Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

BIOLOGY **0610/53**

Paper 5 Practical Test **October/November 2020**

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. Blank pages are indicated.

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1 Amylase is an enzyme that catalyses the break-down of starch into reducing sugars.

Amylase is produced by seeds during germination.

You are provided with extract **U**, which is made from germinating seeds.

You are going to estimate the concentration of amylase in seed extract **U** by comparing it to known concentrations of amylase.

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 gloves and eye protection provided while you are carrying out the practical work.

Step 1 Label four small beakers **A**, **B**, **C**, and **D**.

Step 2 Use the syringes to add the volumes of **2% amylase** and **distilled water** shown in Table 1.1 to each labelled beaker.

Table 1.1

beaker	volume of 2% amylase solution / cm^3	volume of distilled water / cm^3	final percentage concentration of amylase solution
A	10.0	0.0	2.0
B	7.5	2.5	1.5
C	5.0	5.0	1.0
D	2.5	7.5	

(a) (i) Complete Table 1.1 by calculating the final percentage concentration of amylase solution for beaker **D**.

.....% [1]

Step 3 Label five test-tubes **A**, **B**, **C**, **D** and **U**.

View solution

Step 4 Use a syringe to add 2 cm^3 of **starch** suspension to each of the labelled test-tubes.

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Step 5 Prepare a white tile by using a pipette to put drops of iodine solution in five columns labelled **A**, **B**, **C**, **D** and **U**, as shown in Fig. 1.1. There should be **8** drops of iodine solution in each column.

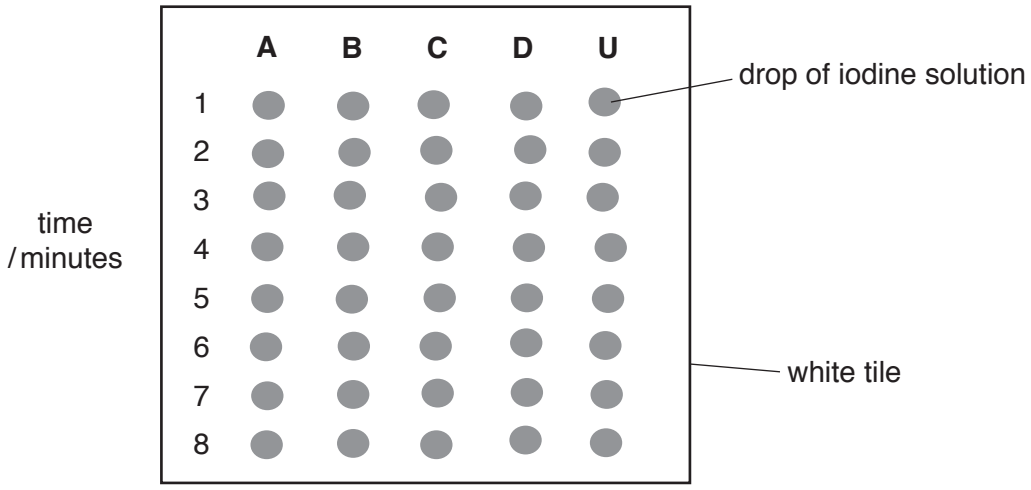

Fig. 1.1

Step 6 Use a clean syringe to add 2 cm^3 of amylase solution from beaker **A** to test-tube **A** and shake gently to mix.

Step 7 Repeat step 6 using beakers **B**, **C**, **D** and **U** and test-tubes **B**, **C**, **D** and **U**.

Step 8 Start the stop-clock.

Step 9 After one minute use a clean pipette to remove one drop of solution from test-tube **A** and add it to the first drop of iodine solution, **A1**, on the white tile. Observe any colour change.

Step 10 Repeat step 9 using:

- the contents of test-tube **B** and iodine solution drop **B1**
- the contents of test-tube **C** and iodine solution drop **C1**
- the contents of test-tube **D** and iodine solution drop **D1**
- the contents of test-tube **U** and iodine solution drop **U1**.

