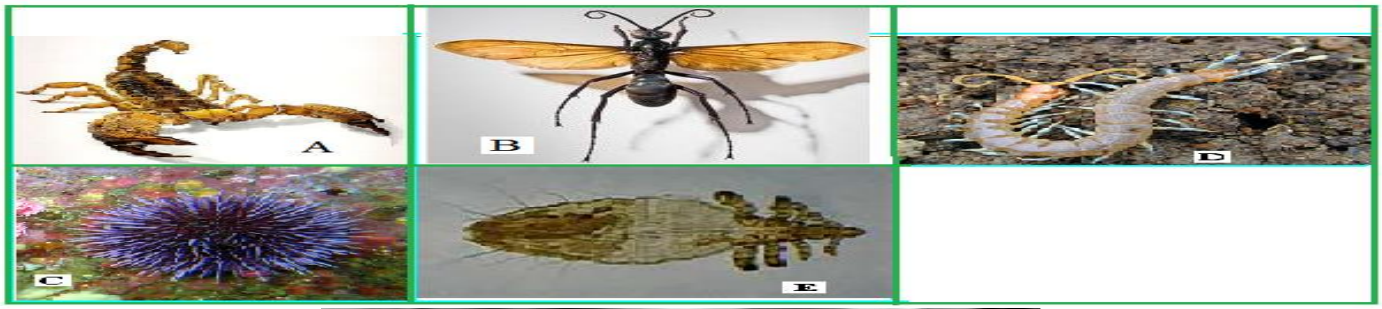
KCSE

RANDOM SERIES (RDS)

PAPERS

BIOLOGY PAPER 1

(231/1)



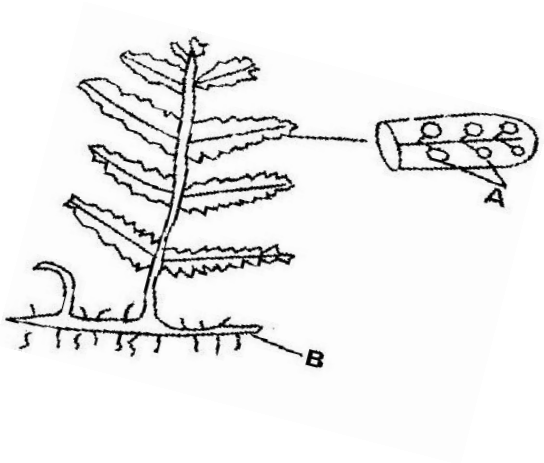


FOR MARKING SCHEME AND OTHER PAPERS CONTACT:

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- **stanleymuthamia@yahoo.com/stanleym315@gmail.com**

RS1

1. Name the tissues whose cells are thickened with:
   a) Cellulose and pectin.
   (1mk)
   ……
   .
   b) Lignin.
   (1mk)
   ……
   .
2. The diagram below represents a fern.



(a) Name Parts labeled A and B. (2mk)

A ……..

B ……

(b) To which division does the plant belong? (1mk)

……

3. State three measures that can be taken to control infection of man by protozoan parasites (3mk)

……

……

……

4. Explain how the following factors hinder self pollination in plants:
   (i) Protogyny (1mk)

   ……

   ……

   (ii) Dioecism (1mk)

   ……

   ……

5. Explain the likely effect on humans and other organisms of untreated sewage discharged into water body that supplies water for domestic use.
   (3mk)
   ……

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6. Name two structures in herbaceous stems that enhance their support.
   (2mk)
   ……

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7. a) Define the term immunity.

   (1mk)

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b) Distinguish between natural immunity and acquired immunity.

(1mk)

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c) Identify one immunizable disease in Kenya.

(1mk)

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8. State three differences between osmosis and active transport. (3mk)

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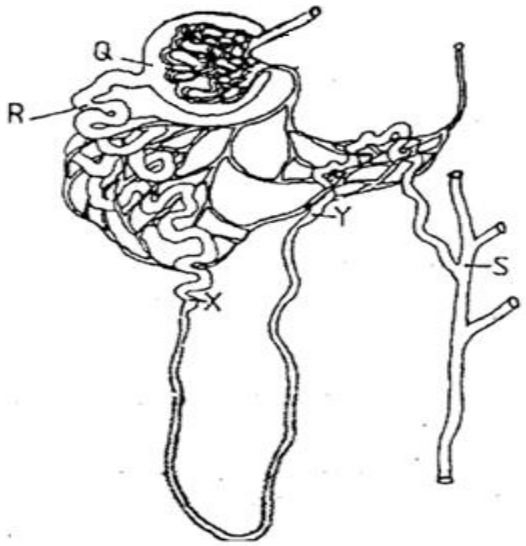
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9. The diagram below illustrates part of a nephron from a mammalian kidney.



a) Name the fluid found in the part labeled Q. (1mk)

……

b) Identify the process responsible for the formation of the fluid named in (a) above.

