



# MARANDA HIGH SCHOOL

Kenya Certificate of Secondary Education

PRE-MOCK EXAMINATIONS 2023

CODE: 231/1

BIOLOGY – FORM 4

Paper 1

MARCH 2023 – TIME: 2 Hours

Name: ..... SCHEME. ..... Adm No: .....

Class: .....

Date: /04/2023

### INSTRUCTIONS TO CANDIDATES

- Answer all the questions.
- Answers **must** be written in the spaces provided in the question paper.
- Additional pages **must not** be inserted.
- Candidates may be penalized for recording irrelevant information and for incorrect spellings.

### FOR EXAMINER'S USE ONLY

Questions	Maximum Score	Candidate's Score
1-25	80	

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Biology Paper 1  
(THEORY)

1 The following apparatus is used in Biological studies.



a) Identify the apparatus.

(1mk)

Pair of forceps;

b) State its function.

(1mk)

Injuries/stinging  
Picking/holding specimen;

Protozoa

2 Explain why plants do not require an elaborate gaseous exchange system.

(2mks)

They have a large surface area to volume ratio;  
diffusion (across the cell membrane) is sufficient  
for their gaseous exchange needs;

3 Name two organisms that belong to the Kingdom Protista.

(2mks)

Amoeba; Plasmodium; Spirogyra  
Paramecium; Chlamydomonas  
Euglena;  
(First two).

4-60 black and 60 white mice were released in an area inhabited by jackals. After six weeks, it was established that 24 black and 8 white mice had remained.

a) Account for the above observation.

(3mks)

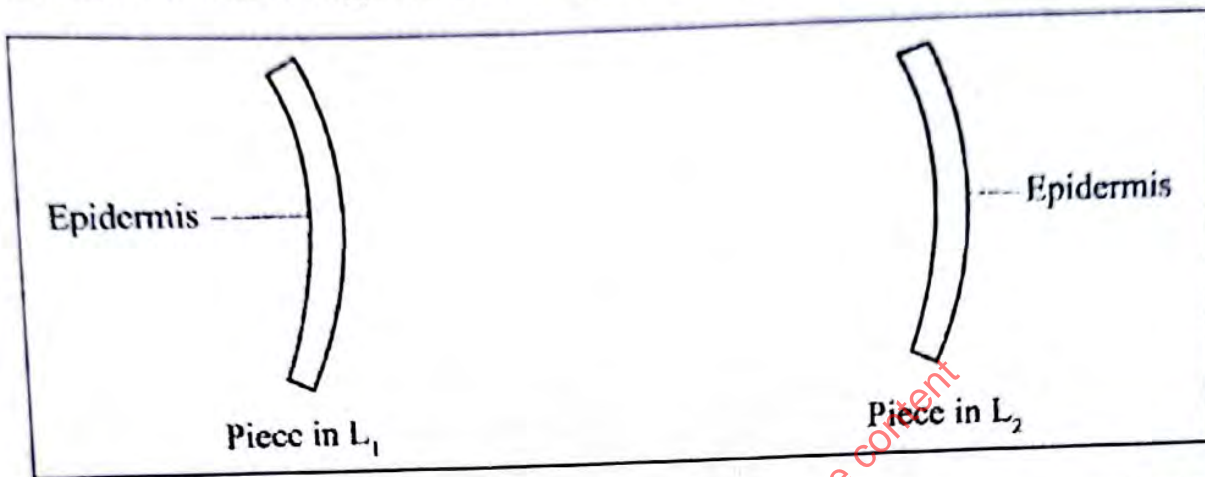
There was a greater decline in the number of white mice than  
black; white mice were selected against; they did not camouflage  
well with the surrounding; hence easily predated upon; 4 mks 3.

b) Name the evolution theory that supports this observation.

