Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

0123456789

BIOLOGY **0610/06**

Paper 6 Alternative to Practical **For Examination from 2016**

SPECIMEN PAPER

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, graphs or rough working.
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.

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

This document consists of **9** printed pages and **1** blank page.

1 Some students investigated the activity of catalase.

Catalase is an enzyme found in plant and animal tissues. It catalyses the breakdown of hydrogen peroxide into water and oxygen. The activity of this enzyme can be measured by collecting the oxygen produced.

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

The students used the apparatus shown in Fig.1.1 to compare the activity of catalase using pieces of sweet potato of different sizes.

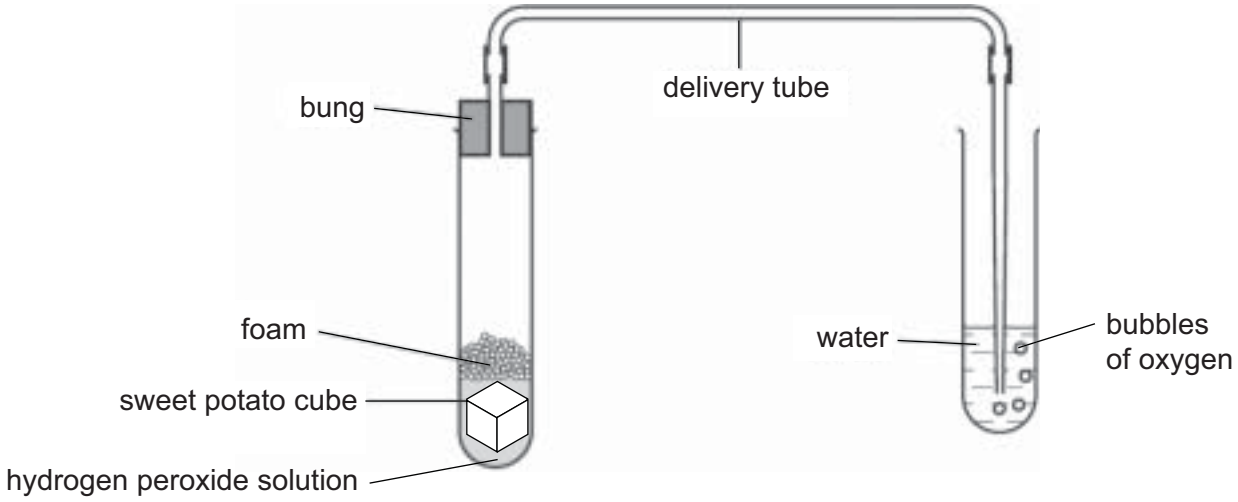

Fig. 1.1

Three cubes of 10 mm × 10 mm × 10 mm of sweet potato were used.

Cube 1 was placed into the test-tube and 5 cm^3 of hydrogen peroxide was added.
The bung was quickly replaced into the top of the test-tube.
The students carefully counted the number of bubbles of oxygen delivered into the water in one minute and then measured the final height of foam in the test-tube.

For **cube 1**, they counted 12 bubbles in one minute. The height of foam is shown in Fig. 1.2.
They then discarded the contents of the test-tube and rinsed it with clean water.

Cube 2 was cut into two pieces of approximately the same size.
Both of these pieces were placed into the test-tube and 5 cm^3 of hydrogen peroxide was added as before.
For **cube 2**, they counted 23 bubbles in one minute. The height of foam is shown in Fig. 1.2.
They then discarded the contents of the test-tube and rinsed it with clean water.

Cube 3 was cut into eight small pieces which were all placed into the test-tube and 5 cm^3 of hydrogen peroxide was added as before.
For **cube 3**, they counted 38 bubbles in one minute. The height of foam is shown in Fig. 1.2.

