Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER			

BIOLOGY **0610/63**

Paper 6 Alternative to Practical **October/November 2018**

1 hour

Candidates answer on the Question Paper.

No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.

Electronic calculators may be used.
You may lose marks if you do not show your working or if you do not use appropriate units.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

This syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **10** printed pages and **2** blank pages.

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1 Catalase is an enzyme found in plant and animal cells. It catalyses the break down of hydrogen peroxide to form water and oxygen.

$$\underset{\text{hydrogen peroxide}}{2H_2O_2} \longrightarrow \underset{\text{water}}{2H_2O} + \underset{\text{oxygen}}{O_2}$$

The oxygen produced during the reaction forms a foam on the surface of the mixture of hydrogen peroxide and catalase. The height of the foam can be used as a measure of the activity of the catalase present.

A student investigated the effect of cooking on the activity of catalase in potato tissue using 3% hydrogen peroxide.

The student used the following method:

Step 1 Cut two potato sticks so that they are identical in both shape and size.

Step 2 Put 5 cm^3 of hydrogen peroxide solution into a test-tube labelled **uncooked potato**.

Step 3 Put 5 cm^3 of hydrogen peroxide solution into a test-tube labelled **cooked potato**.

Step 4 Put one of the potato sticks into a beaker of hot water (90 °C) and leave it for five minutes before carefully removing it.

Step 5 Put the potato stick from step 4 into the test-tube labelled **cooked potato**.

Step 6 Put the uncooked potato stick into the test-tube labelled **uncooked potato**.

Step 7 Leave the potato sticks in the hydrogen peroxide for three minutes and then measure the height of the foam produced in each of the test-tubes.

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Fig. 1.1 shows the test-tubes after three minutes.

