Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

BIOLOGY **0610/51**

Paper 5 Practical Test **May/June 2016**

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 an HB pencil for any diagrams or graphs.
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.

For Examiner's Use	
1	
2	
Total	

The syllabus is approved 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 **3** blank pages.

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

1 Metabolic reactions in cells produce toxic chemicals which can be converted to harmless or less toxic chemicals.

Hydrogen peroxide is broken down using the enzyme catalase which is found in most cells.

Fig. 1.1 shows this reaction.

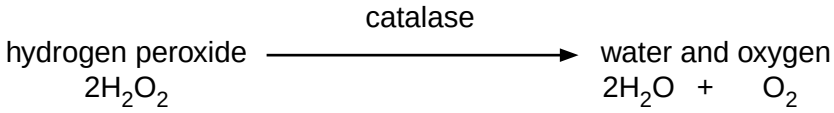

Fig. 1.1

You are going to investigate the effect of alcohol (ethanol) on the activity of catalase found in potato.

Read all the instructions but DO NOT CARRY THEM OUT until you have drawn a table for your results in the space provided in question 1 (a)(ii).

You should use the safety equipment provided while you are carrying out the practical work.

The potato pieces in dishes **A** and **B** have both been cut to the same size.

(a) (i) Measure the length, width and height of one of the pieces of potato.

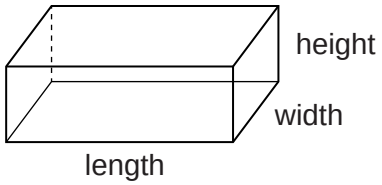

Fig. 1.2

Record your results in Table 1.1.

Table 1.1

length of potato piece / mm	width of potato piece / mm	height of potato piece / mm

[1]

Step 1 Label four test-tubes, **A1**, **A2**, **B1** and **B2**. Add 10 cm^3 of hydrogen peroxide solution to each of the test-tubes.

Step 2 Cut two 30 mm × 10 mm × 2 mm slices from the potato piece in dish **A**.
Leave the slices in dish **A** with the remaining portion of the potato piece.
When cutting, use a white tile and cut away from your hand.

Step 3 Cut two 30 mm × 10 mm × 2 mm slices from the potato piece in dish **B**.
Leave the slices in dish **B** with the remaining portion of the potato piece.
When cutting, use a white tile and cut away from your hand.

Step 4 Place the free end of the delivery tube into the large test-tube of water.

Step 5 Use forceps to remove one of the 30 mm × 10 mm × 2 mm slices of potato from dish **A** and put the slice into the hydrogen peroxide solution in test-tube **A1**.

Step 6 **Immediately** place the rubber bung containing the delivery tube into test-tube **A1**, as shown in Fig. 1.3. Make sure it fits tightly. Start the timer.

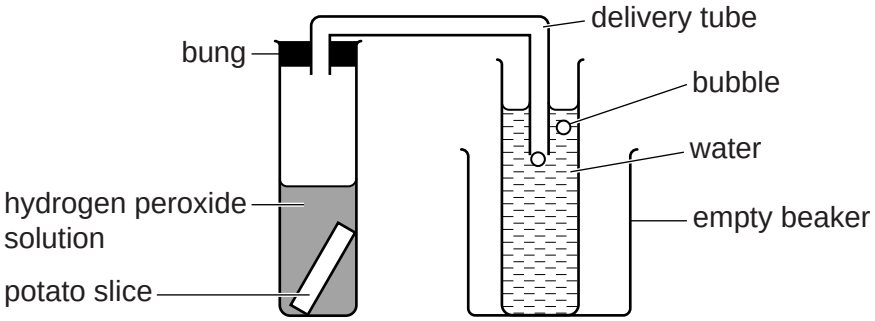

Fig. 1.3

Step 7 Count the number of bubbles released from the delivery tube for 3 minutes. Record your observations in your results table in question **1 (a)(ii)**.

Step 8 Repeat steps **4** to **7** for the second 30 mm × 10 mm × 2 mm slice of potato from dish **A** and use test-tube **A2**.

Step 9 Repeat steps **4** to **8** for the 30 mm × 10 mm × 2 mm slices of potato from dish **B** and use test-tubes **B1** and **B2**.

