

NAME:INDEX NO:.....

SCHOOL:SIGNATURE:

DATE:

231/1

PAPER 1

BIOLOGY FORM 3 TERM 1

(THEORY)

MARCH, 2024 - 2 HOURS

INSTRUCTIONS TO CANDIDATES

- (a) Write your name, index number and school in the spaces provided above
- (b) Sign and write the date of the examination in the spaces provided above
- (c) Answer ALL the questions in the spaces provided on the question paper
- (d) Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.
- (e) Candidates should answer the questions in English

FOR EXAMINER'S USE ONLY

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

17	18	19	20	21	22	23	GRAND TOTAL

This paper consists of 11 printed pages

Answer all the questions in the spaces provided.

1. Explain the following in a predator- prey relationship in a natural habitat. (2 marks)

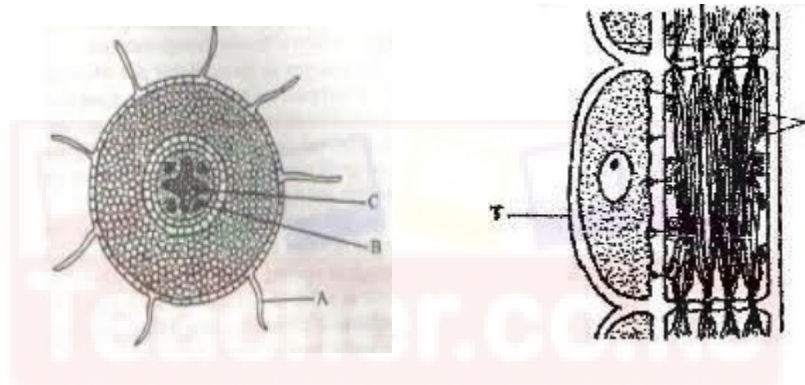
a) Predators have frontal eyes.

For sharp focus on the target prey;

b) Some predators stalk, approach and attack the prey against the direction of wind flow.

To avoid alert to the prey by its scent being carried by wind to the prey;

2. The diagram below represents the transverse section through a part of a plant and a structure, K, obtained from the same section.



K

a) i) Identify the part labelled A. (1 mark)

Root hair;

ii) State the function of the part labelled A. (1 mark)

Absorption of water and mineral salts;

b) Identify the class of the plant from which the section was obtained. (1 mark)

Dicotyledonae;

Reason. (1 mark)

Central, star shaped xylem / the phloem are arranged on the arms of the xylem;

- c) Identify the organ of the plant from which the section was obtained. (1mark)

Root;

Reasons. (2 marks)

Presence of root hairs;

Central, star shaped xylem / the phloem are arranged on the arms of the xylem;

- d) Which label on the section correctly represents the part from which structure K was obtained. (1mark)

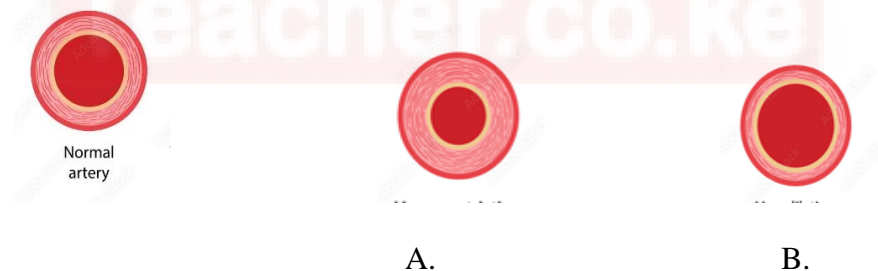
B

- e) State one way in which part labelled T in structure K is structurally adapted to support the function of

K. (1 Mark)

Has numerous mitochondria to provide energy for active transport of organic substances;

3. The diagram below represents the cross section of a normal artery and the changes on its size, A and B under different environmental conditions.



- a) i) State the environmental condition under which the change represented by A is expected. (1 mark)

Cold conditions/ Low temperatures;

- ii) Suggest the internal body temperature of the person whose artery is represented by A. (1 mark)

Below optimum (body temperature);

- iii) State one physical activity that may trigger the artery size to change as represented in A. (1 mark)

Taking a cold bath/ in a freezing room / in a cold room;

- b) What name is given to the phenomena represented by B. (1 mark)

Vasodilation;

- c) i) Suggest the volume of urine produced by a person during the condition where the artery changes to size B.