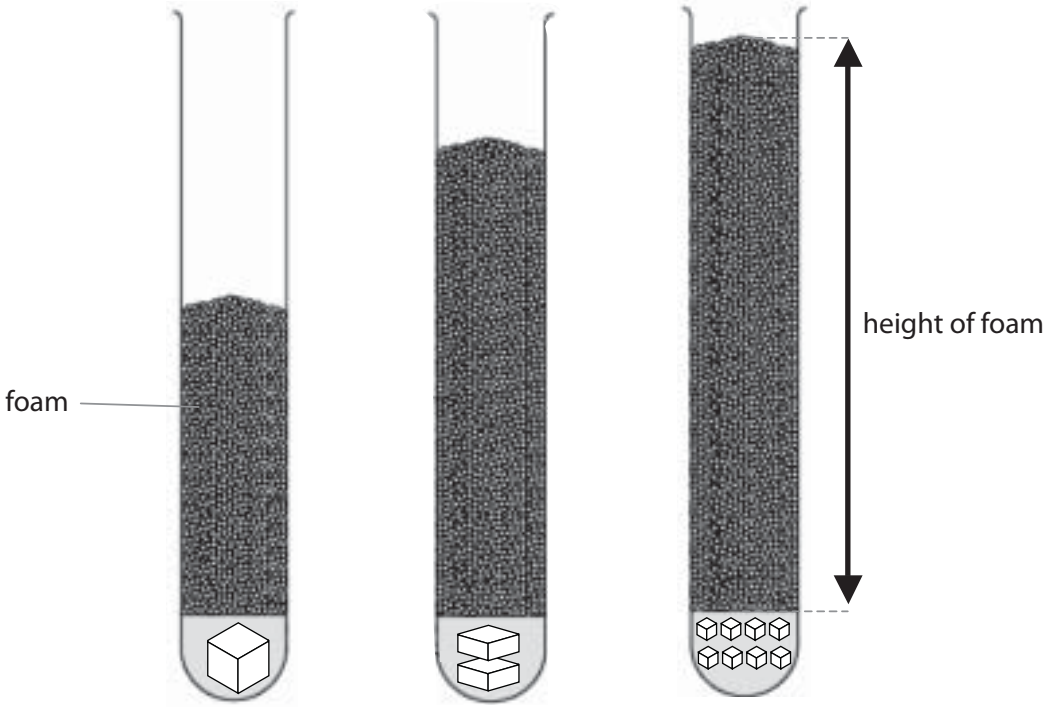

Fig. 1.2

(a) In the space below, prepare a table for the results from this investigation.
Use a ruler to measure the height of foam in Fig. 1.2 for each cube.
Record the height of foam for each cube in your table.

[6]

(b) **(i)** State **two** variables that the students kept constant in this investigation.

1 ……

2 …… [2]

(ii) Suggest how you could improve the method that they followed.

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…… [3]

(c) What conclusion can be drawn from these results.

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..... [1]

(d) (i) The students were given a hypothesis that said

"the activity of catalase increases with increasing temperature".

Describe a similar investigation to the one carried out in **(a)** to test this hypothesis.

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..... [6]

(ii) Outline **one** safety precaution that you would need to take when performing this experiment.

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..... [1]

[Total: 19]