Step 11 Repeat steps 9 and 10 after two minutes using iodine solution drop **A2**, **B2**, **C2**, **D2** and **U2**.

Step 12 Continue to test the contents of the test-tubes at one minute intervals until a drop of the mixtures in the beakers has been added to all eight rows of iodine solution drops on the white tile.

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Step 13 Observe the colour of each drop of iodine solution on the white tile and determine the time at which the starch in each test-tube was broken down.

In your table in **1(a)(ii)**, record the time taken for the starch to be broken down.

If starch was still present in row **8** record the time taken as **>8**.

(ii) Prepare a table to record your results.

[4]

(iii) Explain how you decided when all of the starch had been broken down in step 13.

.....

.....

..... [1]

(iv) Estimate the concentration of amylase in seed extract **U** using your results in **1(a)(ii)**.

State the evidence that supports your choice.

estimated amylase concentration of **U** .....

evidence .....

.....

.....

[1]

(v) Describe how you would test for the presence of reducing sugars.

State the result for a positive test.

method .....

.....

.....

positive test result .....

[3]

(b) Seeds contain starch as a store of energy. Amylase in the seeds catalyses the break-down of the stored starch into reducing sugars. Seeds use the reducing sugars to provide some of the energy required for germination.

Plan an investigation to find out how temperature affects the activity of amylase in germinating seeds.

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..... [6]

View solution

(c) A scientist investigated how the activity of amylase in a seed changed as it germinated.

She measured the activity of amylase in a germinating seed over a period of 18 days.

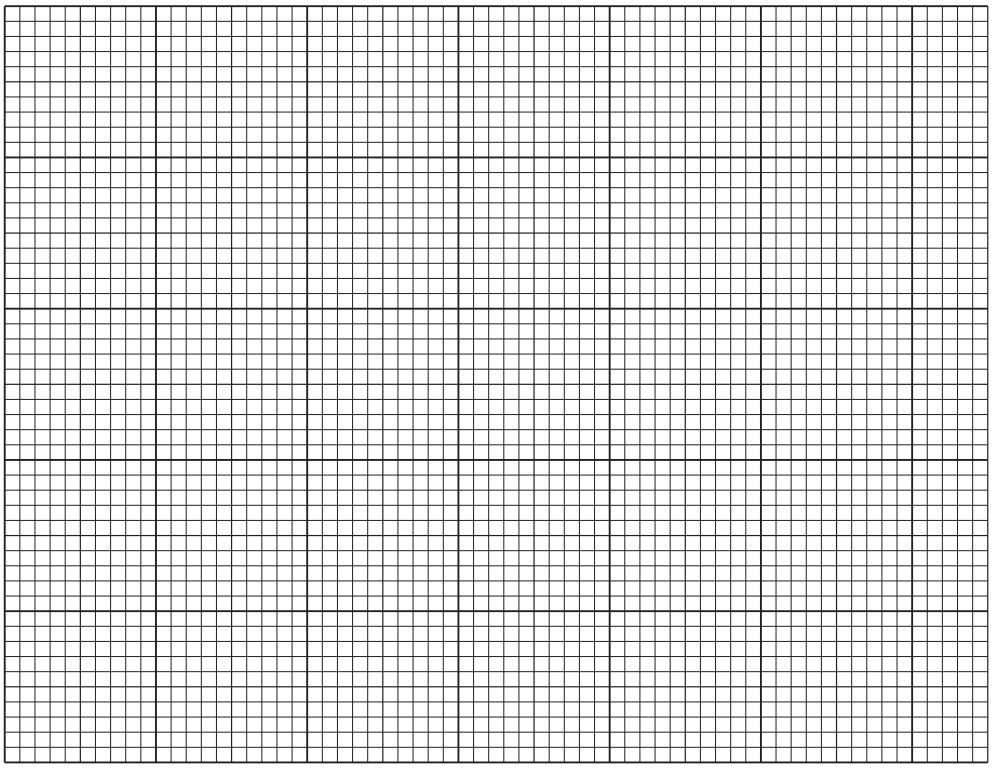
The results are shown in Table 1.2.

