

THE KENYA NATIONAL EXAMINATIONS COUNCIL
Kenya Certificate of Secondary Education



231/3

BIOLOGY (Practical)

Paper 3

Nov. 2023 — 1¾ hours

Serial No.
25630932

Name:

Index Number:

Candidate's signature:

Date:

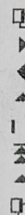
Instructions to candidates

- Write your name and index number in the spaces provided above.
- Sign and write the date of examination in the spaces provided above.
- Answer **all** the questions in the spaces provided.
- You are required to spend the first 15 minutes of the 1¾ hours allowed for this paper reading the whole paper carefully before commencing your work.
- Additional pages must **not** be inserted.
- This paper consists of 6 printed pages.**
- Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.**
- Candidates should answer all the questions in English.**



For Examiner's Use Only

Question	Maximum Score	Candidate's Score
1	11	
2	15	
3	14	
Total Score	40	



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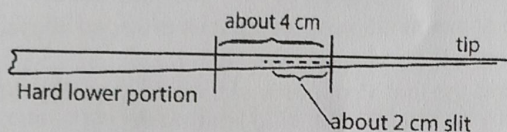
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1 You are provided with the following materials:

- Two similar leaves of *Brassica oleraceae* (Sukuma wiki)
- A scalpel
- 5 cm³ of liquid K_1 in a test tube
- 5 cm³ of liquid K_2 in a test tube
- (Access) to means of timing

Procedure

- (i) Remove the entire leafy parts along the midribs of both leaves.
- (ii) Retain the two midribs still attached to their petioles.
- (iii) Discard the hard lower petiole.
- (iv) Measure about 4 cm of the remaining midrib towards the tip. Cut and discard the tip. The process is illustrated as follows:



- (v) Make a 2 cm slit from the tip end of each of the 4 cm portions as shown in the diagram above.
- (vi) Place one piece into the test tube with liquid K_1 and the other into liquid K_2 and leave them for 20 minutes. Remove the two pieces and make observations.
- (a) Draw the appearance of each piece.

(i) Piece from K_1



(1 mark)

(ii) Piece from K_2

(1 mark)

(b) Account for the observations made on the piece from each liquid.

(i) Piece from K_1

(3 marks)



(ii) Piece from K_2

(3 marks)

(c) State how the experiment would be modified to obtain the same results within a shorter period of time. (2 marks)

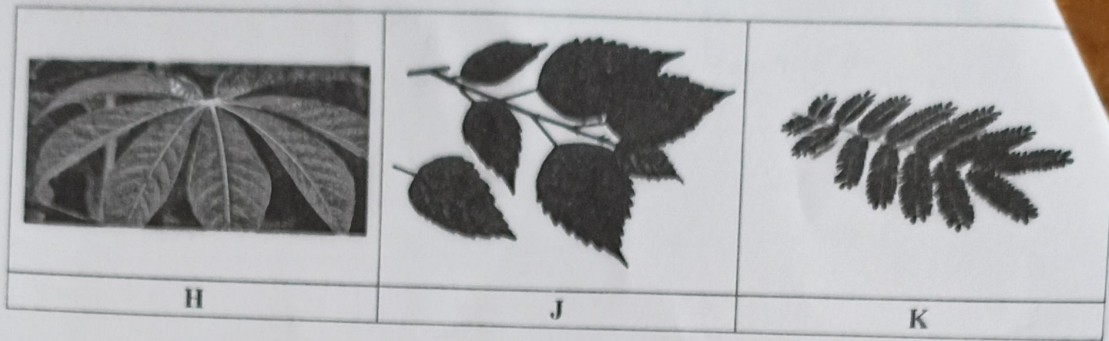
(d) Explain why the petiole and the lower parts of the midribs were not suitable for use in this experiment. (1 mark)

2

You are provided with three plant specimens labelled **E**, **F** and **G** obtained from different plants belonging to different Families.

(a) Use the specimens provided together with the photographs below to construct a dichotomous key that can be used to identify them. Use the features below in the order given to construct the key: (10 marks)

- Simple or compound leaves
- Leaf venation
- Type of compound leaf
- Leaf margin
- Nature of leaf lamina



- (b) Fill the following table indicating the steps followed to identify specimens E, F and G. (3 marks)



Specimen	Steps
E	
F	
G	

- (i) State **one** feature in the root and **one** in the stem of specimen **G** that places the plant in its Class. (2 marks)

Root

Stem

- 3 You are provided with the following materials:

- 3 test tubes and means of labelling them
- Solutions L_1 , L_2 and L_3 ,
- 10 cm³ measuring cylinder,
- Iodine solution.

Procedure

- Label the three test tubes **A**, **B** and **C**.
- To test tube **A**, add 1cm³ of L_1 , add one drop iodine solution. Record the observations in the table below.
- Add 1cm³ of each of L_1 and L_2 into tube **B**. Place it on the test tube rack and leave it undisturbed for ten minutes. Add a drop of iodine solution and record the observations in the table below.
- To the third test tube, **C**, add 1cm³ of L_2 , add two drops of dilute hydrochloric acid. Leave the contents undisturbed for ten minutes. Add 1cm³ of L_1 , shake the contents and again place the contents on the test tube rack for about five minutes, add a drop of iodine solution.
- Record the observations and inferences in the table below.

Test tube	Observations after adding iodine solution	Conclusion
A		
B		
C		

(6 marks)

- (a) (i) Suggest the likely identity of solution L_2 .

(1 mark)

- (ii) Explain your answer in 3(a)(i). (2 marks)



- (b) Suggest with a reason where the process being investigated in this experiment would take place in the human alimentary canal. (1 mark)

(i) Part of alimentary canal

(ii) Reason (2 marks)

- (c) State **two** other modifications one would make in test tube C to obtain similar observations (2 marks)



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