(1mk)

Natural selection;

5 A freshly obtained dandelion stem measuring 5cm long was split lengthwise to obtain two similar pieces. The pieces were placed in solutions of different concentration in petri dishes (L1 and L2) for 20 mins. The appearance after 20 mins is as shown.



a) Account for the appearance of the piece in solution L2 after 20 minutes. (3mks)

L2 was hypertonic to the cell sap of the cortical cells; the cortex cells lost water by osmosis; causing the piece to bend with epidermis on the outer side (Epidermis is waterproof);

b) State one significance of the biological process involved in the experiment (1mk)

- Support in terrestrial plants; Regulation of water at RHT
- Absorption of water from the soil;
- Feeding in insectivorous plants; (Any other relevant answer)

6 State two environmental conditions that can lead to formation of carboxyhaemoglobin in the human body. (2mks)

- Burning carbon in inadequate supply of air is jiko
- Burning of fossil fuels/emissions of carbon from exhaust fumes/mineral generators;

7 a) Name the part of the ovule that forms each of the following structures after fertilization:

- i) Zygote... Egg cell; (1mk)
- ii) Testa... outer integument; outer integument (1mk)

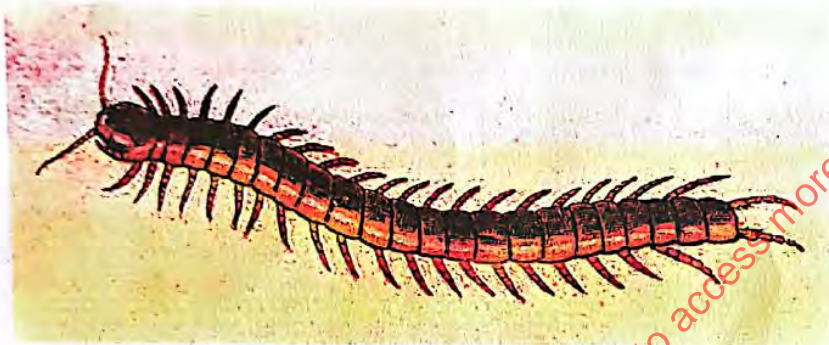
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8 State two structural difference between motor and sensory neurons.

(2mks)

Motor Neuron	Sensory Neuron
1 Cell body situated at one end of the axon.	- Cell body situated off the axon;
2 Multipolar	- Bipolar;

9 Below is a diagram of an organism.



a) Identify the Class to which the organism belongs.

(1mk)

Chilopoda;

b) State two features shown on the diagram that are characteristics of this Class.

(2mk)

- Body segmented (9-20 segments);

- A pair of legs per segment;

- Presence of poison claws; Rj. "Poisonous"

- Pair of antennae; (First two)

10a) Differentiate between population and community as used in ecology.

(1mk)

Population refers to organisms of the same species in a particular habitat at a particular time while community are different species living together in a particular habitat;

b) Explain one negative effect of the use of herbicide on human health.

(1mk)

Herbicides (gradually) accumulate in food chain (plant and animal tissues) which when fed on by human being accumulate to toxic levels leading death;

⇒

First 2

c) State two ways through which energy is lost from one trophic level to the next in a food chain. (2mks)

Alt. sp: Defaecation

- Defaecation; Respiration;
- Excretion i.e sweating, urination;
- Parts that are not consumed; (First two).

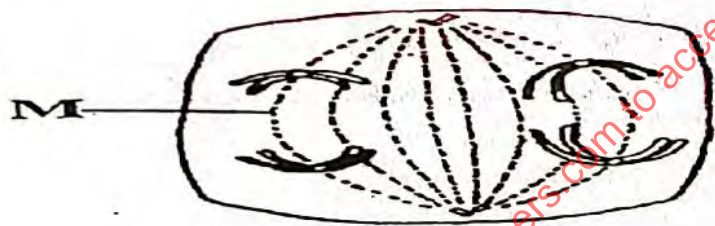
11a) Give two reasons why anaerobic respiration yields less energy than aerobic respiration. (2mks)

- Incomplete break down of the food substances;
- Absence of oxygen;

b) Explain why fats are not efficient respiratory substrates. (2mks)

- Fats are insoluble <sup>in water</sup> hence not easily transported to <sup>respiring</sup> body tissues;
- Fats require more oxygen to be oxidised; (completely)

12 The diagram below represents a stage in cell division.



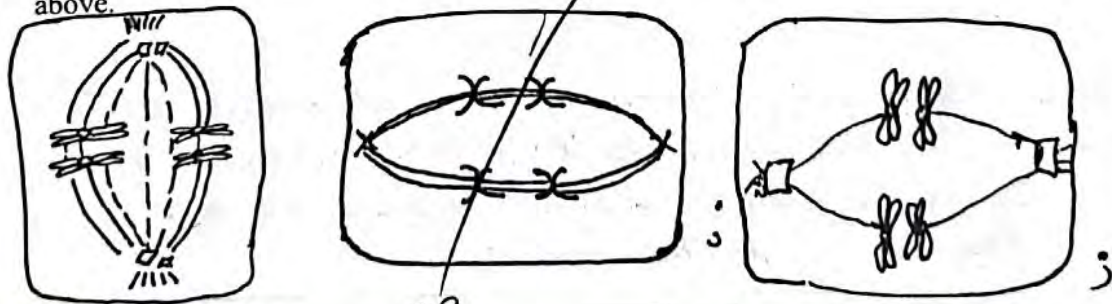
a)i) Name the stage of cell division illustrated. (1mk)

