Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

BIOLOGY **0610/63**

Paper 6 Alternative to Practical **October/November 2022**

1 hour

You must answer on the question paper.

No additional materials are needed.

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 [ ].

This document has **12** pages.

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1 A student investigated the effect of the concentration of a glucose solution on the rate of respiration in a suspension of yeast cells.

The equation for aerobic respiration is:

glucose + oxygen → water + carbon dioxide

The student used this method:

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

Step 2 Add 1 cm^3 of 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 a glass rod to stir the yeast suspension provided in the beaker.

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

Step 6 Add warm water to the beaker labelled **water-bath**. Measure the temperature of the water in the water-bath and record this value as the **starting** temperature.

Step 7 Pour water into the test-tube labelled **water** and set up the apparatus as shown in Fig. 1.1.

View solution

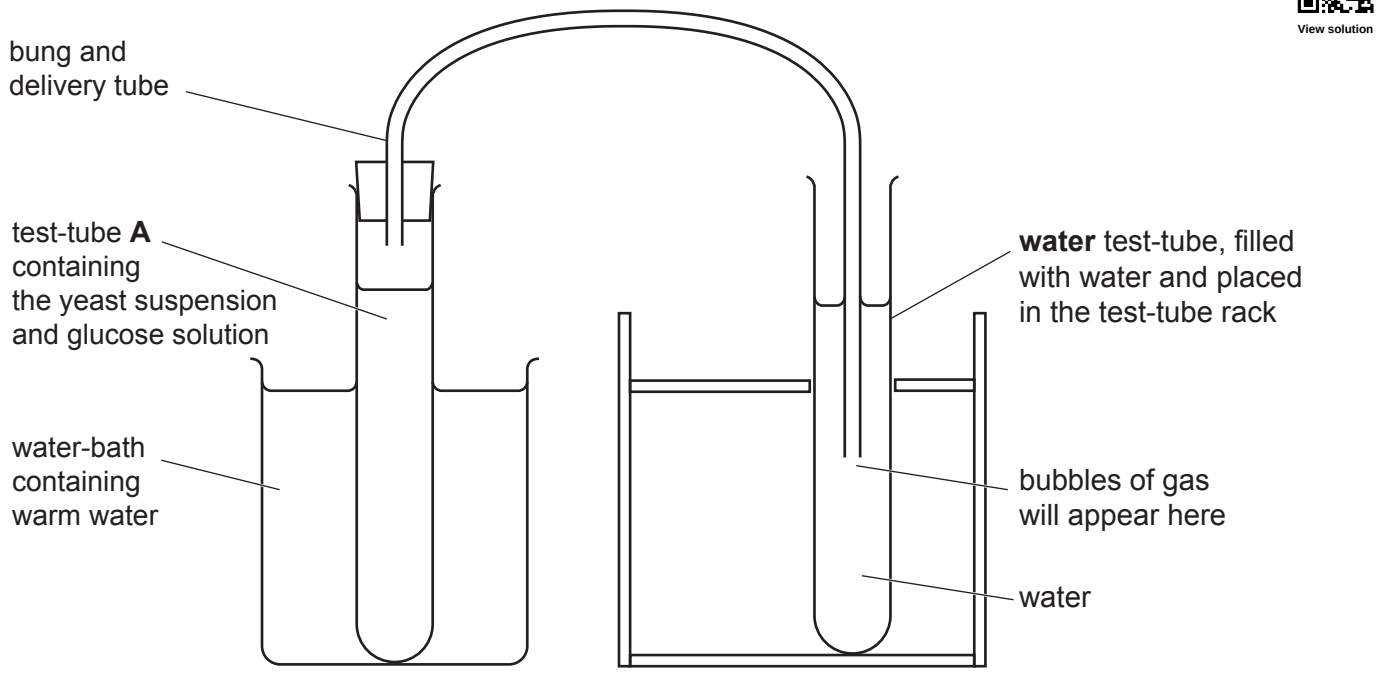

Fig. 1.1

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Step 8 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 9 Start a stop-clock and count the number of bubbles produced in three minutes.

Step 10 Remove test-tube **A** from the apparatus and place it in the beaker labelled **waste**.

Step 11 Put 5 cm^3 of the 0.1 mol per dm^3 glucose solution into test-tube **B**.

Step 12 Stir the yeast suspension.

Step 13 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 14 Place test-tube **B** into the water-bath and connect the bung and delivery tube. Repeat step 8 and step 9.

Step 15 Measure the temperature of the water in the water-bath again and record this as the final temperature of the water in the water-bath.

(ii) Fig. 1.2 shows the readings on the thermometers for step 6 and step 15.

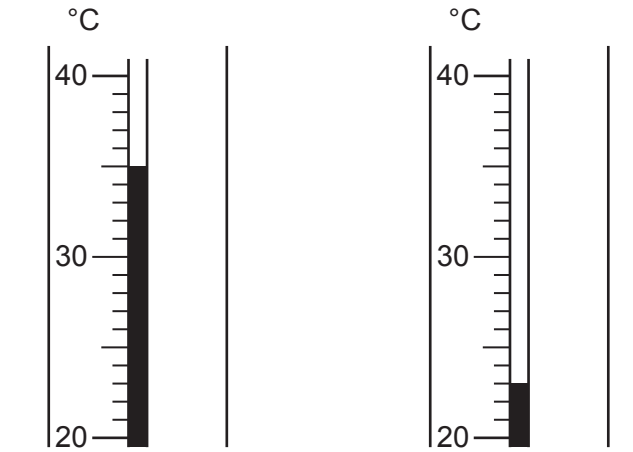

Fig. 1.2

Record the temperatures shown in Fig. 1.2.

