GradeMax

Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME	

CENTRE NUMBER						CANDIDATE NUMBER				

BIOLOGY **0610/52**

Paper 5 Practical Test **October/November 2022**

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 You are going to investigate the effect of hydrogen peroxide concentration on the activity of catalase.

Catalase is an enzyme found in yeast cells. The enzyme catalyses the breakdown of hydrogen peroxide to form water and oxygen. The reaction releases heat.

You are going to compare the activity of catalase in yeast cells in two different concentrations of hydrogen peroxide solution by measuring the change in temperature during the reaction.

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

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

Step 1 Cover the outside of each of the test-tubes with a piece of foil. Do not cover the openings at the top of the test-tubes.

Step 2 Attach a sticky label to the foil on each test-tube. Label one test-tube **A** and the other test-tube **B**. Put the foil-covered test-tubes into the test-tube rack.

Step 3 Use the large syringe to put 10 cm^3 of hydrogen peroxide solution into test-tube **A**.

Step 4 Measure the temperature of the hydrogen peroxide solution in test-tube **A**. Record this measurement as the temperature at 0 minutes in your table in **1(a)(i)**.

Step 5 Use the glass rod to stir the yeast suspension. Use the small syringe to add 1 cm^3 of yeast suspension to the hydrogen peroxide solution in test-tube **A**.

Immediately start the stop-clock.

Step 6 Measure the temperature of the hydrogen peroxide solution in test-tube **A** every minute for five minutes. Record the measurements in your table in **1(a)(i)**.

Step 7 Use the large syringe to put 5 cm^3 of hydrogen peroxide solution and 5 cm^3 of distilled water into test-tube **B**.

Step 8 Repeat steps 4, 5 and 6 using test-tube **B**.

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(a) (i) Prepare a table to record your results.

[4]

(ii) Using your results, identify the highest temperature and the lowest temperature in each test-tube.

Use these values to calculate the maximum temperature **change** in each test-tube.

Space for working.

maximum temperature change in test-tube **A** .....°C

maximum temperature change in test-tube **B** .....°C
[2]

(iii) State a conclusion for your results.

.....

.....

..... [1]

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[Turn over

(iv) State the variable that was measured (dependent variable) in this investigation.

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..... [1]

(b) (i) The test-tubes were covered with foil in step 1.

Predict and explain the effect on the results of **not** covering the test-tubes with foil.

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..... [2]

(ii) State **one** variable, other than covering both test-tubes with foil, that was kept constant in this investigation.

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..... [1]

(c) (i) In a different experiment, students investigated the effect of pH on the breakdown of hydrogen peroxide by calculating the rate of oxygen production.

State the **two** measurements that the students would need to take to calculate the rate of oxygen production in cm^3 per minute.

1 .....

2 .....
[2]

The results of the investigation are shown in Table 1.1.

Table 1.1

pH	rate of oxygen production / cm^3 per minute			average rate of oxygen production / cm^3 per minute
	trial 1	trial 2	trial 3	
5	7	8	8	7.7
6	15	17	14	15.3
7	26	29	27	27.3
8	27	16	28	27.5
9	5	6	4	5.0

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(ii) The students decided that the result for trial 2 at pH 8 was anomalous.

State what is meant by an anomalous result.

.....

.....

..... [1]

(iii) Describe how the students calculated the average value for pH 8.

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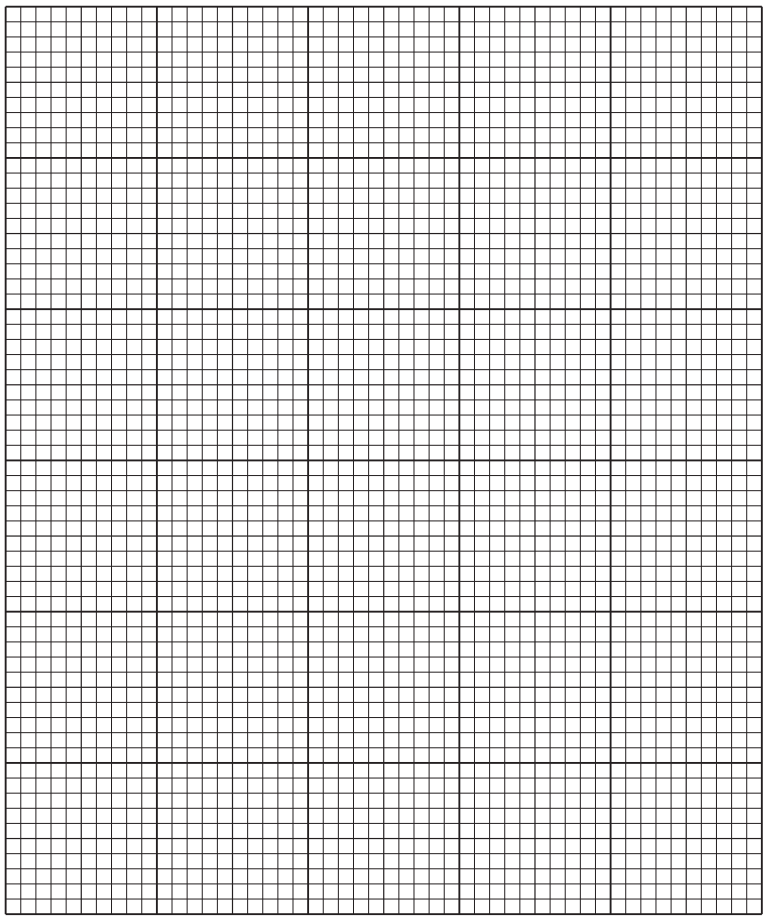
..... [1]