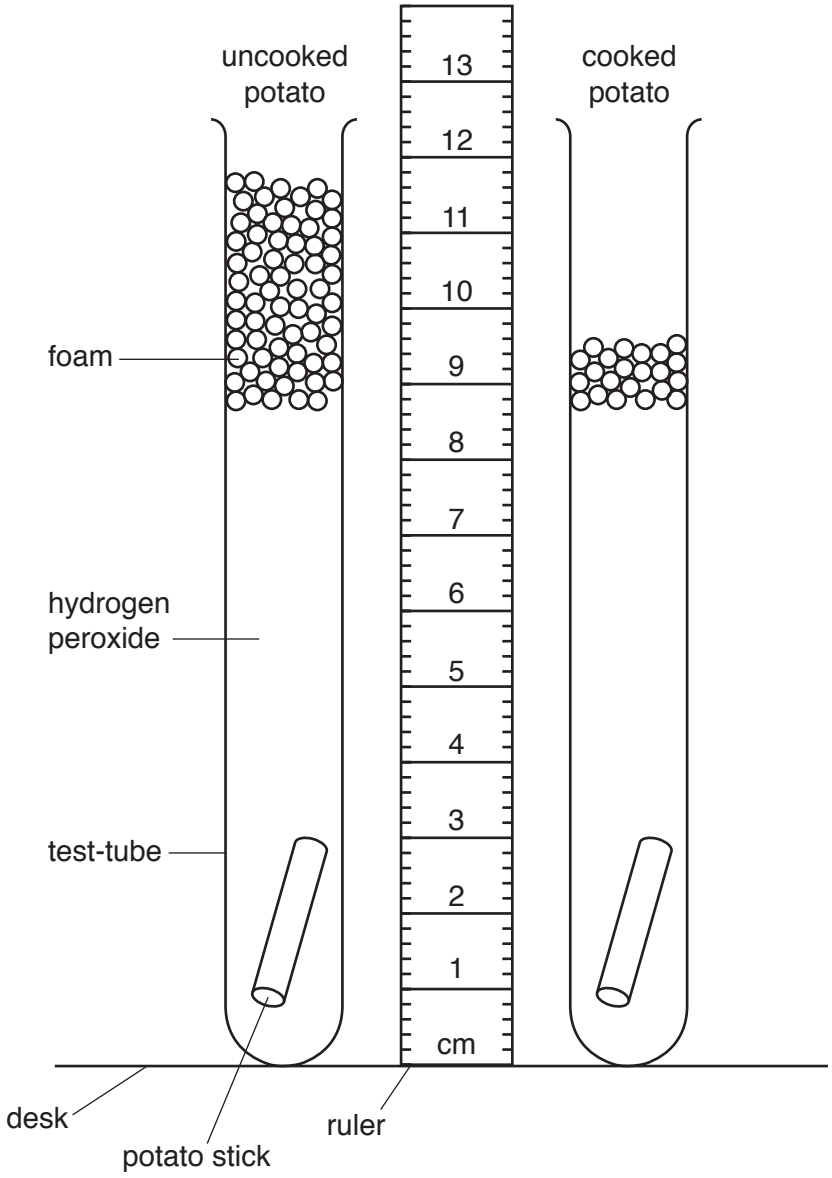

Fig. 1.1

(a) (i) Prepare a table for the student's results.

Measure the height of the foam in each of the test-tubes in Fig. 1.1. Record these values in your table.

View solution

[3]

(ii) Calculate the difference in the height of the foam produced by cooked and uncooked potato after three minutes. Include the units.

Space for working.

.....[1]

(iii) Describe how you made sure that your measurements of the height of the foam in each test-tube could be compared.

.....

.....

.....[1]

(iv) State a conclusion for these results.

.....

.....

.....[1]

(b) (i) Identify the variable that was changed (independent variable) in this investigation.

.....[1]

(ii) State **three** variables, other than the way in which you measured the height of the foam, that should have been kept constant in this investigation.

1 .....

2 .....

3 .....

[3]

(c) Identify **three** sources of error in this method.

View solution

1 .....

.....

2 .....

.....

3 .....

.....

[3]

(d) A student was asked to test the hypothesis:

View solution

Catalase activity is the same in all species of plants.

Plan an investigation to test this hypothesis.

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.....[6]

(e) Potatoes contain a lot of starch. When potatoes start to grow to form new plants, the starch is broken down by the enzyme amylase to form reducing sugars.

Explain how you could test samples of potato to show that starch and reducing sugars are present.

starch .....

.....

.....

reducing sugars .....

.....

.....

.....

View solution [5]

[Total: 24]

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2 Woodlice are small animals.

The rate of respiration of a woodlouse can be measured using a simple respirometer as shown in Fig. 2.1.