Anaphase I;

ii) Give a reason for your answer in 14(a)(i). (1mk)

Homologous chromosomes separate and migrate to opposite poles;

b) In the space provided below, illustrate the next stage of cell division before the one shown above. (1mk)



\*NB chromosomes at the equal of spindle still at break

c) Give one disadvantage of inbreeding among living organisms.

(1mk)

- Hampers variation; resulting in transmission of undesirable genes.
- Loss of hybrid vigour/No hybrid vigour, low hybrid vigour

13 The table below shows the concentration in parts per million of sodium and iodide ions in sea water and cell sap of a plant.

	Sodium ions concentration	Iodide ions concentration
Sea water	326	39
Cell sap	162	574

a) i) Which of the two ions intake will be affected if the plant was sprayed with a chemical that inhibits respiration.

(1mk)

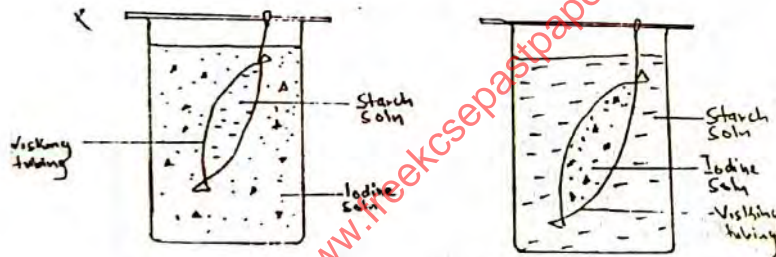
Iodide ions; by iodine ions

ii) Explain your answer in 10(a)(i) above.

(1mk)

The uptake of iodide ions is done by active transport; which is energy dependent, which when inhibited impairs active transport;

b) An experiment was set up as shown in the diagram below.



At the end of the experiment, it was observed that the starch turned blue black while the color of iodine solution in the beaker did not change. Account for this observation.

(2mks)

Visking tubing being semi-permeable; allowed selective passage of the <sup>small</sup> iodine molecule into it; starch molecules are bigger than the iodine hence could not diffuse the smaller pores of the visking tubing into the beaker;

14 State the role of the following organelles:

(3mks)

a) Ribosomes

Site for Protein synthesis;

b) Chloroplast

Site for photosynthesis;

c) Nucleus

Controls the activities of the cell;

15 A goat and a sheep are both herbivores. Explain why the two can comfortably exist in the same ecosystem.

(2mks)

A goat is a browser while a sheep is a grazer; as a result, they can exist comfortably without competition;

16 Explain the role of antidiuretic hormone when the human blood water level is below normal.

(3mks)

(Body is dehydrated) more ADH is secreted; the ADH stimulates the kidney tubules to be more permeable to water; water is reabsorbed into the blood stream; the osmotic balance is attained;

4 max 3

17 Equal amounts of crushed Irish potato were placed in equal volumes of hydrogen peroxide solution at various pH values. A gas L was produced, its volume measured and recorded as shown below.

pH	4.2	7.0	9.2
Volume of gas L	2.9	5.9	7.9

a) Identify gas L.

(1mk)

Oxygen / O<sub>2</sub>;

\*

b) Account for the difference in the volume of gas L produced at pH values 4.2 and 9.2.

