UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER			

6168885115

Biology **0610/53**

Paper 5 Practical Test **October/November 2013**

1 hour 15 minutes

Candidates answer on the Question Paper.

Additional Materials: As listed in the Confidential Instructions.

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.

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1	
2	
Total	

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

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Read through all the questions on this paper carefully before starting work.

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

You are going to investigate the activity of catalase in seeds and seedlings.

You will be provided with extracts from soaked seeds and from seedlings which have been grown for four days. All seeds and seedlings will be from the same plant.

Catalase breaks down hydrogen peroxide into water and oxygen.

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

You will use the apparatus, shown in Fig. 1.1, to compare the catalase activity of the two extracts. This is done by counting the number of bubbles released in one minute.

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

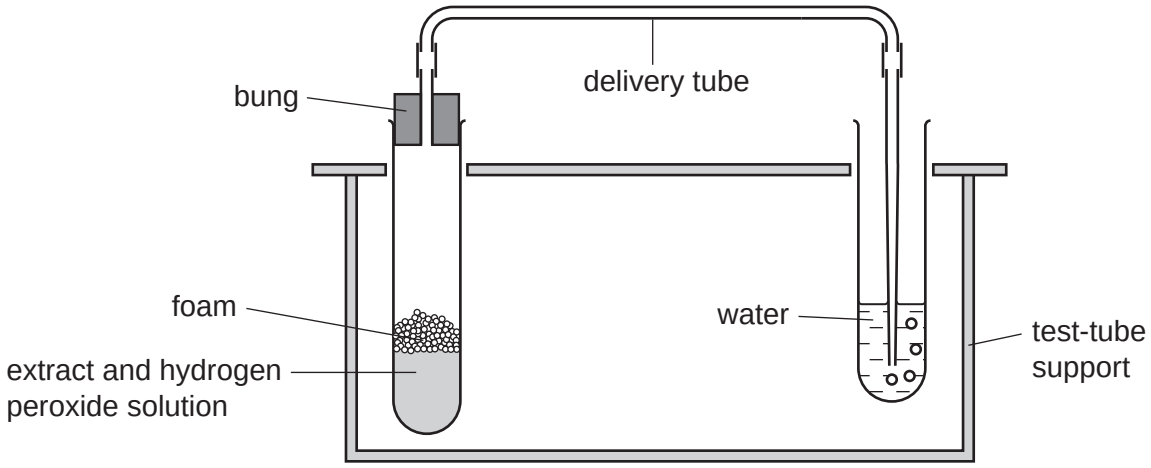


Fig. 1.1

Hydrogen peroxide can irritate the skin and damage your eyes.

- Put on the safety equipment provided.
- Half fill a test-tube with water.
- Place the end of the delivery tube into the test-tube of water. Ensure the end is below the surface of the water, as shown in Fig. 1.1.

(a) (i) Take one of the test-tubes labelled **hydrogen peroxide** and carefully add the contents to the test-tube labelled **seeds 1**.

- Quickly connect the bung with the delivery tube to the test-tube labelled **seeds 1**.

Record the time. .....

- Count the number of bubbles of oxygen released in one minute.

Write your result in Table 1.1.

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Table 1.1

extract	number of bubbles of oxygen released in one minute
seeds 1	
seeds 2	
seedlings 1	
seedlings 2	

Keep test-tube **seeds 1** and its contents. You will need this for part **(d)**.

- Repeat the procedure with each of the test-tubes labelled **seeds 2**, **seedlings 1**, and **seedlings 2**.

  Write your results in Table 1.1. [4]

Keep test-tubes **seeds 2**, **seedlings 1** and **seedlings 2** and their contents. You will need them for part **(d)**.

(ii) Describe your results.

.....

.....

.....

.....

.....

.....

..... [3]

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

.....

..... [1]

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(b) (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]

(c) (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 **(c)(i)**.

.....

.....

..... [1]

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(d) (i) Look at the four test-tubes that you left after completing **(a)(i)**.

Measure the height of the foam produced in each of the test-tubes, as shown in Fig. 1.2.

