Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

5955972098

BIOLOGY **0610/53**

Paper 5 Practical Test **October/November 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	
3	
Total	

This document has **12** pages. Any blank pages are indicated.

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1 You are going to investigate the effect of glucose solution concentration on the rate of respiration in a suspension of yeast cells.

The word equation for aerobic respiration is:

glucose + oxygen → water + carbon dioxide

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)(iii).

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

Step 1 Label one test-tube **A** and a second test-tube **B**. Label the third test-tube **water**.

Step 2 Add 1 cm^3 of the **0.1 mol per dm^3 glucose solution** to test-tube **A**.

Step 3 Add 4 cm^3 of **distilled water** to test-tube **A**.

(a) (i) Use the information in step 2 and step 3 to calculate the concentration of glucose solution in test-tube **A**.

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

Step 4 Use the glass rod to stir the **yeast suspension**.

Step 5 Use a syringe to put 10 cm^3 of the yeast suspension into test-tube **A**. Use the glass rod to mix the contents of test-tube **A**.

Step 6 Raise your hand when you are ready for the hot water to be added to the beaker labelled **water-bath**.

Step 7 Measure the **starting** temperature of the water in the water-bath and record this measurement in the space provided in **1(a)(ii)**.

Step 8 Pour **tap water** into the test-tube labelled **water** and set up the apparatus as shown in Fig. 1.1.

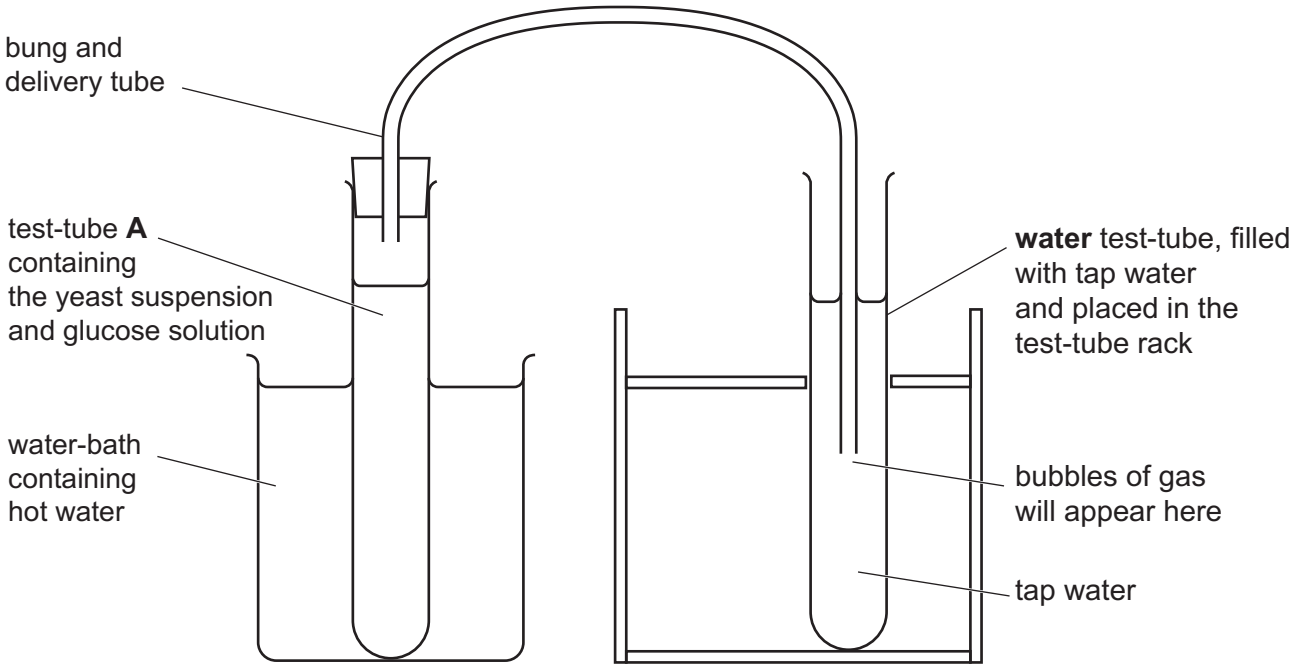

Fig. 1.1

Step 9 Once the apparatus is set up, leave it for two minutes. Bubbles of gas will start to appear at the end of the delivery tube.

Step 10 Start the stop-clock and count the number of bubbles produced in three minutes. Record this measurement in your table in **1(a)(iii)**.

Step 11 Remove test-tube **A** from the apparatus and place it in the beaker labelled **waste**.

Step 12 Put 5 cm^3 of the **0.1 mol per dm^3 glucose solution** into test-tube **B**.

Step 13 Stir the **yeast suspension** again.

Step 14 Use a syringe to put 10 cm^3 of the yeast suspension into test-tube **B** and mix the contents of the test-tube.

