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Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME			
CENTRE NUMBER		CANDIDATE NUMBER	

* 9 8 3 4 1 3 7 8 0 1 *

BIOLOGY **0610/51**

Paper 5 Practical Test **October/November 2024**

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	
3	
Total	

This document has **16** pages. Any blank pages are indicated.

DC (PB/SW) 336151/3

1 You are going to investigate the movement of water across a membrane by osmosis.

Dialysis tubing is made from a type of membrane that is partially permeable. Only small molecules such as water can pass through this membrane.

Read all the instructions but DO NOT DO THEM 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 doing the practical work.

Step 1 Label two test-tubes, **S** and **W**, and place them in a test-tube rack.

Step 2 Use a measuring cylinder to put 20 cm^3 of distilled water into each of the labelled test-tubes.

Step 3 Take a piece of dialysis tubing from the container. One end of the dialysis tubing has been knotted to create a bag. Open the unknotted end of the dialysis tubing. You may need to rub the tubing between your finger and thumb to open it.

Step 4 Use the syringe to put 6 cm^3 of sucrose solution into the open end of the dialysis tubing bag.

Step 5 Rinse the outside of the dialysis tubing bag by dipping it into the **water for washing**. Make sure you keep the open end of the bag above the water.

Step 6 Use a ruler to measure the distance from the knot at the bottom of the dialysis tubing bag to the bottom of the meniscus in the bag, as shown in Fig. 1.1.

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

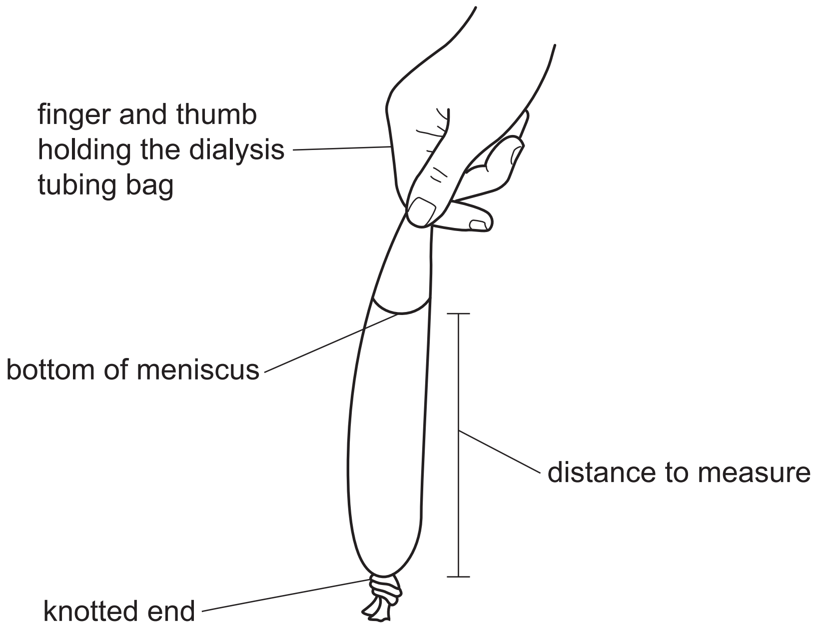

Fig. 1.1

Step 7 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. Use an elastic band to hold the dialysis tubing in place, as shown in Fig. 1.2. Place the test-tube in the test-tube rack.

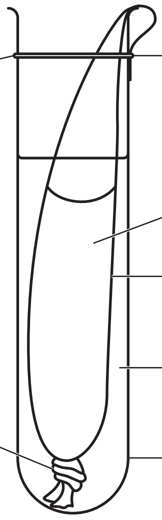

Fig. 1.2

Step 8 Rinse the syringe in the water for washing. Then use the syringe to put 6 cm^3 of distilled water into a second piece of dialysis tubing.

Repeat step 6 and record this measurement for distilled water in your table in **1(a)(i)**. Place this dialysis tubing bag into test-tube **W** and secure it with the remaining elastic band. Place test-tube **W** in the test-tube rack.

Step 9 Prepare a water-bath by putting 100 cm^3 of hot water into the beaker labelled **water-bath**. Raise your hand when you are ready for the hot water.

Step 10 Start the stop-clock and place both test-tubes in the water-bath. Leave the test-tubes in the water-bath for 15 minutes.

Continue with the other questions while you are waiting.

Step 11 After 15 minutes, remove test-tubes **S** and **W** from the water-bath and put them into the test-tube rack.

Step 12 Remove the dialysis tubing bag from test-tube **S**. Use the ruler to re-measure the distance from the knot at the bottom of the dialysis tubing bag to the bottom of the meniscus in the bag. Place the dialysis tubing bag into the container labelled **waste**.

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

Step 13 Repeat step 12 with test-tube **W**.

(a) (i) Prepare a table for 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 **W**.

S .... mm

W .... mm
[1]

(iii) State a conclusion for this investigation.

....

....

.... [1]

(b) (i) Suggest why the dialysis tubing bag was dipped into the water in step 5.

....

....

.... [1]

(ii) Explain why water was used instead of sucrose solution in the dialysis tubing bag in test-tube **W**.

....

....

.... [1]

(iii) Identify **two** variables that were kept constant in this investigation.

1 ....

2 ....
[2]

(iv) This investigation was only done once.

Explain why it is better to repeat an investigation.

....

....

.... [1]

(v) Suggest an alternative method of measuring the movement of water in dialysis tubing bags.

....

....

.... [1]

(c) Sucrose is made from glucose and fructose.

Glucose and fructose are reducing sugars.

Describe how you could test for the presence of reducing sugars.

....

....

....

