Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

BIOLOGY **0610/52**

Paper 5 Practical Test **May/June 2021**

1 hour 15 minutes

You must answer on the question paper.

You will need: The materials and apparatus listed in the confidential instructions

INSTRUCTIONS
- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.
- You should show all your working and use appropriate units.

INFORMATION
- The total mark for this paper is 40.
- The number of marks for each question or part question is shown in brackets [ ].

For Examiner's Use	
1	
2	
Total	

This document has **12** pages. Any blank pages are indicated.

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1 Catalase is an enzyme found in living cells. It catalyses the break-down of hydrogen peroxide to form water and oxygen.

You are going to investigate the effect of catalase concentration on the rate of oxygen production. You have been provided with a celery extract which contains catalase.

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

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

Step 1 Label five test-tubes **A**, **B**, **C**, **D** and **E**. Put the test-tubes into the test-tube rack.

Step 2 Use a measuring cylinder to pour 10 cm^3 of **celery extract** into test-tube **A**.

Step 3 Use the measuring cylinder to transfer 5 cm^3 of celery extract from test-tube **A** to test-tube **B**.

Use the measuring cylinder to add 5 cm^3 of distilled water to test-tube **B**. Place a stopper in test-tube **B** and shake it three times.

Step 4 Remove the stopper. Use the measuring cylinder to transfer 5 cm^3 of the liquid in test-tube **B** to test-tube **C**.

Use the measuring cylinder to add 5 cm^3 of distilled water to test-tube **C**. Place a stopper in test-tube **C** and shake it three times.

Step 5 Remove the stopper. Use the measuring cylinder to transfer 5 cm^3 of the liquid in test-tube **C** to test-tube **D**.

Use the measuring cylinder to add 5 cm^3 of distilled water to test-tube **D**. Place a stopper in test-tube **D** and shake it three times.

Step 6 Remove the stopper. Use the measuring cylinder to transfer 5 cm^3 of the liquid in test-tube **D** to test-tube **E**.

Use the measuring cylinder to add 5 cm^3 of distilled water to test-tube **E**. Place a stopper in test-tube **E** and shake it three times. Remove the stopper.

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(a) (i) Table 1.1 shows the concentration of the celery extract in test-tubes **A** to **E**.

View solution

Table 1.1

test-tube	percentage concentration of celery extract
A	100.00
B	50.00
C	.....
D	12.50
E	6.25

Complete Table 1.1 by calculating and writing in the percentage concentration of celery extract in test-tube **C**. [1]

Step 7 Pour a small amount of the celery extract from test-tube **A** onto the watch glass, as shown in Fig. 1.1.

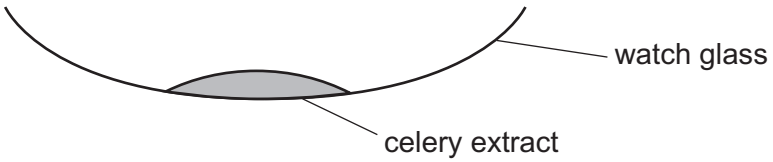

Fig. 1.1

Step 8 Use the forceps to place **one** of the paper discs into the celery extract in the watch glass.

Step 9 Use the ruler to measure 2 cm from the top (open end) of the remaining unlabelled test-tube. Mark this distance by drawing a line on the test-tube with the marker pen.

Step 10 Use the forceps to remove the paper disc from the watch glass. Place the paper disc into the test-tube you prepared in step 9. Push the paper disc to the bottom of the test-tube with the glass rod.

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Step 11 Carefully pour **hydrogen peroxide solution** into the test-tube until it reaches the line you marked on the test-tube in step 9. Immediately start the stop-clock and observe the paper disc rising.

Stop the stop-clock when the paper disc reaches the surface of the hydrogen peroxide solution.

Record the time taken for the disc to rise, in your table in **1(a)(ii)**. Record the time in seconds. If the paper disc has **not** reached the surface of the hydrogen peroxide solution after three minutes, stop the stop-clock and record the time as >180 in your table.

Step 12 Pour the hydrogen peroxide solution and paper disc into the beaker labelled **waste**.

Empty the contents of the watch glass into the waste beaker. Wipe the watch glass with a paper towel.

Step 13 Repeat steps 7 to 12 using the celery extract in test-tubes **B**, **C**, **D** and **E**.

(ii) Prepare a table to record your results.

[4]

(iii) State a conclusion for this investigation.

.....

.....

..... [1]

(iv) Identify the variable that you have changed (independent variable) and the variable you have measured (dependent variable) in this investigation.

independent variable .....

.....

dependent variable .....

.....

[2]

(b) (i) The oxygen gas produced by the reaction forms bubbles on the paper disc. The bubbles cause the disc to rise to the top of the hydrogen peroxide solution. The time taken for the disc to rise can be used to calculate the rate of the reaction.

View solution

Explain how you could calculate the rate at which the disc rises.

.....

.....

.....

..... [2]

(ii) Identify **one** source of error in step 4 and **one** source of error in step 11.

View solution

error in step 4 .....

.....

.....

error in step 11 .....

.....

.....

[2]

(c) Sodium chloride affects the activity of the enzyme catalase.

This enzyme catalyses the break-down of hydrogen peroxide to release water and oxygen gas.

View solution

$$2H_2O_2 \xrightarrow{\text{catalase}} 2H_2O + O_2$$

hydrogen peroxide — water — oxygen

Plan an experiment to determine the effect of sodium chloride concentration on the volume of oxygen gas produced during this reaction.

.....

.....

.....

.....

.....

.....

.....

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.....

.....

.....

.....

..... [6]

(d) The enzyme catalase is a protein.

View solution

State the test for protein and state the result of a positive test.

test .....

.....

positive test result .....

.....

