**Cambridge International Examinations**
Cambridge International General Certificate of Secondary Education

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| CANDIDATE NAME | | | | | | | | | |
| CENTRE NUMBER | | | | | | CANDIDATE NUMBER | | | |

*0016022679*

**BIOLOGY** **0610/62**

Paper 6 Alternative to Practical **May/June 2018**

**1 hour**

Candidates answer on the Question Paper.

No Additional Materials are required.

**READ THESE INSTRUCTIONS FIRST**

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.

Electronic calculators may be used.
You may lose marks if you do not show your working or if you do not use appropriate units.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

This syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **10** printed pages and **2** blank pages.

DC (LK/AR) 145511/4


CAMBRIDGE International Examinations

**[Turn over**

**1** A student investigated the rate of respiration of yeast at two different temperatures.

Step 1 The student was provided with a yeast suspension which also contained glucose. Two identical sets of equipment were set up as shown in Fig. 1.1.

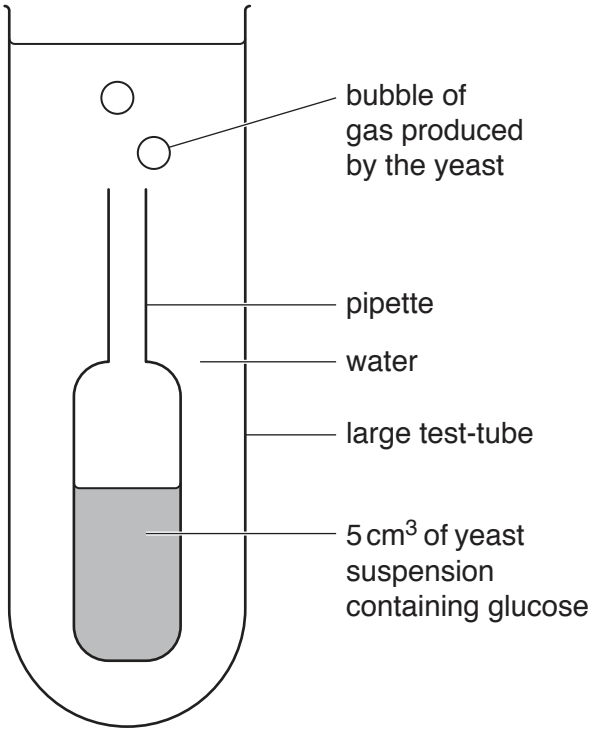



**Fig. 1.1**

Step 2 One set of the equipment shown in Fig. 1.1 was placed into a **warm** water-bath and the starting temperature of the water-bath was recorded as 50 °C. The other set was placed into a **cool** water-bath which had a starting temperature of 25 °C. The volume of water in each water-bath was the same.

Step 3 The student counted the number of gas bubbles produced by the yeast suspension in five minutes and recorded the results in a tally chart. This is shown in Fig. 1.2.

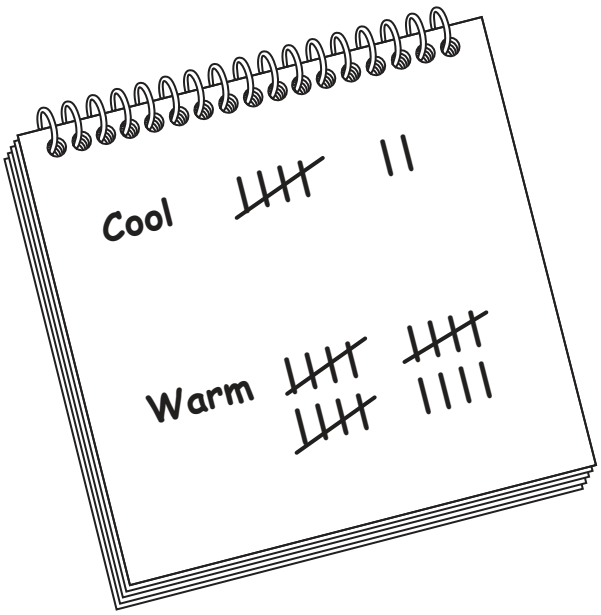



**Fig. 1.2**

**(a) (i)** Prepare a table and record the student's results shown in Fig. 1.2.

[3]

Step 4 At the end of the investigation the final temperature of the water in both water-baths was measured. The results are shown in Fig. 1.3.


thermometer in the **warm** water-bath


thermometer in the **cool** water-bath

**Fig. 1.3**

**(ii)** Use the information in step 2 and Fig. 1.3 to complete Table 1.1.

**Table 1.1**

| water-bath | starting temperature / °C | final temperature / °C |
|---|---|---|
| warm | | |
| cool | | |

[1]

**(b) (i)** State a conclusion for the results.

.....

