Cambridge Assessment International Education

Cambridge IGCSE™ (9–1)

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

0123456789

BIOLOGY **0970/06**

Paper 6 Alternative to Practical **For examination from 2023**

SPECIMEN PAPER **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 **14** pages. Any blank pages are indicated.

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

$$2H_2O_2 \longrightarrow 2H_2O + O_2$$

hydrogen peroxide — water — oxygen

The oxygen produced forms a foam. You can measure the height of the foam to determine catalase activity.

A student investigated catalase activity in cooked and uncooked potato tissue.

The student:

Step 1 cut two potato cylinders so that they were identical in shape and size

Step 2 put 5 cm^3 of 3% hydrogen peroxide solution into a test-tube labelled **cooked potato**

Step 3 put 5 cm^3 of 3% hydrogen peroxide solution into a test-tube labelled **uncooked potato**

Step 4 put one of the potato cylinders into a beaker of hot water for five minutes

Step 5 removed the potato cylinder from the hot water and put it into the test-tube labelled **cooked potato**

Step 6 put the uncooked potato cylinder into the test-tube labelled **uncooked potato**

Step 7 left the potato cylinders in the 3% hydrogen peroxide solution for three minutes and then measured the height of the foam produced in each of the test-tubes.

Fig 1.1 shows the test-tubes after three minutes.

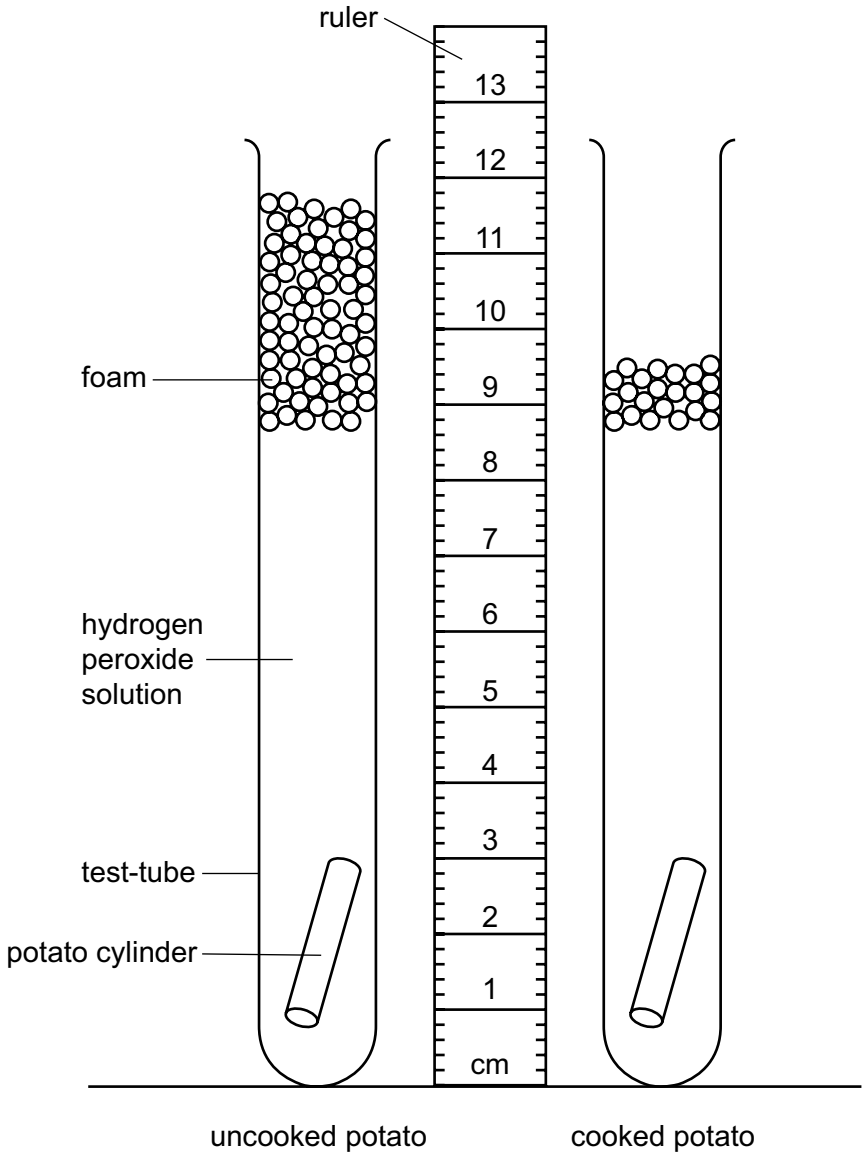

Fig. 1.1

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

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

[3]

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

..... [1]

(iii) State **one** conclusion for these results.

