Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

BIOLOGY **0610/52**

Paper 5 Practical Test **May/June 2020**

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. Blank pages are indicated.

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1 You are going to investigate the effect of temperature on diffusion. Dialysis tubing is used to represent a cell membrane. Cell membranes are partially permeable.

Read all of 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 wear the gloves and eye protection provided during the practical work.

Step 1 Label one test-tube **C** and the other test-tube **H**. Draw a small **X** on the outside of both test-tubes approximately half-way down each test-tube as shown in Fig. 1.1.

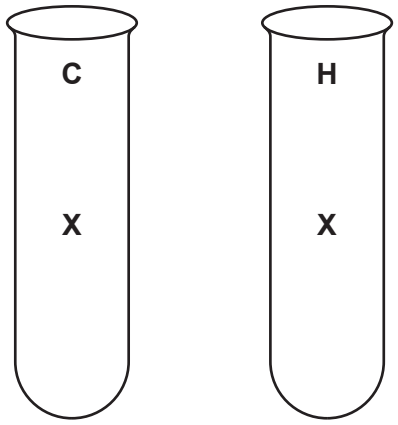

Fig. 1.1

Step 2 You are provided with two lengths of dialysis tubing which have been knotted at one end to form a bag. The bags can be opened by rubbing the unknotted end between two fingers.

Step 3 Use a pipette to put starch suspension into one of the opened dialysis tubing bags. Keep adding the starch suspension until the dialysis tubing bag is approximately three-quarters full.

Step 4 It is important that the starch suspension does not spill onto the outside of the dialysis tubing bag. Fill a 10 cm^3 syringe with distilled water. Hold the dialysis tubing bag containing starch over the container labelled **waste** and use the syringe to carefully wash the outside of the bag with the distilled water.

Step 5 Place the dialysis tubing bag containing starch suspension into test-tube **C**. Fold the open end of the dialysis tubing over the top of the test-tube. Secure with an elastic band approximately 2 cm from the top of the test-tube as shown in Fig. 1.2.

Place test-tube **C** in the test-tube rack.

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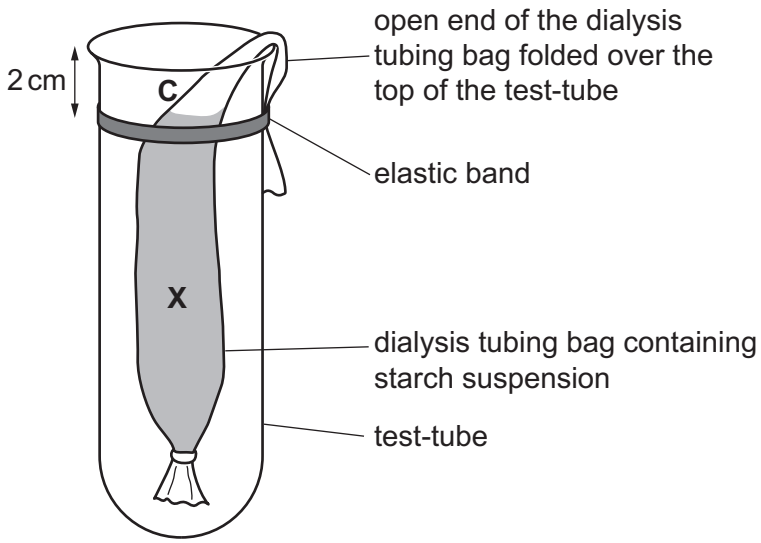

Fig. 1.2

Step 6 Open the other dialysis tubing bag. Repeat steps 3, 4 and 5 with the other dialysis tubing bag and test-tube **H**.

Step 7 Add distilled water to test-tube **C** until it reaches the level of the elastic band.

Step 8 Raise your hand when you are ready for hot water. Add hot water to test-tube **H** until it reaches the level of the elastic band.

Step 9 Measure the temperature of the water in test-tube **C** and test-tube **H**, record this in your table in **1(a)(i)**.

Step 10 Use a syringe to add 1 cm^3 of iodine solution to the water in each test-tube.

Step 11 Start the stop-clock.

Step 12 Observe the crosses on the test-tubes by looking through the dialysis tubing as shown in Fig. 1.3.