.... [2]

[Total: 14]

2 In plants, water moves up the stem in xylem vessels as a column of water molecules as a result of transpiration.

A celery stalk that still has its leaves attached can be used to investigate the movement of water in a plant, as shown in Fig. 2.1.

Fig. 2.2 shows dye in the xylem vessels of a celery stalk.

Fig. 2.1

not to scale

Fig. 2.2

Plan an investigation to determine the effect of temperature on the rate of movement of a coloured dye through celery stalks.

....

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.... [6]

3 (a) Fig. 3.1 is a photograph of a banana borer insect which is a pest of banana plants.

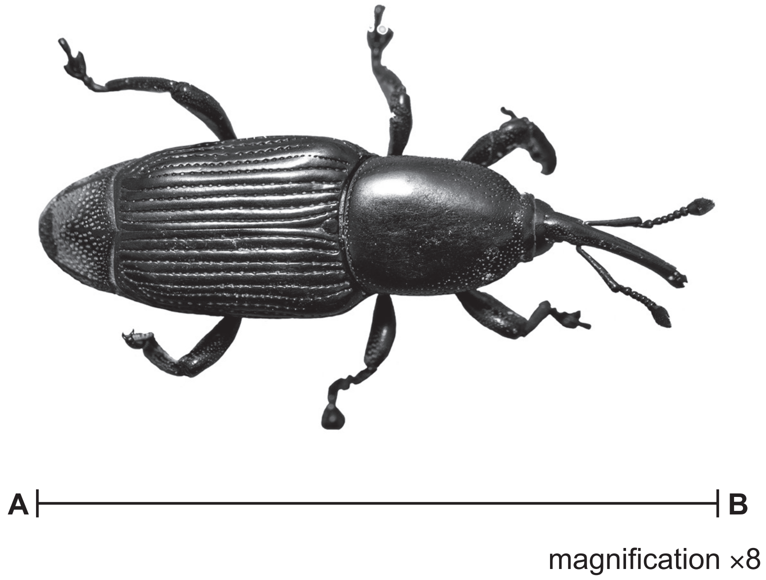

Fig. 3.1

Line **AB** represents the length of the banana borer.

Measure the length of line **AB** in Fig. 3.1.

length of line **AB** .... mm

Calculate the actual length of the banana borer using the formula and your measurement.

$$\text{magnification} = \frac{\text{length of line } \mathbf{AB} \text{ in Fig. 3.1}}{\text{actual length of the banana borer}}$$

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

Space for working.

.... mm
[3]

(b) Fig. 3.2 is a photograph of one leaf from a banana plant.

magnification ×0.04

Fig. 3.2

Fig. 3.3 is a photograph of one leaf from a strawberry plant.

magnification ×1.3

Fig. 3.3

(i) Identify **three** ways the strawberry plant leaf in Fig. 3.3 differs from the banana plant leaf in Fig. 3.2.

difference 1 ....

....

difference 2 ....

....

difference 3 ....

....

[3]

(ii) Leaves release carbon dioxide gas during respiration.

State the name of an indicator that is used to test for the presence of carbon dioxide gas.

.... [1]

(c) Fig. 3.4 shows a banana flower.

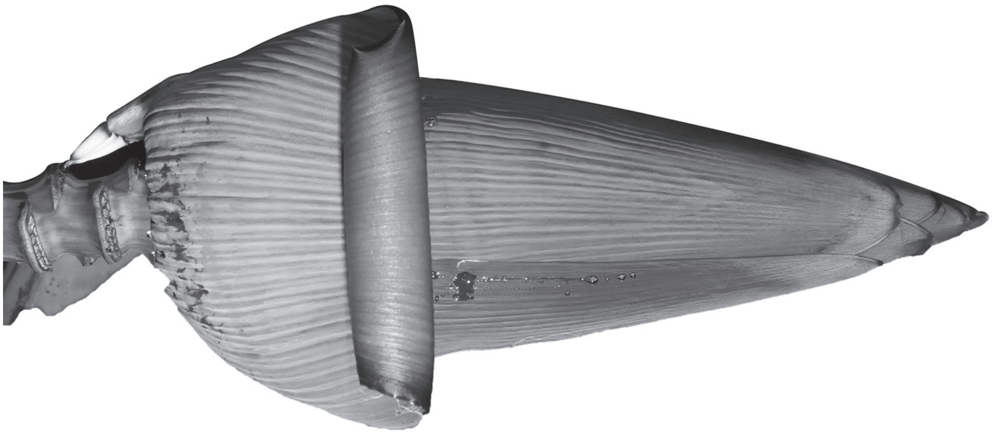

Fig. 3.4

Draw a large diagram of the banana flower shown in Fig. 3.4.

[4]

(d) Bananas contain protein.

A student investigated the protein content in different types of fruit.

Table 3.1 shows the student's results.

Table 3.1

type of fruit	protein content / g per 100 g of fruit
apple	0.3
apricot	1.4
avocado	2.0
banana	1.1
guava	2.6
passion fruit	2.2
pineapple	0.9

(i) Calculate the mass of guava that a person would need to eat to gain 14.5 g of protein.

Give your answer to the nearest whole number.

Space for working.

.... g [2]

(ii) Plot a bar chart on the grid of the data in Table 3.1.

[4]

(iii) State the dependent variable in the investigation described in **3(d)**.

.... [1]

(e) Samples of three different types of food were labelled **X**, **Y** and **Z**. The samples were tested for protein and starch.

The food tests showed that:

- Food **X** contained both protein and starch.
- Food **Y** contained starch only.
- Food **Z** contained protein only.

Complete Table 3.2 to show the expected final colours of these food tests.

Table 3.2

type of food	protein test final colour	starch test final colour
X		
Y		
Z		

[2]

[Total: 20]

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