Step 15 Place test-tube **B** into the water-bath and connect the bung and delivery tube. Repeat step 9 and step 10.

Step 16 Measure the temperature of the water in the water-bath again and record this as the final temperature in the space provided in **1(a)(ii)**.

(ii) starting temperature of the water in the water-bath ..... °C

final temperature of the water in the water-bath ..... °C

[1]

(iii) Prepare a table to record your results.

[3]

(iv) Use your results to calculate the rate of bubble production for each of the test-tubes.

rate of bubble production for test-tube **A** ..... bubbles per minute

rate of bubble production for test-tube **B** ..... bubbles per minute [1]

(v) State a conclusion for your results.

.....

.....

..... [1]

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

.....

..... [1]

(vii) Explain why the temperature of the water in the water-bath is a source of error.

Suggest an improvement for this error.

explanation .....

.....

improvement .....

..... [2]

(viii) Suggest why the yeast suspension was stirred in step 4 and step 13.

.....

..... [1]

(ix) Suggest why the test-tube was left in the water-bath for two minutes in step 9.

.....

.....

..... [1]

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(b) A student wanted to measure the **volume** of gas produced by respiring yeast cells in one minute.

Complete Fig. 1.2 by drawing and labelling the apparatus the student could use to do this.

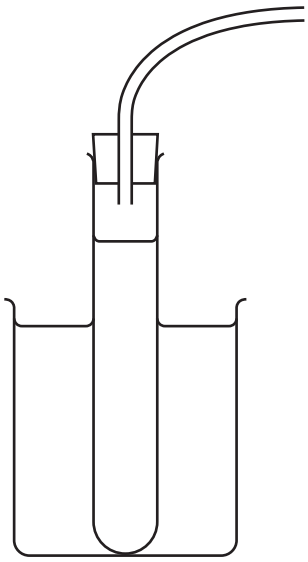


Fig. 1.2

[2]

[Total: 14]

2 **(a)** Fig. 2.1 is a photograph of an inkcap mushroom. Mushrooms are a type of fungus that grow in fields and forests.

magnification ×1.5

Fig. 2.1

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

[4]

(ii) Line **AB** represents the width of the mushroom cap shown in Fig. 2.1.

Measure the length of line **AB** on Fig. 2.1.

length of line **AB** on Fig. 2.1 ..... mm

Use your measurement and the formula to calculate the actual width of the mushroom cap.

$$\text{magnification} = \frac{\text{length of line } \mathbf{AB} \text{ on Fig. 2.1}}{\text{actual width of the mushroom cap}}$$

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

Space for working.

..... mm
[3]

(b) In a study, the colour of the cap of mushrooms growing in different temperatures was recorded.

The colour was determined using the scale shown in Fig. 2.2.

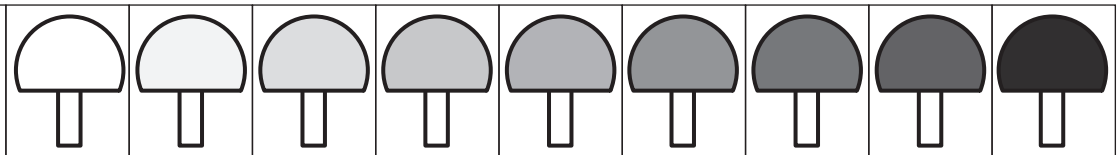
cap colour									
score	0	1	2	3	4	5	6	7	8

Fig. 2.2

The results are shown in Table 2.1.

Table 2.1

temperature / °C	cap colour score
15	8
17	8
19	6
21	5
23	3
25	1
27	0

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(i) Plot a line graph on the grid of the data in Table 2.1.

[4]

(ii) Using the information in your graph, describe the results of this study.

.....

.....

.....

.....

..... [2]

(iii) Fig. 2.3 shows the cap of a mushroom grown at a constant temperature.

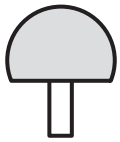

Fig. 2.3

Using the scale in Fig. 2.2 and your graph, estimate the temperature that the mushroom in Fig. 2.3 was grown in.

Show on your graph how you obtained your estimate.

..... °C
[2]

(iv) Suggest why your answer in **2(b)(iii)** can only be an estimate.

.....

.....

..... [1]

(v) All of the mushrooms used in the study were of the same species.

Suggest why it was important that they were all the same species.

.....

.....

..... [1]

(vi) State **one** variable, other than the species of mushroom, which should have been kept constant in this study.

.....

.....

..... [1]

(c) Some mushrooms contain vitamin C.

Describe the method you would use to test a sample of mushrooms for vitamin C.

.....

.....

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.....

.....

[2]

[Total: 20]

3 Plan an investigation to find out how the volume of water added to germinating seeds affects the rate of germination.

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..... [6]

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