Little/ low; (1 mark)

- ii) Explain your answer in 3. c) i) above. (2 marks)

In hot weather/ under vigorous physical activity/when the internal body temperature is above normal/ optimum; the body lose most water through sweat (less water shall be lost by urination);

4. Name the most appropriate method that could be used to estimate the population size of the following organisms. (2 marks)

- i) Grasshoppers in the school field.

Capture recapture;

- ii) Different plant species along the slope of a hill.

Line transect/ belt transect;

5. Explain the reason for the following during preparations of fresh microscope slide in a light microscope.

- i) Thin sectioning. (2 marks)

For easy penetration/ absorption of stain/ dye;

For easy penetration of light;

- ii) Staining. (1 mark)

To make the specimen structures distinct/ more clear;

6. Give two reasons why the light stage of photosynthesis is useful for the dark stage. (2 marks)

Provides energy/ ATP necessary for dark stage;

Provides Hydrogen atoms necessary for dark stage;

7. State two observable features of a male cone that would make it easy for a student to identify it positively on a tree. (2 marks)

Positioned on the terminal end of the branches;

Are small and clustered;

8. Explain the role of the following in protecting the body against invasion of disease causing organisms.

- i) Gastric secretions. (2 marks)

Has Hydrochloric acid; which kills disease causing organisms that may chance in food taken in;

- ii) Clotting of blood. (2marks)

Forms a hard clot; which prevents the entry of disease causing organisms into the body;

9. State two functions of lysosomes. (2 marks)

Kills harmful organisms in the cell;

May the cell the whole cell when the cell becomes a threat to others;

10. During an experiment, it was found that germinating bean seeds released 9.0 cm^3 of Carbon (IV) Oxide while 8.8 cm^3 of Oxygen was consumed.

- i) Calculate the RQ. (2 marks)

$$RQ = 9.0 \text{ cm}^3 / 8.8 \text{ cm}^3 ;$$

$$= 1.0;$$

- ii) Identify the respiratory substrate. (1 mark)

Carbohydrate;

11. Identify the parts of the mammalian heart that plays the following roles.

- i) Slows down the rate of pumping of blood. (1 mark)

Vagus nerve;

- ii) Prevents over dilation of the heart. (1 mark)

Pericardium membrane;

- iii) Prevents backflow of blood during contraction of the ventricles. (2 marks)

Bicuspid valve;

Tricuspid valve;

12. The diagram below represents an apparatus used to collect specimen for study.



- a) Identify the apparatus. (1 mark)

A pair of forceps;

- b) Name one specimen in each case below where the use of the apparatus is recommended. (2 marks)

Plant specimen *Stinging nettle/ giant hogweed;*

Animal specimen. *Bees/ Spiders;*

- c) Name one other apparatus that would be used together with the apparatus above to further enhance protection of the hands. (2 marks)

Hand gloves;

13. The cardiac muscles are said to be myogenic. What is the meaning of the term myogenic. (1 mark)

Rythmic contractions of the heart arise from within the cardiac muscles themselves (without nervous stimulation);

14. A student mixed a sample of urine from a patient with Benedict's solution and boiled the mixture.

the colour changed to orange.

- i) Name the food substance that was present in the urine. (1 mark)

Glucose;

ii) Identify the disease that the patient was suffering from (1 mark)

Diabetes mellitus;

iii) Name the organ in the patient may not be functioning properly? (1 mark)

Pancreas;

15. Name three plant leaf excretory products. (3 marks)

Caffein;

Quinine;

Cocain;

Cannabis;

Nicotine; First three

16. Explain the importance of the grana in the process of photosynthesis. (2 marks)

*Absorbs light energy; and provides the site for light reactions; for splitting of water into H atoms/
photolysis and formation of ATP; award max 2 marks*

17. Name **two** cell structures that synthesize the following cell organelles. (2 marks)

i) Ribosomes (1 mark)

Nucleolus;

i) Lysosomes (1 mark)

Golgi apparatus/body;

18. The diagram below represents a skull of a certain animal.



- a) i) State the likely mode of nutrition for the animal from which the skull was obtained. (1 mark)

Herbivorous;

- ii) Give two reasons for your answer in 18 a i) above. (2 marks)

Presence of diastema;

Presence of horny pad;

- b) With a reason identify the class of the animal from which the skull was obtained. (2 marks)

Class (Class) Mammalia;

Reason *Heterodont teeth;*

19. Study the diagram below of a flower obtained from a plant.



- a) The following key may be used to identify the plant on which the flower is growing.

