Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

BIOLOGY **0610/51**

Paper 5 Practical Test **October/November 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. Any blank pages are indicated.

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1 (a) Dialysis tubing can act as a partially permeable membrane because it has microscopic holes that allow small soluble molecules to pass through by diffusion.

You are going to investigate the molecules that can diffuse through dialysis tubing.

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 Remove the piece of dialysis tubing from the beaker of water labelled **W**. It has been knotted at one end to form a bag. Gently rub the unknotted end of the dialysis tubing until it is open.

Step 2 Use a syringe to put 10 cm^3 of solution **M** into the open end of the dialysis tubing bag.

Step 3 Hold the open end of the bag and rinse the outside of the dialysis tubing by dipping it into the water in beaker **W**.

Step 4 Place the dialysis tubing bag inside the large test-tube labelled **T** so that approximately 2 cm of the dialysis tubing folds over the top of the test-tube. Secure it with an elastic band, as shown in Fig. 1.1.

Step 5 Use a measuring cylinder to pour **warm distilled water** into large test-tube **T** so that it covers the dialysis tubing bag, as shown in Fig. 1.1.

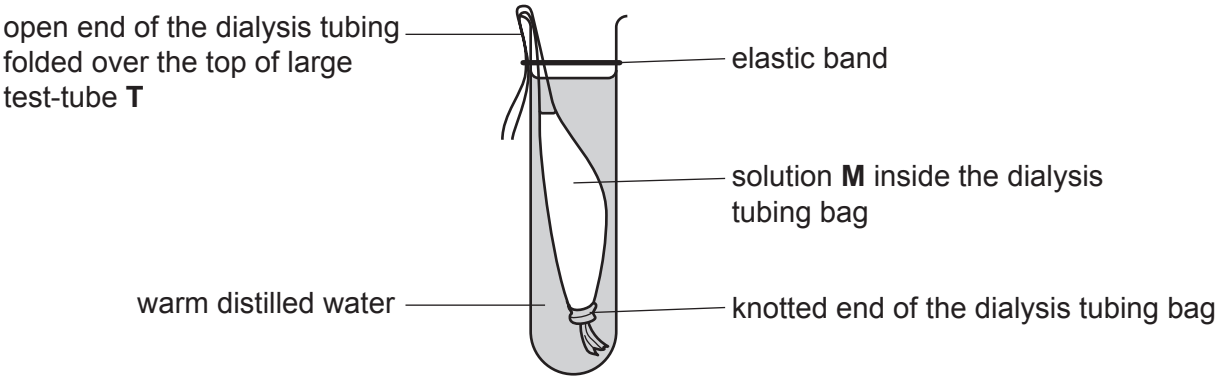

Fig. 1.1

Step 6 Leave large test-tube **T** in the test-tube rack for 15 minutes.

Continue with the other questions while you are waiting.

Step 7 Label a small beaker **T**.

After 15 minutes remove the dialysis tubing bag from large test-tube **T** and put it in the **waste** container.

Pour the liquid from large test-tube **T** into beaker **T**.

Step 8 Label six clean test-tubes **A**, **B**, **C**, **D**, **E** and **F**.

Step 9 Use a syringe to put 2 cm^3 samples of solution **M** into test-tubes **A**, **B** and **C**.

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Step 10 Use a clean syringe to put 2 cm^3 samples of liquid **T** into test-tubes **D**, **E** and **F**.

Step 11 Test the contents of test-tubes **A** and **D** for reducing sugars using the correct food-testing reagent.

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

Step 12 Test the contents of test-tubes **B** and **E** for protein using the correct food-testing reagent.

Step 13 Test the contents of test-tubes **C** and **F** for starch using the correct food-testing reagent.

Record your results from steps 11, 12 and 13 in your table in **1(a)(i)**.

(i) Prepare a table to record your results from steps 11 to 13 in the space provided. Include the final colours of the food tests for each test-tube.