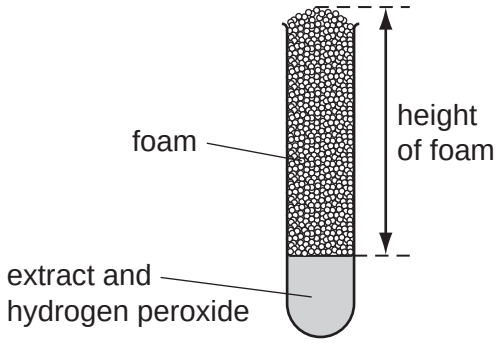


Fig. 1.2

Record the heights 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]

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

.....

.....

..... [1]

[Total: 19]

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2 You are going to investigate the variation in size of bean seeds.

Fig. 2.1 shows five 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]

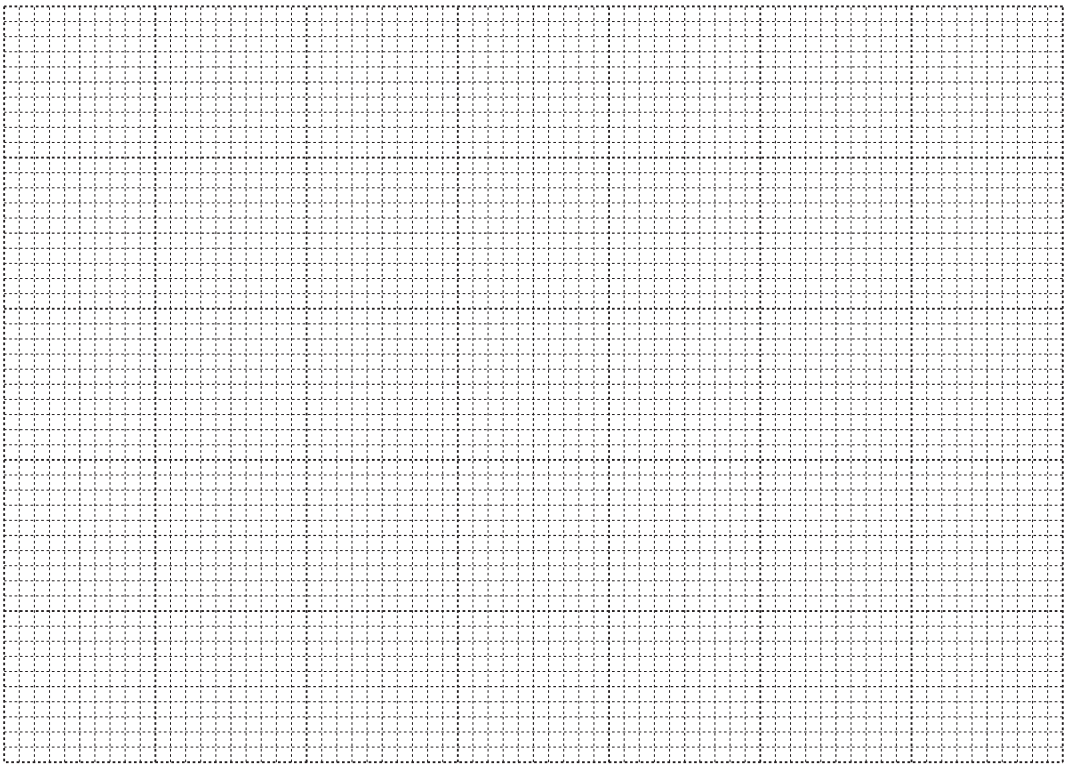
(iii) Count the tally marks in each group of bean seed length.

Write the total numbers 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) You are provided with two bean seeds, which have been soaked in water for 48 hours.

- Select one of the seeds and remove the testa (seed coat).
- The bean seed is in two parts. Carefully separate the parts and place on the white tile.
- Use the hand lens to look at the inside of both parts, to view the embryo.
- If an embryo is not present use another bean seed.

(i) Make a large, labelled drawing of the inside of one part 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.

maximum length of bean seed ..... mm

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

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

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

Calculate the magnification of your drawing.

Show your working.

magnification × ..... [4]

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

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

.....

.....

.....

..... [2]

[Total: 21]

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