(1mk)

……

c) Which two hormones exert their effect in the nephron? (2mk)

……

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……

10. State three characteristics of members of kingdom Monera that are not found in other kingdoms.

(3mk)

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11. What is meant by the following biological terms?

i) Crenation (1mk)

……

……

ii) Haemolysis (1mk)

……

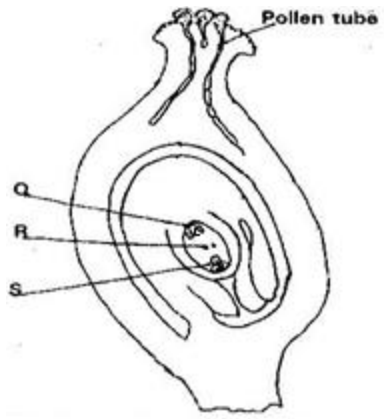
……

iii) Plasmolysis (1mk)

……

……

12. The diagram below shows a stage during fertilization in flowering plant.



a) Name the parts labeled Q, R, and S. (3 mk)

Q ……

R ……

S ……

b) State the function of the pollen tube. (1 mk)

……

……

13. a) State the major factor in the 'Global warming' experienced in the world today.
(1mk)

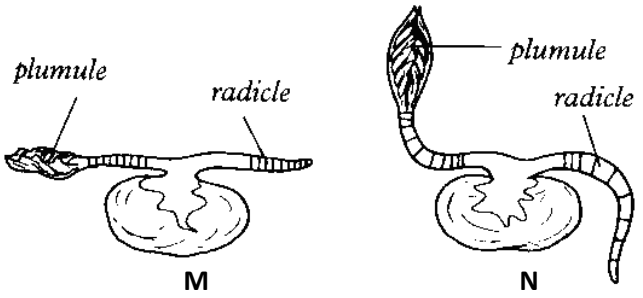
……,…….

b) Suggest two ways of reducing the Global warming. (2mk)

……

……

14. An experiment was set to investigate a certain aspect of response. A seedling was put on a horizontal position as shown in figure M below. After 24 hours, the set up was as shown in figure N.



a) Name the response exhibited. (1mk)

……

b) Explain the curvature of the shoot upwards. (3mk)

……

……

……

……

15. The paddles of whales and the fins of fish adapt these organisms to aquatic habitats.
a) Name the evolutionary process that may have given rise to these structures. (1mk)

……

b) What is the name given to such structures? (1mk)

……

……

c) Give two examples of vestigial organs in man. (2mk)

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16. a) Name a protein and vitamin involved in blood clotting.
i) Protein. (1mk)

……
……

ii) Vitamin (1mk)

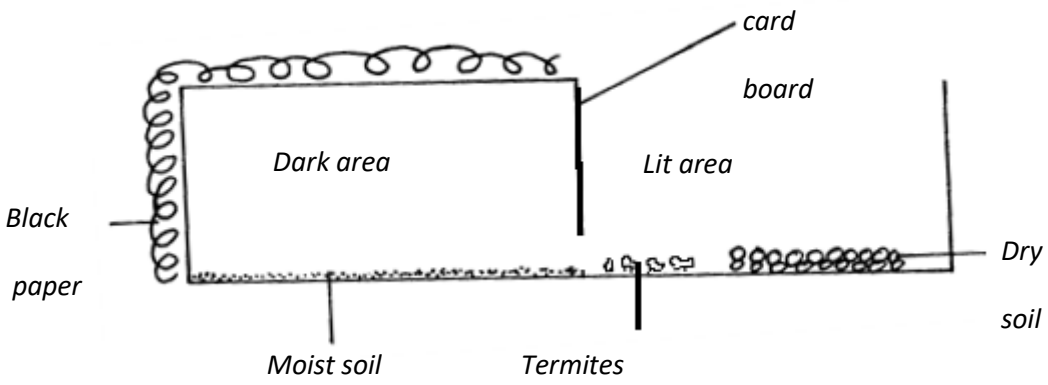
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b) Explain why blood is not normally used for transfusion after one month. (1mk)