(ii) Prepare a table to record your results.
Your table should show:

- the numbers of bubbles produced by each slice of potato in 3 minutes
- the mean number of bubbles produced by the potato piece from each of dishes **A** and **B**.

Record your results in your table as you carry out the practical work.

[6]

(b) Explain why the bung of the delivery tube must fit tightly into the test-tube.

.....

.....

.....[2]

(c) The potato pieces that you used were soaked in different concentrations of alcohol for 24 hours.

- The potato piece in dish **A** had been soaked in 20% alcohol.
- The potato piece in dish **B** had been soaked in 2% alcohol.

(i) Suggest the relationship between the number of bubbles and the activity of catalase.

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.....

.....[1]

(ii) Compare the activity of catalase in the potato pieces from dish **A** and dish **B**.

.....

.....

.....[1]

(iii) Predict the number of bubbles that would be produced in 3 minutes if a piece of potato was soaked in 50% alcohol before being placed in hydrogen peroxide solution.

.....[1]

(d) (i) State **one** variable that you controlled in this investigation.

Describe how this variable was controlled.

variable .....

how it was controlled .....

.....

.....

[2]

(ii) The method you used to measure the oxygen gas produced is a source of error.

State **one** reason why this method is a source of error.

.....

.....

Suggest how to improve the method to minimise this error.

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.....

.....

[2]

(iii) Identify **one** other source of error. State why this is a source of error.

source of error .....

.....

reason .....

.....

.....

[2]

(iv) Describe a control experiment that you could carry out for this investigation. **Do not carry out this experiment**.

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.....

.....[2]

(v) Predict the result you would expect from the control experiment described in **(iv)**.

.....

.....[1]

(e) State one safety precaution required when ethanol is used in an investigation.

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.....

.....[1]

(f) In an investigation into the effects of alcohol on the nervous system, people were asked to carry out a test on their reaction time.

The person being tested looked at a coloured block on a computer screen.
As soon as the colour changed they pressed a button.
The time taken to press the button was recorded by the computer.
This was their reaction time.

Twenty people were tested before and after consuming a drink containing the same concentration of alcohol.

Table 1.2 shows the results of this investigation.

