Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

BIOLOGY **0610/52**

Paper 5 Practical Test **February/March 2023**

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.

[Turn over

1 Potato cells absorb methylene blue dye when the potato tissue is placed into the dye solution.

If the dyed potato cells are placed in water the dye will diffuse into the water.

You are going to investigate the effect of temperature on the diffusion of methylene blue dye from dyed potato cells.

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)(ii).

You should use the safety equipment provided while you are doing the practical work.

Step 1 Raise your hand when you are ready for hot water to be put into the beaker labelled **hot water**.

Step 2 Measure the temperature of the water in the beaker labelled **hot water**.

Record this measurement in the space provided in **1(a)(i)**.

Step 3 Label one test-tube **C**, one test-tube **W** and one test-tube **H**.

Step 4 Draw a line 5 cm from the base of each test-tube, as shown in Fig. 1.1. Place the three test-tubes in the test-tube rack.

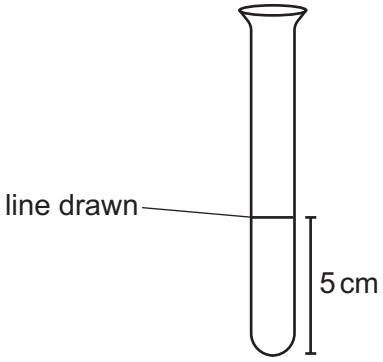

Fig. 1.1

Step 5 Fill test-tube **C** with cold water up to the line drawn in step 4. Put test-tube **C** into the beaker labelled **cold water**.

Step 6 Fill test-tube **W** with warm water up to the line drawn in step 4. Put test-tube **W** into the beaker labelled **warm water**.

Step 7 Fill test-tube **H** with hot water up to the line drawn in step 4. Put test-tube **H** into the beaker labelled **hot water**.

Step 8 You are provided with three potato cylinders in the beaker labelled **P**. They have been soaked in methylene blue solution and then rinsed.

Place the three potato cylinders on the white tile and cut the three potato cylinders to approximately 2 cm in length.

Step 9 Place one of the potato cylinders from step 8 into each test-tube.

Step 10 Start the stop-clock. Leave the test-tubes for 15 minutes.

Continue with the other questions while you are waiting.

Step 11 After 15 minutes, measure the temperature of the water in the beaker labelled **hot water** again.

Record this measurement in the space provided in **1(a)(i)**.

(a) (i) Record the temperatures you measured in step 2 and step 11.

Include the unit.

water temperature in the beaker labelled **hot water** in step 2 .....

water temperature in the beaker labelled **hot water** in step 11 .....

[2]

Step 12 Remove the test-tubes from the beakers and shake all the test-tubes for 10 seconds. Place the test-tubes into the test-tube rack.

Step 13 Hold the piece of white card behind the test-tubes to help you observe the contents of the test-tubes.

Observe the intensity of the blue colour of the liquid in test-tubes **C**, **W** and **H**.

Record your observations in your table in **1(a)(ii)**.

(ii) Prepare a table to record your results.

[3]

[Turn over

(iii) State a conclusion for your results.

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.....

..... [1]

(iv) Identify **one** possible source of error in step 8.

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..... [1]

(v) Identify **one** safety hazard in the investigation.

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..... [1]

(vi) Your measurements in **1(a)(i)** may suggest that the temperature of the water during the investigation was a source of error.

Suggest an improvement to reduce this type of error.

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..... [1]

(b) A student investigated the effect of surface area on diffusion.

The student used this method:

- Cut four cubes from a potato. Each cube should be a different size.
- Put the potato cubes into a methylene blue solution for 24 hours.
- After 24 hours, remove the potato cubes from the solution and rinse them in cold water.
- Fill four test-tubes with water. Place one potato cube into each test-tube. Leave the test-tubes for 15 minutes.
- Some of the methylene blue dye will diffuse out of the potato cube into the water during the 15 minutes. Shine a light through the water in the test-tube after 15 minutes.
- Measure the percentage of light that is absorbed by the methylene blue dye in the water in each test-tube.
- The higher the concentration of methylene blue dye in the water the greater the percentage of light absorbed.

(i) State the independent variable and the dependent variable in the investigation described in **1(b)**.

independent variable .....

.....

dependent variable .....

.....

[2]

(ii) State **one** variable that was kept constant in the investigation described in **1(b)**.

..... [1]

(iii) Fig. 1.2 is a graph showing the student's results.