View solution

[4]

(ii) State the names of the food-testing reagents that you used to test for the presence of each substance.

reducing sugars .....

protein .....

starch .....

[2]

View solution

(iii) State which substances are present in solution **M**.

View solution

.....

.....

..... [1]

(iv) Conclude, based on your results, if any of the substances in solution **M** diffused through the dialysis tubing membrane.

State the evidence from your results for this conclusion.

View solution

substance(s) .....

evidence .....

.....

[1]

(b) Explain why it was important to rinse the outside of the dialysis tubing bag in step 3.

View solution

.....

.....

..... [1]

(c) Identify **one** hazard in the investigation described in **1(a)** and state **one** precaution taken to reduce the risk of this hazard.

hazard .....

precaution .....

.....

[2]

View solution

(d) Starch can be broken down into reducing sugars. The enzyme amylase catalyses this reaction.



Plan an investigation to find out the effect of pH on the activity of the enzyme amylase.

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..... [6]

[Total: 17]

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2 **(a)** A student used an aquatic plant to investigate the effect of temperature on the rate of photosynthesis.

View solution

Fig. 2.1 shows the apparatus used by the student.

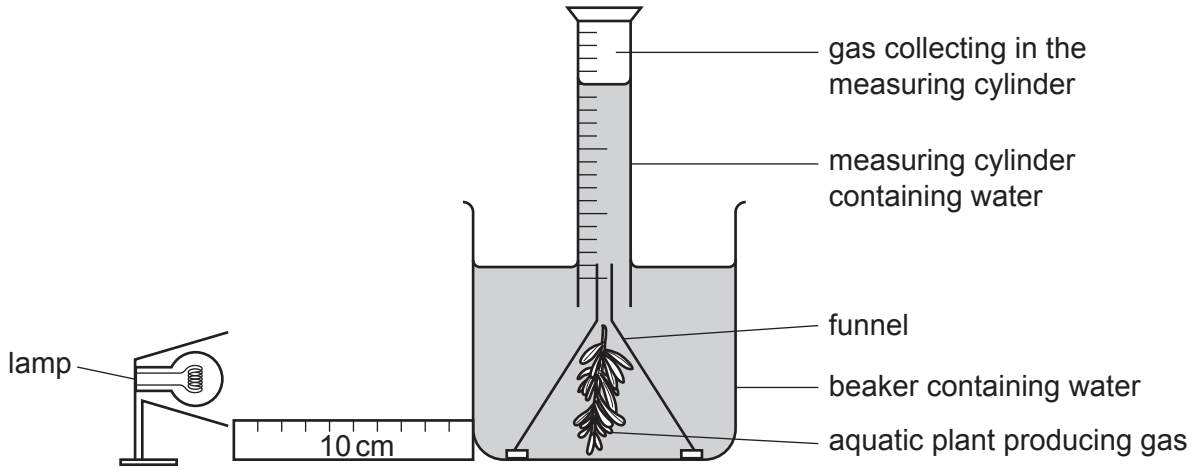


Fig. 2.1

A lamp was placed at a distance of 10 cm from the apparatus. Sodium hydrogencarbonate was added to the water to provide a source of carbon dioxide.

The student measured the volume of gas produced in 20 minutes at six different temperatures.

(i) State the variable that was changed (independent variable) in this investigation.

..... [1]

(ii) State **two** variables that should be kept constant in this investigation.

View solution

1 .....

2 .....

[2]

(iii) Only one set of results was collected in the investigation described in **2(a)**.

Explain why repeating the investigation two more times would be an improvement to the method.

.....

.....

..... [1]

View solution

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

View solution

Table 2.1

temperature / °C	volume of gas collected in 20 minutes / cm^3	rate of photosynthesis / cm^3 per minute
5	5.0	0.25
10	7.8	0.39
15	12.0	0.60
20	22.8	1.14
25	21.0	1.05
30	16.0	0.80

(i) Calculate the percentage increase in the volume of gas produced from 10 °C to 15 °C.

