Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

2153836542

BIOLOGY **0610/52**

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.

1 You are going to investigate the effect of temperature on the diffusion of vitamin C.

Vitamin C is an important part of a balanced diet and is found in some fruits and vegetables. When vegetables are boiled in water the vitamin C diffuses out into the surrounding water.

A dialysis tubing bag filled with a vitamin C solution represents a vegetable.

The blue dye DCPIP is used as an indicator for the presence of vitamin C. High concentrations of vitamin C will decolourise DCPIP quickly.

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

Step 1 Label one large test-tube **hot** and a second large test-tube **cold**.

Step 2 Remove one piece of dialysis tubing from the beaker labelled **D** and rub the unknotted end between your fingers to open it.

Step 3 Use a syringe to put 10 cm^3 of the vitamin C solution, labelled **V**, into the open end of the dialysis tubing bag.

Step 4 Rinse the outside of the filled dialysis tubing bag by dipping it into the beaker of distilled water labelled **W**.

Step 5 Place the filled dialysis tubing bag into the large test-tube labelled **hot** and secure it in place with an elastic band, as shown in Fig. 1.1.

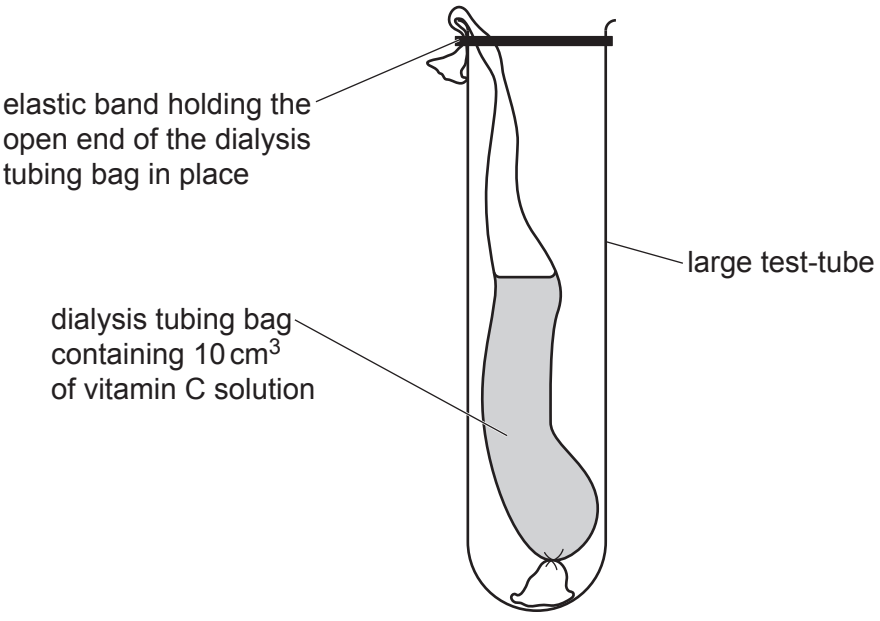

Fig. 1.1

Step 6 Repeat step 2 to step 5, placing the second filled dialysis tubing bag into the large test-tube labelled **cold**.

Step 7 Raise your hand when you are ready for hot water to be added to the beaker labelled **hot water**.

Step 8 Measure the temperature of the water in the beaker labelled **hot water** and record this in **1(a)(i)**.

Step 9 Measure the temperature of the water in the beaker labelled **cold water** and record this in **1(a)(i)**.

(a) (i) Record the temperature of the hot water and the cold water. Include the unit.

temperature of hot water .....

temperature of cold water .....

[2]

Step 10 Half-fill the large test-tube labelled **hot** with water from the hot water beaker.

Step 11 Half-fill the large test-tube labelled **cold** with water from the cold water beaker.

Step 12 Start the stop-clock and leave the dialysis tubing bags in the water for 15 minutes.

Continue with the other questions while you are waiting.

Step 13 Label an empty small beaker **hot** and another empty small beaker **cold**.

Step 14 After 15 minutes, remove the dialysis tubing bag from the large test-tube labelled **hot** and put it in the container labelled **waste**.