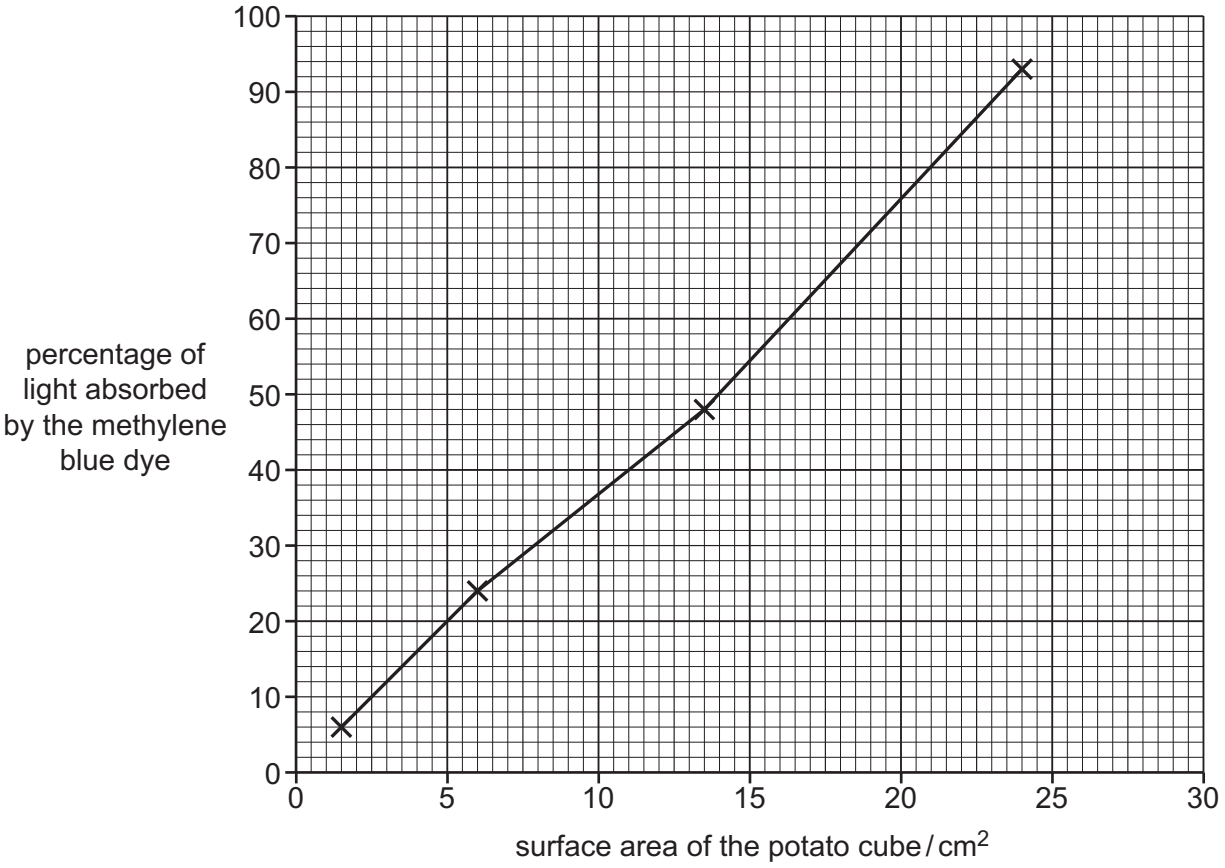

Fig. 1.2

Using Fig. 1.2, estimate the percentage of light absorbed by the methylene blue dye when the surface area of the potato cube is 18 cm^2.

Show on Fig. 1.2 how you obtained your estimate.

..... %

[2]

[Total: 14]

2 **(a)** A scientist investigated the nutritional content of fruit juice.

(i) State the name of the reagent or solution that would be used to test the fruit juice for starch.

..... [1]

(ii) State the name of the reagent or solution that would be used to test the fruit juice for reducing sugars.

..... [1]

(iii) A sample of fruit juice was tested for protein.

State the result of a positive test.

..... [1]

(b) Fruit juice contains vitamin C.

Plan an investigation to determine the effect of temperature on vitamin C concentration in fruit juice.

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..... [6]

(c) Scientists wanted to find out if drinking beetroot juice lowers blood pressure.

Two groups of men had their systolic blood pressure measured. Group 1 drank 500 cm^3 of beetroot juice and group 2 drank 500 cm^3 of apple juice.

After six hours their systolic blood pressures were measured again.

The results are shown in Table 2.1.

