

No. 13-14



**MARANDA HIGH SCHOOL**  
Kenya Certificate of Secondary Education  
**PRE-MOCK EXAMINATIONS 2022**

CODE: 231/1: SUBJECT: BIOLOGY PAPER 1

JUNE

2022

TIME: 2 HOURS

*MARKING GUIDE*

NAME: \_\_\_\_\_ ADM NO: \_\_\_\_\_

CLASS: \_\_\_\_\_ Candidate's signature \_\_\_\_\_ Date \_\_\_\_\_ /6/2022.

**INSTRUCTIONS TO CANDIDATES**

- Write your name, date, admission number and class in the spaces provided.
- This paper consist of 26 questions.
- Answer all the questions in the spaces provided.

**FOR EXAMINER'S USE ONLY**

QUESTIONS	MAXIMUM SCORE	CANDIDATE'S SCORE
1-26	80	

1a. When viewing a specimen under a light microscope in a well-lit place, which three adjustments will ensure that the field of view is bright enough? (3marks)

- i) Adjusting mirror to reflect light through condenser
- ii) Open diaphragm;
- iii) Click objective lense in position.

b) What is the function of the revolving nose piece in a microscope? (1mark)

- Holds object lense;
- Allows change of objective lense to another;

2. State the importance of the following in living animals. (2marks)

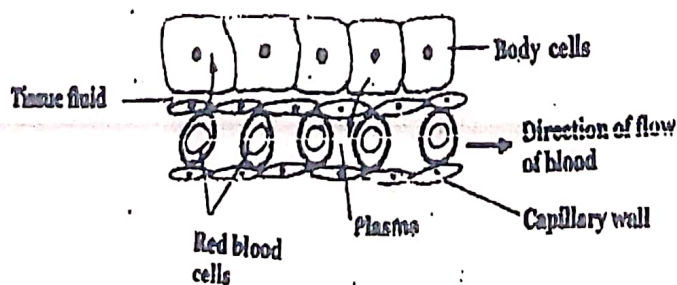
a) Irritability

Enables organisms to react appropriately to changes in their environment

b) Excretion.

Ensures that metabolic wastes materials are eliminated.

3. Study the diagram below showing gaseous exchange in tissues.



a) Name the compound that dissociates to release the gas that diffuses from the blood capillary to the body cells. (1mark)

Oxyhaemoglobin.

b) State one adaptation of the blood capillary that favors diffusion of the gas in (a) above. (1mark)

Has a thin endothelium to reduce diffusion distance; very narrow lumen to allow for passage of R.B.C.s.

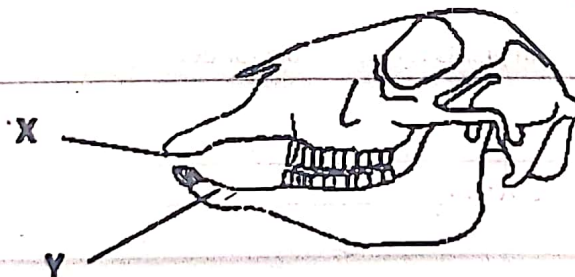
ci) Name one non-cellular component that does not filter out of capillaries during tissue fluid formation. (1marks)

Plasma Protein.

ii) why doesn't the component named above not filter out of capillaries? (1mark)

Plasma proteins molecules are too big to filter out through the pores of capillaries.

4. Below is a diagram of jaw of a certain animal.



a i) Suggest the mode of nutrition of the animal. (1mark)

Herbivorous.

ii) Identify the part labeled Y and state its function. (2marks)

Identity:

Diastema

Narrow

Function:

Gives room to allow the tongue to turn food in the mouth;

b) Name structure X

(1mark)

Horny pad;

5a. State the adaptation of vascular bundle in plant nutrition.

(2marks)

Xylem are lignified and hollow for efficient transport of  $H_2O$  &  $CO_2$   
Phloem - have prominent nucleus for co-ordination  
- Numerous mitochondria for yielding energy  
- Have Myofibrils for efficient transport

Narrow lumen of capillaries, r side walls/pitted & lateral mixing  $H_2O$ .  
Prominent nucleus & co-ordination of cell activities  
phloem elements  
sieve plates

b) Why are xylem vessels more efficient in transportation of water than the tracheid? (1mark)

