Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER			

BIOLOGY **0610/63**

Paper 6 Alternative to Practical **October/November 2020**

1 hour

You must answer on the question paper.

No additional materials are needed.

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 [ ].

This document has **16** 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.

A student wanted to estimate the concentration of amylase in a seed extract, **U**. They did this by determining the time taken for **U** to break down starch. This result was then compared to the time taken by known concentrations of amylase.

Step 1 The student was given a beaker containing seed extract **U**.

Step 2 The student made the four concentrations of amylase solution in beakers **A**, **B**, **C** and **D** by using the volumes of 2% amylase solution and distilled water shown in Table 1.1.

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) Calculate the final percentage concentration of amylase solution for beaker **D** in Table 1.1.

.....% [1]

Step 3 A white tile was prepared 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 were 8 drops of iodine solution in each column.

View solution

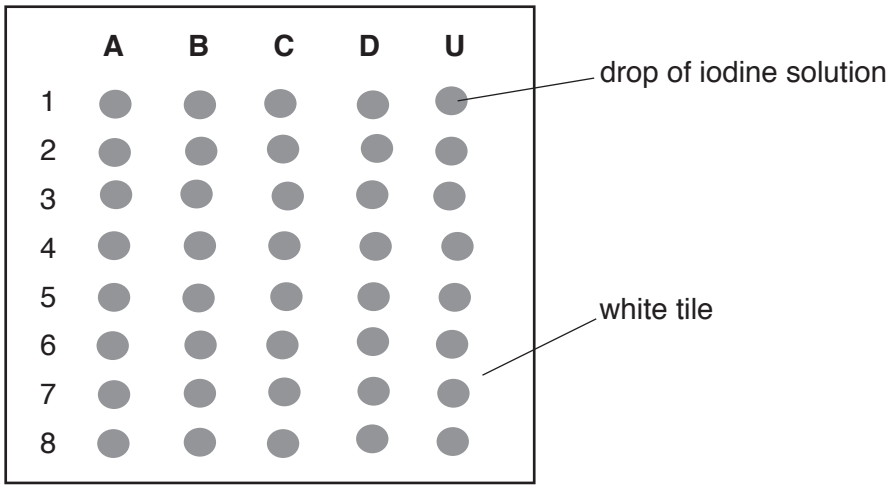

Fig. 1.1

Step 4 2 cm^3 of starch suspension was put into each of the beakers labelled **A**, **B**, **C**, **D** and **U**.

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Step 5 A stop-clock was started.

Step 6 After one minute one drop of the mixture from beaker **A** was added to the first drop of iodine solution labelled **A1** on the white tile. This was repeated for beakers **B**, **C**, **D** and **U** using drops **B1**, **C1**, **D1** and **U1**.

Step 7 Step 6 was repeated at one minute intervals until drops of the mixtures in the beakers had been added to all eight rows of iodine solution drops on the white tile.

The results are shown in Fig. 1.2.