Table 2.1

group	mean systolic blood pressure / mm Hg	
	before drinking	after six hours
1	132.4	127.4
2	131.3	132.1

(i) Using the data in Table 2.1, calculate the percentage change in mean systolic blood pressure for group 1.

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

Space for working.

..... %
[3]

(ii) State **one** factor that was kept constant in the investigation described in **2(c)**.

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..... [1]

(d) Fig. 2.1 is a photomicrograph of a section through a bronchiole in a human lung.

magnification ×130

Fig. 2.1

(i) Line **PQ** represents the width of the bronchiole.

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

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

Calculate the actual width of the bronchiole using the formula and your measurement.

$$\text{magnification} = \frac{\text{length of line } \mathbf{PQ}}{\text{actual width of the bronchiole}}$$

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

Space for working.

..... mm
[3]

(ii) Make a large drawing of the layers of tissue in the bronchiole shown in Fig. 2.1.

Do **not** draw individual cells.

[4]

(e) A scientist investigated the effect of exercise on breathing rate and heart rate while running.

They measured the percentage increase in breathing rate and heart rate from the resting rates during a four-minute run.

The results are shown in Table 2.2.

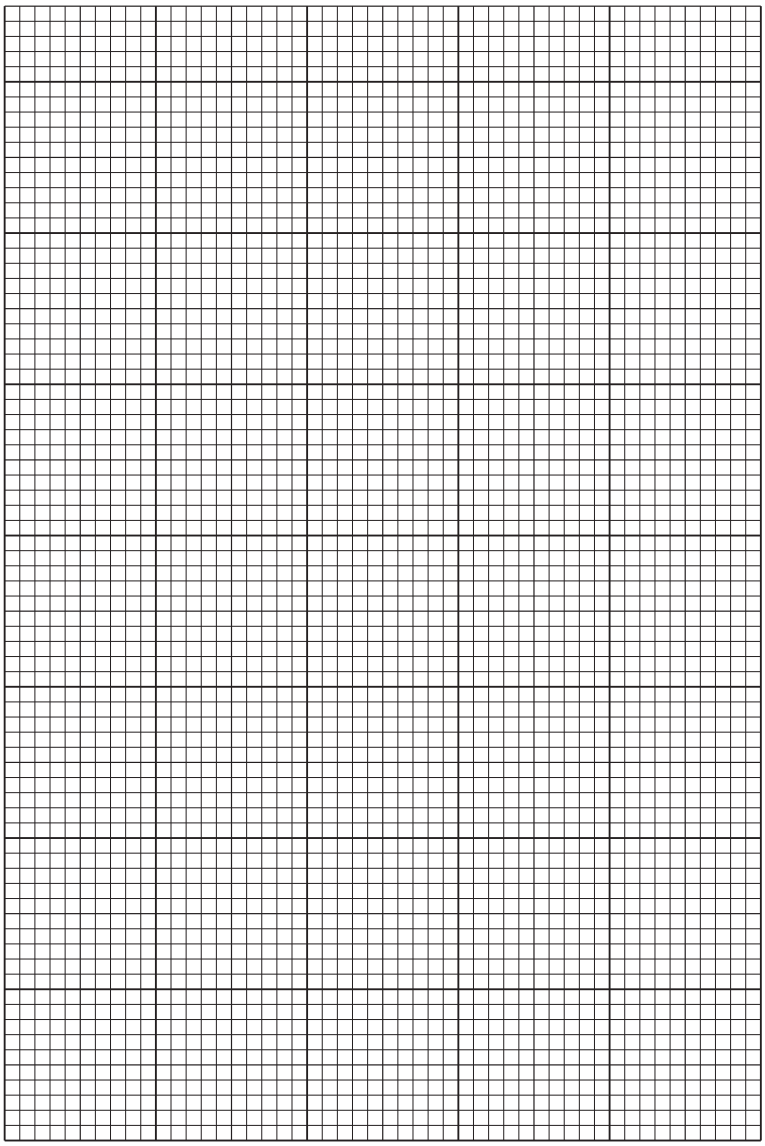
Table 2.2

time / s	percentage increase from resting rates	
	breathing rate	heart rate
0	0	0
60	92	21
120	123	40
180	135	59
240	142	77

(i) Using all the data in Table 2.2, plot a line graph on the grid of the percentage increase from resting rate against time.

You will need to plot breathing rate and heart rate as **two** separate lines on your graph.

Include a key.



[5]

(ii) State a conclusion for the data shown in your graph.

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..... [1]

[Total: 26]

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