1 a) Petals separate from sepals go to 2.

b) Petals and sepals joined Plant P.

2 a) Flower with four stamens Plant Q.

b) Flower with more than four stamens go to 3.

3 a) Ovary as tall as wide Plant R.

b) Ovary taller than wide go to 4.

4 a) Flower has two petals Plant S.

b) Flower has more than two petals Plant T.

i) Use the dichotomous key to identify the plant from which the flower was obtained. (1 mark)

Plant R;

ii) Write the steps followed to identify the plant. (1 mark)

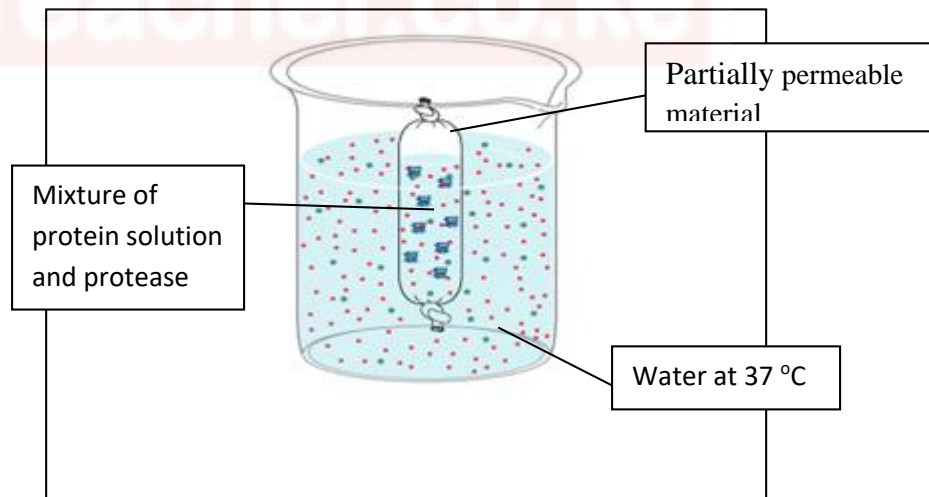
1a, 2b, 3a.;

b) Use the observable features in the flower to identify the class of the plant from which it was obtained.

Class. *Class Dicotyledonae* (1 mark)

Reason. *Has five stamens;* (1 mark)

20. Form 2 students set up an experiment on diffusion as shown below. The set up was left to stand for 15 minutes.



a) What does the partially permeable material represent in a cell. (1 mark)

Cell membrane;

b) Give a reason for keeping the water at Water at 37°C. (1 mark)

To provide optimum/ favourable/ suitable temperature for enzyme/protease action;

- c) The students carried out a test for proteins using the **contents of the partially permeable material** after the 15 minutes. Suggest the conclusions made. (1 mark)

Proteins absent;

Explain your answer in 20 c) above. (1 mark)

Proteins were broken down / hydrolysed/ digested to amino acids by the action protease;

- d) Amino acids were found to be present in the water. Explain its source and presence there. (2 marks)
(From the partially permeable material following) break down of starch; diffused to the water through the partially permeable material because it has small sized particles;

21. Name the carbohydrate storage compounds in the following: (2 marks)

i) Plant cells *Starch;*

ii) Fungi *Glycogen;*

22. a) Give two structural features that distinguish phagocytes from lymphocytes. (2 marks)

Lobed nucleus;

Granules in the cytoplasm;

b) Identify one immunisable disease in Kenya. (1 mark)

Tb, Polio, Dipthera, Whooping cough, Measles.

23. Name the diseases caused by the following causative agents.

i) *Vibrio cholerae* (1 mark)

Cholera

ii) *Entamoeba histolytica.* (1 mark)

Amoebic dysentery/ Amoebiasis