Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

4439318502

BIOLOGY **0610/51**

Paper 5 Practical Test **May/June 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 Rice contains starch. Amylase is an enzyme that catalyses the breakdown of starch to form reducing sugars.

You are going to investigate the effect of amylase on cooked rice.

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)(i).

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

Step 1 Label one empty test-tube **W10** and label the other empty test-tube **A10**.

Step 2 Put the test-tubes in the empty beaker labelled **80 °C water-bath**.

Step 3 Label one of the large test-tubes containing rice **W** and the other large test-tube containing rice **A**.

Step 4 Put both large test-tubes containing rice in the empty beaker labelled **40 °C water-bath**.

Step 5 Raise your hand when you are ready for warm water to be added to the **40 °C** water-bath.

Step 6 Use the measuring cylinder to add 20 cm^3 of **distilled water** to the rice in the test-tube labelled **W**.

Step 7 Use the measuring cylinder to add 20 cm^3 of **amylase solution** to the rice in the test-tube labelled **A**.

Step 8 Start the stop-clock and leave the test-tubes of rice in the **40 °C** water-bath for 10 minutes. While you are waiting, carry out step 9.

Step 9 Use the syringe to add 2 cm^3 of Benedict's solution to each of the empty test-tubes, **W10** and **A10**. Put the test-tubes back in the empty beaker labelled **80 °C water-bath**.

Step 10 After 10 minutes (step 8), put the stopper into test-tube **W** and invert the test-tube three times. Remove the stopper.

Step 11 Use a clean pipette to remove 2 cm^3 of the liquid surrounding the rice in test-tube **W**. Put the 2 cm^3 of liquid into test-tube **W10**. Put test-tube **W10** back into the beaker labelled **80 °C water-bath**.

Step 12 Repeat steps 10 and 11 with test-tubes **A** and **A10**.

Step 13 Raise your hand when you are ready for hot water to be added to the beaker labelled **80 °C water-bath**.

Step 14 Leave test-tubes **W10** and **A10** in the **80 °C** water-bath for 10 minutes. While you are waiting continue with the other questions.

Step 15 After 10 minutes, record the **colour** of the liquid in test-tubes **W10** and **A10** in the table you have prepared in **1(a)(i)**.

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

[3]

(ii) State a conclusion for your results.

.....

.....

..... [1]

(iii) State **one** variable that was kept constant in this investigation.

..... [1]

(iv) State the purpose of adding distilled water to the test-tube of cooked rice labelled **W**.

.....

.....

..... [1]

(v) It was important that step 6 was carried out before step 7.

Predict the effect on the results if step 7 was carried out before step 6.

.....

.....

..... [1]

(vi) The temperature of the 40 °C water-bath will decrease during the investigation.

State **one** piece of equipment that could be used to maintain the temperature at 40 °C.

..... [1]

(b) State how you could show that cooked rice contains starch.

.....

.....

.....

.....

..... [2]

(c) Some students investigated the effect of temperature on the rate of amylase activity. They measured the mass of reducing sugars produced in five minutes, at different temperatures.

The results of this investigation are shown in Fig. 1.1.

