



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 2023

1 hour

Candidates answer on the Question Paper.

Additional Materials: As listed in Confidential Instructions.

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 7 printed pages and 1 blank page.

- 1 Plants containing chlorophyll manufacture the carbohydrate during photosynthesis. Starch is a carbohydrate.



The starch was removed from the leaves of different green plants, **A** and **B**, by destarching them. The leaves were then exposed to light for 6 hours as part of an investigation into whether light is necessary for photosynthesis.

Fig. 1.1 shows two leaves, labelled, **A** and **B**.

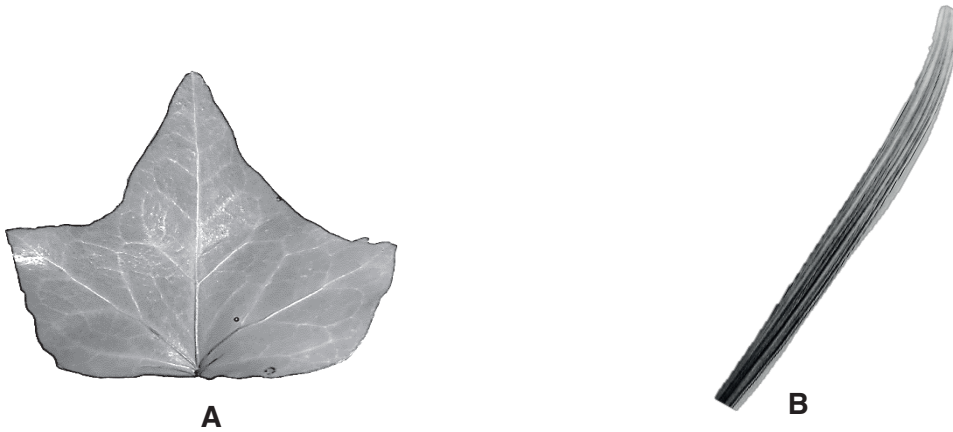


Fig. 1.1

- (a) Describe and explain what you would have done to destarch the leaves.

.....

.....

.....

..... [3]

- (b) Complete the table by describing **two visible** differences between leaf **A** and leaf **B**.

leaf A	leaf B

[2]

(c) Fig. 1.2 is a 1 cm grid.

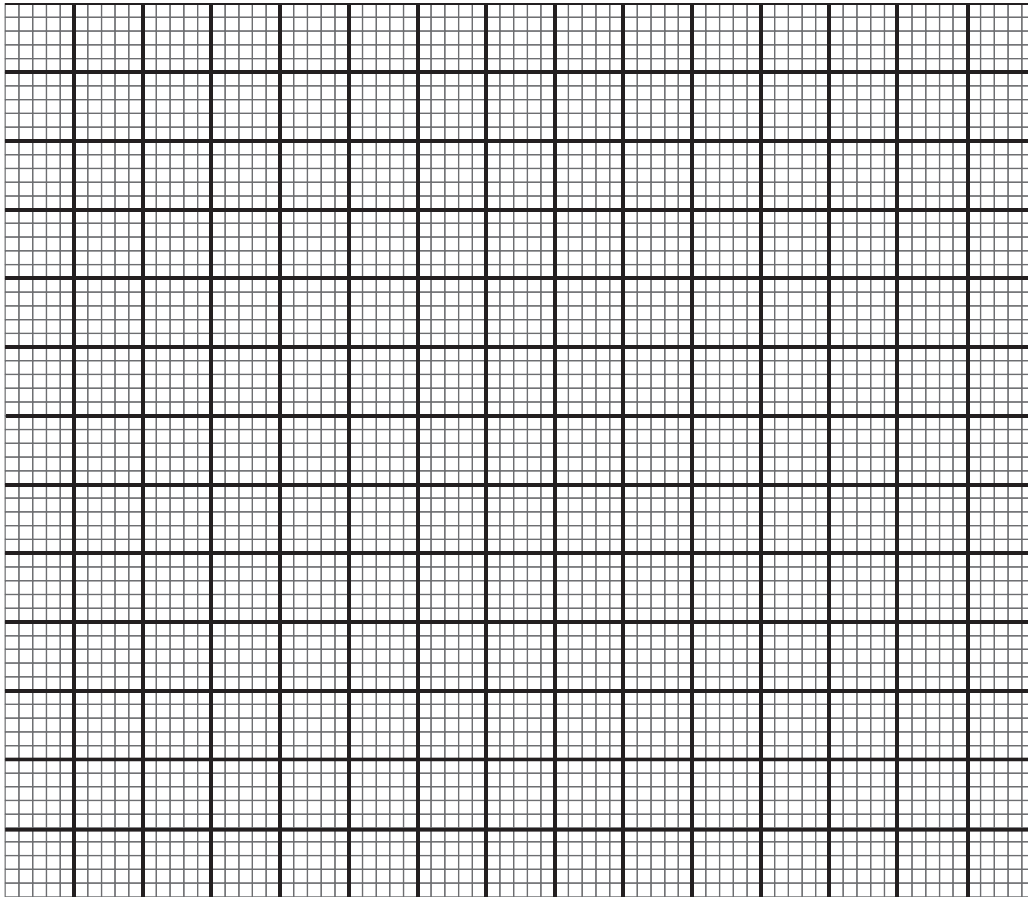


Fig. 1.2

Suggest how this 1 cm grid could be used to calculate the surface area of the whole of leaf **A**.

