Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

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.

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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.

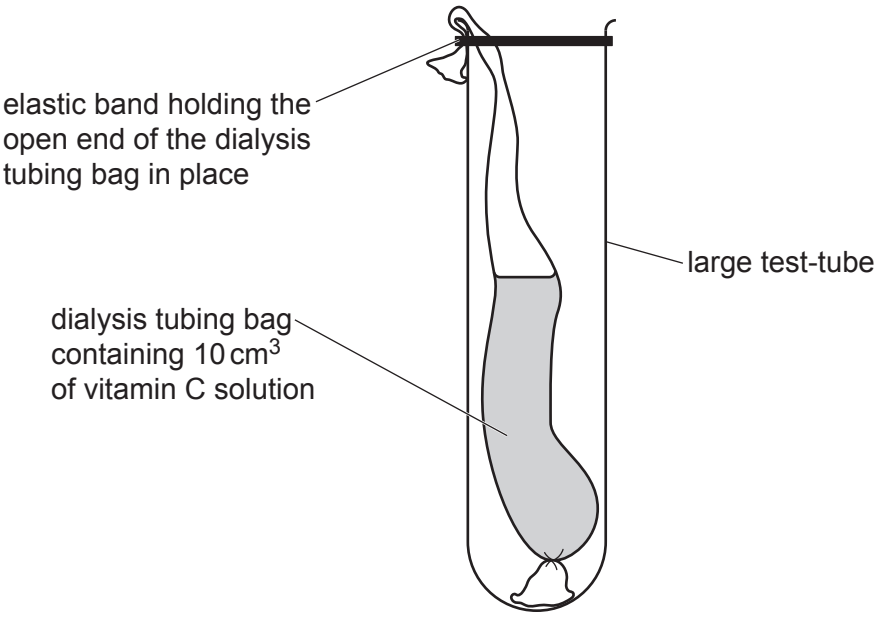

Fig. 1.1

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**.

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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)**.

View solution

(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**.

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(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.

.....

.....

..... [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]

View solution

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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.

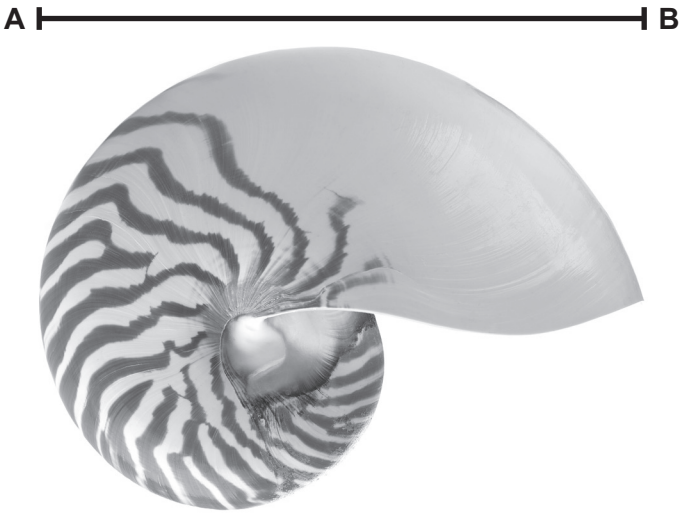

Fig. 2.1

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

View solution

[4]

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

View solution

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.

View solution



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]

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

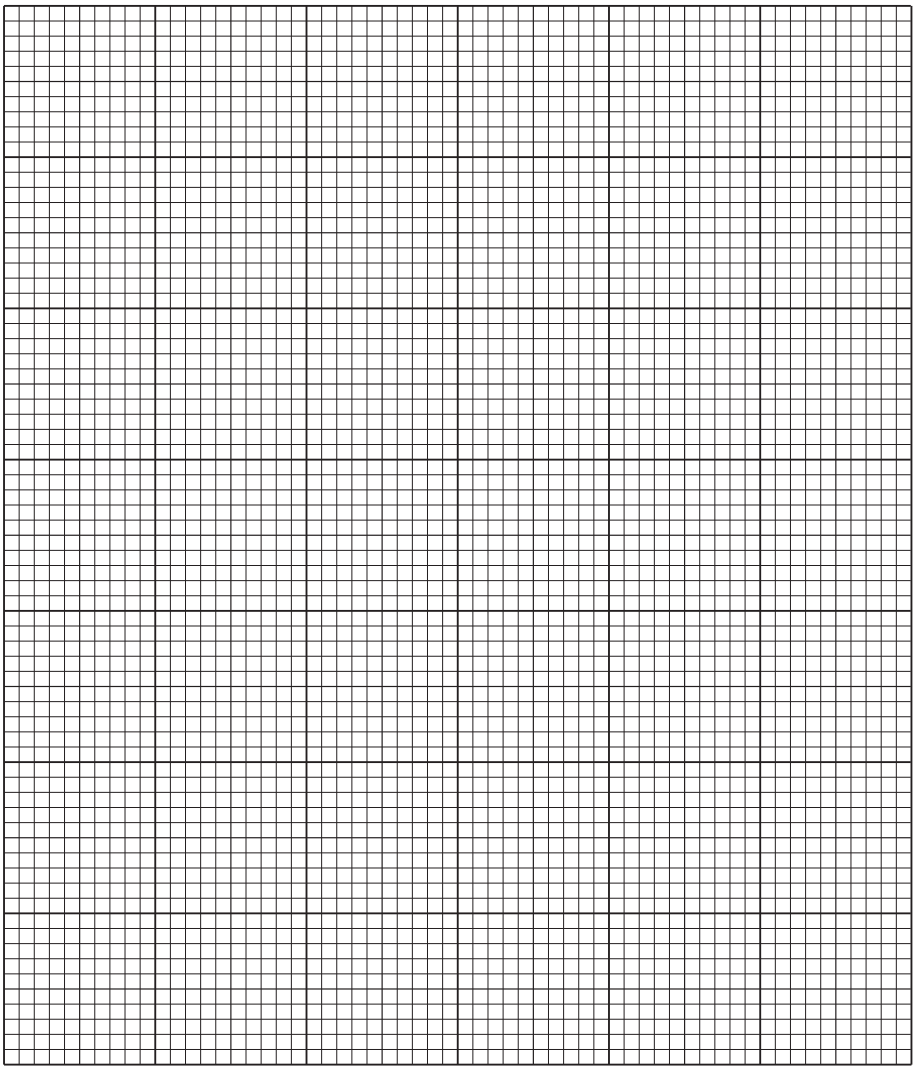
View solution

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.

View solution

.....

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..... [2]

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

View solution

Suggest why such a large number of shells were measured.

.....

.....

..... [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.

View solution

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

Space for working.

.....%

[3]

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

View solution

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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