.....

.....

..... [1]

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

..... [1]

(ii) State why it is important that the two potato cylinders were identical in shape and size.

.....

.....

..... [1]

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

1 .....

2 .....
[2]

(c) Identify **one** possible source of error in the method used in this investigation.

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.....

..... [1]

(d) A student stated that:

'Catalase activity is the same in all species of plants.'

Plan an investigation to test this statement.

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..... [6]

(e) Potatoes contain starch. Starch can be broken down into reducing sugars.

Describe the tests to identify starch and reducing sugars and give the results of the positive tests.

starch .....

.....

.....

reducing sugars .....

.....

.....

.....

[5]

[Total: 21]

2 A woodlouse is a small animal.

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.

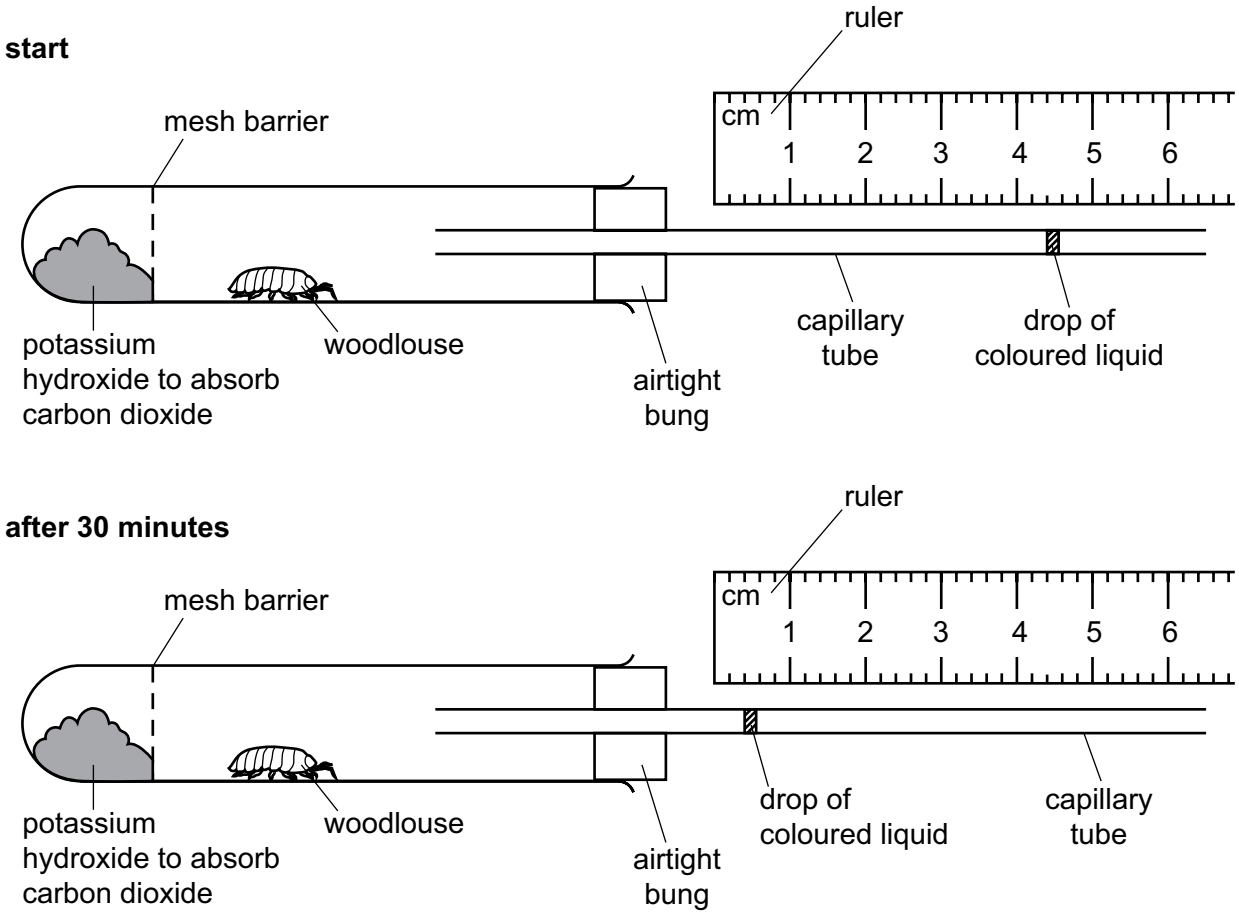


Fig. 2.1

(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) Calculate the distance moved by the drop of coloured liquid in 30 minutes.

distance moved ..... mm [1]

(iii) Calculate the rate of movement of the drop of coloured liquid in mm per minute.