View solution

Table 1.2

time / days	activity of amylase / arbitrary units
0	0
3	0
6	40
9	240
12	240
15	120
18	65

(i) Plot a line graph of the data in Table 1.2.



[4]

(ii) Describe the pattern shown by the data in your graph.

View solution

.....

.....

.....

.....

..... [2]

(d) (i) The data in Table 1.2 did not enable the scientist to determine precisely when the amylase was most active.

Explain why.

View solution

.....

.....

..... [1]

(ii) Suggest what further data is needed to be able to determine exactly when amylase was most active.

.....

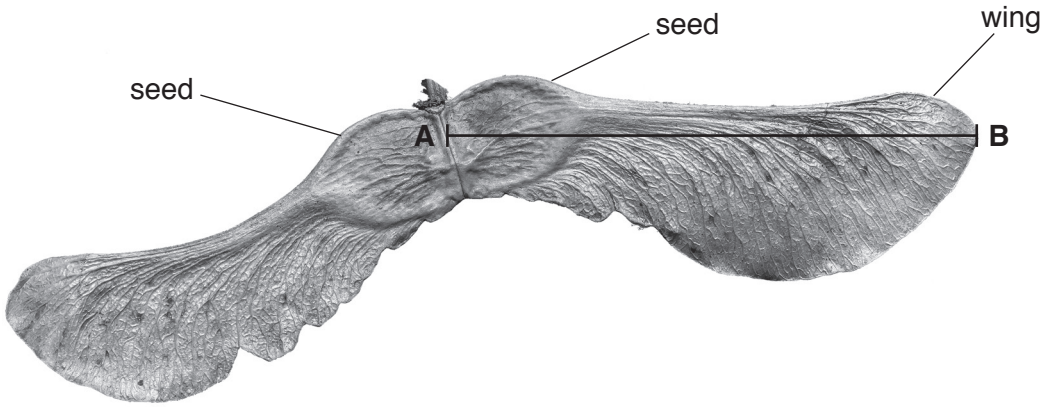
.....

..... [1]

[Total: 24]

View solution

2 Fig. 2.1 shows a photograph of two winged seeds from a sycamore tree.



magnification ×4

Fig. 2.1

(a) (i) Make a large drawing of the two winged seeds shown in Fig. 2.1.

Do **not** label your drawing.

View solution

[4]

(ii) Measure the length of line **AB** on the winged seed on Fig. 2.1.

View solution

length of line **AB** ..... mm

Calculate the actual seed length using the equation and your measurement. Include the unit.

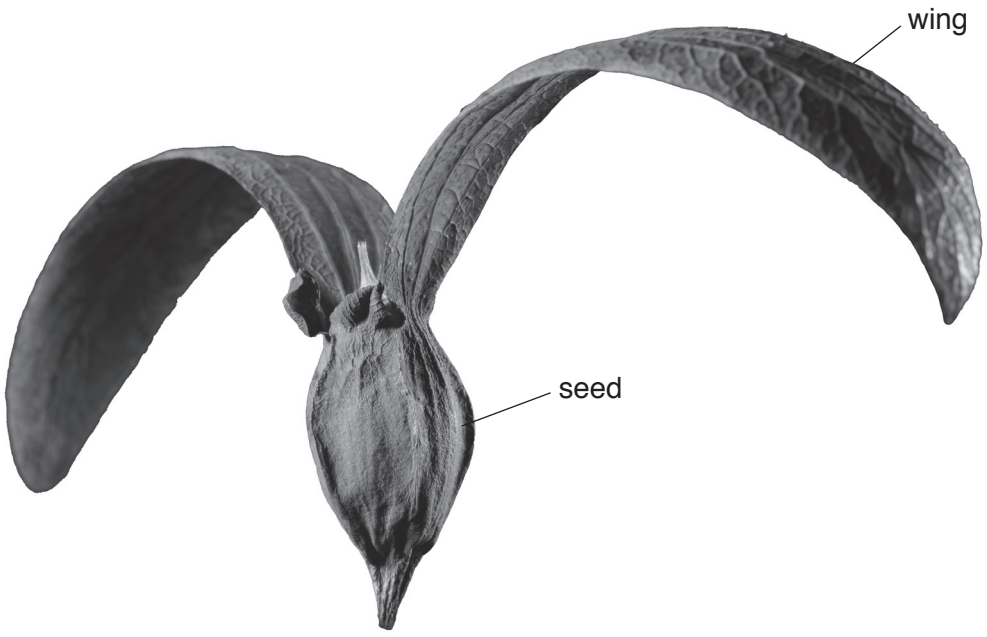
$$\text{magnification} = \frac{\text{length of line } \mathbf{AB}}{\text{actual seed length}}$$