Calculate the change in temperature.

starting temperature ..... °C

final temperature ..... °C

change in temperature ..... °C

[2]

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(iii) The student recorded the number of bubbles of gas produced in three minutes by drawing a line in their notebook for each bubble observed.

Fig. 1.3 shows the student's results. Each line represents one bubble of gas.

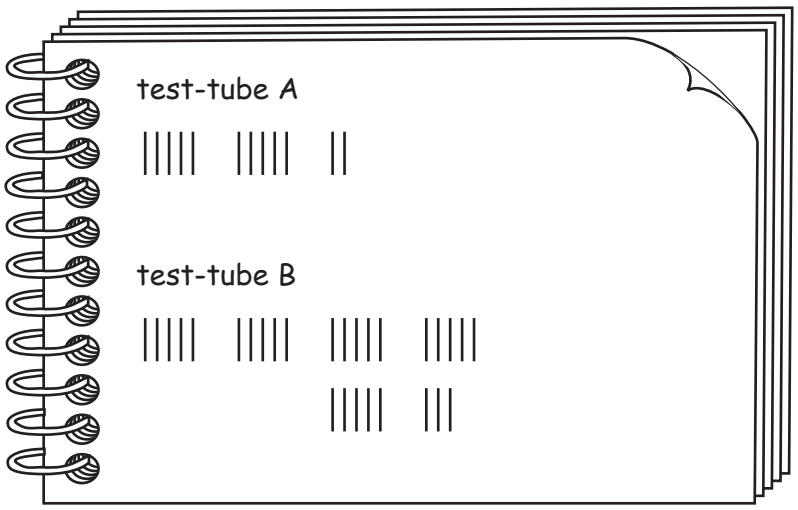

Fig. 1.3

Prepare a table and record the results shown in Fig. 1.3.

[2]

(iv) Using the results shown in Fig. 1.3, 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 the results of this investigation.

.....

.....

..... [1]

(vi) Identify the variable that the student 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 12.

.....

..... [1]

(ix) Suggest why the test-tube was left in the water-bath for two minutes in step 8.

.....

.....

..... [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. 1.4 by drawing and labelling the apparatus the student could use to do this.

View solution

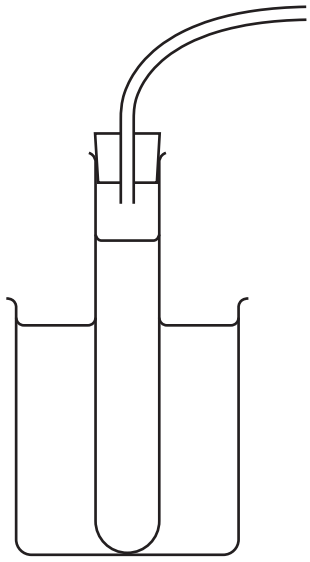

Fig. 1.4

[2]

[Total: 14]

2 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]

View solution

3 **(a)** Fig. 3.1 is a photograph of an inkcap mushroom. Mushrooms are a type of fungus that grow in fields and forests.

View solution



magnification ×1.5

Fig. 3.1

(i) Make a large drawing of the inkcap mushroom shown in Fig. 3.1.

[4]

(ii) Line **AB** represents the width of the mushroom cap shown in Fig. 3.1.

View solution

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

length of line **AB** on Fig. 3.1 ..... mm

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

$$\text{magnification} = \frac{\text{length of line } \mathbf{AB} \text{ on Fig. 3.1}}{\text{actual width of the mushroom cap}}$$

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. 3.2.

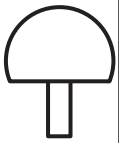
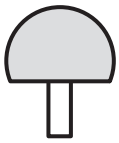
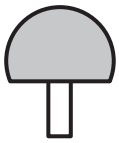
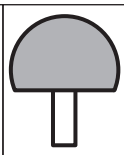
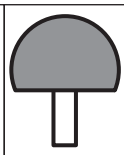
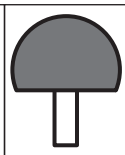
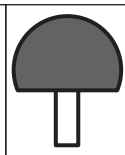
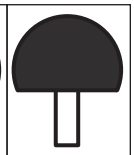
cap colour									
score	0	1	2	3	4	5	6	7	8

Fig. 3.2

The results are shown in Table 3.1.

Table 3.1

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 3.1.

View solution

[4]

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

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..... [2]

(iii) Fig. 3.3 shows the cap of a mushroom grown at a constant temperature.

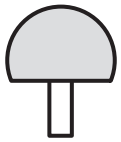

Fig. 3.3

Using the scale in Fig. 3.2 and your graph, estimate the temperature that the mushroom in Fig. 3.3 was grown in.

Show on your graph how you obtained your estimate.

..... °C
[2]

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(iv) Suggest why your answer in **3(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.

.....

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..... [1]

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

.....

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..... [1]

(c) Some mushrooms contain vitamin C.

View solution

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

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[2]

[Total: 20]

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