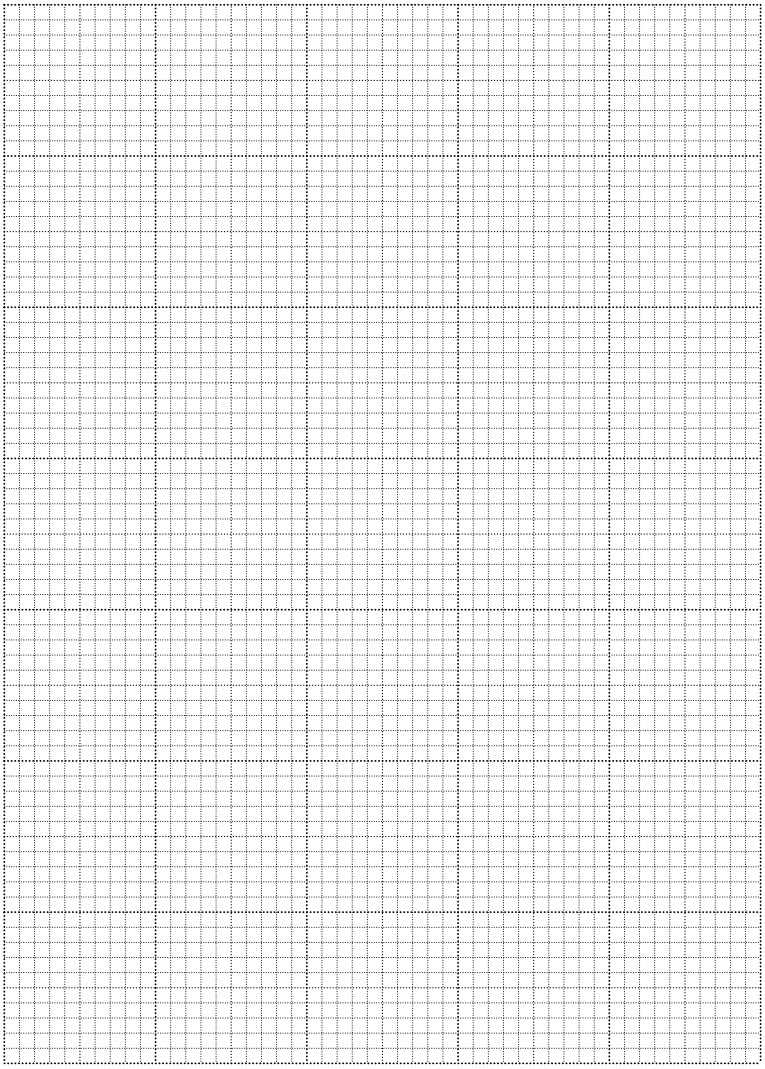
Table 1.2

test person	reaction time before consuming alcohol / milliseconds	reaction time after consuming alcohol / milliseconds
1	272	322
2	310	350
3	225	270
4	243	290
5	240	308
6	264	315
7	201	238
8	262	300
9	225	252
10	235	278
11	225	253
12	247	271
13	226	266
14	194	220
15	206	239
16	309	340
17	223	261
18	243	286
19	270	316
20	180	225
mean	240	

(i) Calculate the mean for the reaction time after consuming alcohol.

Write your answer in Table 1.2. [1]

(ii) Plot a bar chart to show the **mean** reaction time of the people tested before and after consuming alcohol.



[3]

(iii) The range of reaction times recorded before consuming alcohol is 180–310 milliseconds.

Use Table 1.2 to identify the range of reaction times recorded after consuming alcohol.

..... milliseconds [1]

[Total: 27]

2 Fig. 2.1 is a photograph of a cross-section of a vascular bundle in a leaf.
Line **AB** shows the length of the vascular bundle.

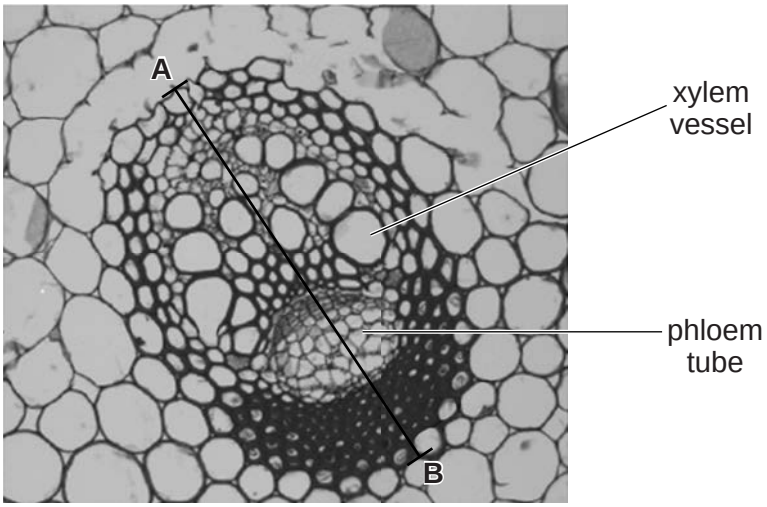


Fig. 2.1

(a) (i) Make a large drawing to show the different regions of the vascular bundle shown in Fig. 2.1.
Do **not** draw any individual cells.
Identify and label on your drawing the position of the xylem vessel as shown in Fig. 2.1.

[5]

(ii) Measure the length of line **AB** as shown on Fig. 2.1. **Include the unit.**

Length of **AB** .....

Mark on your drawing a line in the same position as **AB**.

Measure the line you have drawn.

Length of line on drawing .....

$$\text{magnification} = \frac{\text{length of line on drawing}}{\text{length of } \mathbf{AB}}$$

Calculate the magnification of your drawing using the information above and your answers.

Show your working.

magnification .....
[3]

(iii) State **one** way **visible** in Fig. 2.1 in which the xylem vessel is different from the phloem tube.

.....

.....

.....[1]

(b) The walls of xylem vessels are supported by a chemical called lignin, which can be stained by a red dye. This makes the xylem vessel walls easily seen when using a microscope.

Use this information to plan how you could find the position of the vascular bundles in a stem.

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.....[4]

[Total: 13]

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