

231/3

# BIOLOGY

(Practical)

Mar. 2022 - 1¾ hours

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 7 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 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>     |                   |



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, go to 4  
b) leaves/leaf Non-green/Variegated - - - E

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

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- (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;<br>Res; -no change<br>-no observable change;<br>Acc; No colour change | starch absent     |
| Vitamin C (Ascorbic acid) | To (about 2ml of) 'DCPIP in a test tube' Add (a drop of) food substance / M   | DCPIP is decolourised or DCPIP becomes colourless;  | Vitamin C present |
| Lipids                    | Put / sub (a drop of) the food substance / M onto the filter paper / plain paper (allow the drop to dry)<br>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/fain stem         | strong/firm stem.            |

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- (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 stimulate 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;

Retiulate/Network Venation / Branched Venation /

Net-veined leaves;

Broad leaves/lamina;

Compact petiole

Ac; Presence of two cotyledons;

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