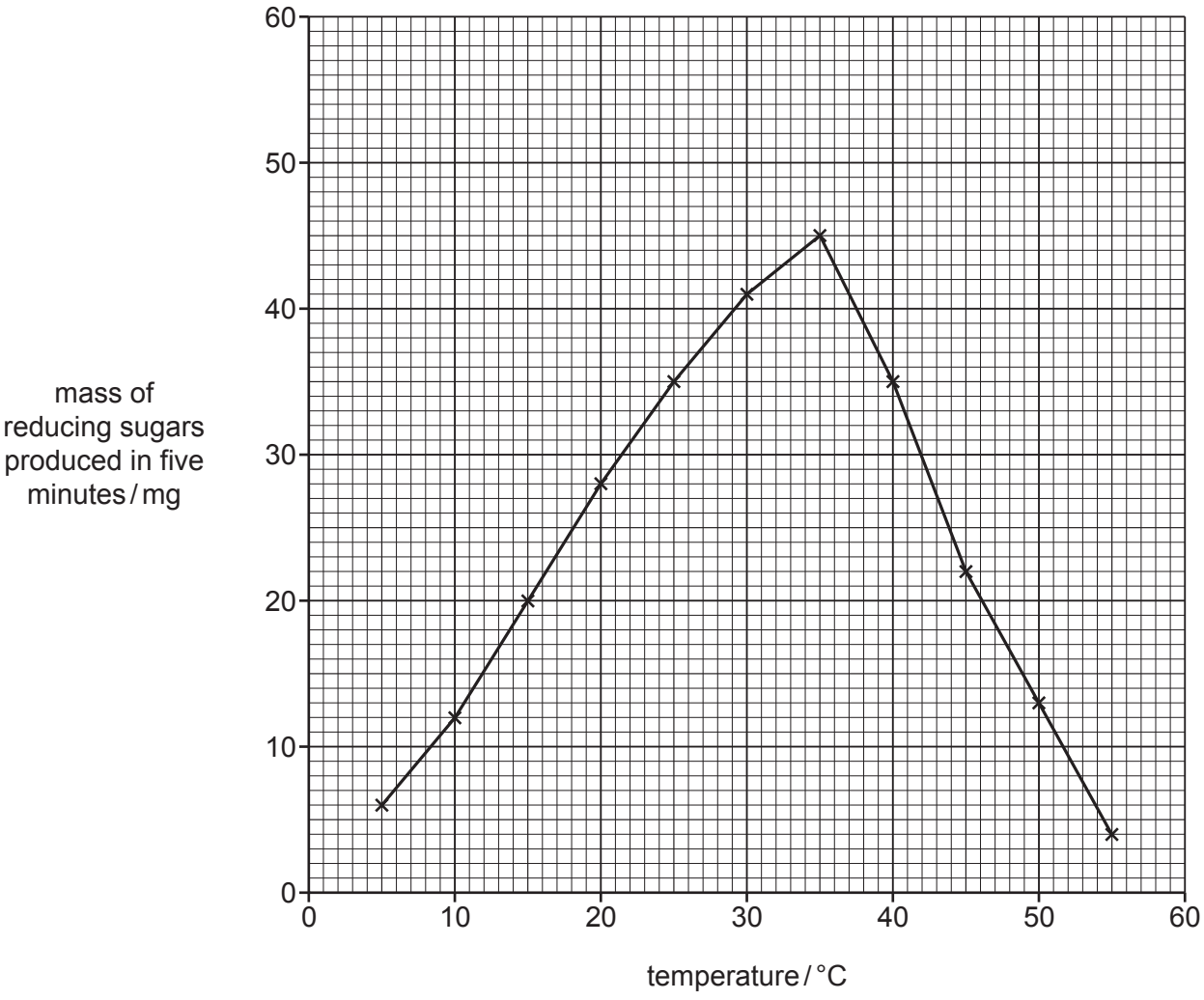


Fig. 1.1

(i) Describe the effect of temperature on the activity of amylase shown in the graph in Fig. 1.1.

.....

.....

.....

.....

..... [2]

(ii) Use the graph to estimate the **rate** of amylase activity, in mg per minute, at a temperature of 42 °C.

Space for working.

..... mg per minute
[2]

(iii) The students wanted to obtain a more accurate value for the temperature at which amylase works best.

Suggest further investigative work that the students should carry out.

.....

.....

.....

.....

..... [2]

(d) Plan an investigation to determine the effect of pH on the activity of amylase.

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..... [6]

[Total: 22]

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2 Fig. 2.1 is a photomicrograph of a section through part of a marram grass leaf, *Ammophila arenaria*.



Fig. 2.1

(a) (i) Draw a large diagram of the section of marram grass leaf shown in Fig. 2.1.

Do **not** draw individual cells.

[4]

(ii) Fig. 2.2 shows a cross-section of a whole marram grass leaf.