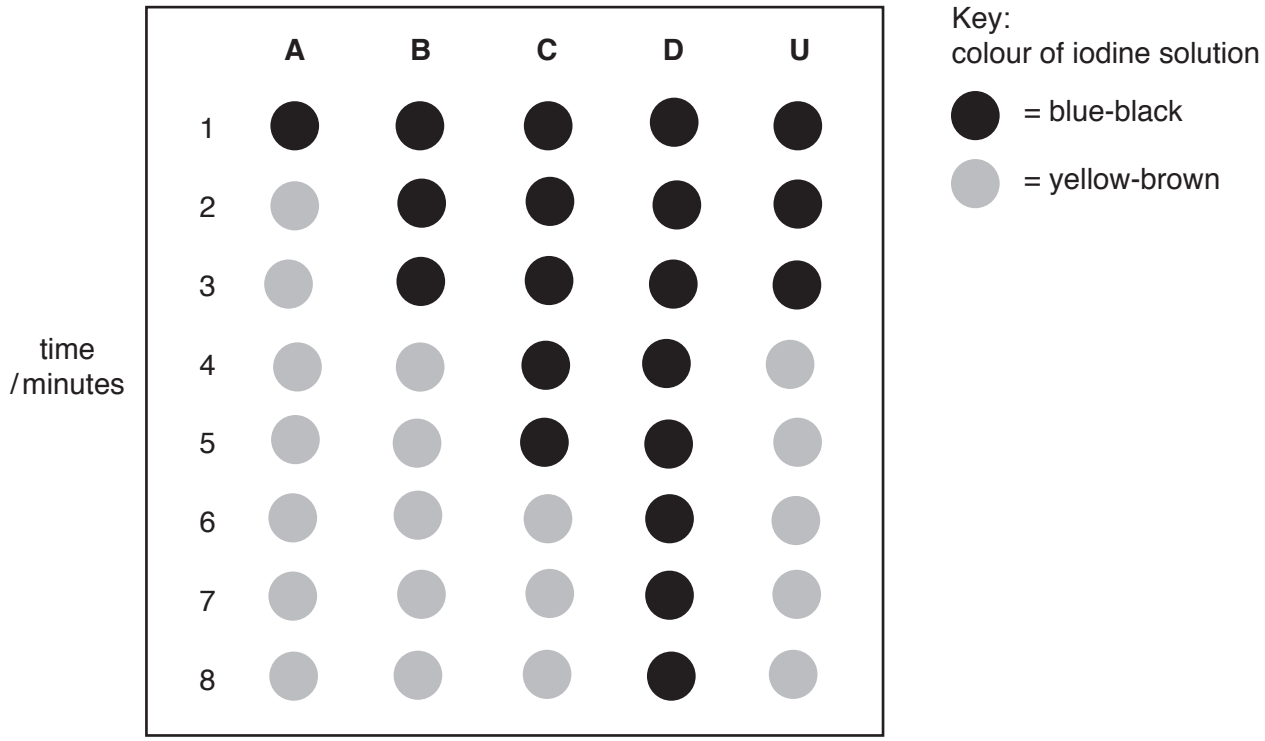

Fig. 1.2

(ii) Prepare a table and record the time taken for the starch to be broken down, using the information in Fig. 1.2.

If starch is still present in row 8, record this in your table as **> 8**.

[3]

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(iii) Explain how you decided that all of the starch had been broken down.

.....

.....

..... [1]

(iv) Estimate the concentration of amylase in seed extract **U** using the results in **1(a)(ii)** and Fig. 1.2.

State the evidence that supports your choice.

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

evidence .....

.....

.....
[1]

(v) State **one** safety precaution that should be taken when carrying out the investigation described in **1(a)**.

.....

.....

..... [1]

(vi) 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

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(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.

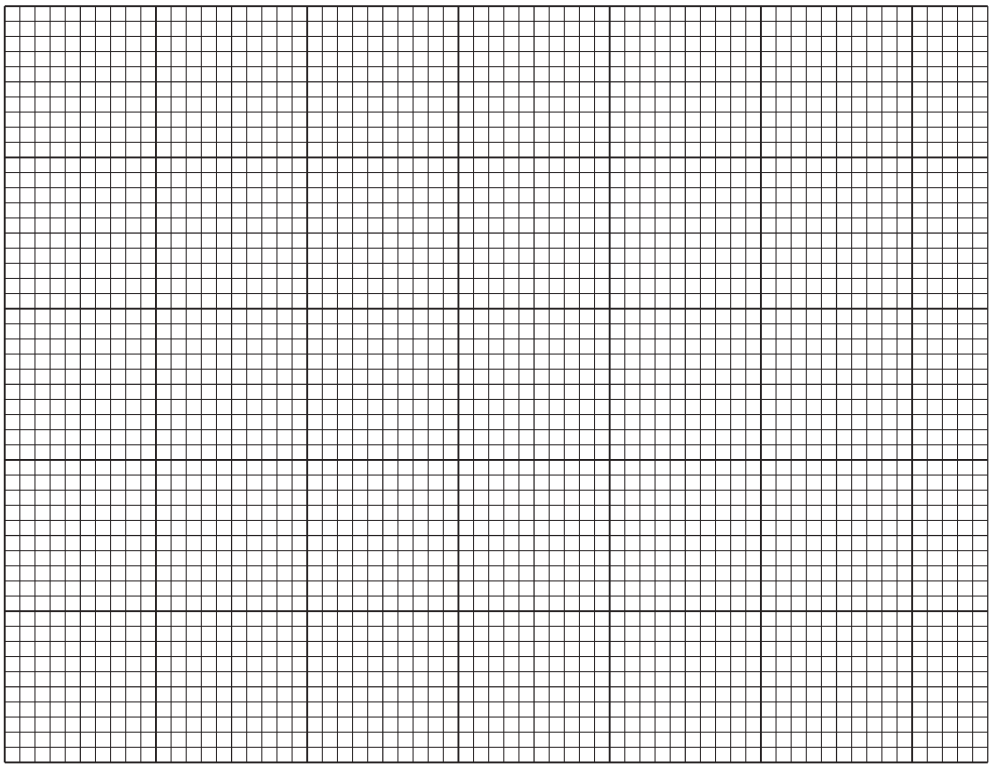
The results are shown in Table 1.2.

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]

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

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.....

.....

.....

.....

..... [2]

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

View solution

Explain why.

.....

.....

..... [1]

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

.....

.....

..... [1]

[Total: 24]

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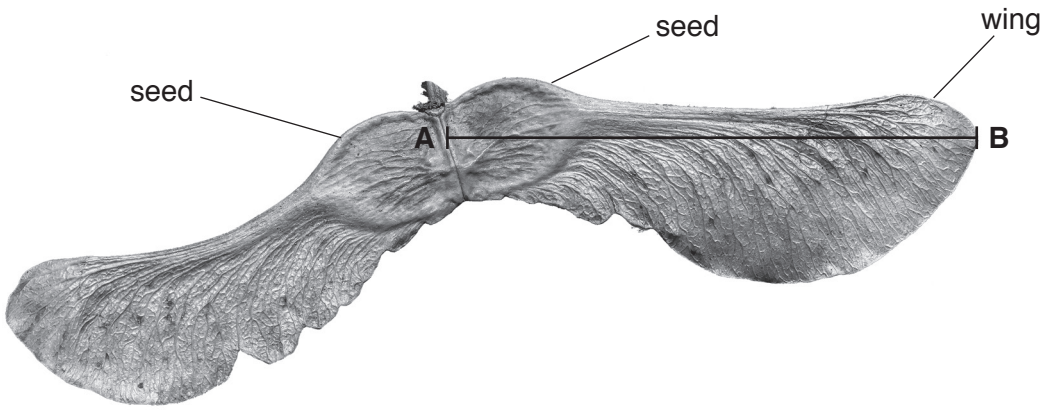
2 Fig. 2.1 shows a photograph of two winged seeds from a sycamore tree.