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A group of Form four students set up an experiment to investigate a biological process using termites. They used a small box in which a portion was covered with black paper and had moist soil. The open part had dry soil. Termites were placed inside in open area of the box.



a) Predict what happened to the termites after 30 minutes. (1mk)

……
……

b) What form of response is exhibited by termites? (1mk)

……
……

c) State one biological significance of the above response to termites.(1mk)

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17. a) Name two fins in a bony fish which perform the following functions:-

i) Changing direction. (1mk)

……

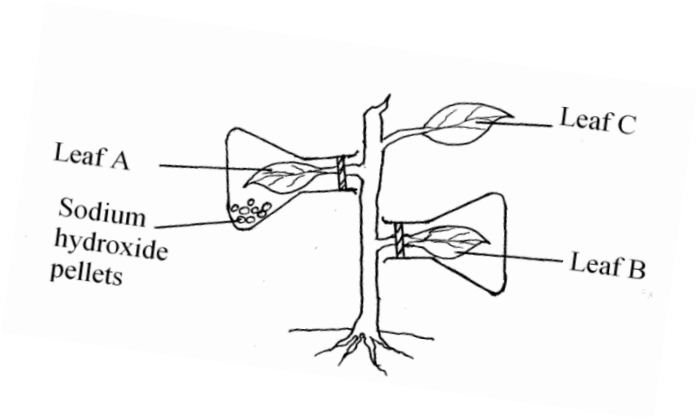
ii) Control pitching. (1mk)

……

(b) State the role of myotomes in fish. (1mk)

……
……

18. The diagram below represents an experimental set up to investigate a certain scientific concept. The potted plant was first destarched by keeping it in dark for four days.



The set up was then placed in sunlight for five hours and leaves were tested for starch.

a) What scientific concept was being investigated? (1mk

……

……

b) i) Give the results likely to be obtained after starch test for A and B.

A and B.

A …… (1mk)

B …… (1mk)

ii) Account for the results in leaf A in b (i) above. (1mk)

……
……

c) Why was leaf C included in the set-up? (1mk)

……

19. a) Explain the importance of transport in plants.

(2mk)

……
……
……

b) What is the role of root hairs in plants?

(1mk)

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20. a) Identify the source of urea that is removed via the kidneys in a healthy human being.

(1mk)

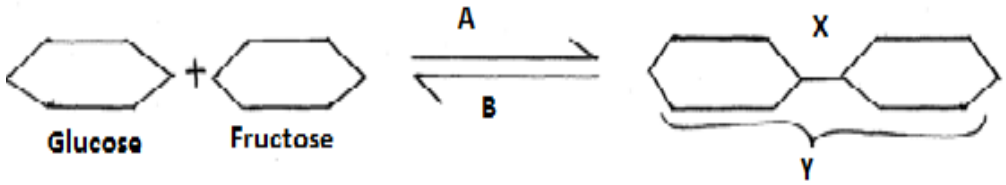
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b) Explain why a pregnant woman excretes less urea compared to a woman who is non- pregnant.

(2mk)

……
……
……

Study the reaction below and answer the questions that follow.



a) What biological processes are represented by A and B? (2mk)

A .....

B .....

b) Identify the product Y. (1mk)

.....

c) State the bond represented by X. (1mk)

.....

21. .Explain the events of the light stage of photosynthesis. (3mk)

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22. Explain what happens in humans when the concentration of glucose in the blood rises above the normal level. (3mk)

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23. a) Outline the main features of Lamarckian theory of evolution. (2mk)

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b) In view of modern genetics, explain why Lamarck's theory is unacceptable. (1mk)

……

……

……

……

c) Name one factor in nature that increases the process of evolution. (1mk)

……

…

RDS 2

1. Name two structure that link the foetus to its mother.
   (2 mks)

2. (a) Name one class in phylum chordata where organisms undergo metamorphosis. (1 mks)

   (b) State two main distinguishing features found in class mammalia only. (2 mks)

3. (a) What is carapace? (1 mks)

   (b) State two ways in which the exoskeleton has helped in the success of arthropods life in terrestrial habitats. (2 mks)

4. (a) What is meant by the term “allele”. (1 mks)

(b) Distinguish between dominant and recessive alleles. (2 mks)

5. (a) State two organic pollutants of the rivers flowing through urban centres in Kenya. (2 mks)

(b) Apart from solid wastes, state two major pollutants on land. (2 mks)

6. (a) What is organic evolution? (2 mks)

(b) Explain why certain rugs become ineffective in curing a disease after many years of use. (2 mks)