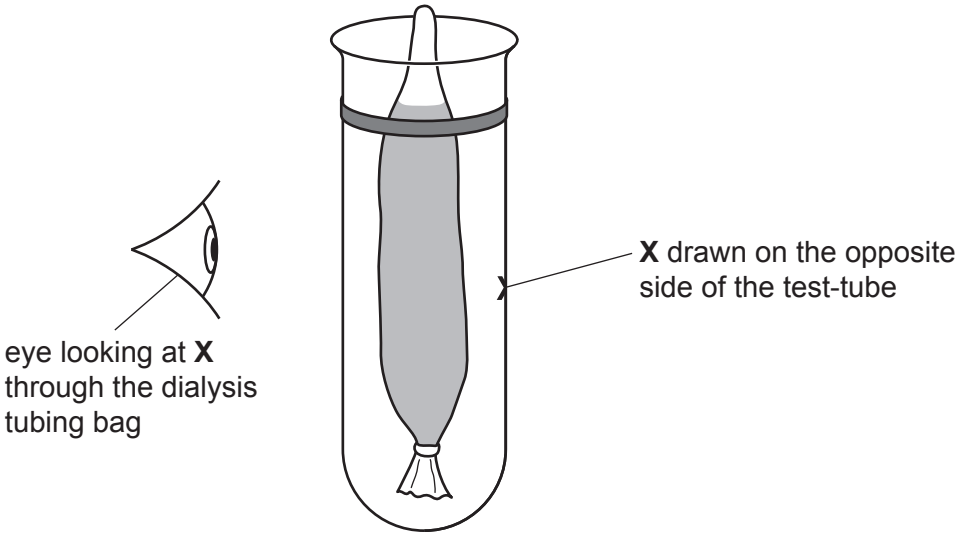

Fig. 1.3

Step 13 Measure the time taken for each cross to stop being visible through the dialysis tubing bag. Record the times, in seconds, in your table in **1(a)(i)**. If the cross is still visible after 10 minutes stop timing and record the time as **>600**.

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

View solution

[4]

(ii) State a conclusion for this investigation.

.....

.....

..... [1]

(iii) Identify the variable that you have changed (independent variable) in this investigation.

..... [1]

(iv) Dialysis tubing allows small molecules to move through it by diffusion.

Starch is unable to diffuse out of the dialysis tubing bag.

State **one** piece of evidence for this from your investigation.

.....

.....

..... [1]

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(v) Identify **one** possible source of error in this investigation and suggest **one** additional piece of apparatus that could be used to reduce the effect of this error.

error .....

.....

.....

apparatus .....

.....

.....

[2]

(b) (i) Amylase is an enzyme that breaks down starch to form reducing sugars.

View solution

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

Include the result of a positive test.

method .....

.....

.....

.....

.....

result .....

[3]

(ii) Plan an investigation to determine the effect of different concentrations of amylase on the breakdown of starch.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [6]

[Total: 18]

View solution

2 A student investigated the effect of different concentrations of sugar solution on osmosis in potato sticks.

The student used this method:

- cut six potato sticks
- measure the initial mass of each potato stick
- place each potato stick in a different concentration of sugar solution
- leave the potato sticks in the sugar solutions for one hour
- after one hour remove the potato sticks and measure the final mass of each potato stick.

View solution

(a) (i) All of the potato sticks were left in the sugar solutions for the same length of time.

State **two** other variables that the student should have kept constant during their investigation.

1 .....

2 .....

[2]

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

..... [1]

View solution

(b) The results of the investigation are shown in Table 2.1.

View solution

Table 2.1

concentration of sugar solution / mol per dm^3	initial mass of potato stick / g	final mass of potato stick / g	percentage change in mass
0.0	2.14	2.18	1.87
0.2	1.90	1.91	0.53
0.4	2.32	2.30	–0.86
0.6	2.25	2.21	–1.78
0.8	2.08	2.03	
1.0	2.16	2.10	–2.78

(i) Calculate the percentage change in mass for the potato stick that was placed in the 0.8 mol per dm^3 sugar solution.