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

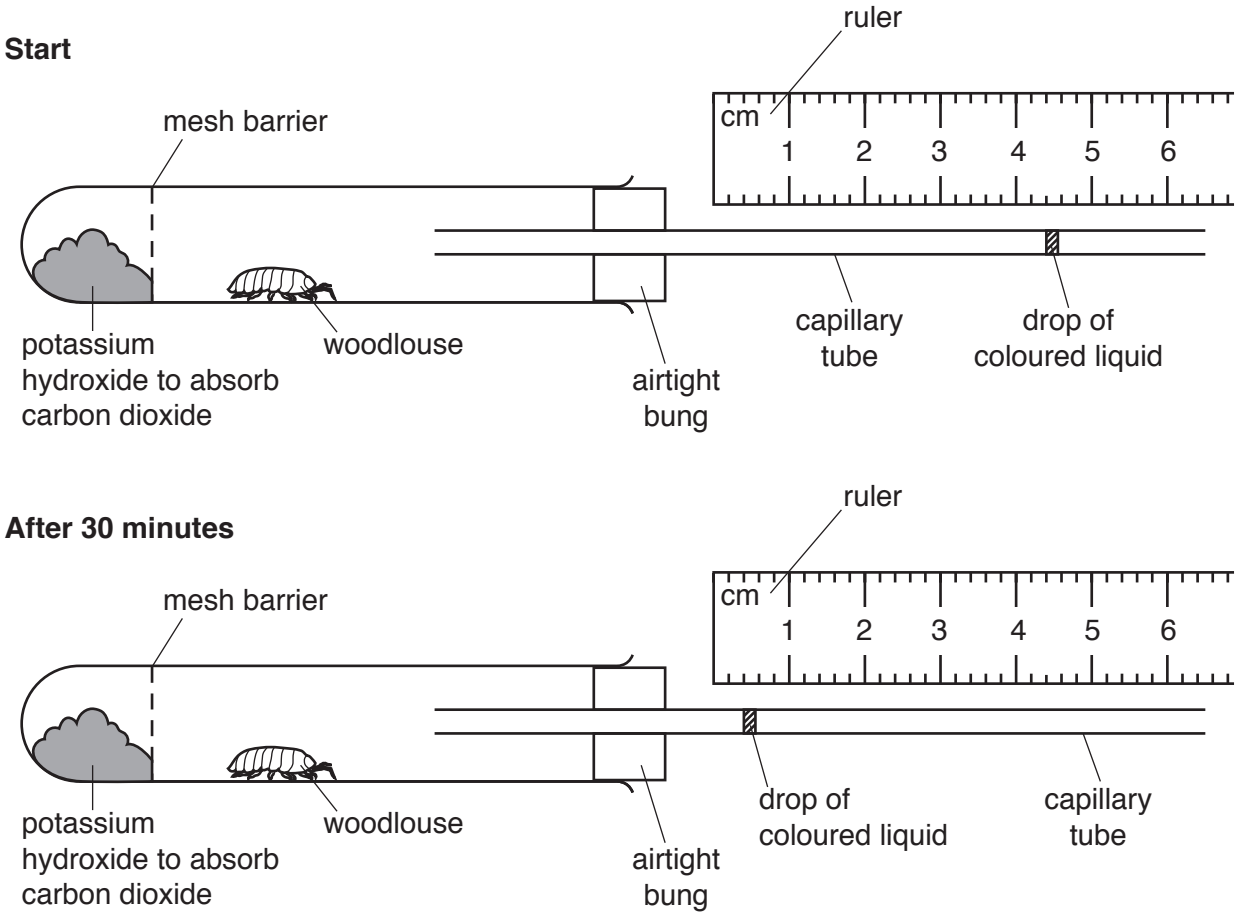

Fig. 2.1

View solution

(a) (i) Record the position of the drop of coloured liquid in the capillary tube shown in Fig. 2.1 at the **start** and **after 30 minutes**.

Start ..... mm

After 30 minutes ..... mm
[1]

(ii) Using the information in **2(a)(i)**, calculate the rate of movement of the drop of coloured liquid in mm per minute. Give your answer to one decimal place.

View solution

Space for working.

..... mm per minute [2]

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(b) The rate of movement of the drop of coloured liquid along the respirometer can be used as a measure of the rate of respiration. A student used the apparatus shown in Fig. 2.1 to investigate the rate of respiration in different species of small animals.

