



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
International General Certificate of Secondary Education

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**BIOLOGY**

**0610/61**

Paper 6 Alternative to Practical

**October/November 2011**

**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 a pencil for any diagrams or graphs.

Do not use staples, paper clips, highlighters, glue or correction fluid.

**DO NOT WRITE IN ANY BARCODES.**

Answer **all** questions.

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.

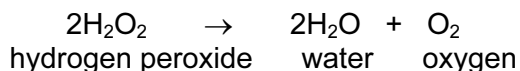
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3	
<b>Total</b>	

This document consists of **13** printed pages and **3** blank pages.





- 1 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 volume of oxygen gas given off as shown in Fig. 1.1.

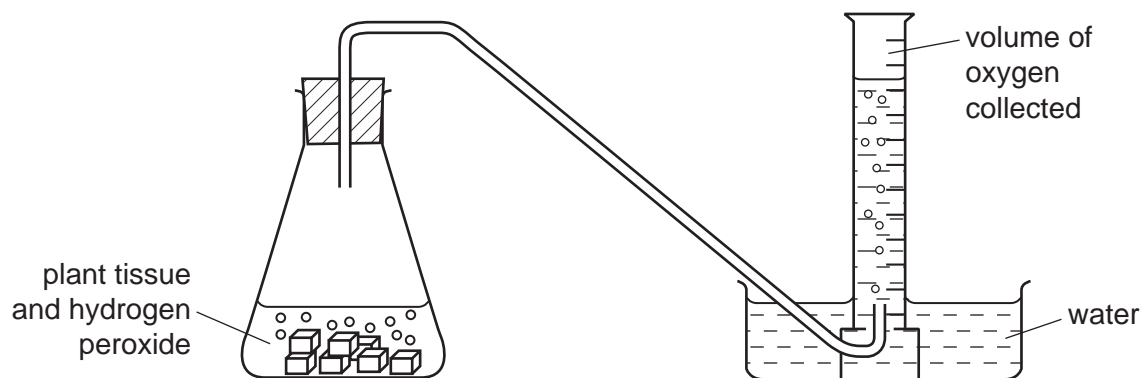


Fig. 1.1

Some students compared the catalase activity in two plant tissues, **sweet potato**, *Ipomoea batanua*, and **Irish potato**, *Solanum tuberosum*.

- 2.0 g of **sweet potato** was cut into small pieces.
- The small pieces were placed in a flask together with 25 cm<sup>3</sup> of hydrogen peroxide.
- The bung and delivery tube were fitted to the flask, as shown in Fig. 1.1.
- The volume of oxygen gas released was measured after 4 minutes (experiment 1).
- This was repeated three times (experiments 2, 3 and 4).
- The same procedure was carried out with 2.0 g of **Irish potato** cut into small pieces.
- The results are shown in Table 1.1.

Table 1.1

experiment	volume of oxygen gas / cm <sup>3</sup>	
	sweet potato	Irish potato
1	32.0	12.5
2	20.0	9.0
3	35.5	8.5
4	28.0	10.0
total	115.5	
mean	28.9	

- (a) (i) The total volume of oxygen gas and the mean volume of oxygen gas have been calculated for the **sweet potato**.

Calculate these values for the **Irish potato**.

Show your working below.

Write your answers in Table 1.1.

[2]

- (ii) Suggest why the tissues were cut into small pieces before being added to the flask.