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.

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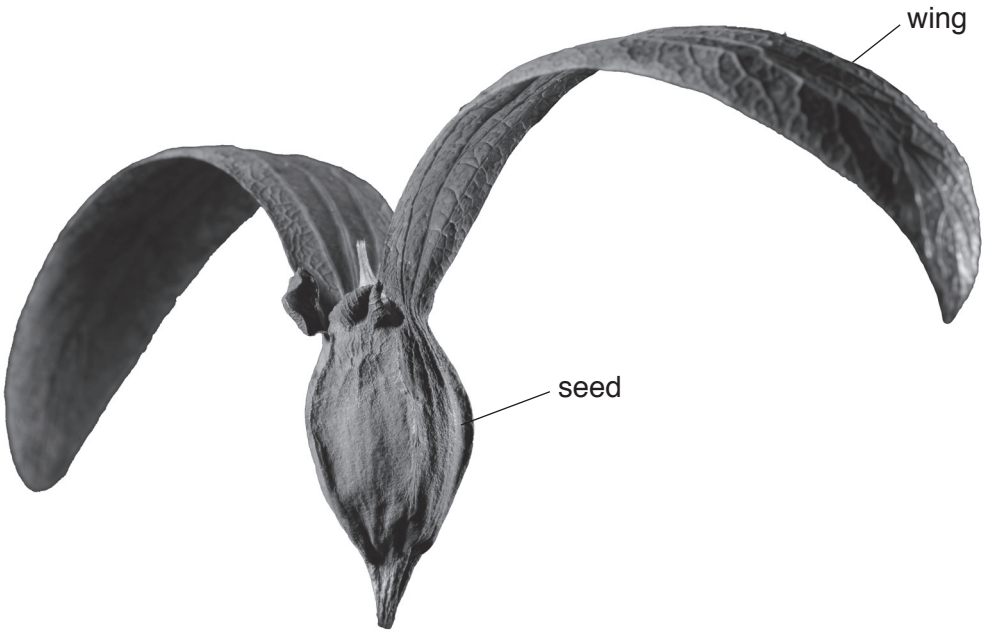

magnification ×1.5

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.

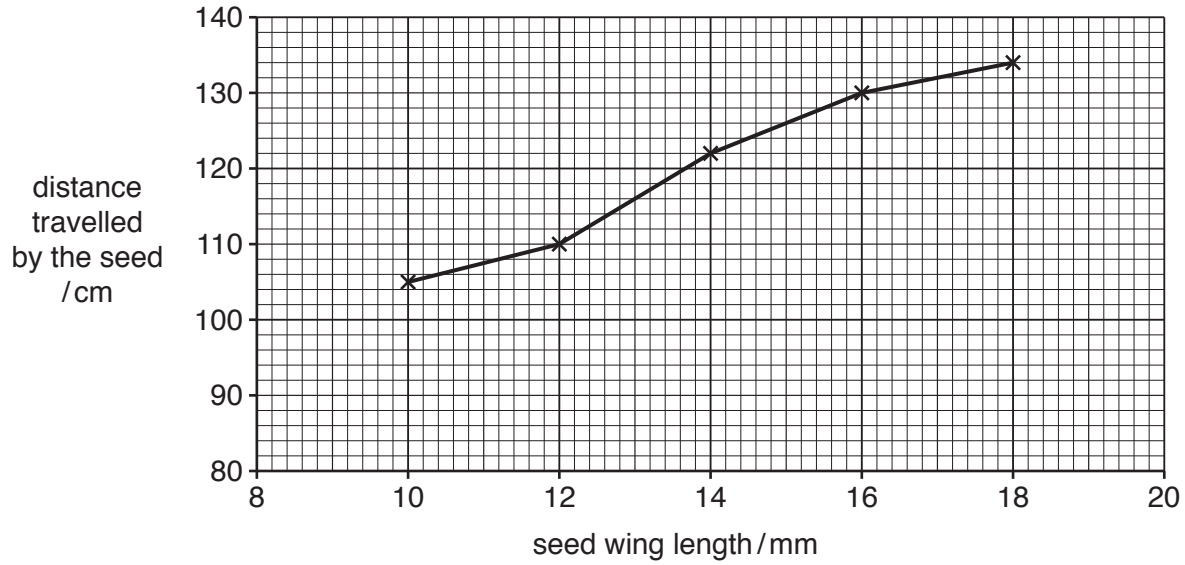

Fig. 2.3

(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]

View solution

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