MARANDA HIGH SCHOOL

Kenya Certificate of Secondary Education
THE MOCK EXAMINATIONS, 2025

231/3	BIOLOGY May/June, 2025	PAPER 3 TIME: 2½ Hrs

MARKING GUIDE

1. You are provided with the following apparatus and reagents to carry out an experiment:

- Specimen **P**

- Hydrogen peroxide about 20 cm^3

- Scalpel

- 2M Hydrochloric acid about 5 cm^3

- 4 Sodium Chloride about 10 cm^3

- Metallic spatula

- 2 -5ml syringes

- 3 -50ml measuring cylinders

- Distilled water

- 3-Means of labelling

- Pestle and mortar

- Stop watch or means of timing

  Procedure

  (i) Label the measuring cylinders **A**, **B**, **C**.

  (ii) Measure 5ml of hydrogen peroxide and pour in **A**, do the same to **B** and **C**.

  (iii) To **A** add 2ml of dilute hydrochloric acid using a syringe. To **B** and **C** add 2ml of Sodium Chloride in each using another syringe.

  (iv) Using a scalpel cut the stem to remove the lower part called the root for all the 5 pieces of the specimen **P**.

  (v) Crush the remaining part of one piece of **P**, scoop it with spatula and dip it in **A**; Record your observation after 2min.

  (vi) Repeat the same procedure for **B**, and for **C** crush three pieces of specimen **P**.

a) Record your observations in the table below: (3marks)

Test tube	Observation
A	*No/least foam/effervescence/froth/bubbles;√* *Acc:less/little/lowest value*
B	*Medium/moderate amount of foam produced;√*
C	*Highest amount of foam produced;√*

(a) Account for your observations in: (6marks)

A:*Hydrochloric acid provided an acidic medium;√ which denatured the enzyme; (catalase,lowering the rate of reaction)*

B: *Sodium chloride provided co-factor;√ which activated enzyme;(increasing the rate of reaction)*

C:*Increase in enzyme concentration together with the co-factor;√ made the reaction to increase to optimum;√*

(b) Giving one reason based on the root, state the class from which **P** was obtained. (2 marks)

Class: *Dichotyledonae;√*

Reason:*Tap root system;√*

(c) (i) Name the condition under which the specimen **P** was grown. (1 mark)

Dark /absence of sunlight;√
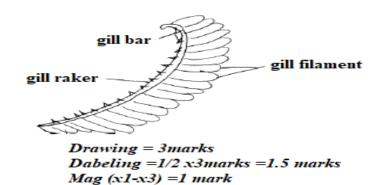
(ii) Give **one** reason for your answer (1mark)

Longer internodes;√ acc: yellow in colour/thin stem/etiolated

(d) Apart from the type of germination exhibited by **P**, name the other type of germination.

(1mark)

Hypogeal;√

2.You are provided with specimen **J**.

(a) (i) Using observable features only, identify the habitat to which the **J** leaves.   (1mark)

Aquatic/water;√

(ii) Give **two** reasons for your answer in (a)(i) above   (2marks)

Presence of gills; Presence of fins;acc operculum

(b) Stroke the specimen using your 30 cm ruler from:

(i) Head towards the tail. Record your observation   (1mark)

Slippery/Smooth;√ acc:less/no resistance;

(ii) Tail towards the head. Record your observation   (1mark)

Rough/more resistance;√

(iii) What is the significance of your observation in (b)(i) and (ii) above?   (1mark)

Minimize/reduces friction during locomotion in water;√

(c) Using the scalpel provided, cut and remove the operculum to expose the gills. Remove one complete

gill from the specimen and place it the petri-dish containing enough water to cover it.

Examine the gills under a hand lens.

(i).Draw and label it   (5 marks)

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gill bar

gill filament

gill raker

Drawing = 3marks
Dabeling =1/2 x3marks =1.5 marks
Mag (x1-x3) =1 mark
Total =5 marks

Conditons for drawing:
continuous outline
no shading
proportionality

(ii) Explain **two** adaptations of the respiratory surface used by J to its function   (2marks)

Numerous to increase surface area for gaseous exchange;√

Highly vacularised/dense network of capillary to maintain a steep concentration gradient;√

Thin epithelium to reduce diffusion distance;√

(iii) Name one of the paired fins in J   (1mark)

Pelvic

pectoral;√

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3.You are provided with a specimen labeled **X** and two solutions **L₁** and **L₂** .Push a cork borer through **X** to obtain two cylinders. Trim the ends to ensure that each cylinder is 3cm long. Put the two cylinders in **L₁**. Obtain two other similar cylinders of 3cm long each and put them in liquid **L₂**.Let the set up stand for 30 minutes.

(a) Tabulate your results in the table below   (2marks)

		Initial length (mm)	Final length (mm)	Average length (mm)
Cylinders in L₁	Cylinder 1	30	*32*	*31.5;*√
	2	30	*31*	
Cylinder in L₂	Cylinder 1	30	*29*	*28.5;*√
	2	30	*28*	

(b) State the nature of solution **L₁** and **L₂** .

(2marks)

Solution **L₁:** *hypotonic;*√

Solution **L₂:** *hypertonic;*√

(c) Explain the differences in the average lengths of the cylinders between solutions **L₁** and **L₂**.

Solutions **L₁**

(2marks)

The cells of the cylinder gained water from the solution by osmosis;hence increased in length;√

Solution **L₂**   (2

marks)

The cells of the cylinder lost water to the solution by osmosis;hence decreased in length;√

(d)(i) Give **two** roles of the process being investigated above in plants (2marks)

Opening and closing of the stomata;√

Feeding in insectivorous plant;√

Provide mechanical support due to cell turgidity;

Absorption of water from the soil by the plant roots;

Movement of water from one cell to the other;

(ii) Explain the role of oxygen in active transport (2marks)

Oxidise /Used in aerobic breakdown of food;√ to provide energy required for active transport;√