7. (a) What is the meaning of the term "vector" from
   (i) Ecological perspective? (1 mk)

   (ii) Genetic engineering perspective. (1 mk)

(b) State two advantages of cloning organisms. (2 mks)

8. Bivalent, synapsis and crossing over are terminologies used
   (a) In reference to which stage, of which type of cell division? (2 mks)

   (b) Differentiate between synapsis and synapse. (2 mks)

9. How is the mammalian trachea adapted to its function? (2 mks)

10.(a) Name the four portions of the human nephron that are only found in the cortex. (2 mks)

   (b) State two processes that are involved in urine formation. (2 mks)

11.(a) What is meant by the term 'ecosystem'? (2 mks)

(b) State four abiotic factors that affect organisms in almost all ecosystems. (2 mks)

12.A certain plant was found to have 22 chromosomes in its calyx cells. State the number of chromosomes present in: (2 mks)

(a) Embryo sac cells

(b) Seed endosperm

13.(a) Why is glycolysis an anaerobic process? (1 mk)

(b) State three products of glycolysis. (3 mks)

14. Name the specific part of brain that triggers sweating. (1 mk)

15. The following table shows information on concentration of salts in the cell sap of two mature water plants A and B and the concentration of the salt in the marine water.

Plant	**Conc. Of salt in PPm**	
	Cell sap	Marine water
A	0.025	0.011
B	0.031	0.066

Name the process by which cells of plants A and B absorb mineral ions from the water.
(2 mks)

A.....

B.....

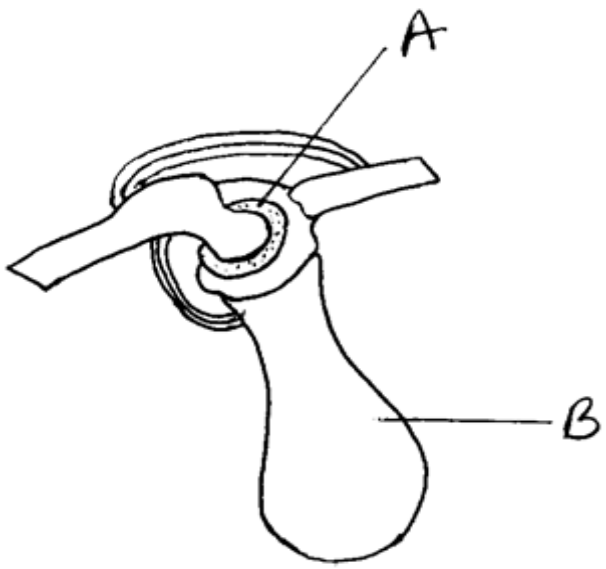
16.Name the part of the ear that carries out the following functions:

(a) Converts sound vibrations into nerve impulses. (1 mk)

(b) Converts sound waves to sound vibrations. (1 mk)

(c) Transports and amplify sound vibrations. (1 mk)

17.The diagram below represents the structure of the human shoulder joint.



(a) Name the part labeled B (1mk)

(b) State the roles played by part A. (2 mks)

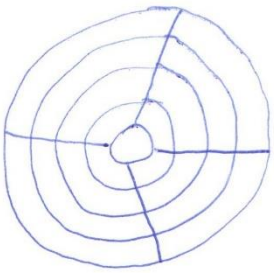
(c) State on functional differences between the above joint and the knee joint. (2 mks)

18. State one structural and one functional difference between rough endoplasmic reticulum and smooth endoplasmic reticulum.

Structural difference (1 mk)

Functional difference (1 mk)

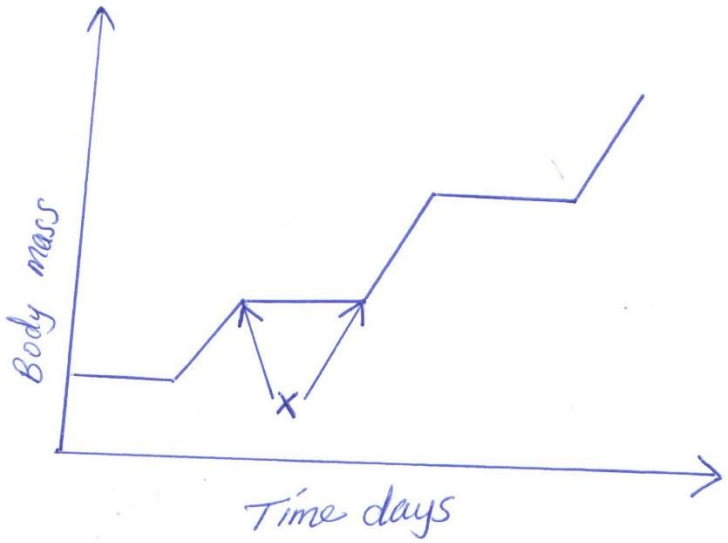
19. The diagram below shows the front view of mammalian eye.



