UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER			

8179475121

BIOLOGY **0610/62**

Paper 6 Alternative to Practical **October/November 2013**

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.

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 document consists of **9** printed pages and **3** blank pages.

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1 Catalase is a common enzyme found in both plants and animals.

Some students investigated the activity of catalase in seeds and seedlings.

They used extracts from soaked seeds and from seedlings which had been grown for four days. All the seeds and the seedlings were from the same plant.

Catalase breaks down hydrogen peroxide into water and oxygen.

$$2H_2O_2 \rightarrow 2H_2O + O_2$$

Fig. 1.1 shows the apparatus used to compare the catalase activity of the two extracts. This was done by counting the number of bubbles of oxygen released in one minute.

Oxygen starts to be released as soon as hydrogen peroxide is added to the extract.

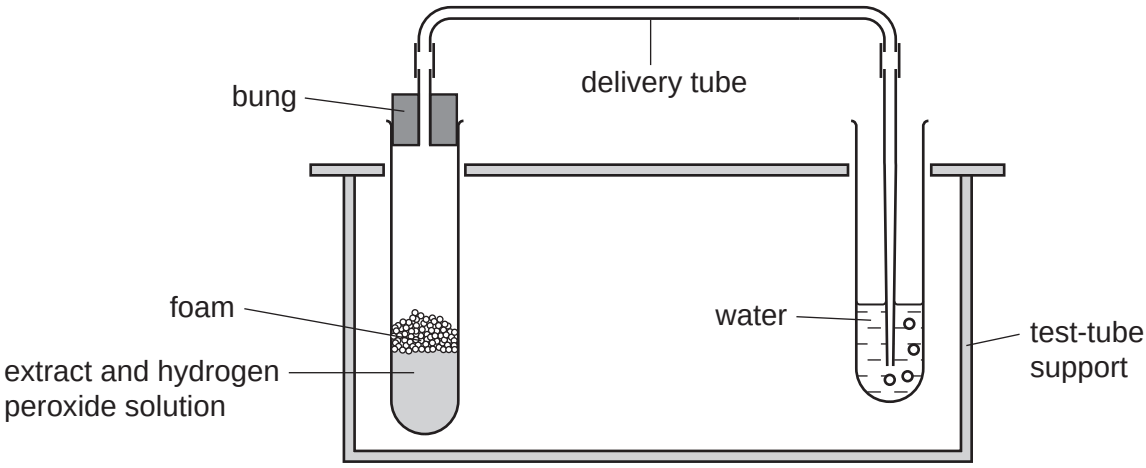


Fig. 1.1

- 2 g of extract from soaked seeds was used. This was placed in a test-tube, labelled **seeds 1** as shown in Fig. 1.1.
- Hydrogen peroxide was poured into the test-tube.
- The bung was quickly replaced into the top of this test-tube. The number of bubbles of oxygen released in one minute was counted and recorded in Table 1.1.
- This was repeated with another extract of soaked seeds, labelled **seeds 2**. The results were recorded in Table 1.1.
- The whole procedure was repeated with extracts from four-day old seedlings, labelled **seedlings 1** and **seedlings 2**. The results were recorded in Table 1.1.

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Table 1.1

extract	number of bubbles of oxygen released in one minute
seeds 1	43
seeds 2	50
seedlings 1	30
seedlings 2	37

(a) (i) Describe the results.

.....

.....

.....

.....

.....

.....

..... [3]

(ii) State the conclusion that can be made from these results.

.....

..... [1]

(b) (i) State **two** possible sources of experimental error in this investigation.

1 .....

2 ..... [2]

(ii) Suggest how to improve the method to reduce **one** of the errors stated in **(b)(i)**.

.....

.....

..... [1]

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[Turn over

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- After the reaction had finished the four test-tubes contained different heights of foam.

Fig. 1.2 shows the four test-tubes.