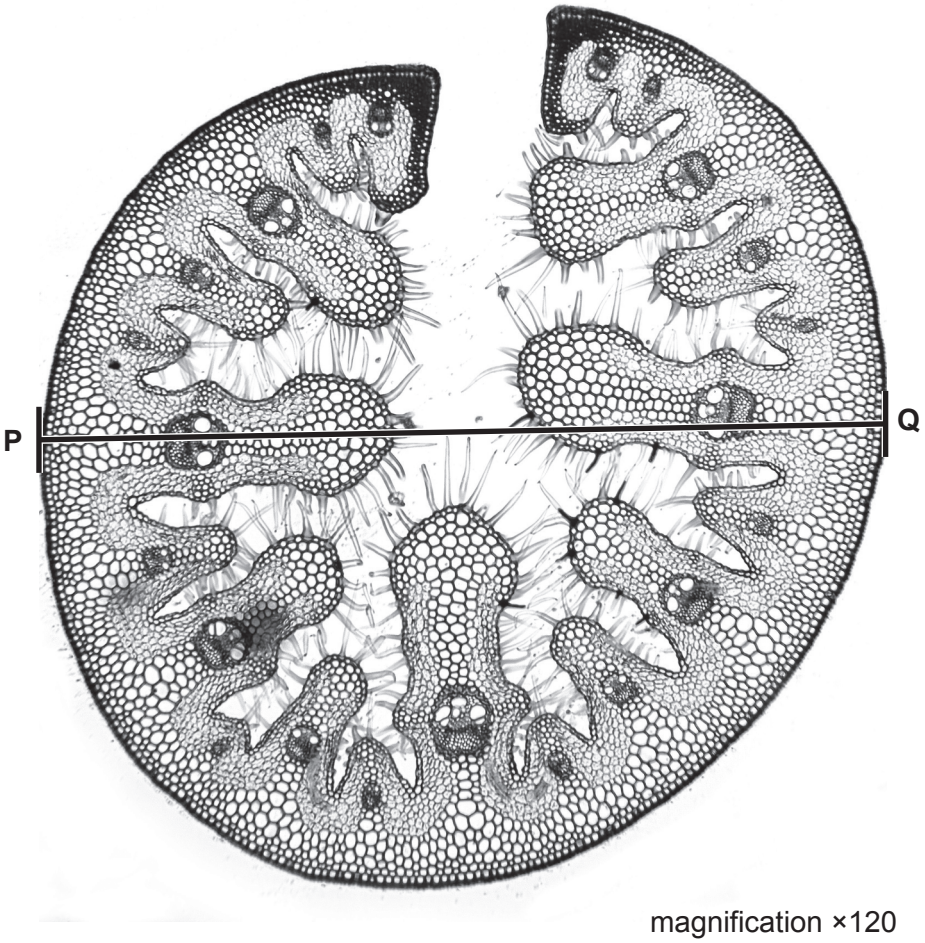


Fig. 2.2

Measure the length of line **PQ** on Fig. 2.2.

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

Calculate the actual diameter of the marram grass leaf using the formula and your measurement.

$$\text{magnification} = \frac{\text{length of line } \mathbf{PQ} \text{ on Fig. 2.2}}{\text{actual diameter of the marram grass leaf}}$$

Give your answer to **one** decimal place.

Space for working.

..... mm
[3]

(b) Scientists investigated the effect of different concentrations of sodium chloride solution on the germination and growth of marram grass.

Marram grass seeds were germinated in Petri dishes on filter paper which had been soaked in one of the different sodium chloride solutions. Each Petri dish contained 15 seeds and the investigation was repeated four times.

After 20 days, the lengths of the seedling roots were measured with a ruler.

(i) State the variable that was changed (independent variable) and the variable that was measured (dependent variable) in this investigation.

independent variable .....

.....

dependent variable .....

.....

[2]

(ii) State **two** ways the scientists designed the investigation to produce valid and reliable results.

1 .....

.....

2 .....

.....

