



EXAMINATIONS COUNCIL OF ESWATINI
Eswatini General Certificate of Secondary Education

CANDIDATE
NAME

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CENTRE
NUMBER

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CANDIDATE
NUMBER

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BIOLOGY

6884/04

Paper 4 Alternative to Practical

October/November 2022

1 hour

Candidates answer on the Question Paper.

No Additional Materials required.

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name in the spaces provided.

Write your answers in dark blue or black pen.

You may use an HB pencil for any diagrams, graphs or rough working.

Do **not** use staples, paper clips, glue or correction fluid.

Do **not** write on the barcode.

Answer **all** questions.

You may use an electronic calculator.

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

The number of marks is given in brackets [] at the end of each question or part question.

For Examiner's Use	
1	
2	
Total	

This document consists of 8 printed pages and 4 blank pages.

1 A student is provided with an apple, a beaker and three boiling tubes labelled **A**, **B** and **C**.

The following procedure is followed:

- 1 The apple was cut longitudinally into two equal halves.
- 2 One half of the apple was placed in the Petri dish with water to cover the cut surface.
- 3 The other half of the apple was peeled to remove the skin.
- 4 Three cubes of 1cm × 1cm × 1cm were cut from the peeled half.
- 5 One cube was placed in boiling tube **A**.
- 6 The second cube was cut into four equal pieces and placed in boiling tube **B**.
- 7 The third cube was crushed using a scalpel and placed into boiling tube **C**.
- 8 Water was added to cover the samples ensuring that the depth of the water was the same in all the boiling tubes.
- 9 The boiling tubes were shaken for 3 seconds.
- 10 About 3 cm³ of Benedict's solution were added into each of the 3 boiling tubes.
- 11 The three boiling tubes were placed at the same time in a water-bath between 70 °C and 80 °C.
- 12 The boiling tubes were observed for up to 2 minutes.

The time for colour change from blue to yellow was recorded in Table 1.1.

Table 1.1

boiling tube	time taken for colour change/s
A	38
B	28
C	20

(a) Explain the observations for boiling tubes **A**, **B** and **C**.

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[4]

(b) Suggest the aim of the investigation.

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.....
..... [1]

(c) Explain why it was **not** necessary to add the Benedict's solution at the same time in all the boiling tubes in step 10.

.....
..... [1]

(d) State any **two** variables that were controlled in the investigation to ensure that the results were reliable.

1
2 [2]

(e) State an advantage of heating the sample in a water-bath.

.....
..... [1]

(f) Apples also contain vitamin C.

Describe how you would test crushed apple in water for the presence of vitamin C.

.....
.....
..... [2]

(g) Fig. 1.1 shows the other half of the apple from step 2.

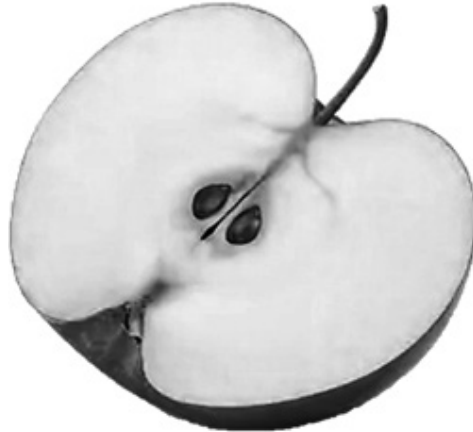


Fig. 1.1

(i) Draw the cut section of the apple in Fig. 1.1 and label:

- the part that developed from an ovary as **R**
- the remains of the style as **S**.

[4]

(ii) Apple seeds are dispersed by animals.

State a visible feature of an apple which shows that its seeds are dispersed by animals.

..... [1]

[Total: 16]

- 2 Fig. 2.1 shows an investigation that was carried out to count the number of bubbles of gas produced per unit time by yeast.

The following procedure was followed:

- 1 Dried yeast was added to the glucose solution and the mixture shaken gently.
- 2 The apparatus was set up as shown in Fig. 2.1.
- 3 The set-up was kept at a water-bath at 35 °C.