Step 15 Pour the remaining contents of the large test-tube labelled **hot** into the small beaker labelled **hot**.

Step 16 Repeat step 14 and step 15 with the large test-tube labelled **cold** and the small beaker labelled **cold**.

Step 17 Fill a clean syringe with 10 cm^3 of DCPIP solution.

Step 18 Put 1 cm^3 of the solution from the small beaker labelled **hot** into a clean test-tube.

Step 19 Add a drop of the DCPIP solution to the test-tube from step 18 and swirl to mix. After a few seconds the blue colour should disappear.

Step 20 Continue to add drops of DCPIP until the blue colour **remains** after mixing.

Step 21 Calculate and record, in your table in **1(a)(ii)**, the volume of DCPIP **used**.

Step 22 Repeat step 17 to step 21 with the solution in the small beaker labelled **cold**.

(ii) Prepare a table to record your results in the space provided.

The volume of DCPIP **used** can be calculated using the equation:

volume of DCPIP used = 10 – volume of DCPIP remaining in the syringe

[4]

(iii) State a conclusion for your results.

.....

.....

..... [1]

(iv) Suggest why the dialysis tubing bag was rinsed in step 4.

.....

.....

..... [1]

(v) Identify **one** source of error in step 10 or step 11 and suggest a suitable piece of equipment to overcome this error.

error .....

.....

equipment .....

.....

[2]

(vi) Identify the variable that you changed (independent variable) and the variable that you measured (dependent variable) in this investigation.

independent variable .....

.....

dependent variable .....

.....
[2]

(vii) Suggest why repeating the procedure several times would improve the investigation.

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..... [1]

(b) Dialysis tubing acts as a partially permeable membrane and can be used to represent a model cell to investigate osmosis.

Plan an investigation to find out how different concentrations of sugar solutions affect the movement of water into or out of dialysis tubing.

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..... [6]

[Total: 19]

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2 Nautiluses are a genus of marine animals that live in shells. Fig. 2.1 is a photograph of a nautilus shell.

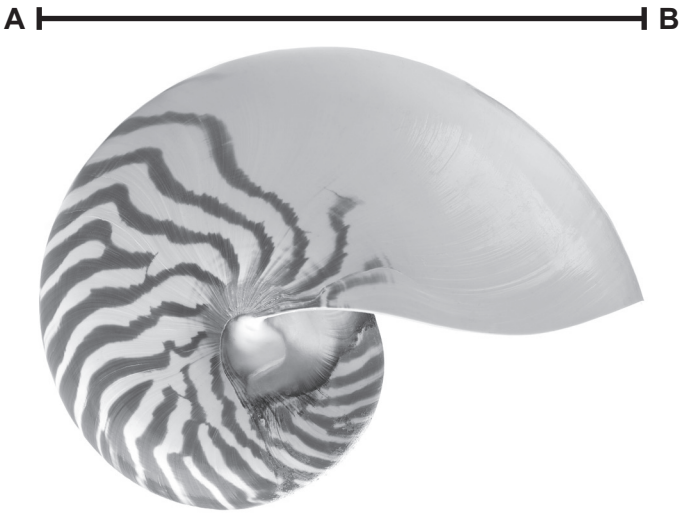


Fig. 2.1

(a) (i) Make a large drawing of the shell shown in Fig. 2.1.

[4]

(ii) Line **AB** represents the width of the nautilus shell.

Measure the length of line **AB** in Fig. 2.1.

length of line **AB** in Fig. 2.1 ..... mm

The actual width of the shell is 130 mm.

Calculate the magnification of the shell in Fig. 2.1.

$$\text{magnification} = \frac{\text{length of line } \mathbf{AB} \text{ in Fig. 2.1}}{\text{actual width of the shell}}$$

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

Space for working.

.....
[3]

(b) Fig. 2.2 shows a fossilised nautilus shell.

Fig. 2.2

Describe **one** visible similarity and **one** visible difference between the nautilus shell in Fig. 2.1 and the fossilised nautilus shell in Fig. 2.2.

similarity .....

.....

difference .....

