

**THE KENYA NATIONAL EXAMINATIONS COUNCIL**  
**Kenya Certificate of Secondary Education**

**231/3**

*Marking scheme;*

**BIOLOGY**

*Murray*  
*0802 Paper 3/4*

*Mohamed Abdi Farah* (Practical)

**Mar. 2022 - 1<sup>3</sup>/<sub>4</sub> hours**



Name ..... Index Number .....

Candidate's Signature ..... Date .....

**Instructions to Candidates**

- (a) Write your name and index number in the spaces provided above.
- (b) Sign and write the date of examination in the spaces provided above.
- (c) Answer **all** the questions in the spaces provided.
- (d) You are required to spend the first 15 minutes of the 1<sup>3</sup>/<sub>4</sub> hours allowed for this paper reading the whole paper carefully before commencing your work.
- (e) Additional pages must not be inserted.
- (f) **This paper consists of 7 printed pages.**
- (g) **Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.**
- (h) **Candidates should answer the questions in English.**

**For Examiner's Use Only**

Question	Maximum Score	Candidate's Score
1	14	
2	14	
3	12	
<b>Total Score</b>	<b>40</b>	



Turn over

P-Bean

E- Tree colour 1.

F- Marz (leaf)

G- Lantana (anara)

H- Bougainvillea (twig)

J- Jacaranda

(a) You are provided with plant specimens labelled E, F, G, H, and J. Use the specimens to develop a dichotomous key that can be used to identify the plants from which they were obtained based on the following characteristics in the order they are given: (6 marks)

- (i) Leaf form
- (ii) Leaf venation
- (iii) Leaf colour

1 a) leaf simple - - - - go to 2  
 b) leaf compound - - - - J

2 a) Leaves/leaf network veined - - - go to 3  
 b) leaves/leaf parallel veined - - - F

3 a) Leaves/leaf Green/Non-variegated - - - G/H, or GO to 4  
 b) leaves/leaf Non-green/Variegated - - - E

4 a) Leaf Margin serrated - - - - G/H  
 b) Leaf Margin smooth - - - - H/H

- (b) Account for the likely observation if fresh specimen E was exposed to light and tested for starch. (3 marks)

Green parts/parts with chlorophyll will turn blue black (with iodine solution/iodine); due to presence of starch since photosynthesis has occurred; White parts turn brown/retain iodine solution; due to absence of starch since photosynthesis has not occurred.

- (c) Explain one observable feature that adapts plants from which specimen G and H were obtained to a dry environment.

G (2 marks)

Rough/hairy leaf surface; to reduce transpiration.  
Leaves fold; to reduce transpiration.

H (2 marks)

shiny/glossy leaf surface; to reduce transpiration  
Folding of leaves; to reduce water loss;

- (d) Besides leaf characteristics, state one other observable characteristic on the plant from which specimen F was obtained that enables it to be placed in its Class. (1 mark)

Fibrous root system;  
Floral parts in threes/multiples of three

Act; one cotyledon.

2. You are provided with solution M which is a food substance.

### Procedure

(a) Using the reagents provided, test for the food substance present in substance M and complete the table below. (12 marks)

Food Test	Procedure	Observation	Conclusion
Starch	To about 2ml of food substance/M (in a test tube); Add (2 drops) of iodine solution;	Colour of iodine retained / yellow / brown; Res; -no change -No observable change; Acc; No colour change	starch absent
Vitamin C (Ascorbic acid)	To (about 2ml of) 'DCPIP in a test tube' Add (a drop of the) food substance / M	DCPIP is decolourised or DCPIP becomes colourless;	Vitamin C present
Lipids	Put / sub (a drop of the food substance / M) on to the filter paper / plain paper (allow the drop to dry) Hold against a source of light;	No translucent mark left (on the filter paper)	Lipids absent

(b) State two precautions one should observe while conducting the experiment in 2(a). (2 marks)

- ✓ Avoid contamination of reagents / apparatus / Avoid mixing of droppers / use clean apparatus.
- ✓ Avoid burning of filter paper / plain paper when drying.
- ✓ Avoid spilling / misusing of reagents / food substance;

3. You are provided with specimen N and P which are plants of the same species grown under different conditions.

(a) State two observable differences between the two specimens. (2 marks)

N	P
yellow leaves / white / green / yellow stem	Green leaves / Green stem
small leaves	large / big leaves.
long stem / tall stem / long internodes	short stem / short internodes;
thin stem	thick stem.
Weak / fragile / feeble / faint stem	strong / firm stem.



- (b) (i) Name the phenomenon observed in specimen N. (1 mark)

Etiolation;

- (ii) Explain how the knowledge on the phenomenon named in b(i) is applied in agriculture. (2 marks)

proper spacing / thinning / pruning / picking out / weeding / using a transparent material / polythene on a green house; to enable adequate penetration of light for the crop;

- (c) Account for the appearance of specimen N. (3 marks)

The specimen is weak / tall / long / thin; because they were grown in a darkness; hence absence of light / insufficient light; in darkness there is high concentration of auxin in shoot tip that stimulates faster elongation; OR

The specimen has small / yellow leaves / white stem / lack of chlorophyll; because they were grown in darkness; hence couldn't carry out photosynthesis / synthesis of chlorophyll;

- (d) State **two** other environmental factors necessary for seed germination apart from **light**.  
(2 marks)

Oxygen;

Water/moisture;

Optimal/optimum temperature/warmth;

- (e) State **two** observable features on the specimens that make them be placed in the same Class.  
(2 mark)

Tap root system;

Reticulate/Network Venation/Branched Venation/

Net-veined leaves;

Broad leaves/lamina;

Compact petiole;

Ac; presence of two cotyledons;

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