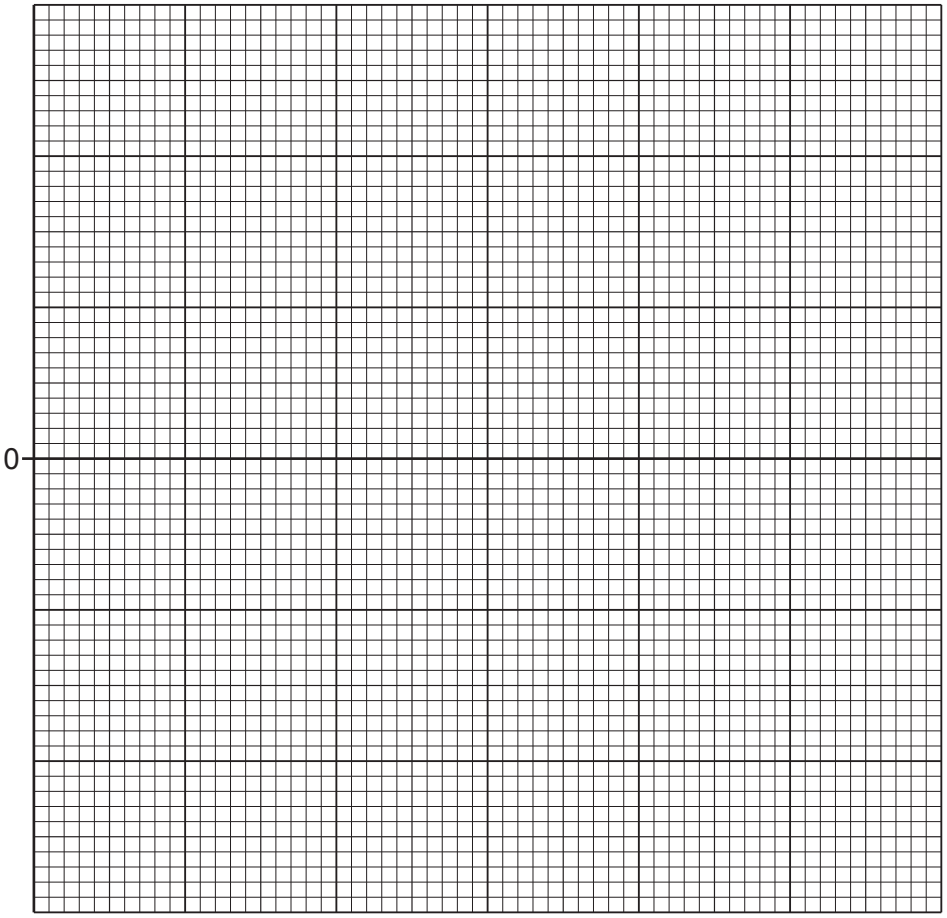
Give your answer to **two** decimal places.

Space for working.

..... %
[2]

(ii) Plot a line graph on the grid to show the data in Table 2.1. One axis has been started for you.

View solution



[4]

(iii) State the concentration of the sugar solution at which your graph shows there would be no change in the mass of the potato stick.

View solution

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

(iv) The student wanted to obtain a more accurate value for the concentration of the sugar solution at which there would be no change in the mass of the potato stick.

View solution

Suggest further investigative work that the student should carry out.

.....

.....

.....

.....

..... [2]

(c) Fig. 2.1 is a photomicrograph showing cells from a potato.

View solution

The structures visible within the cells are starch grains.

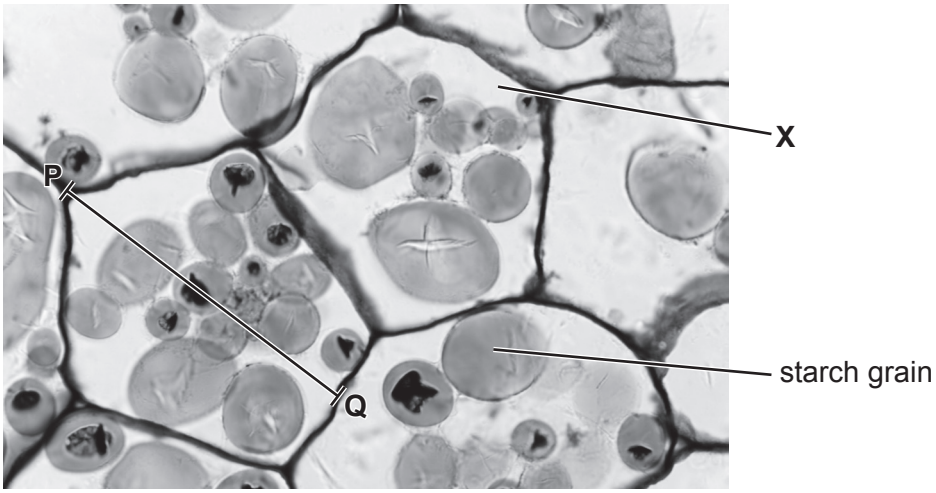


Fig. 2.1

(i) Draw a large diagram of the cell labelled **X**. Do not label your diagram.

[4]

(ii) Measure the length of line **PQ** on Fig. 2.1. Include the unit.

View solution

length of line **PQ** .....

The actual length of the potato cell at line **PQ** is 0.14 mm.

Calculate the magnification of the potato cell using the formula and your measurement.

$$\text{magnification} = \frac{\text{length of line } \mathbf{PQ}}{\text{actual length of the potato cell}}$$

Give your answer to the nearest whole number.

Space for working.

.....
[3]

(iii) A student measured the actual lengths of five of the starch grains present in one potato cell. The results are shown in Table 2.2.

View solution

Table 2.2

length of starch grain / mm
0.052
0.048
0.025
0.023
0.017

Calculate the average length of the starch grains.

..... mm [1]

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(d) Potato cells release carbon dioxide during respiration.

State the name of an indicator which could be used to test for the presence of carbon dioxide and give the result of a positive test.

indicator .....

result .....
[2]

[Total: 22]

View solution

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