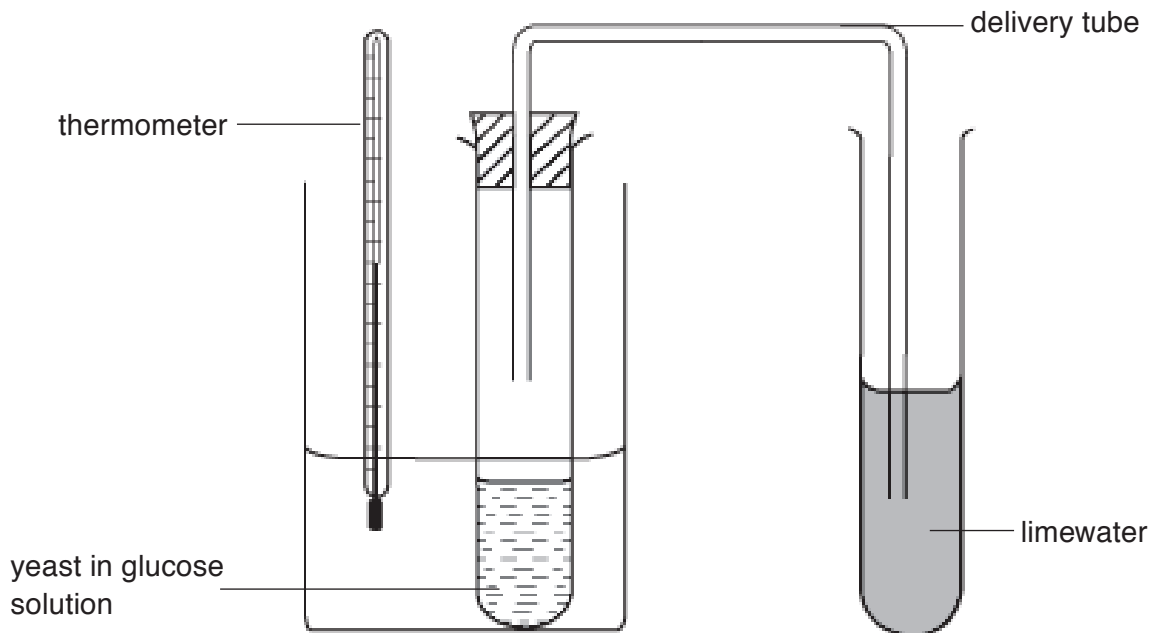


Fig. 2.1

The set up was left for two minutes and then the number of gas bubbles produced in one minute was counted.

The number of bubbles released was 33.

- (a) (i) Calculate the rate of bubble production per second using the result. Give your answer to two decimal places and include the unit.

..... [2]

- (ii) State a reason for leaving the apparatus for two minutes before counting the number of bubbles.

.....
 [1]

(iii) As the investigation continued, the limewater changed colour.

Describe and explain the change in the limewater as the experiment continued.

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.....
..... [3]

(iv) Suggest and explain the effect of leaving the set up for 24 hours at the same temperature on the number of bubbles released per minute.

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..... [2]

(v) Suggest a change to the method, other than temperature, that would increase the rate of reaction.

..... [1]

(vi) Describe how you would modify the investigation in Fig. 2.1 to find out if glucose is necessary for the change in the limewater.

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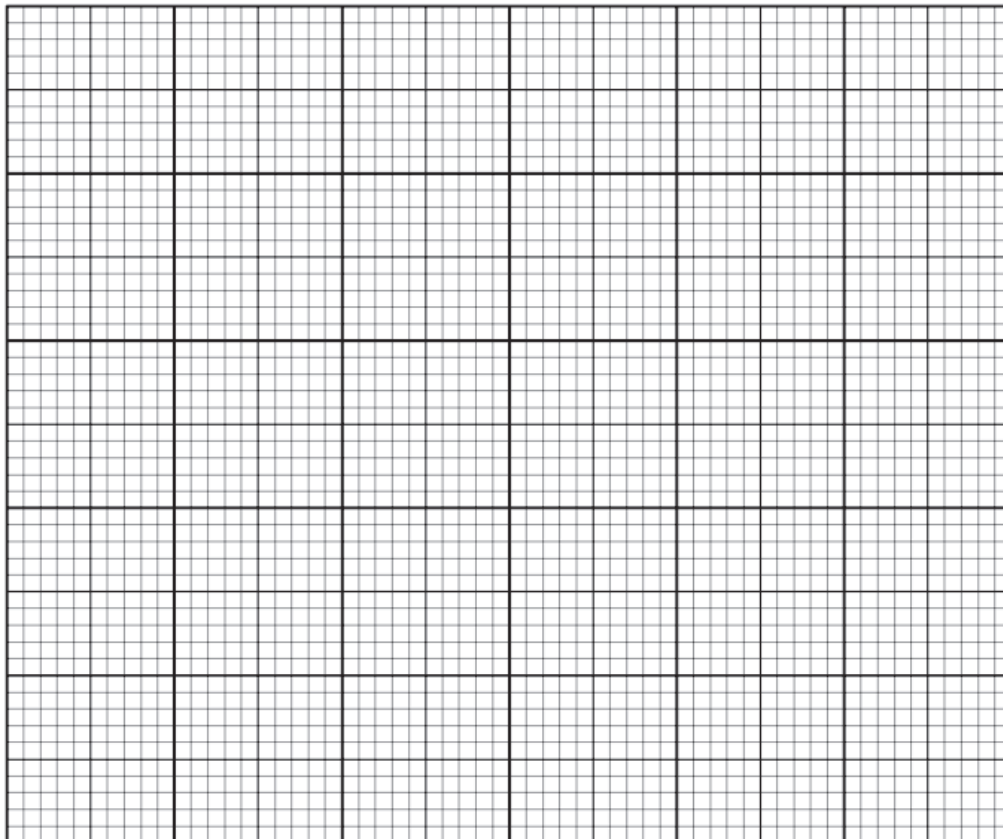
- (b) A student carried out a similar investigation to measure the number of bubbles produced at different temperatures.

The results are recorded in Table 2.1.

Table 2.1

temperature/ $^{\circ}\text{C}$	rate of bubbles production/ bubbles per minute
0	0
15	11
30	33
45	75
60	54

- (i) Plot, on the grid, a graph of the results shown in Table 2.1.



[5]

(ii) Estimate, using your graph, the rate of bubble production by yeast at 40 °C.

Show on your graph how you determined your answer.

..... [2]

(iii) Describe the trend shown by the results in Table 2.1 and your graph.

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.....
.....
..... [3]

(c) State the dependent and independent variable in this investigation.

dependent

independent [2]

[Total: 24]