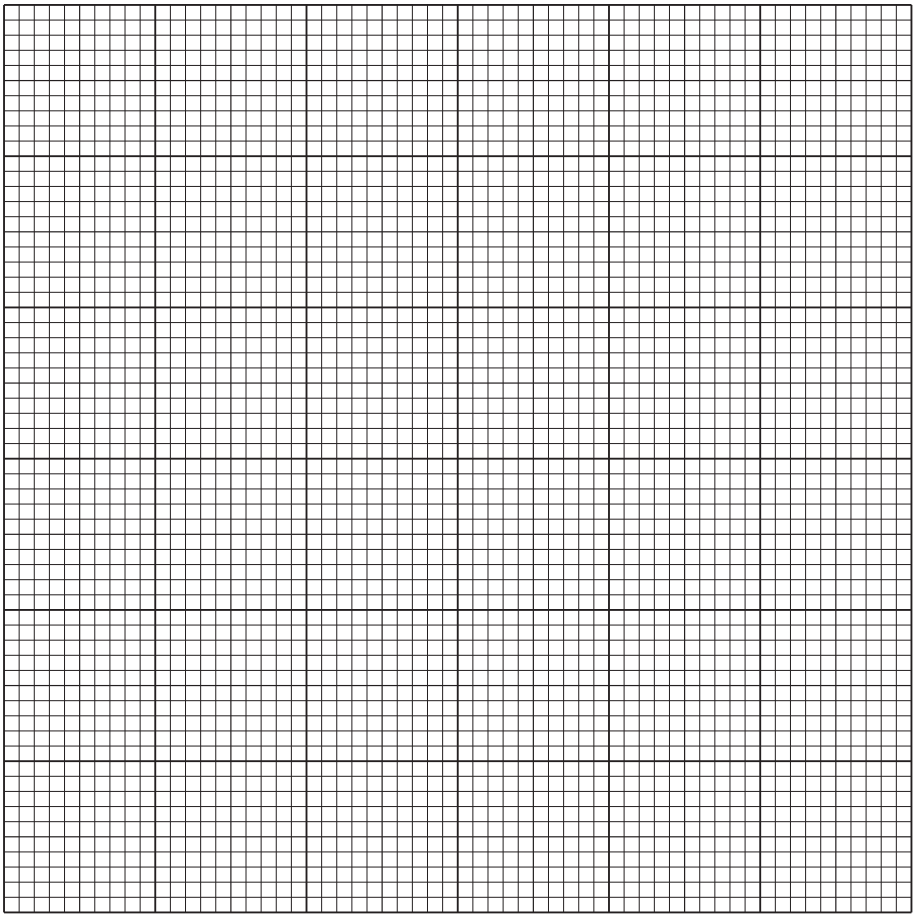
Give your answer to **two** significant figures.

Space for working.

..... %
[3]

(ii) Use the information in Table 2.1 to plot a line graph on the grid to show the effect of temperature on the rate of photosynthesis.

View solution



[4]

(iii) Describe the pattern shown by the data in your graph.

View solution

.....

.....

.....

.....

..... [2]

(iv) Use your graph to estimate the rate of photosynthesis when the temperature is 17 °C.

View solution

Show on your graph where you took your readings.

..... cm^3 per minute

[2]

(c) Fig. 2.2 is a photograph of one flower of an aquatic plant, *Cabomba caroliniana*.

View solution



magnification ×6

Fig. 2.2

(i) Make a large drawing of the flower shown in Fig. 2.2.

Label the stigma on your drawing.

[5]

(ii) Measure the length of line **XY** on Fig. 2.2.

View solution

length of line **XY** ..... mm

Calculate the actual width of the flower shown in Fig. 2.2 using your measurement and the formula.

$$\text{magnification} = \frac{\text{length of line } \mathbf{XY} \text{ on Fig. 2.2}}{\text{actual width of the flower}}$$

Include the unit.

Space for working.

.....
[3]

[Total: 23]

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