[2]

[Total: 20]

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2 **(a)** The photograph in Fig. 2.1 shows a leaf from a European holly tree (*Ilex aquifolium*).

View solution

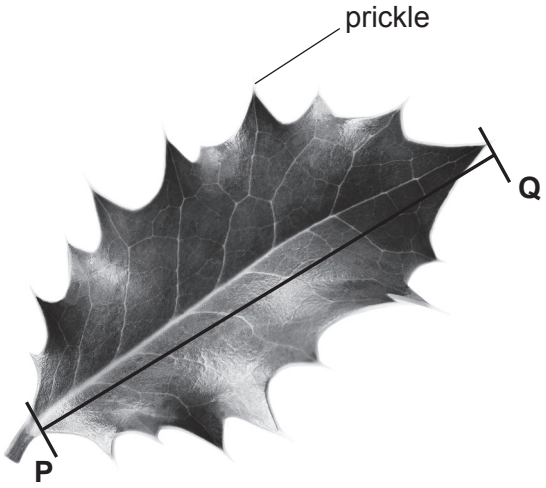

Fig. 2.1

(i) Draw a large diagram of the holly leaf shown in Fig. 2.1.

Do **not** label your drawing.

[4]

(ii) The line **PQ** on Fig. 2.1 shows the length of the leaf.

View solution

Measure the length of line **PQ** on Fig. 2.1. Include the unit.

length of line **PQ** .....

Draw a line on your drawing in the same position as line **PQ** in Fig. 2.1.

Measure the length of the line you have drawn. Include the unit.

length of the line on your drawing .....

Calculate the magnification of your drawing using your measurements and the formula.

$$\text{magnification} = \frac{\text{length of the line on your drawing}}{\text{length of line } \mathbf{PQ} \text{ in Fig. 2.1}}$$

Space for working.

.....
[3]

(b) Students investigated the relationship between the number of prickles on holly leaves and the height of the leaves above the ground.

View solution

- The students collected leaves from a total of five holly trees.
- The students took leaves from seven different heights on each holly tree.
- They collected 10 leaves from each height on each tree.
- They counted the number of prickles on each of the holly leaves and calculated the average number of prickles per leaf at each height.

The results of the investigation are shown in Table 2.1.

Table 2.1

height above ground on each holly tree / m	average number of prickles per leaf
0.5	18
1.0	14
1.5	13
2.0	
3.0	8
4.0	3
5.0	1

(i) The students counted a total of 614 prickles on the leaves collected at a height of 2.0 metres.

Calculate the total number of leaves collected at 2.0 metres above ground .....

Then calculate the average number of prickles per leaf.

Give your answer to the nearest whole number.

Space for working.

.....

[3]

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(ii) State **two** ways the students ensured that they collected a representative sample of leaves.

1 .....

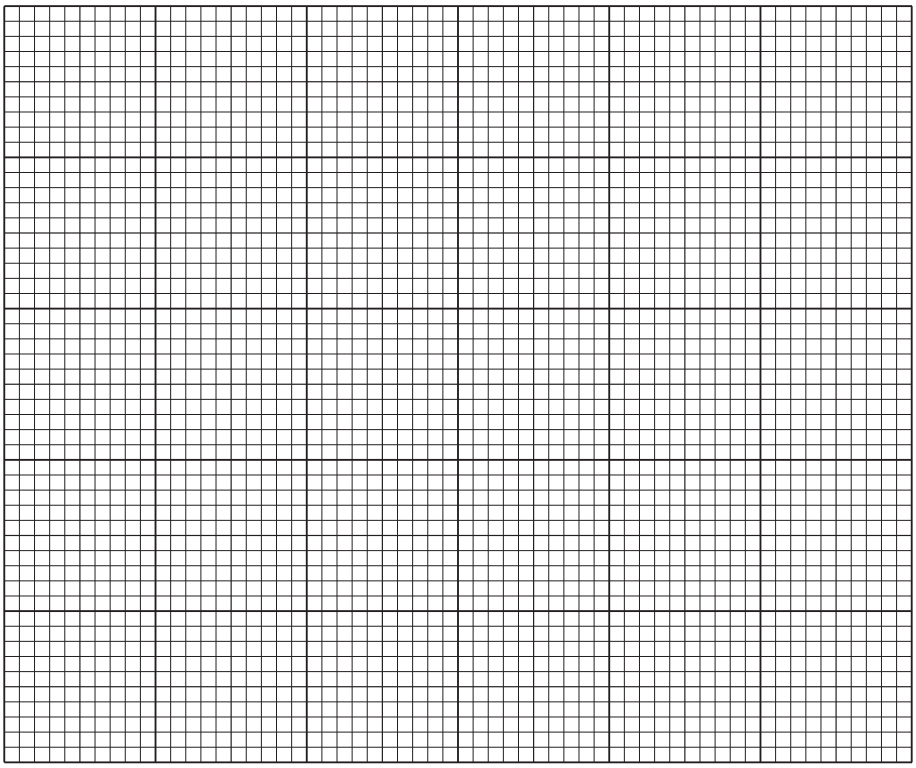
.....

2 .....

.....

[2]

(iii) Plot a line graph on the grid to show the data in Table 2.1. Include a line of best fit.



[4]

(c) Fig. 2.2 shows another holly leaf.

View solution



Fig. 2.2

Count and record the number of prickles on the leaf shown in Fig. 2.2.

Use the information in Table 2.1 or your graph in **2(b)(iii)** to estimate the height on the tree from which this holly leaf was collected.

number of prickles .....

estimated height on the holly tree ..... m

[2]

(d) Leaves contain starch.

View solution

State the solution used to test for starch and give the result of a positive test.

solution .....

.....

positive test result .....

.....

[2]

[Total: 20]

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