Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

2892005064

BIOLOGY **0610/52**

Paper 5 Practical Test **February/March 2021**

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.

DC (CJ/CB) 203209/4

1 You are going to investigate osmosis. You will be using a model cell made from dialysis tubing. Dialysis tubing is permeable to water but **not** permeable to larger molecules such as sucrose, which is a type of sugar.

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 test-tube **DW** and the other **S**. Place both test-tubes in the test-tube rack.

Step 2 Fill the syringe with 10 cm^3 of **sucrose solution**.

Step 3 Remove one knotted piece of dialysis tubing from the container. Open the unknotted end by rubbing it gently between your fingers. Carefully transfer the 10 cm^3 of sucrose solution from the syringe into the dialysis tubing bag.

Step 4 Hold the top of the dialysis tubing bag containing the sucrose solution as shown in Fig. 1.1. Use the ruler to measure the distance from the knot to the meniscus of the liquid in the bag.

Think about how you will ensure that this measurement can be made consistently.

Record this measurement in your table in **1(a)(i)**.

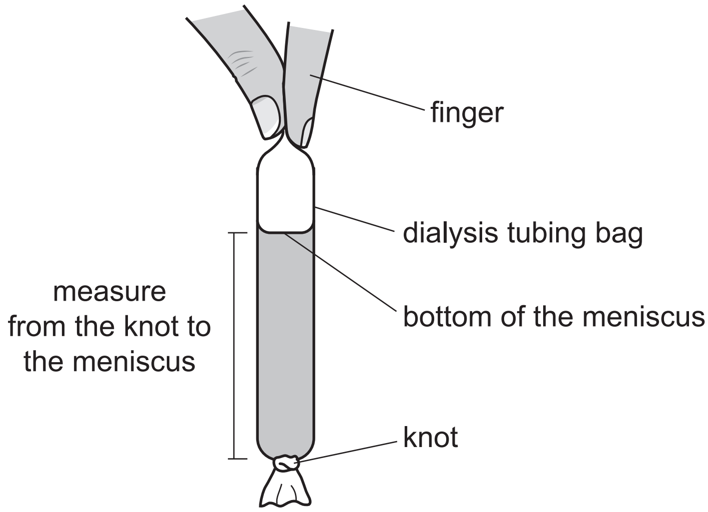


Fig. 1.1

Step 5 Place the dialysis tubing bag into the test-tube labelled **S**. Fold the open end of the bag over the top of the test-tube and secure with an elastic band, as shown in Fig. 1.2.

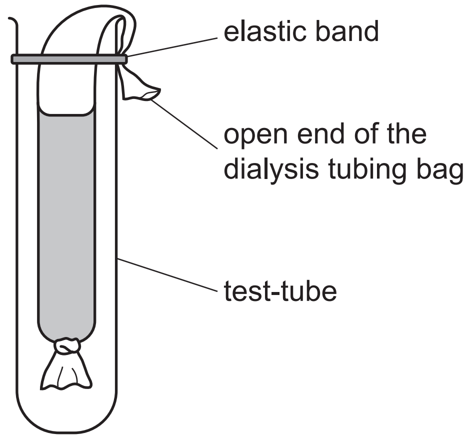


Fig. 1.2

Step 6 Fill the syringe with 10 cm^3 of **distilled water**.

Step 7 Remove the second knotted piece of dialysis tubing from the container. Open the unknotted end by rubbing it gently between your fingers. Carefully transfer the 10 cm^3 of distilled water from the syringe into the dialysis tubing bag.

Step 8 Repeat steps 4 and 5 with the dialysis tubing bag containing the distilled water and the test-tube labelled **DW**.

Record the measurement for distilled water in your table in **1(a)(i)**.

Step 9 Use the measuring cylinder to measure 30 cm^3 of distilled water. Pour the distilled water into test-tube **S**, as shown in Fig. 1.3.

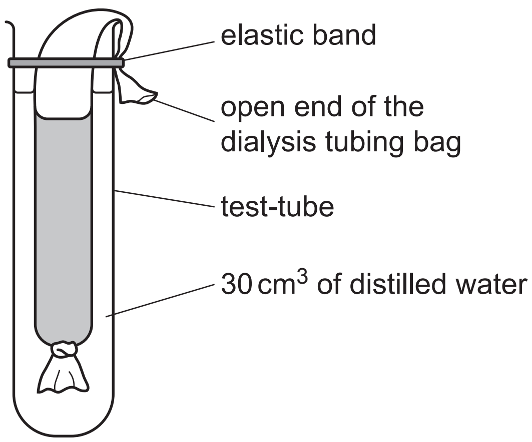


Fig. 1.3

Step 10 Repeat step 9 for test-tube **DW**.

Step 11 Place test-tubes **S** and **DW** into the empty 250 cm^3 beaker. Raise your hand when you are ready for 200 cm^3 of hot water to be added to the beaker to make a hot water-bath.