[2]

(c) The results of the investigation described in **2(b)** are shown in Table 2.1.

Table 2.1

concentration of sodium chloride solution / g per dm^3	average root length / mm
0	33
2	22
4	19
6	13
8	2
10	1

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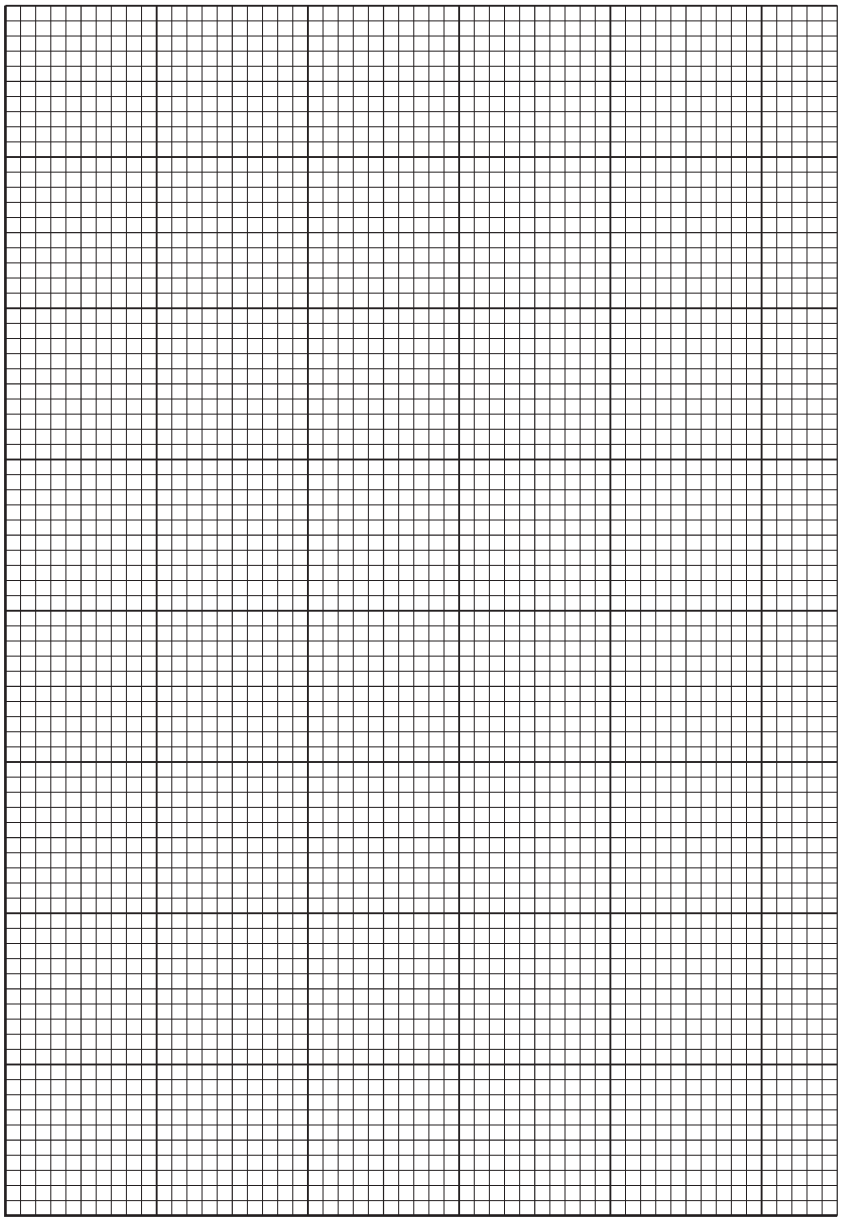
(i) Using the information in Table 2.1, calculate the percentage decrease in the average root length when the concentration of sodium chloride was changed from 4 g per dm^3 to 6 g per dm^3.

Give your answer to **three** significant figures.

Space for working.

..... %
[3]

(ii) Plot a line graph on the grid of the data in Table 2.1.



[4]

[Total: 18]

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