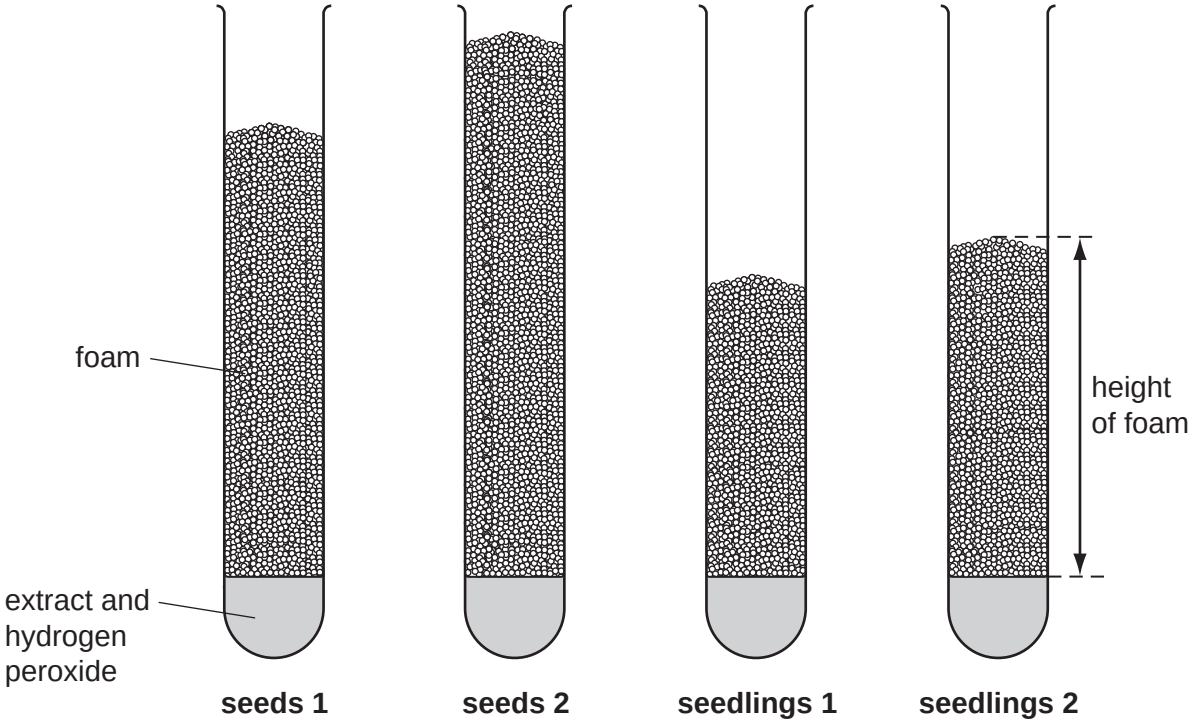


Fig. 1.2

(c) (i) Measure the height of the foam in each of the test-tubes shown in Fig. 1.2.

Record the height of foam in Table 1.2.

Table 1.2

extract	height of foam / mm
seeds 1	
seeds 2	
seedlings 1	
seedlings 2	

[2]

(ii) State the conclusion that can be made from these results.

.....

..... [1]

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(iii) State **and** explain whether your conclusion in **(a)(ii)** is consistent with your conclusion in **(c)(ii)**.

.....

.....

..... [1]

(d) (i) Explain why the tests for seeds and seedlings were repeated.

.....

..... [2]

(ii) Seeds and seedlings were crushed to make the extracts.

Suggest **two** reasons why whole seeds and seedlings were **not** used in this investigation.

1 .....

.....

2 .....

..... [2]

(e) Another group of students wanted to investigate the activity of catalase in different types of seeds.

For this investigation suggest:

(i) a variable to change;

..... [1]

(ii) **two** variables to keep constant;

1 .....

2 ..... [1]

(iii) a variable to measure;

..... [1]

(iv) a suitable control.

..... [1]

[Total: 19]

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2 You are going to investigate the variation in size of bean seeds. The bean seeds have been soaked in water for 48 hours.

Fig. 2.1 shows five soaked bean seeds.



A ..... mm

B ..... mm

C ..... mm

D ..... mm

E ..... mm

Fig. 2.1

(a) (i) Measure, to the nearest mm, the **maximum** lengths of the five seeds labelled **A**, **B**, **C**, **D** and **E** shown in Fig. 2.1.

Write your measurements on Fig. 2.1. [2]

Forty other bean seeds have been measured for you.

This data has been recorded as a tally in Table 2.1.