Step 12 Start the stop-clock and leave the test-tubes in the hot water-bath for 15 minutes.

Continue with the other questions while you are waiting.

Step 13 After 15 minutes remove test-tubes **S** and **DW** from the hot water-bath and place them in the test-tube rack.

Step 14 Carefully remove the dialysis tubing bag from test-tube **S**. Hold the top of the bag and use the ruler to measure the distance from the knot to the meniscus of the liquid in the bag. Ensure that your measurement starts from the same place as the measurement made in step 4.

Record this measurement in your table in **1(a)(i)**.

Step 15 Repeat step 14 with test-tube **DW**.

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

[4]

(ii) Calculate the change in distance from the knot to the meniscus of the solution in the dialysis tubing bag in test-tubes **S** and **DW**.

S .... mm

DW .... mm

[1]

(iii) Explain why it was important to take the measurements in step 4 and step 14 from the same place on the dialysis tubing.

....

....

.... [1]

(iv) State a conclusion for the results of this investigation.

....

....

.... [1]

(v) Identify the variable that was measured (dependent variable) in this investigation.

.... [1]

(b) (i) One syringe was used for both step 2 and step 6. This is a source of error.

Explain why this was a source of error and how this could have affected the results.

error ....

....

....

effect on the results ....

....

....
[2]

(ii) Only one set of results was collected during this investigation.

Explain why it is better to collect several sets of results.

....

....

.... [1]

(c) Students investigated the effect of sucrose concentration on the mass of potato cylinders.

- A potato was cut into cylinders.
- The potato cylinders were all cut to 2 cm in length.
- The initial mass of each potato cylinder was measured and recorded.
- Each potato cylinder was put into a different concentration of sucrose solution.
- The potato cylinders were left in the sucrose solutions for one hour.
- The potato cylinders were removed from the sucrose solutions and the final mass of each potato cylinder was measured and recorded.

(i) State **two** variables that were kept constant in this investigation.

1 ....

2 ....

[2]

The results of the investigation are shown in Table 1.1.

Table 1.1

concentration of sucrose / mol per dm^3	initial mass of potato cylinder / g	final mass of potato cylinder / g	change in mass / g	percentage change in mass
0.00	2.13	2.29	0.16	7.5
0.20	2.05	2.08	0.03	1.5
0.40	2.52	2.42	–0.10	–4.0
0.60	1.68	1.52	–0.16	–9.5
0.80	1.56	1.32	–0.24	–15.4
1.00	2.51	2.08	–0.43	

(ii) Calculate the **percentage** change in mass of the potato cylinder that was immersed in 1.00 mol per dm^3 sucrose solution.

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

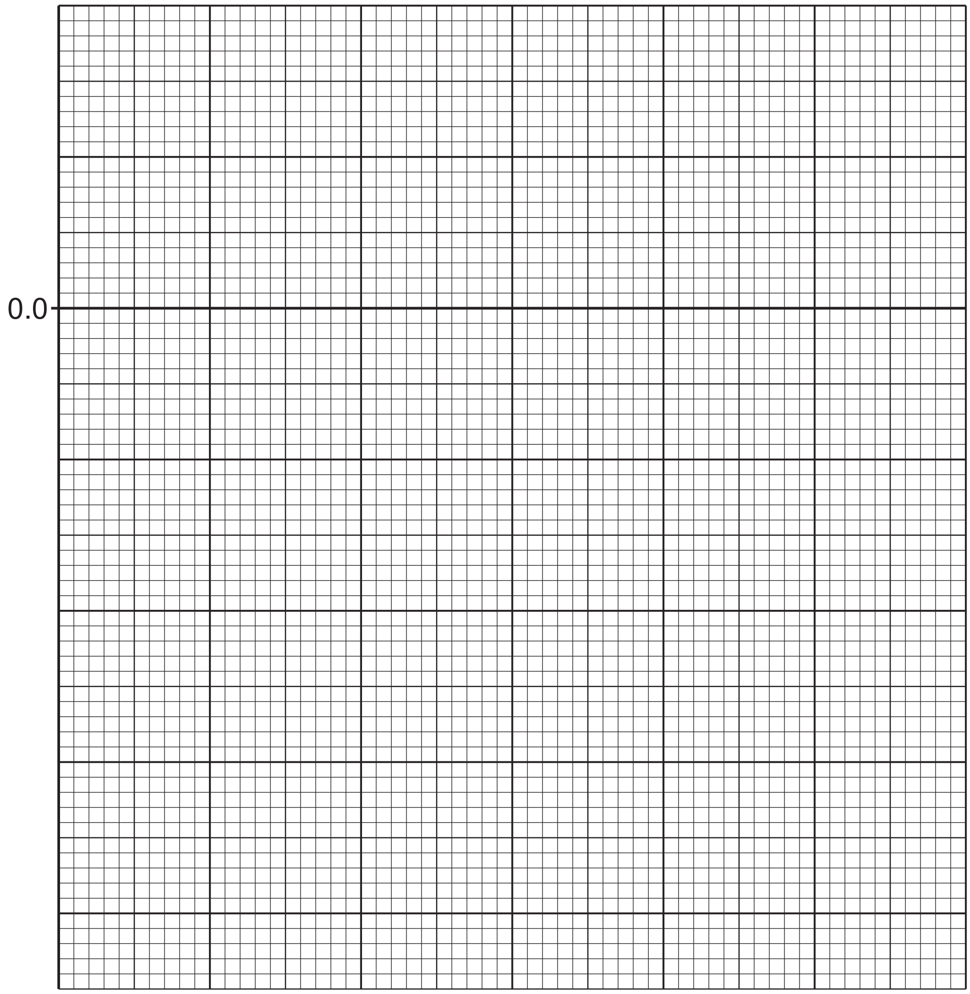
Space for working.

