EXAMINATIONS COUNCIL OF ESWATINI
Eswatini General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

BIOLOGY **6884/04**

Paper 4 Alternative to Practical **October/November 2019**

1 hour

Candidates answer on the Question Paper.

No Additional Materials required.

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on the space 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.

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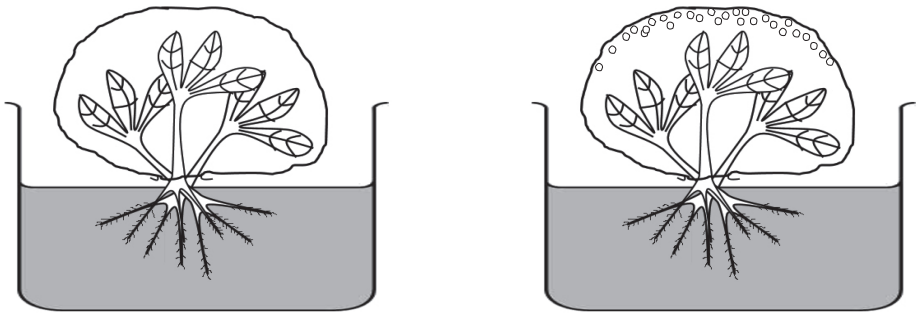
[Turn over

1 **(a)** You are provided with three spinach seedlings. The seedlings' roots are placed in a beaker of water and the shoots are enclosed in a transparent plastic bag as shown in Fig. 1.1**A**.



A **B**

Fig. 1.1

The set-up is allowed to stand for 10 minutes. After 10 minutes the plastic bag appears as shown in Fig. 1.1**B**.

(i) Describe and explain a change observed on the internal surface of the plastic bag in Fig. 1.1**B**.

description

.....

.....

explanation

.....

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.....

.....

..... [4]

(ii) Explain why **three** seedlings are used instead of one.

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..... [2]

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(iii) Explain why a plastic bag that allows light to pass through is used.

.....

..... [1]

(iv) State a reason for leaving the set-up to stand for 10 minutes before any observations are made.

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..... [1]

(b) Fig. 1.2 shows a picture of a spinach seedling.

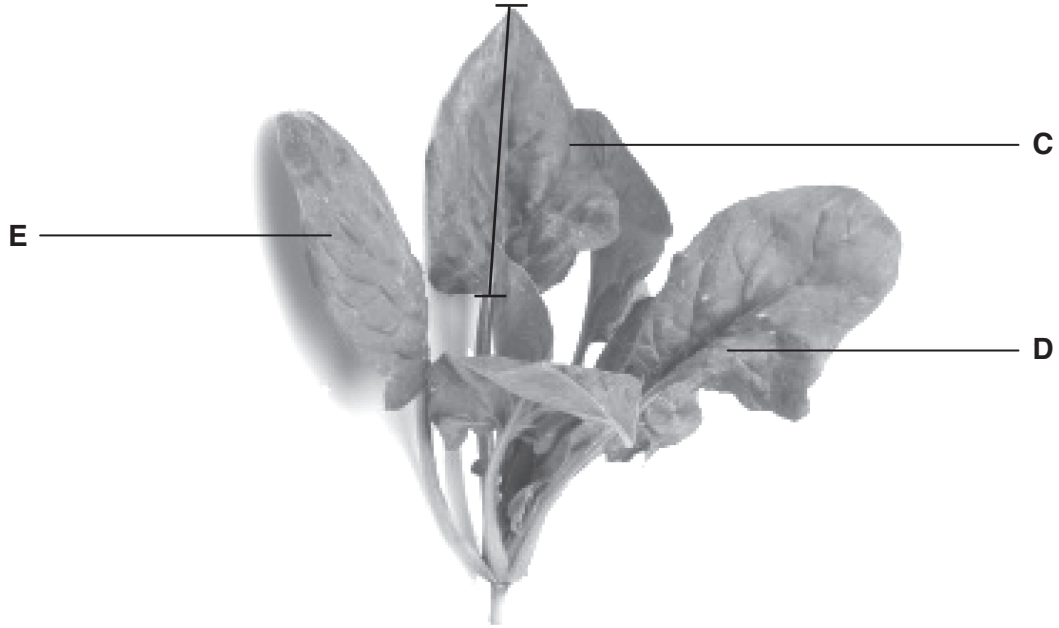

Fig. 1.2

(i) Measure the lengths of the leaves **C**, **D** and **E** in Fig. 1.2.