.....

.....[1]

**(ii)** Counting the number of gas bubbles produced may not be an accurate method of measurement.

Explain why **and** suggest an improvement.

explanation .....

.....

.....

improvement .....

.....

.....

[2]

**(iii)** Identify a variable that **should** have been kept constant during this investigation but was not. Suggest how this variable could have been kept constant.

variable .....

.....

how this variable could have been kept constant .....

.....

.....

[2]

**(iv)** Identify the variable that was changed (independent variable) and the variable that was measured (dependent variable) in this investigation.

independent variable .....

.....

dependent variable .....

.....

[2]

**(c)** A scientist investigated the effect of different concentrations of glucose on the rate of carbon dioxide production in yeast cells. They measured the volume of carbon dioxide produced by the yeast cells in five minutes.

**(i)** The scientist decided to test their method before beginning the investigation.

They performed three trials using one concentration of glucose.

The results are given in Table 1.2.

**Table 1.2**

| trial | volume of carbon dioxide produced in 5 minutes / $cm^3$ |
|---|---|
| 1 | 13.6 |
| 2 | 14.3 |
| 3 | 12.9 |

Calculate the average volume of carbon dioxide produced in 5 minutes.

..... $cm^3$

Calculate the average rate of carbon dioxide production per minute.

..... $cm^3$ per minute
[2]



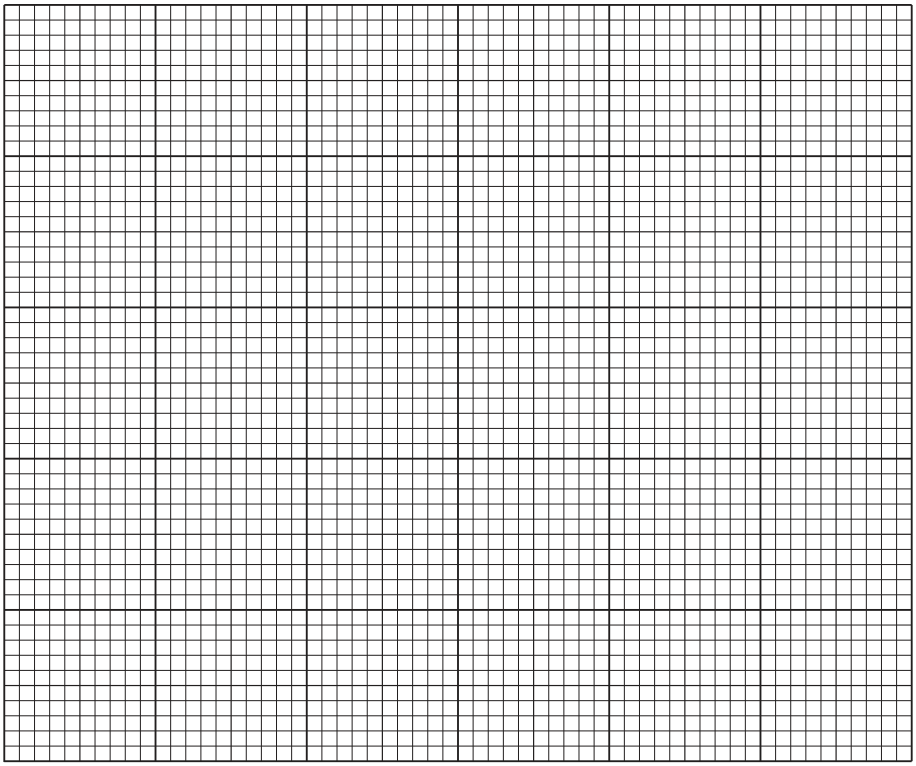
**[Turn over**

**(ii)** The scientist performed the investigation. Their results are shown in Table 1.3.

**Table 1.3**

| percentage concentration of glucose | average rate of carbon dioxide production / $cm^3$ per minute |
|---|---|
| 0.5 | 1.3 |
| 1.0 | 2.6 |
| 1.5 | 3.8 |
| 2.0 | 4.3 |
| 2.5 | 4.4 |
| 3.0 | 4.4 |

Plot a graph on the grid, using the data in Table 1.3, to show the effect of glucose concentration on the rate of carbon dioxide production. Include a line of best fit.



