MARANDA HIGH SCHOOL

Kenya Certificate of Secondary Education

THE MOCK EXAMINATIONS, 2025

231/3	**BIOLOGY**	**PAPER 3**
	May/June, 2025	**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	***<u>Highest</u> 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)

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;√

3.You are provided with a specimen labeled **X** and two solutions **L_1** and **L_2** .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 **L_1**. Obtain two other similar cylinders of 3cm long each and put them in liquid **L_2**.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 L_1	Cylinder 1 2	 30 30	 ***32*** ***31***	 ***31.5;***√
Cylinder in L_2	Cylinder 1 2	 30 30	 ***29*** ***28***	 ***28.5;***√

(b) State the nature of solution **L_1** and **L_2** .

(2marks)

Solution **L_1**: ***hypotonic;***√

Solution **L_2**: ***hypertonic;***√

(c) Explain the differences in the average lengths of the cylinders between solutions **L_1** and **L_2**.

Solutions **L_1**

(2marks)

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

Solution **L_2** (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;***√