....%

[3]

(iii) Plot a line graph on the grid of the concentration of sucrose solution against the percentage change in mass. One axis has been started for you.

Include a curved line of best fit on your graph.



[4]

(iv) Estimate the concentration of sucrose solution at which there was **no** percentage change in the mass of the potato cylinder.

.... mol per dm^3 [1]

(v) Explain why the percentage change in mass is more useful than the change in mass when analysing the results in Table 1.1.

....

....

.... [1]

(d) State the name of the solution that is used to test for the presence of starch and give the result of a positive test.

test solution ....

positive result ....
[2]

[Total: 24]

2 Fig. 2.1 is a photograph of a tomato fruit that has been cut in half.

Fig. 2.1

(a) **(i)** Draw a large diagram of the tomato fruit shown in Fig. 2.1.

[4]

(ii) Describe how you could show that a tomato fruit contains vitamin C.

....

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....

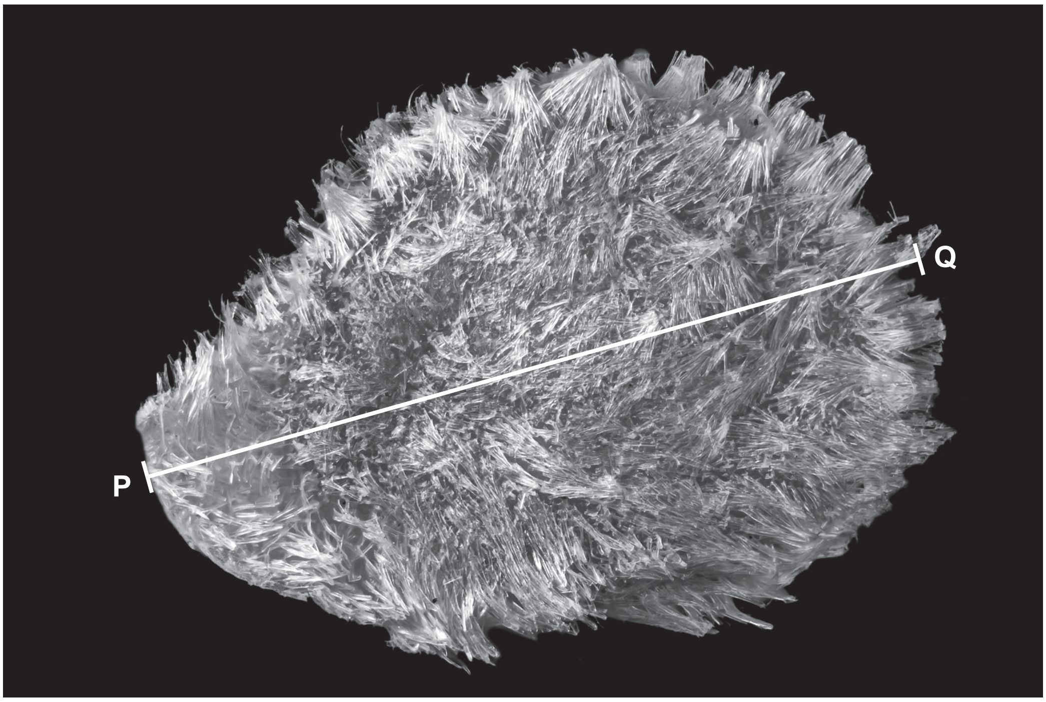
....

....

....

.... [3]

(b) Fig. 2.2 is a photomicrograph of a tomato seed.



magnification ×50

Fig. 2.2

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

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

Calculate the actual size of the tomato seed using the formula and your measurement.

$$\text{magnification} = \frac{\text{length of line } \mathbf{PQ}}{\text{actual length of the tomato seed}}$$

Include the unit.

Space for working.

....

[3]

(c) Plan an investigation to determine the optimum (best) temperature for germination of tomato seeds.

....

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....

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....

....

....

....

....

....

.... [6]

[Total: 16]