2 Fig. 2.1 shows the lower surface of a leaf from a dicotyledonous plant, on a 1 cm^2 grid.

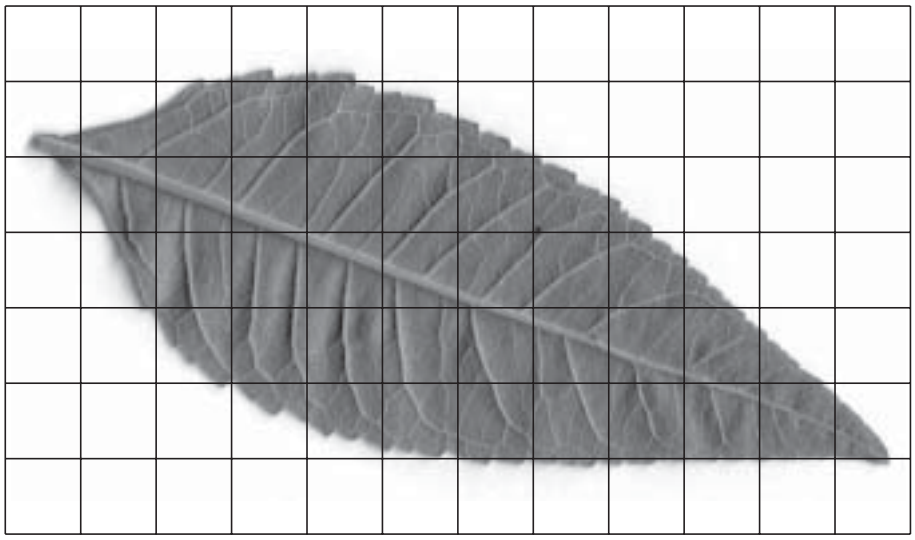


Fig. 2.1

(a) (i) Make a large, labelled drawing of the leaf in Fig. 2.1.

[5]

(ii) Calculate the surface area of the leaf in Fig. 2.1.

.... [1]

(iii) Describe the method you used to determine the surface area of the leaf.

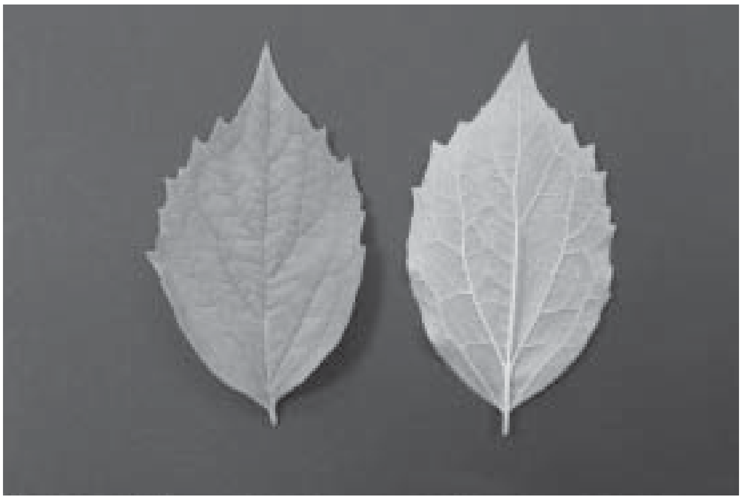
....

....

....

.... [2]

(b) Fig. 2.2 shows the upper and lower surfaces of the same leaf of another dicotyledonous plant.



upper surface lower surface

Fig. 2.2

Describe **two** ways, visible in Fig. 2.2, in which the upper surface of the leaf is different from the lower surface.

1 ....

....

2 ....

.... [2]

(c) A student investigated the effect of different wind speeds on the rate of transpiration of some leaves.

The student took five leaves from a tree and weighed each of them on a balance.

Each of the leaves was then hung from a different piece of wire.

Fans were used to blow air at different speeds over each leaf.

After 12 hours, the student weighed each leaf again. The results are shown in Table 2.1.

Table 2.1

wind speed / m per s	mass of leaf at the start / g	mass of leaf at the end / g	loss in mass / g
0	5.7	3.8	
1	5.3	3.3	
3	5.9	3.7	
6	5.1	2.6	
8	5.3	2.6	

(i) Calculate the loss in mass for each leaf. Complete Table 2.1. [2]

(ii) Construct a graph to show the loss in mass against wind speed.

[5]

(iii) Use your graph to determine the loss in mass at a wind speed of 10 m per s. Show on the graph how you obtained your answer.

..... g [2]

(iv) A student criticised the results by saying that the loss in mass does not allow for a fair comparison between leaves.

Suggest a more appropriate calculation and explain why it gives a fairer comparison.

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..... [2]

[Total: 21]

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