Measurements should be taken from the tip of the leaf to the bottom of the leaf where it joins the stalk as indicated by the line drawn on leaf **C** in Fig. 1.2.

leaf **C** .....

leaf **D** .....

leaf **E** ..... [1]

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(ii) Calculate the average length of the 3 leaves.

..... [1]

(iii) Draw a diagram of leaf **D** in Fig. 1.2 using a magnification of x2.

[3]

(iv) State **two** visible features of the spinach leaves in Fig. 1.2 that identify the spinach as a dicotyledonous plant.

1 .....

2 ..... [2]

(c) The leaves of spinach plants that have been grown with plenty of space in between them are greener than the leaves of spinach plants that have been grown very close together.

(i) Explain the difference in colour between the leaves of the plants grown far apart compared to the leaves of those grown together.

.....

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..... [3]

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(ii) The upper surface of the spinach leaf is shiny.

Explain how the shiny upper surface of spinach leaf enables the plant to survive in high temperatures.

.....

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..... [2]

[Total: 21]

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[Turn over

2 During an investigation, yeast is added to a boiling tube containing a glucose solution at 40 °C. The boiling tube is shaken well and then a balloon is placed over the top of the tube as shown in Fig. 2.1.

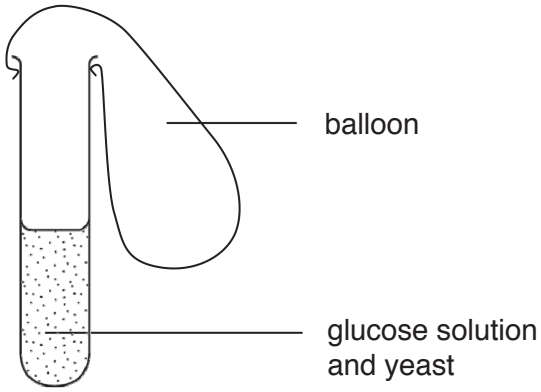

Fig. 2.1

(a) Over time froth gradually forms on top of the solution in the boiling tube.

Measure the height of froth in the boiling tube in Fig. 2.1 and record against time 0 minutes in Table 2.1.

Fig. 2.2 shows the boiling tube at different time intervals during the investigation.

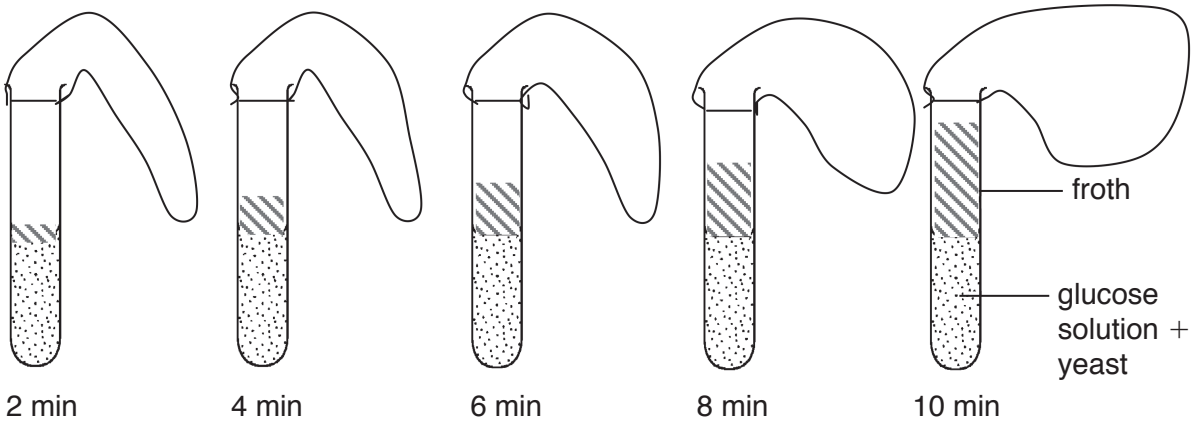

Fig. 2.2

Measure the height of froth at the different time intervals and record your results in Table 2.1.