.....

[3]

(b) Fig. 2.2 is a photograph of a seed from another type of tree.

View solution



magnification ×1.5

Fig. 2.2

Describe **one** similarity and **one** difference between the seeds in Fig. 2.1 and the seed in Fig. 2.2.

similarity .....

.....

difference .....

.....

[2]

(c) Seeds such as those in Fig. 2.1 and in Fig. 2.2 can rotate when they fall, moving them further away from the parent tree.

A student collected sycamore seeds with wings of different lengths. They dropped the seeds from the same height and measured the distance travelled by each seed.

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The results are shown in Fig. 2.3.

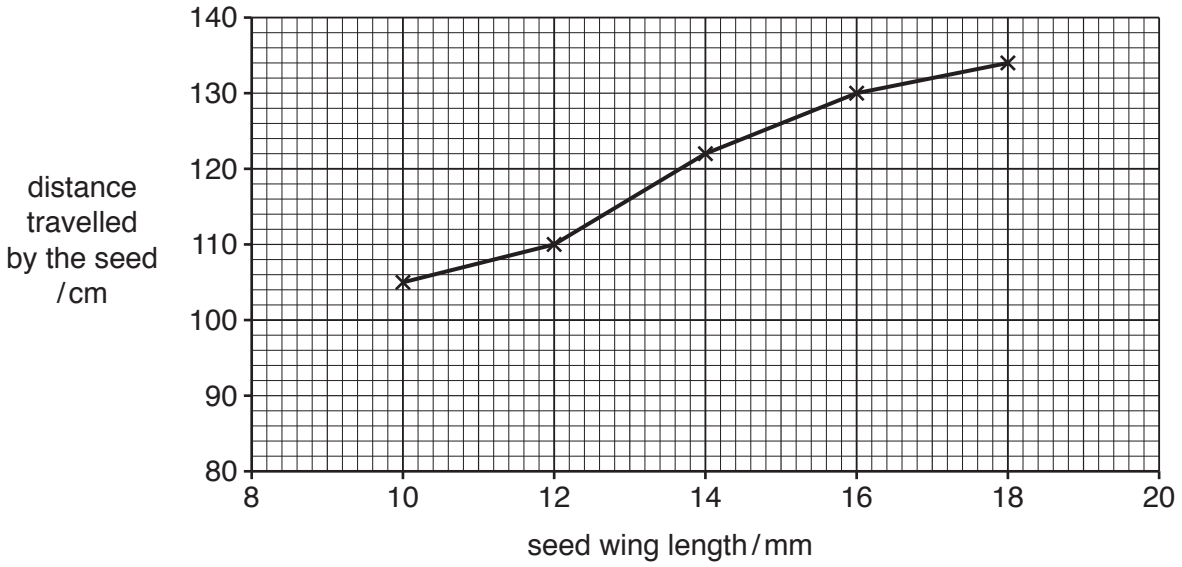

Fig. 2.3

(i) Estimate, using the graph, the distance travelled by a seed with a wing length of 15 mm.

Show on your graph how you estimated this value.

..... cm
[2]

(ii) Calculate the percentage increase in the distance travelled by a seed with a wing length of 18 mm compared to a seed with a wing length of 10 mm.

View solution

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

Space for working.

..... %
[3]

(iii) State **two** variables that should be kept constant in the investigation described in **2(c)**.

1 .....

.....

2 .....

.....

[2]

[Total: 16]

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