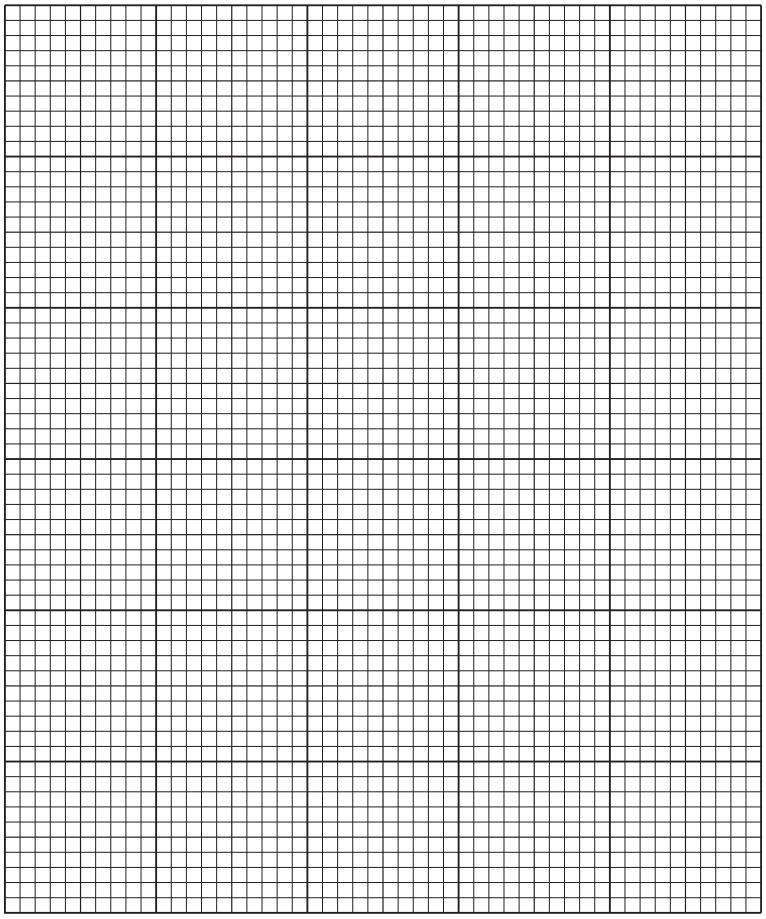


The results are shown in Table 2.1.

Table 2.1

animal species	rate of movement of drop of coloured liquid / mm per minute			
	repeat 1	repeat 2	repeat 3	average
A	1.6	1.7	1.3	1.5
B	0.9	1.0	0.7	0.9
C	2.4	2.6	2.5	2.5
D	1.9	2.0	1.9	1.9

(i) Plot a bar chart on the grid to show the average rate of movement of the drop of coloured liquid in the capillary tube for the four different species of animal.



[3]

(ii) State which letter represents the animal species with the highest rate of respiration.

.....[1]

(iii) The student decided it would be better to calculate the rate of respiration per gram of animal so that the values could be compared.

Describe how the student could find out the rate of respiration per gram of animal.

.....

.....

.....

.....[2]

(c) Fig. 2.2 shows a photograph of a woodlouse.

View solution

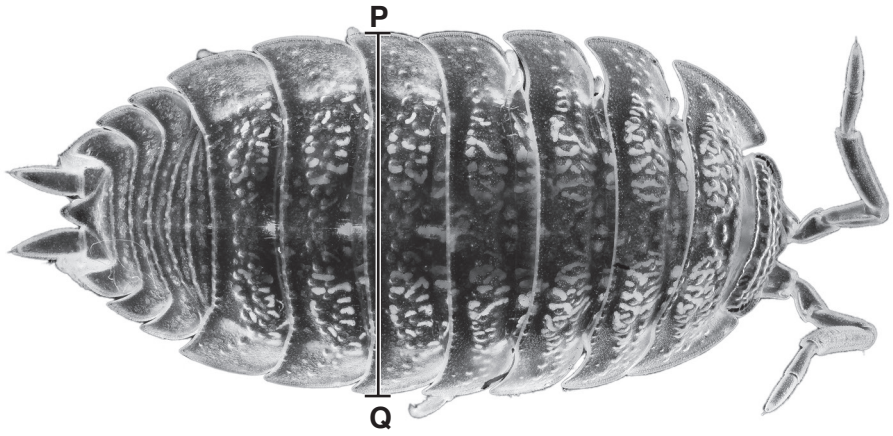


Fig. 2.2

(i) Draw a large diagram of the woodlouse in Fig. 2.2.

[4]

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(ii) The magnification of the woodlouse in Fig. 2.2 is ×9.

View solution

Measure the width of the woodlouse along line **PQ**. Include the unit.

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

Calculate the actual width of the woodlouse using the formula. Include the unit.

$$\text{magnification} = \frac{\text{length of line } \mathbf{PQ} \text{ on Fig. 2.2}}{\text{actual width of woodlouse}}$$

Show your working and give your answer to **two** decimal places.

.....
[3]

[Total: 16]

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