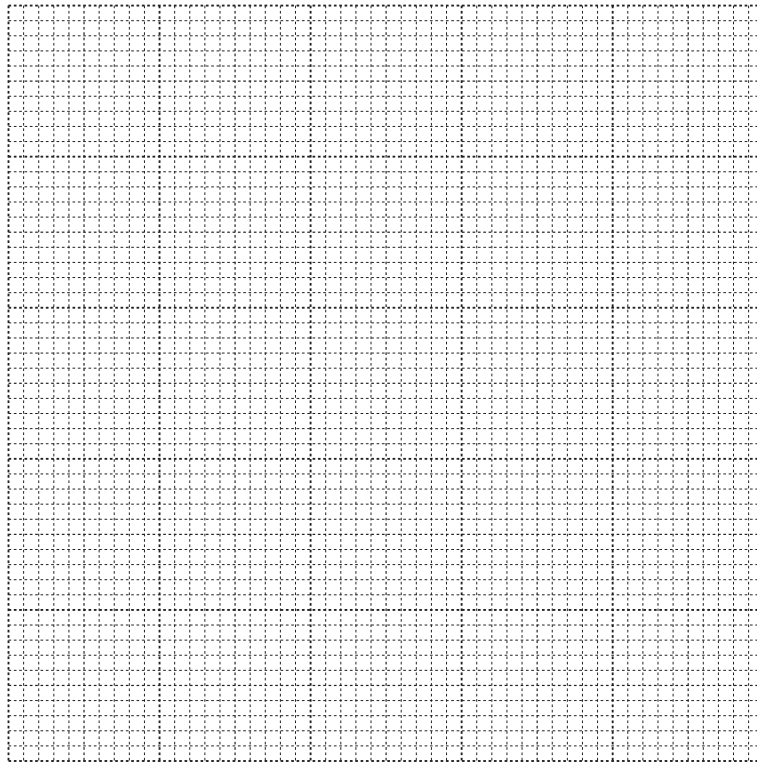
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(b) (i) Draw a bar chart to show the volumes of oxygen gas collected for the **sweet potato**.

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Draw a horizontal line across your bar chart to show the mean value.



[5]

(ii) Suggest two reasons for the variation in the results of the four **sweet potato** experiments.

- 1 .....
- .....
- 2 .....
- .....

[2]

(c) Suggest and explain **two** ways in which a similar investigation could be planned to collect more reliable data.

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..... [4]

[Total: 14]

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2 Birds have feathers to cover their bodies.

Fig. 2.1 shows two types of feather, **A** and **B**.



**Fig. 2.1**

**(a) (i)** Make a labelled outline drawing of feather **A**.

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[4]



(ii) Suggest a function of feather **A**.

.....  
..... [1]

(iii) Suggest a function of feather **B** and explain how it is adapted for this function.

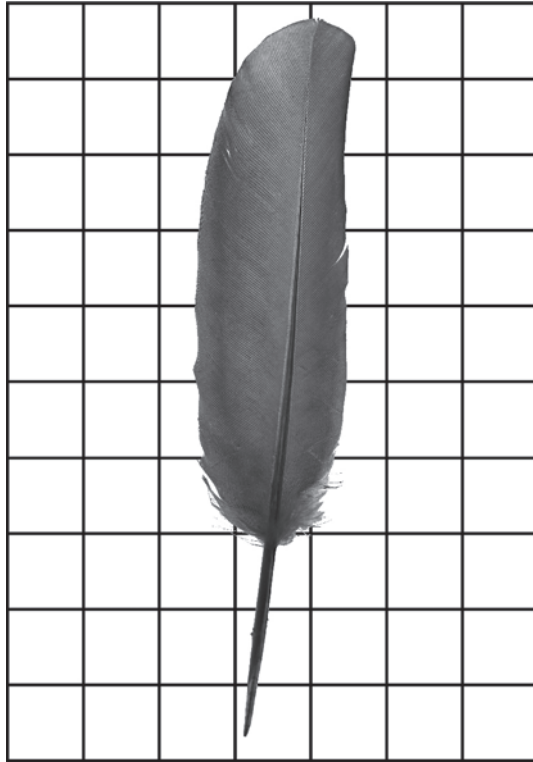
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**Question 2 continues on the next page.**

Fig. 2.2 shows feather **B** placed upon a grid. You will use this to help you to estimate the surface area of feather **B**.

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**Fig. 2.2**

- (b) (i)** Measure the size of one of the grid squares. Use this to calculate the surface area of feather **B**.

Show your working.

area of feather **B** .....cm<sup>2</sup> [3]

(ii) Describe a more accurate method that you could use to find the actual surface area of feather **B**.

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..... [2]

[Total: 12]

- 3 Fig. 3.1 shows three cress seedlings grown under different conditions. The seeds came from the same plant and the seedlings have been grown for the same length of time.

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The seedlings are drawn to scale.