Are hollow and placed end to end with no cross walls to minimise resistance

6. Which structure in plants is responsible for development of:-

(2marks)

a) Lateral roots

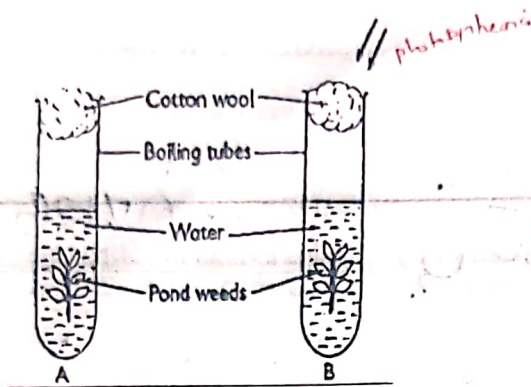
Pericycle;

b) cork cells

Cork Cambium;

7. Hydrogen carbonate indicator is a red indicator whose colour turns purple in alkaline conditions and yellow in acidic conditions.

Below are two set ups, A was kept in darkness while B was kept in a well-lit place. They were let to stand for 6 hours after which Bromothymol blue was added into each test tube.



a) State the expected observations on addition of the indicator in each test tube and give an explanation in each case. (4marks)

i) Test tube A

Observation Indicator turns yellow.

Explanation Plant respire releasing  $\text{CO}_2$  that made water acid.

ii) Test tube B

Observation Indicator turns purple.

Explanation In the presence of light plant carries out photosynthesis using up  $\text{CO}_2$ .

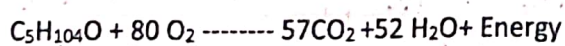
b) Why was it necessary to use cotton wool instead of a rubber stopper? (1mark)

Allow diffusion of respiratory gases in and out of the tube.

8a) In what form is the energy produced from respiration stored in cells? (1mark)

Adenosine tri-phosphate (ATP).

b) Below is a chemical equation that represents oxidation of a certain food substance.



RQ

i) Calculate the RQ value of the food.

$$\text{Respiratory Quotient} = \frac{\text{Carbon (IV) oxide produced}}{\text{Oxygen used}} = \frac{57}{80} \quad (2\text{marks})$$

$$RQ = \frac{57 \text{ CO}_2}{80 \text{ O}_2} = 0.7125;$$

ii) Identify the food substance being respired.

(1mark)

Lipids. acc. oils or fats

9. The figures 1 and 2 are cells obtained from two different organisms. Study them and answer the questions that follow.

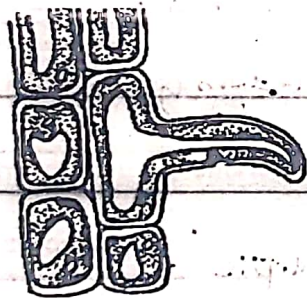


Figure 1



Figure 2

a) Both cells were found to have numerous mitochondria. State the significance of the finding for each cell. (2marks)

figure 1

Generates Enough/More energy for active absorption of mineral ions from the soil.

figure 2

Generates enough/More energy for movement/swimming of sperm cell towards ovum to facilitate fertilization.

b) State how the following adapts the stated cell to their function.

(2marks)

- i) Presence of acrosome in Figure 2 cell: Contains  $\rightarrow$  lytic enzyme that digests the vitelline membrane of ovum for fertilization;
- ii) Presence of an elongation in figure 1 cell. Increase surface area for absorption of water and mineral ions;

10 a) Distinguish between a tissue and an organ.

(1mark)

Tissue - A group of particular specialized cells performing a specific function

Organ - Made up of several tissues working together to perform specific function;

b) Name the tissue that

i) Lines and protects the internal and external surfaces in animals.

(1mark)

Epithelium;

ii) Consists of special thin walled irregularly shaped cells that are for storage and packing in plants.

(1mark)

Parenchyma;

11. State two importance of mastication of food.

(2marks)

- Break food into smaller pieces for easy swallowing
- Mixes food with saliva which contains digestive enzymes.
- Breaking food into smaller sizes to increase S.A for Enzymes

12. The following is the dental formula of a certain animal.

$$I \frac{2}{2} \quad C \frac{1}{1} \quad P \frac{2}{2} \quad M \frac{3}{3}$$

i) Calculate the total number of teeth of the animal? Show your working. (2marks)

$$2(4+2+4+6) = 32;$$

ii) Identify with a reason the mode of feeding of the animal. (2marks)

Carnivorous;  
Reason: Presence of all types of teeth / lacks horny pad

13. In which way do the following determine energy requirements in man? (2marks)

i) Sex of an individual --- Males are more muscular than females hence require more energy than female;

ii) Size of an individual --- Smaller organisms have large surface area to volume ratio hence lose heat at faster rate hence the need to replace it; (accept converse).

