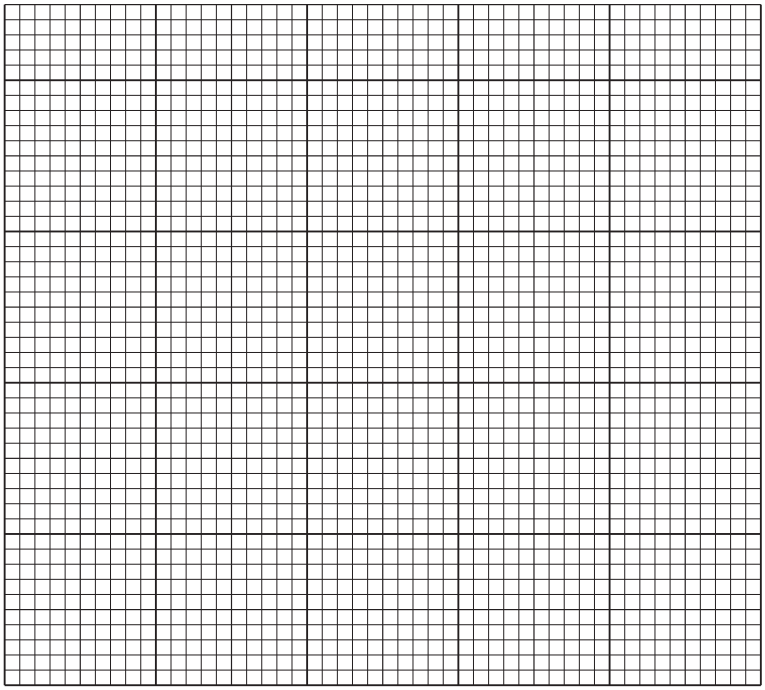
(i) Using the data in Table 2.1, plot a line graph on the grid to show the effect of temperature on the rate of oxygen use.

View solution



[4]

(ii) Use your graph to estimate the rate of oxygen use by stick insects at a temperature of 18 °C.

Show on your graph how you obtained your estimate.

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..... mm^3 per mg per minute
[2]

[Total: 20]

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