(iv) Using the data in Table 1.1, plot a line graph on the grid to show the effect of pH on the average rate of oxygen production.



[4]

(v) Describe the effect of pH on the average rate of oxygen production.

Use the data from your graph to support your answer.

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..... [2]

(vi) The students wanted to obtain a more accurate value for the pH at which the average rate of oxygen production was highest.

Suggest what further investigative work the students should do.

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..... [2]

[Total: 23]

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2 Fig. 2.1 is a photomicrograph of a cross-section of a stalk of celery, *Apium graveolens*.

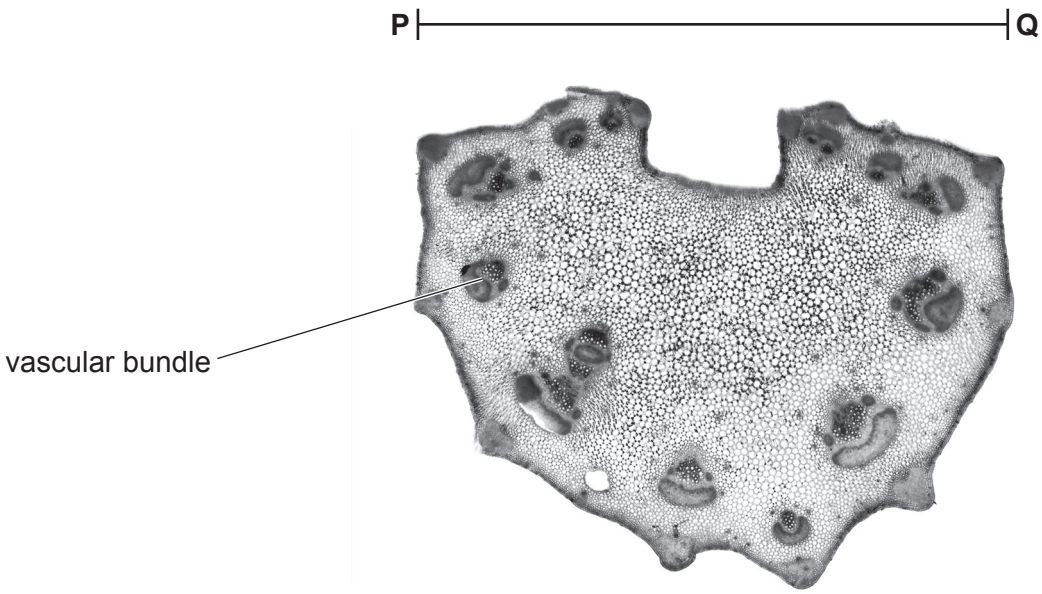

Fig. 2.1

(a) (i) Draw a large diagram of the celery stalk in Fig. 2.1.

Show the positions of the vascular bundles on your drawing but do not draw individual cells.

Label **one** vascular bundle on your drawing.

[5]

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(ii) Line **PQ** on Fig. 2.1 represents the width of the celery stalk cross-section.

The actual width of the cross-section is 27 mm.

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

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

Calculate the magnification of the photomicrograph using the formula and your measurement.

$$\text{magnification} = \frac{\text{length of line } \mathbf{PQ}}{\text{actual width of the celery stalk cross-section}}$$

Give your answer as a whole number.

Space for working.

.....
[3]

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[Turn over

(b) The movement of water up a celery stalk can be investigated by placing a celery stalk in a solution of dye. Fig. 2.2 shows a celery stalk in a glass containing dye.



Fig. 2.2

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Plan an investigation to determine the effect of air temperature on the movement of dye up a celery stalk.

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..... [6]

(c) Describe a method that can be used to find out if samples of plant tissue contain reducing sugars.

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..... [3]

[Total: 17]

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