14. What is the structural difference between the phloem tissue of the sub divisions Gymnospermaphyta and Angiospermaphyta? (1mark)

Gymnosperms --- No companion cells.

Angiosperms --- Have companion cells.

15.a) State two ways in which the heart is protected against mechanical injury during heartbeat. (2marks)

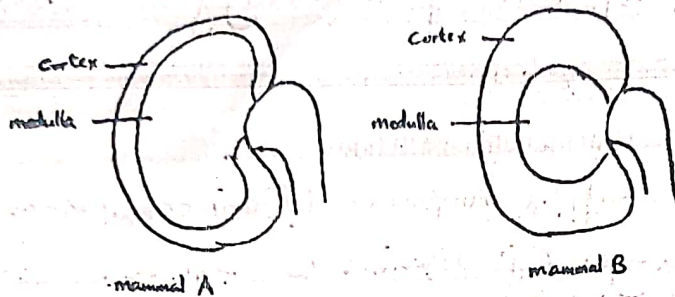
Pericardium membrane prevents overstretching;  
- Pericardial fluid reduces friction between the heart and rib-cage;

b) What is the cause of arteriosclerosis? (1mark)

Accumulation of cholesterol/plaque in the inner lining of artery;



16. The following diagrams show a section through the cortex and medulla of two kidneys obtained from different animals.



a) Which animal lives in the desert? Explain

(3marks)

A - Have thin cortex with small Bowman's capsule  
 for reduced ultra filtration (few & small glomeruli)  
 - Long loop of Henle to increase water reabsorption/  
 (large medulla to accommodate long loop of Henle)

b) State the differences in the nature of urine produced by the two animals on a normal day in terms of volume and concentration.

(2marks)

A - Produces small volume of concentrated urine;  
 B - Produces large volume of dilute urine;

17. State the difference between habitat and ecological niche.

(2marks)

Habitat - Specific place with specific set of conditions where organisms live

Niche - Position that an organism occupies in a habitat and its role;

18a) State two functions of aerenchyma tissue in hydrophytes.

(2marks)

- for buoyancy;
- Allow gas exchange/diffusion of respiratory gases within the plant.

19a) What two roles does the placenta in human have in reproduction?

(2marks)

- Secretion of reproductive hormones (Oestrogen/Progesterone);
- Site of exchange of materials between foetus and Mother's blood;

b) State two functions of follicle stimulating hormone in female reproduction. (2marks)

- Stimulates secretion of oestrogen;
- Stimulates development of graafian follicles;

20. Briefly explain the role of the two types of cell division in the life cycle of mammals. (2marks)

i) Mitosis

Causes multiplication of cells resulting to growth

ii) Meiosis

Results in formation of haploid cells/gametes

21a) What is a dichotomous key?

(2mark)

A set of contrasting statements describing observable characteristics of organisms written in pairs;

b) Explain why a dichotomous key is useful to a botanist.

(2marks)

Enables botanists to identify plant and animal species based on their characteristics, place organisms into their right group based on their characteristics.

22. State the functions of the following parts of a dicot flower.

(2marks)

a) Style

- Supports the stigma;
- Provides passage for pollen tube carrying male gametes;

(1mark)

b) Sepals

- Protects floral parts esp. the buds
- Coloured to attract insect pollinators.

23a) What is the meaning of carrying capacity in a habitat?

(1mark)

Maximum number of organisms of a given species a habitat can support without exhausting/depleting available resources;

b) Name two density dependent factors that determines the carrying capacity of a population in an ecosystem.

(2marks)

- Availability of food;
- " " water;
- " " space;
- " " mates;

24. Suggest reasons to explain the following observations:

a) Removal of predators for a certain herbivore population may in the long run lead to a decrease in herbivores population.

(2marks)

Removal of predators leads to increase in herbivore population, this increases competition, causing death or migration.

- b) There is a wider variety of herbivores in the wood land than in the open grassland. (marks)
- In woodland the herbivores can hide from their predators easily unlike grassland;
  - They have variety of plants to feed on;

25. What type of evolution is supported by the following: (2marks)

a) Analogous structures

Convergent evolution

b) Homologous structures

Divergent evolution

26. State the significance of following in plants:

i) Phototropism

(1mark)

Enables plant shoot to grow towards and obtain light for photosynthesis;

ii) Geotropism

(2marks)

- Enables shoot to grow upwards to obtain light;
- Enables roots to grow downwards for anchorage/absorption of water and mineral salts;