Table 2.1

time/min	height of froth/mm
0	
2	
4	
6	
8	
10	

[1]

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(b) The balloon is carefully removed from the boiling tube and the gas inside is tested with limewater.

State and explain the changes observed in the limewater.

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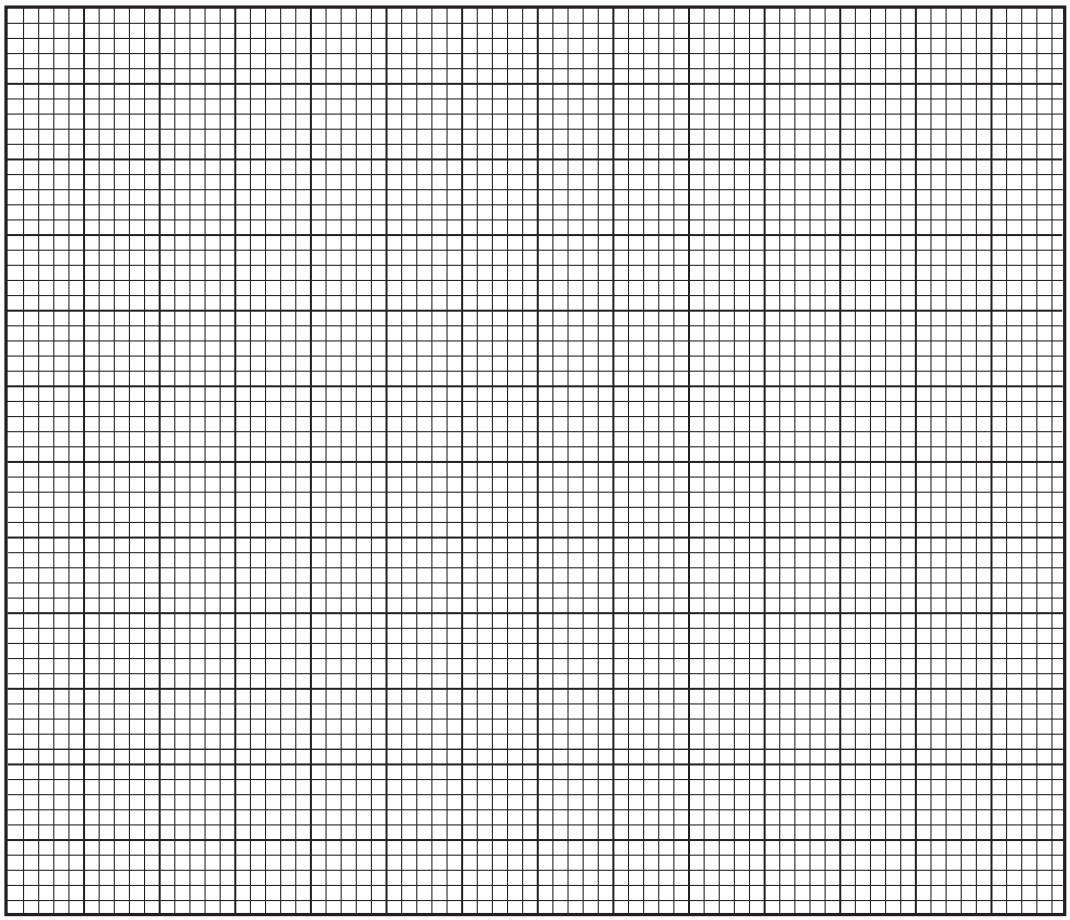
..... [3]

(c) Plot a graph on the grid, using your data from **Table 2.1**, to show the relationship between the time and the height of the froth.



[5]

(d) State and explain the effect of shaking the boiling tube at the beginning of the experiment.

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..... [2]

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(e) Suggest a change that would be observed if the experiment is carried out at 5 °C.

.....

..... [1]

(f) Describe how the investigation can be modified to determine the effect of the glucose concentration on the rate of froth formation.

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..... [4]

(g) Describe how you can collect and measure the precise volume of gas released in the experiment.

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..... [4]

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