UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

0033314124

Biology **0610/51**

Paper 5 Practical Test **October/November 2011**

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 **both** 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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1	
2	
Total	

This document consists of **7** printed pages and **1** blank page.

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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 oxygen produced.

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

Hydrogen peroxide should be used with care. Please wear the eye protection and plastic gloves provided.

- Set up the apparatus as shown in Fig. 1.1.
- Make sure the end of the delivery tube is below the level of the water in test-tube **B**.

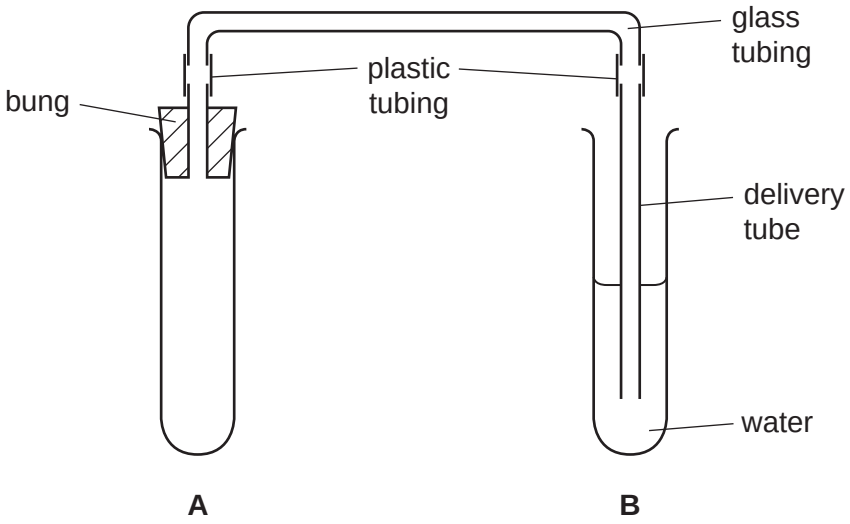

Fig. 1.1

Read through the method below before starting the experiment.

You are provided with a slice of sweet potato and three test-tubes each containing the same concentration of hydrogen peroxide solution.

- Remove the outer layer from around the slice of sweet potato.
- Cut three cubes from the slice. Each cube should be 1 cm × 1 cm × 1 cm.
- Place one cube (cube 1) in test-tube **A**.
- Empty the contents of one of the test-tubes labelled **hydrogen peroxide solution** into test-tube **A**, onto cube 1.
- **Immediately** replace the bung in test-tube **A** as bubbles will appear when the solution makes contact with the tissue.
- Begin timing when the first bubble comes out of the delivery tube and count the number of bubbles that escape into the water in test-tube **B** for a period of **1 minute**.
- Measure the depth of the foam in test-tube **A** after another minute.

(a) (i) Record your results for cube 1 in Table 1.1. [2]

- Discard the contents of test-tube **A** in the container provided, labelled **waste washings**, and rinse the test-tube with water.
- Place the second cube (cube 2) of sweet potato and the contents of another test-tube labelled **hydrogen peroxide solution** in test-tube **A** and repeat the procedure.

(ii) Record your results for cube 2 in Table 1.1. [2]

- Discard the contents of test-tube **A** in the container provided, labelled **waste washings** and rinse the test-tube with water.
- Cut the third cube of sweet potato tissue into eight smaller pieces (cut up cube).
- Put **all** eight pieces into test-tube **A** and repeat the procedure.

(iii) Record your results for the cut up cube in Table 1.1. [2]

Table 1.1

	number of bubbles released in 1 minute	depth of foam after another minute / mm
cube 1		
cube 2		
cut up cube		

(b) Explain an advantage of repeating the test with two identical cubes of sweet potato tissue.

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..... [1]

(c) (i) Use the data in Table 1.1 to compare the activity of the enzyme catalase in the cut up cube with that of cube 2.

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..... [2]

[Turn over

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(ii) Explain why the tissue in the cut up cube gave different results from those for cube 2.

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..... [2]

(d) State and explain a possible source of error in the design of this investigation.

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..... [2]

(e) Suggest how a similar investigation could be planned to collect more reliable data. Draw a sketch of the apparatus that you would use.

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..... [5]

[Total: 18]

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Question 2 starts on page 6.

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2 You will investigate the rate of cooling of water in test-tubes that are wrapped with different materials.

You are provided with three large test-tubes and a thermometer. When each test-tube has been prepared, stand it in the rack provided.

- Wrap one of these test-tubes with one layer of paper tissue.
  Use an elastic band to fix the paper tissue in position.

- Wrap the second test-tube with one layer of foil.
  Use an elastic band to fix the foil in position.

- The third test-tube will remain unwrapped.

Read through the method before starting the experiment.

The test-tubes are going to be filled with equal volumes of hot water.
You will be recording the **initial** temperature of the water in each test-tube and then every minute for a total of 6 minutes.

(a) (i) Design a suitable table to record your results.

[3]

- **When you are ready, raise your hand and the Supervisor will add hot water to your test-tubes.**

- Take the **initial** temperature of the water in each test-tube and then every minute for a total of 6 minutes.

(ii) Record the results in your table. [3]

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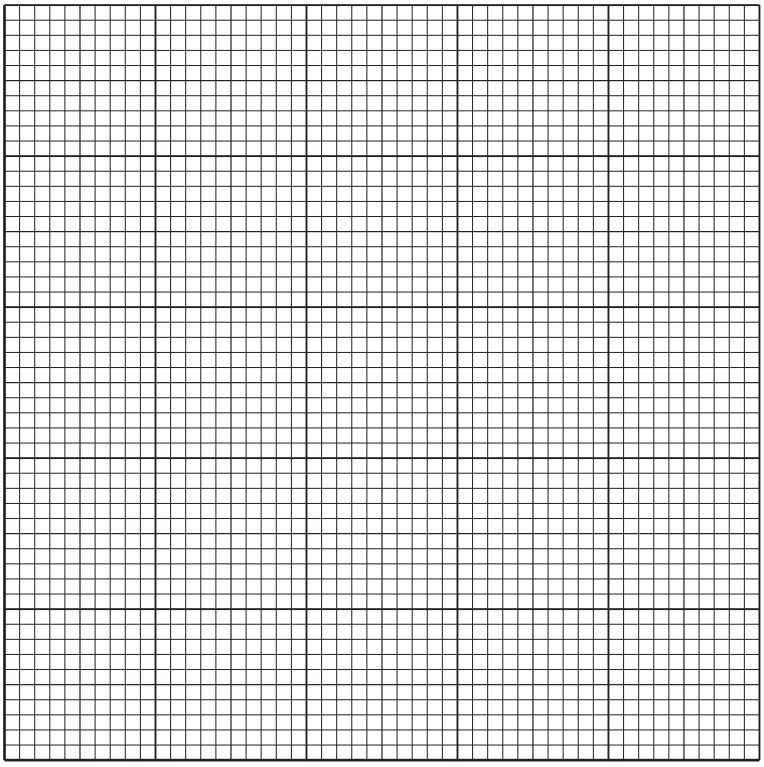
(iii) Plot a graph to show the temperature of water in each test-tube against time. Use the same axes for the three sets of data.



[5]

(iv) Describe and explain your results.

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[5]

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(b) Birds have feathers covering their bodies. You are provided with two types of feather.

Feather **W1** is from a bird's chest and feather **W2** is from a wing or tail.

(i) Make a labelled outline drawing of feather **W1**.

[4]

(ii) Describe the function of each feather.

feather **W1** .....

.....

feather **W2** .....

..... [2]

[Total: 22]