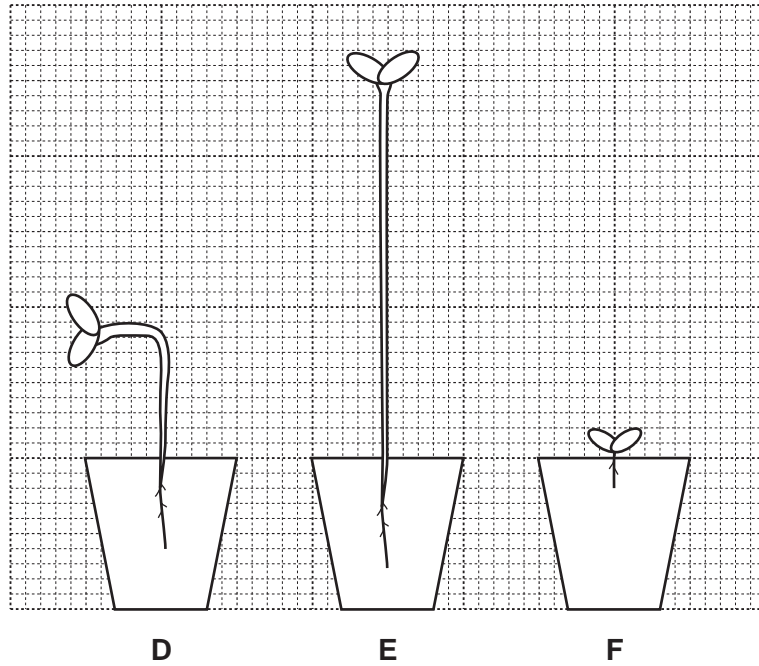


Fig. 3.1

- (a) The cress seedlings, **D**, **E** and **F** differ in appearance. For each seedling state how it is different and suggest an explanation.

(i) seedling **D**

.....  
 .....  
 .....  
 .....  
 ..... [3]

(ii) seedling **E**

.....  
 .....  
 .....  
 .....  
 ..... [3]

(iii) seedling F

.....

.....

.....

.....

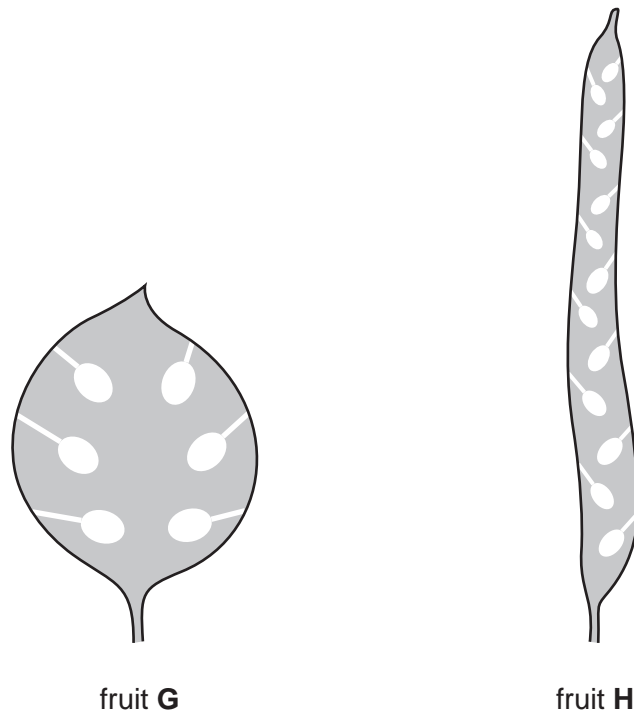
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**Question 3 continues on the next page.**

(b) Seeds develop within the fruits of flowering plants.  
 Fig. 3.2 shows two types of fruit, **G** and **H**, from species similar to cress.

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**Fig. 3.2**

(i) Describe two similarities between fruit **G** and fruit **H**.

1 .....

.....

2 .....

..... [2]

(ii) Complete Table 3.1 by recording two differences between fruit **G** and fruit **H**.

**Table 3.1**

fruit <b>G</b>	fruit <b>H</b>
1 .....	.....
.....	.....
2 .....	.....
.....	.....

[2]

(c) Suggest how the seeds may be dispersed from these two fruits.

.....  
..... [1]

[Total: 14]

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