[4]

**(iii)** Describe the effect of glucose concentration on the rate of carbon dioxide production by respiring yeast cells, shown in your graph.

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.....[3]

**(iv)** Estimate the concentration of glucose the scientist used to test their method. Use your answer for **1(c)(i)** and your graph to find this value.

..... % [1]

**(d) (i)** Describe how the student could show that the glucose used in the investigation is a simple (reducing) sugar.

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.....[3]

**(ii)** Identify one hazard when testing for simple (reducing) sugars.

Describe one precaution that could be taken to reduce the risk.

hazard .....

.....

precaution .....

.....

.....[2]

[Total: 26]

**2** Fig. 2.1 shows *Asterionella*, which are microscopic algae that live in fresh water.

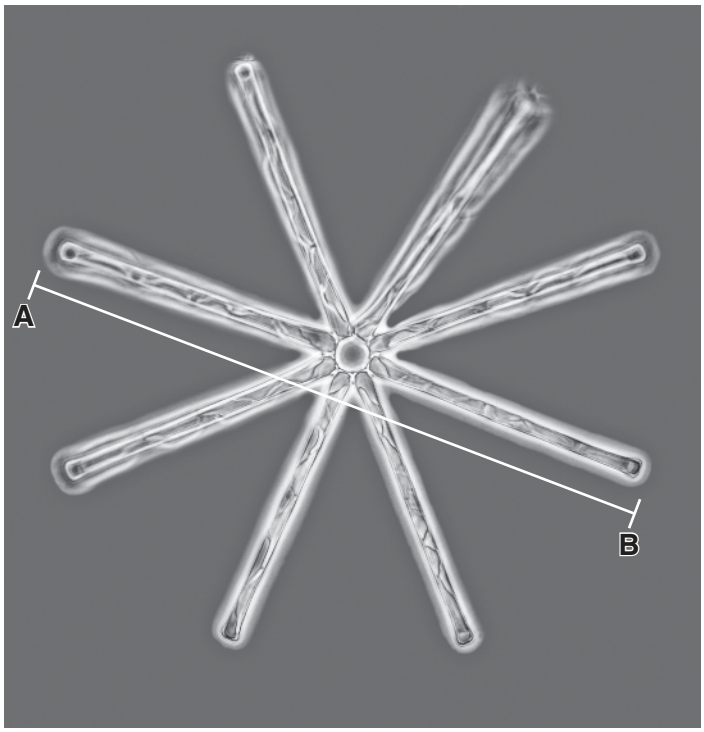


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**Fig. 2.1**

**(a) (i)** Make a large outline drawing of the algae. Do not label your drawing.

[4]

**(ii)** Measure the length of the line **AB** in Fig. 2.1. Include the unit.

length of **AB** .....

Use the formula to calculate the actual diameter of the algae shown in Fig. 2.1. Include the units.

$$\text{magnification} = \frac{\text{length of line } \mathbf{AB}}{\text{actual diameter of algae}}$$

Show your working.

.....
[3]

**(b)** Algae photosynthesise. This process uses carbon dioxide.

Hydrogencarbonate indicator can be used to determine the concentration of carbon dioxide in a solution.

| colour of hydrogencarbonate indicator | concentration of carbon dioxide |
|---|---|
| purple | low |
| red | medium |
| yellow | high |

**(i)** A student wanted to use hydrogencarbonate indicator to investigate the effect of light intensity on photosynthesis in fresh water algae.

Describe how the student could carry out this experiment.

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.....[6]

**(ii)** State the name of a pH indicator other than hydrogencarbonate which could be used to detect a change in pH.

.....[1]

[Total: 14]

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