.....
[2]

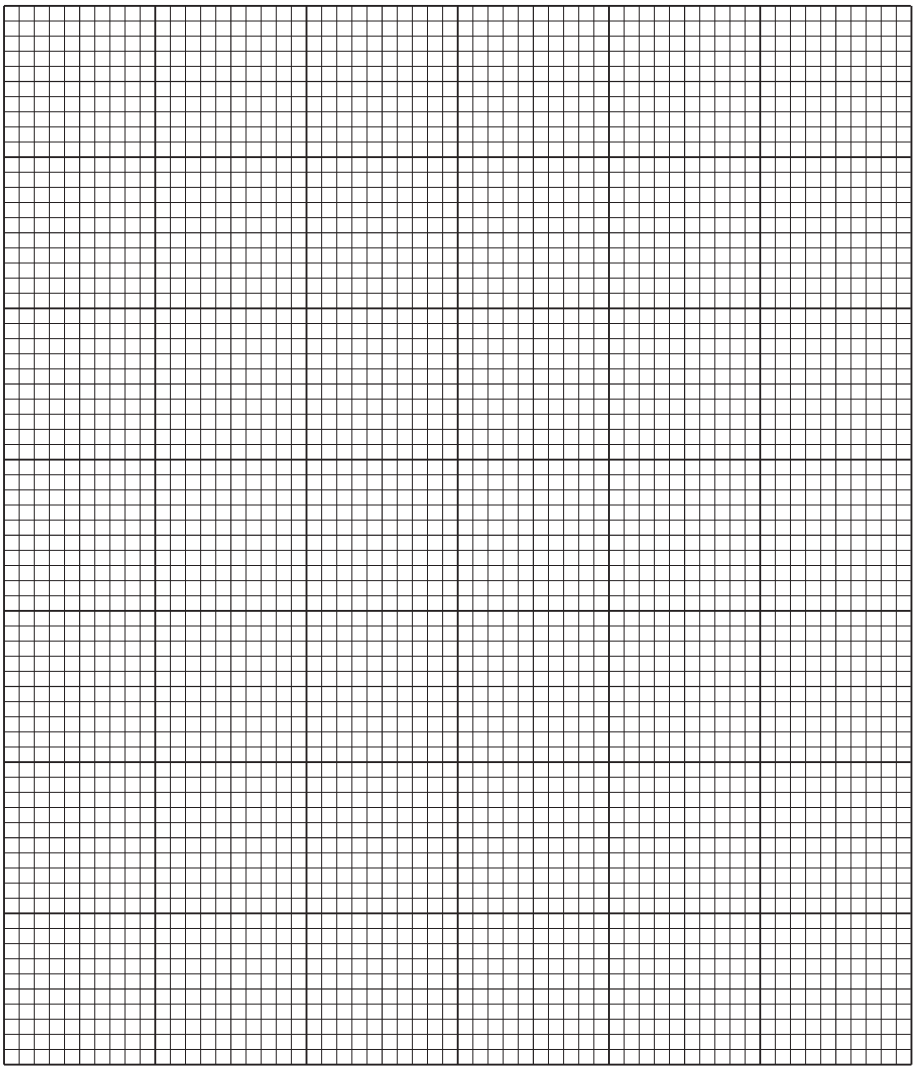
(c) A population of one species of nautilus was studied. The widths of the nautilus shells were measured and recorded.

The results are shown in Table 2.1.

Table 2.1

width of shell / mm	number of shells
101–110	8
111–120	84
121–130	138
131–140	98
141–150	22

(i) Plot a histogram on the grid of the data in Table 2.1.



[4]

(ii) Using the information in your graph, describe the results of this study.

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..... [2]

(iii) The study measured the width of 350 nautilus shells.

Suggest why such a large number of shells were measured.

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..... [1]

(iv) Using the data in Table 2.1, calculate the percentage of the population of nautiluses that have shells that are wider than 130 mm.

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

Space for working.

.....%
[3]

(d) The nautilus feeds on fish which are an important source of protein.

State the name of the test for protein. Give the result of a positive test.

test for protein .....

positive test result .....
[2]

[Total: 21]

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