Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER | | | | | |

CANDIDATE NUMBER | | | | |

9531640679

BIOLOGY **0610/62**

Paper 6 Alternative to Practical **February/March 2017**

1 hour

Candidates answer on the Question Paper.

No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.

Electronic calculators may be used.
You may lose marks if you do not show your working or if you do not use appropriate units.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **10** printed pages and **2** blank pages.

1 **(a)** A student investigated the effect of different concentrations of sucrose solution on the movement of water into and out of potato cells by osmosis.

Water enters cells if the solution outside the cells is less concentrated than the solution inside the cells.

Water exits cells if the solution outside the cells is more concentrated than the solution inside the cells.

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

The student was given four different concentrations of sucrose solution labelled **A**, **B**, **C** and **D**.

The student was also given four potato sticks which were cut to the same length and diameter.

Step 1 The student measured the length of four potato sticks. The potato sticks for this step are shown in Fig. 1.1.

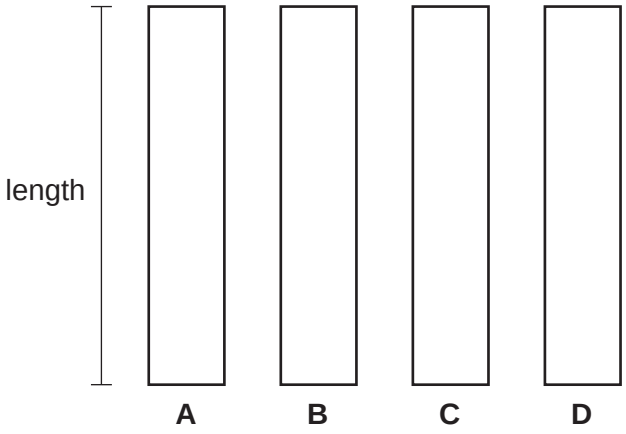

Fig. 1.1

Step 2 The student labelled a large test-tube **A** and used a syringe to put 25 cm^3 of sucrose solution **A** into the large test-tube.

Step 3 The student repeated step 2 using solutions **B**, **C** and **D** and three more large test-tubes. The student reused the syringe from step 2.

Step 4 The student placed one potato stick into each of the four large test-tubes, **A**, **B**, **C** and **D**. This step is shown in Fig. 1.2.

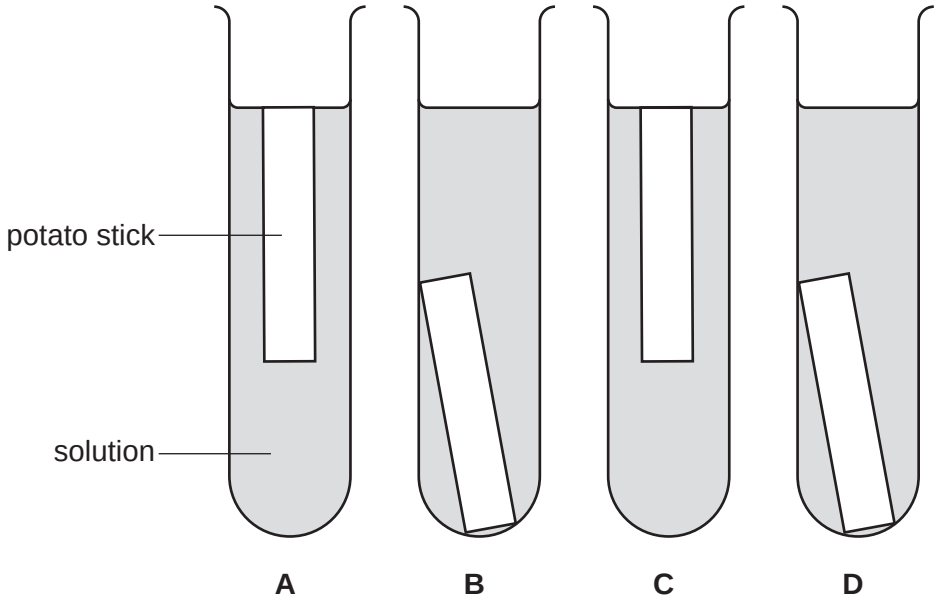

Fig. 1.2

Step 5 The potato sticks were left in the solutions for 30 minutes.

Step 6 After 30 minutes the student removed the potato sticks from the solutions and measured the length of each potato stick. The potato sticks for this step are shown in Fig. 1.3.

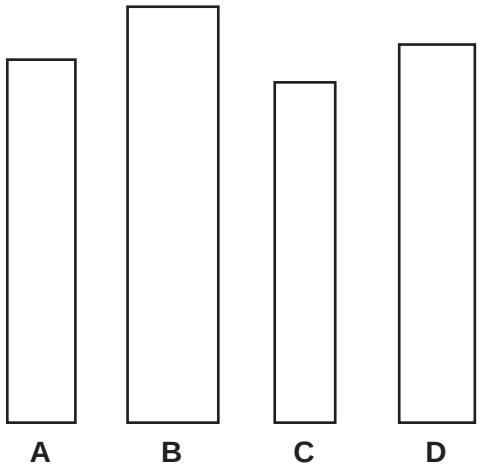

Fig. 1.3

(i) Measure the length of each potato stick in Fig. 1.1 and Fig. 1.3 and record the results in your table in **(a)(i)**.

Prepare a table to record your results in the space provided.
Your table should show:

- the length of the potato sticks at the start
- the length of the potato sticks after 30 minutes
- the change in length of the potato sticks.

[4]

(ii) Suggest why it is important to compare the change in length rather than the final lengths of the potato sticks in this type of investigation.

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.....