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(ii) Insert the tally mark for each bean seed **A**, **B**, **C**, **D** and **E** in the correct row in Table 2.1. [2]

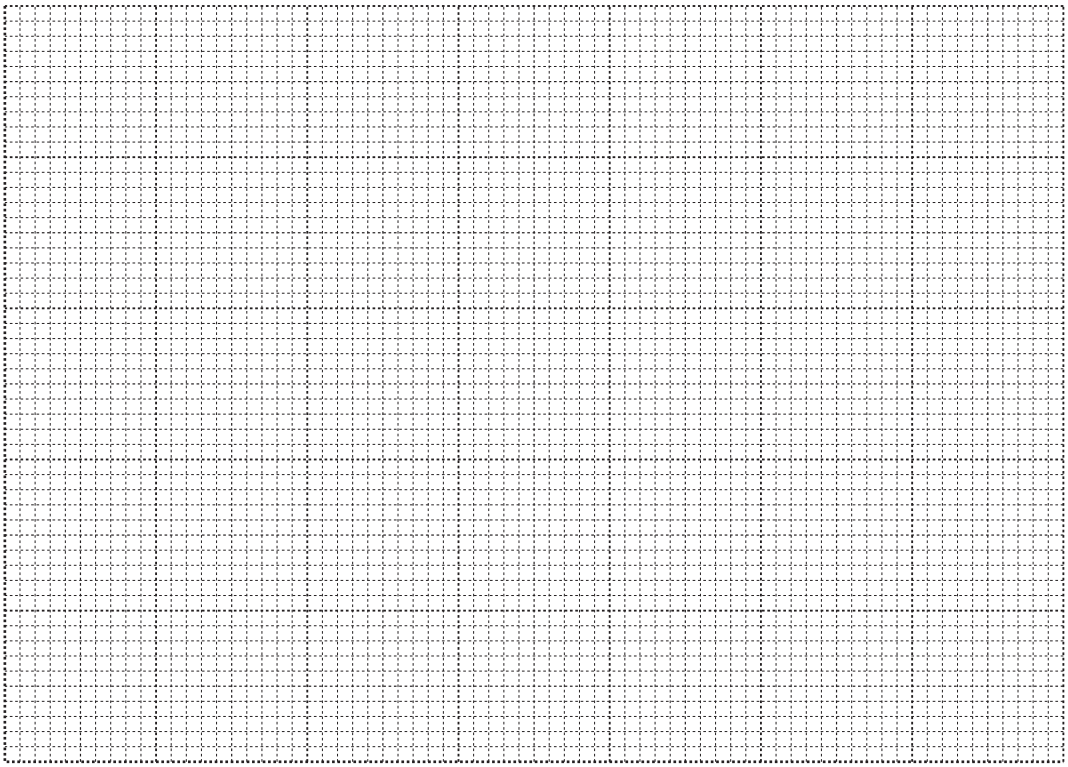
(iii) Count the tally marks in each group of bean seed length.

Write the total number in each group in Table 2.1. [2]

Table 2.1

bean seed length / mm	tally	number in group
24.0 – 25.9	*I*	
26.0 – 27.9	*IIII*	
28.0 – 29.9	*~~IIII~~ II*	
30.0 – 31.9	*~~IIII~~ ~~IIII~~ ~~IIII~~ II*	
32.0 – 33.9	*~~IIII~~ I*	
34.0 – 35.9	*~~IIII~~*	

(iv) Construct a histogram on Fig. 2.2 of the number in each group of bean seed length.



[4]

Fig. 2.2

(v) Name the type of variation shown by the bean seeds.

.....

[1]

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(b) Fig. 2.2 shows one bean seed with the testa (seed coat) removed.



Fig. 2.2

(i) Make a large, labelled drawing of the bean seed.
Include detail of the embryo in your drawing.

[4]

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(ii) You are going to calculate the magnification of your drawing.

Measure the maximum length of the bean seed in Fig. 2.2.

maximum length of the bean seed in Fig. 2.2 ..... mm

Measure the maximum length of the bean seed in your drawing.

Draw a line on your drawing, to show where you have measured this length.

maximum length of the bean seed in your drawing ..... mm

Calculate the magnification of your drawing.

Show your working.

magnification × ..... [4]

Bean seeds are included in the human diet. Most types of bean seeds have a high protein content.

(c) Describe a food test you could do to show that bean seeds contain protein.

.....

.....

.....

..... [2]

[Total: 21]

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