Give your answer to **one** decimal place.

Space for working.

..... mm per minute
[2]

(b) The rate of movement of the drop of coloured liquid along the respirometer can be used to estimate the rate of respiration.

A student used a respirometer to investigate the rate of respiration in four animal species.

The results are shown in Table 2.1.

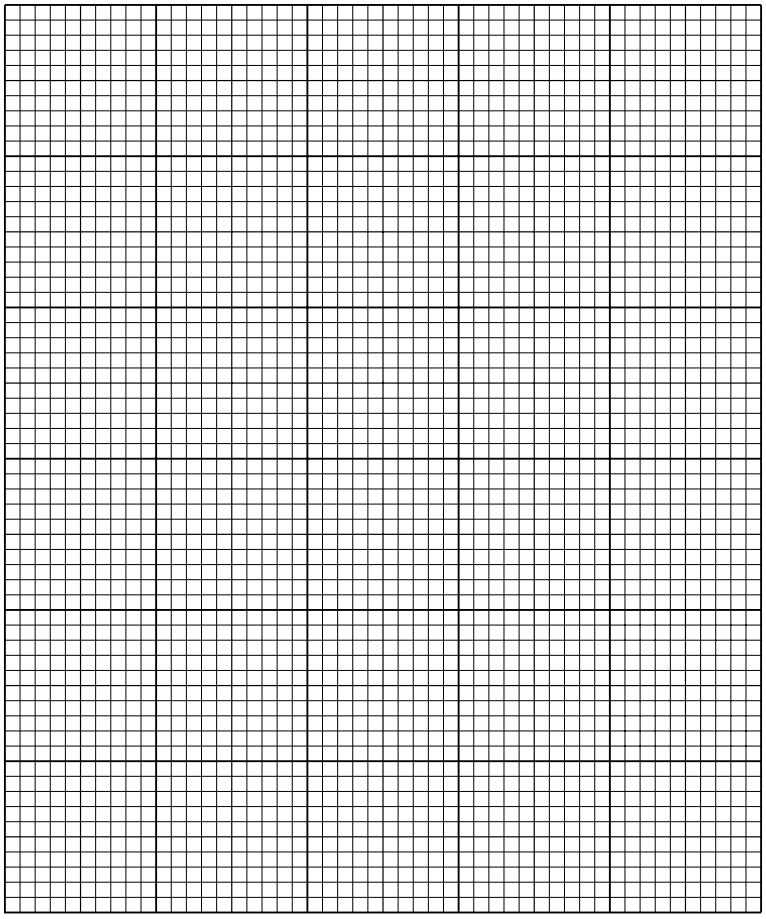
Table 2.1

animal species	rate of movement of the drop of coloured liquid / mm per minute			
	trial 1	trial 2	trial 3	mean
A	1.5	1.7	1.3	
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) Calculate the missing mean for animal species **A**.

Write your answer in Table 2.1. [1]

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



[3]

(iii) State the letter of the animal species which has the highest rate of respiration.

..... [1]

(iv) Suggest a suitable control for the investigation described in **2(b)**.

.....

.....

..... [1]

(v) 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.

.....

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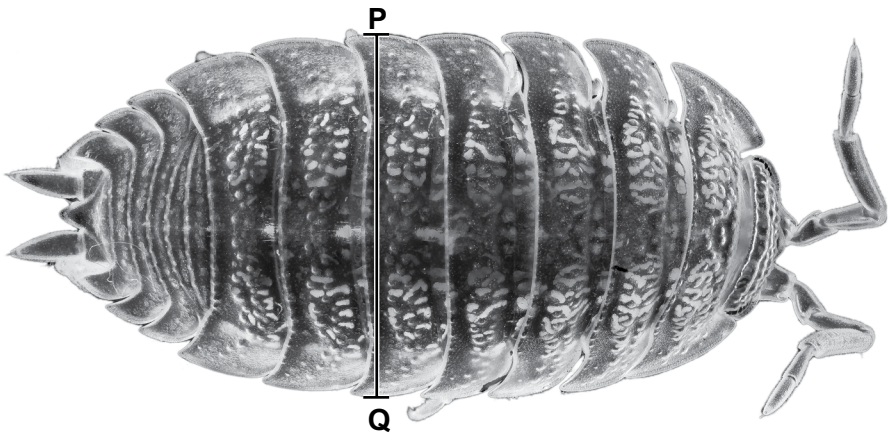
..... [2]

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



magnification ×9

Fig. 2.2

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

[4]

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

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

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

Calculate the actual width of the woodlouse using the formula and your measurement.

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

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

Space for working.

..... mm
[3]
[Total: 19]

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