.....
.....
.....
.....
..... [4]

(d) Leaf **A** was immersed in very hot water. Both surfaces of the leaf were observed. The leaf was then removed and placed on a white tile.

(i) Suggest a suitable piece of laboratory equipment that could have been used to immerse the leaf safely.

..... [1]

(ii) Explain why bubbles were seen on the leaf when placed in hot water and why on only one side of the leaf.

.....
.....
.....
..... [4]

(e) Leaf **A** had been destarched and left in the light.

(i) Describe a test you could do in the laboratory to discover whether the leaf had carried out photosynthesis while being in the light.

.....
.....
.....
.....
..... [4]

(ii) Describe how you would ensure that the test you have described was carried out safely.

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

(iii) Explain how you would know from this test whether photosynthesis had occurred.

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

[Total: 20]

- 2 A student wished to examine the internal structure of a mammalian kidney. She cut the kidney in half along its length.

Fig. 2.1 is a photograph of the cut surface of the kidney that she studied.

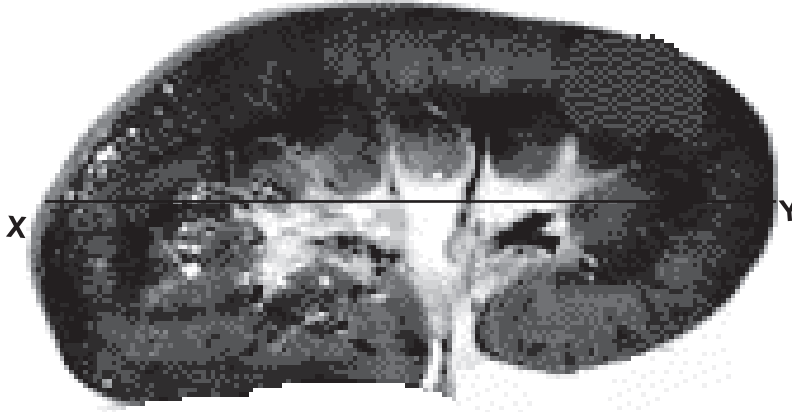


Fig. 2.1

- (a) (i) In the space below, make a drawing of the kidney as it appears in Fig. 2.1.

[4]

- (ii) On your drawing, use label lines to identify the medulla (**M**) and the first part of the ureter (**U**).

[2]

- (b) (i) On the photograph in Fig. 2.1, Identify the line labelled **X – Y**.

Measure and record the length of this line.

length of line **X – Y** mm [1]

- (ii) On your own drawing, draw a line in the same position as **X – Y**. [1]

- (iii) Measure and record the length of the line you have drawn on your drawing.

..... mm [1]

- (iv) Use your measurements in (b) (i) and (b) (iii) to calculate the magnification of your drawing compared to the photograph in Fig. 2.1.

Give your answer to 1 decimal place.

magnification [2]

- (c) Using features visible in Fig. 2.2, explain why the kidney is an organ.

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

- (d) The student wanted to investigate the effect of placing a piece of kidney and a piece of lung in warm water. She used the following procedure:

- cut a piece of kidney $20\text{ mm} \times 20\text{ mm} \times 20\text{ mm}$ and place it in boiling tube **C**;
- cut a piece of lung $20\text{ mm} \times 20\text{ mm} \times 20\text{ mm}$ and place it in boiling tube **D**;
- pour 15 cm^3 of water at 40°C into each boiling tube;
- left both boiling tubes for 10 minutes.

The boiling tubes after 10 minutes are shown in Fig. 2.2.

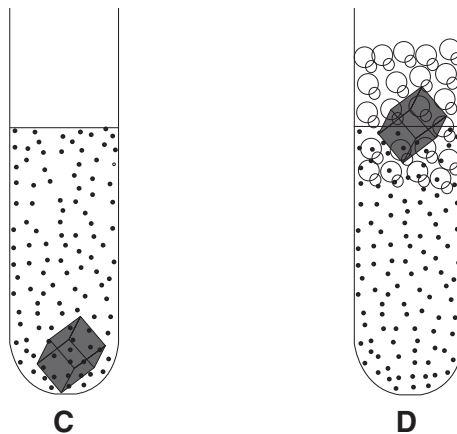


Fig. 2.2

- (i) Describe **one** observable difference between boiling tubes **C** and **D** in Fig. 2.2 apart from bubbles and suggest an explanation for the difference.

difference

.....

explanation

..... [2]

- (ii) State the variables that were controlled in this investigation into the effect of placing pieces of kidney and lung in warm water.

.....

.....

.....

..... [3]

- (iii) State why it is important to control variables in a scientific investigation.

..... [1]

- (iv) The student extended the investigation to determine which gas was present in the bubbles seen in Fig. 2.2. She collected samples of the gas to test them.

Describe how you would carry out tests to determine if the gas responsible for the bubbles was carbon dioxide or oxygen. State the positive results for each gas.

gas	test	positive result
carbon dioxide		
oxygen		

[2]

[Total: 20]