.....[1]

(b) The student examined each potato stick after the 30 minutes soaking time. Their observations are recorded in Fig. 1.4.

potato stick A - slightly soft, bends a little

potato stick B - very hard and easy to snap in half

potato stick C - very soft and bends easily

potato stick D - does not bend but difficult to snap in half

Fig. 1.4

(i) Use the information in your table of results and in Fig. 1.2 and Fig. 1.4 to identify solutions **A**, **B**, **C** and **D**.

Write your answers in Table 1.1.

Table 1.1

relative concentration of sucrose solution	solution letter
least concentrated ↓ most concentrated	

[2]

(ii) Explain how the results support your answer to part **(b)(i)**.

.....

.....

.....

.....[3]

(iii) Identify **one** source of error with the method and suggest an improvement.

error .....

.....

improvement .....

.....

[2]

(iv) State **one** of the controlled variables for this investigation.

.....

.....[1]

(c) Another investigation was carried out into the effect of different concentrations of sucrose solution on potato sticks.

In this investigation students decided to measure the change in mass rather than the change in length.

The students followed a similar method to the one in your investigation but they left the potato sticks to soak for three hours instead of 30 minutes.

(i) Suggest why the students left the potato sticks in the solutions for three hours instead of 30 minutes.

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.....[1]

(ii) The students dried the potato sticks on paper towels before measuring the mass of each potato stick.

Suggest why this step was **not** important in the investigation described in **1(a)**, where length was measured.

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.....[1]

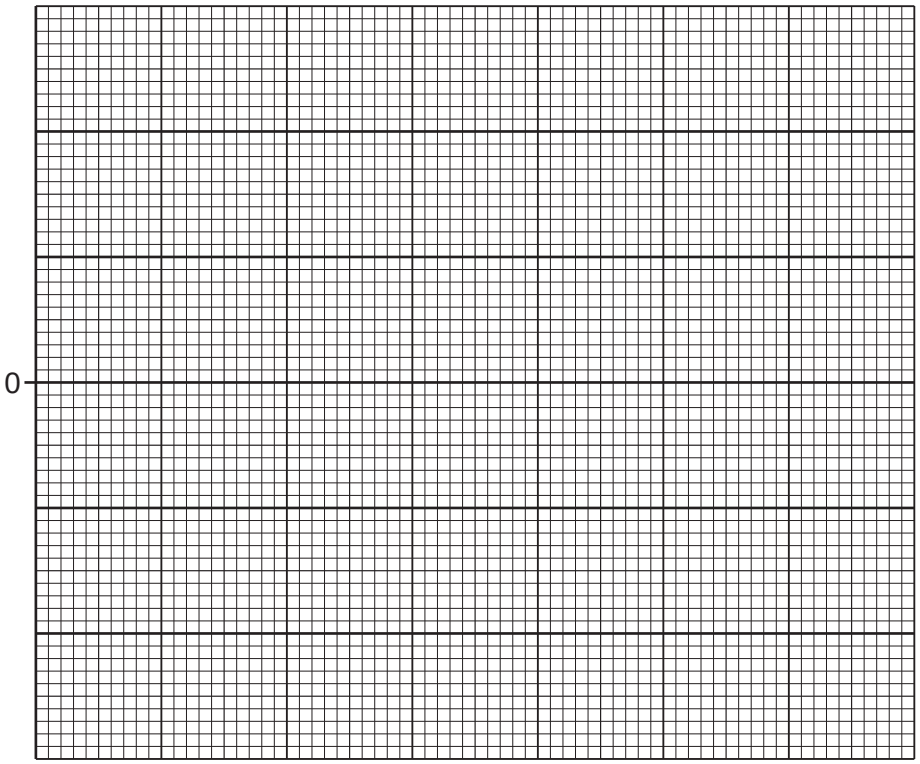
Table 1.2 shows their results.

Table 1.2

concentration of sucrose solution / g per dm^3	percentage change in mass
0	29.5
70	12.0
140	–3.0
210	–15.0
280	–26.0
350	–29.5

(iii) Using Table 1.2, plot a graph on the grid to show the effect of the concentration of sucrose solution on the percentage change in mass.

The *y*-axis has been started for you.



[4]

(iv) Use your graph to find the concentration of sucrose solution that would cause **no change** in mass of the potato stick.
Mark this point on your graph with a **+** and record the concentration.
Include the unit.

.....
[2]

(v) Students tested other potatoes and found different values for the concentration of sucrose solution that would cause no change in mass.

Suggest **one** reason for this.

.....

.....

.....[1]

[Total: 22]

2 Fig. 2.1 shows a flower. Some of the petals have been removed.

Fig. 2.1

(a) Draw a large diagram of the flower.

[4]

(b) Fig. 2.2 shows a different kind of flower.

magnification ×2.0

Fig. 2.2

(i) Measure the length of the labelled anther in the photograph.

length of anther ..... mm [1]

(ii) Use your answer to **2(b)(i)** and the equation to calculate the actual length of the anther.

$$\text{magnification} = \frac{\text{length of anther on photograph}}{\text{actual length of anther}}$$

Show your working.

actual length of anther ..... mm [2]

(c) After pollination and fertilisation, seeds will develop. These will disperse to new environments. If conditions are suitable they will germinate.
A student put some seeds on wet cotton wool in a Petri dish and left them to germinate. The student counted the number of seeds that had germinated.

Describe a method the student could use to find the best or optimum temperature for the germination of seeds.

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.....[6]

(d) After germination, the growing seedling may get most of its energy from food stores inside the seed.

(i) Describe how you could test the food store inside the seed for starch.

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.....

.....[2]

(ii) State the result that shows starch is present.

.....[1]

(iii) Starch is broken down into simple sugars.
Most of these sugars are reducing sugars.
Describe how you could test for reducing sugars.

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.....[2]

[Total: 18]

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