(3mks)

More gas was produced at pH 9.2 than pH 4.2; pH 9.2...

was alkaline/basic; was favourable for the optimal work

for an enzyme act;

of enzyme (catalase) in the Irish potato; lower pH 4.2 does not

(2mks)

- 18a) State two ways in which red blood cells are adapted to their function. (2mks)
- Biconcave, increase SA for packaging of haemoglobin;
  - Lack nucleus to create more room for packaging of haemoglobin;
  - Flexible to squeeze through the narrow capillaries;
  - Presence of haemoglobin that has high affinity for oxygen;

b) In which two forms is carbon (iv) oxide transported in the body. (2mks)

- Solution form / weak carbonic acid
- Carbamino-haemoglobin; Carbaminohaemoglobin;

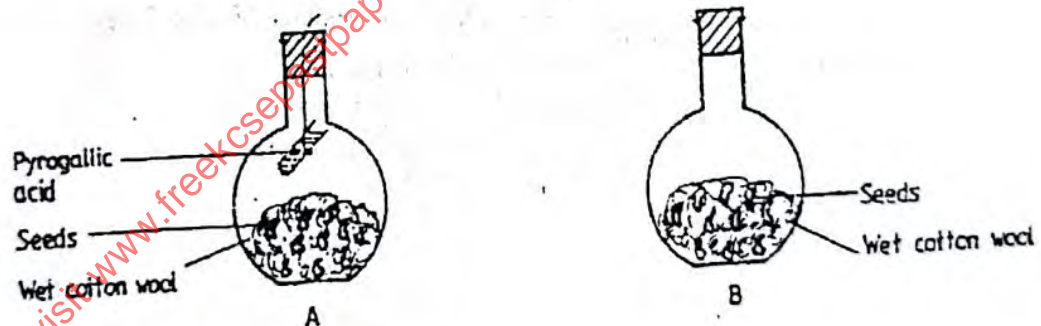
19

State three characteristics of a respiratory surface. (3mks)

(3mks)

- Moist to dissolve respiratory gases;
- Large SA for maximum diffusion/gaseous exchange;
- Thin walled/epithelium for faster diffusion of gases;
- Must be permeable to respiratory gases;

20 A student set up an experiment as shown in the diagrams below



The set up was at room temperature for a week

(a) What was the aim of the experiment? (1mks)

(1mks)

Investigate whether oxygen is necessary for germination;

(b) What would be the expected results at the end of the experiment (2mks)

(2mks)

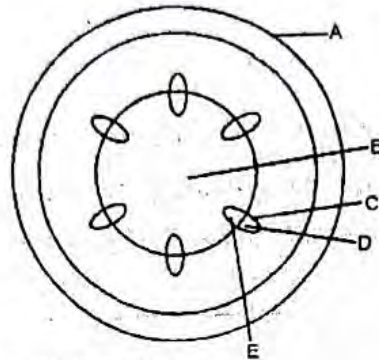
- A - No germination;
- B - Germination occurred;



21 After four months of pregnancy, the ovaries of a woman can be removed without terminating pregnancy. However, during the first four months of pregnancy, the ovaries must remain intact if pregnancy is to be maintained. Explain these observations. (2mks)

Before 4 months of pregnancy, ovaries produce progesterone; after 4 months, placenta is fully developed and takes over the role's

22 The diagram below represents a transverse section of a young stem



(a) Name the parts labelled A and B (2mks)

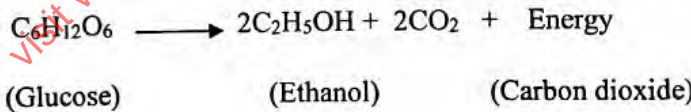
A. Epidermis;

B. Pith;

b) State two ways in which xylem vessels are adapted to their function. (2mks)

- Lignified walls to prevent falling under pressure;
- Long narrow lumen facilitate capillarity;
- Made of dead cells to allow passage of water;
- Pited sidewalls for lateral (first two).

23 A process that occurs in plants is represented by the equation below.



Long and continuously hollow for efficient movt of water;

a) Name the process. (1mk)

Anaerobic respiration; Fer. respiration alone.

b) State two economic importance of the process named in (a) above. (2mks)

- Used in baking industries; Dairy industry to manufacture dairy products eg yogurt
- Brewing industries to make alcohol;
- Manufacture of organic acids;
- Treatment of sewage;

(Name other relevant answers).

24 Explain why some desert animals excrete uric acid rather than ammonia. (2mks)

Ammonia is less soluble in water; hence requires more water to be eliminated/excreted;

25 A shoot of seedling exposed to light on one side bends towards the source of light as it grows.

a) Name the response exhibited by the shoot of the seedling. (1mk)

Positive phototropism;

b) Explain how the bending towards the source of light occurs. (3mks)

Auxins being sensitive to light, migrate laterally to the darker side; high concentration of auxins on the darker side stimulates faster growth; the shoot bends towards direction of light;