(i) Draw the change that would appear when a person moves from a brightly lit area to a dimly lit area. (1 mk)

(ii) Explain what causes this change. (2 mks)

20.The graph below shows growth pattern of an insect.



(a) Name the pattern growth shown. (1 mk)

(b) Suggest what is happening to the insect at point X. Explain your answer. (2 mks)

(c) State one advantage of metamorphosis to the life cycle of insects. (1 mk)

21.State three adaptations of the malphigian layer to its functions. (2 mks)

22.Name the parts of a seed that are formed by the following flower parts.

(2 mks)

(i) Inner integuments –

(ii) Outer integuments -

23. Name the hormones produced from the following glands.
(2 mks)
(a) Corpora allata
(b)

(c) Prothoracic glands

24. (a) Name one plant division that shows alternation of generations.
(1 mk)

(c) State two reasons why moss species are poorly adapted to live in terrestrial habitats.
(2mks)

25. Name the causative agents of the following diseases:
(i) Pneumonia -

(ii) Herpes simples - (2 mks)

26. Mention two factors that hinder self-pollination in the flowers of monoecious plants.
(2 mks)

27. (a) What is deamination? (1 mk)

(b) Explain the importance of deamination in the body
(1 mk)

(c) Where is urea formed in the body? (1 mk)

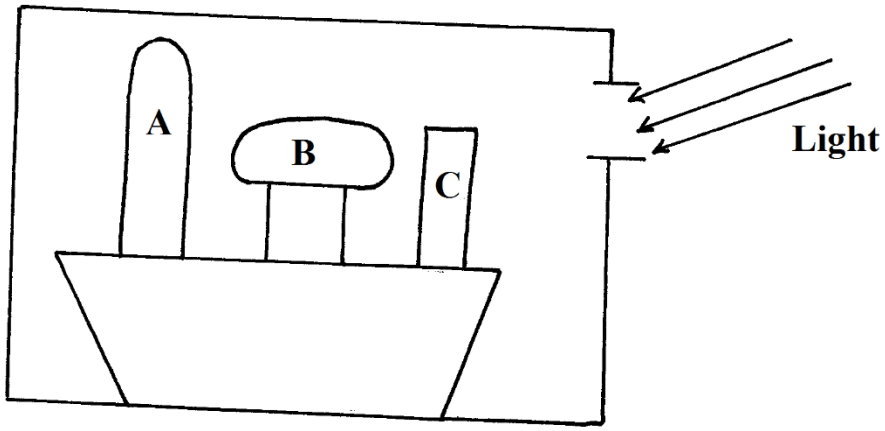
RDS 3

1 Name the element obtained from insects by insectivorous plants. (1mk)

……

……

2 An experiment was set up using seedlings as shown in the diagram below.



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

……

……..

b) Why were seedlings B and C included in the experiment? (1mk)

……

……..

3 State the importance of the following processes that take place in human nephron.

a) Ultrafiltration (1mk)

……

……..

b) Selective reabsorption (1mk)

……

……..

4 State the functions of centrioles in a cell. (2mk)

……

……..

……

5 State **ONE** process that takes place during the light stage and ONE that takes place in the dark stage of photosynthesis. (2mks)

Light stage;

……

……..

Dark stage;

……

……..

6 Give a reason why a diet consisting of maize meal and cabbage if eaten over a long period may lead to Kwashiorkor in children. (2mks)

……

……..

……

7 a) What is meant by non-disjunction? (1mk)

……

……..

b) Give **ONE** example of continuous variations in humans. (1mk)

……

……..

8 State the functions of the following parts of mammalian ear.

a) Ear Ossicles. (1mk)

……

……..

b) Semi-circular canals. (1mk)

……

……..

c) Eustachian tube. (1mk)

……

……..

9 Give a reason why primary productivity in an aquatic Ecosystem decreases with depth. (1mk)

……

……..

10 State **TWO** functions of the substance secreted by sebaceous glands. (2mks)

……..

……

……..

11 a) What is homeostasis? (1mk)

……

……..

b) Name **3** processes in the human body in which homeostasis is involved. (3mks)

……

……..

……

……..

12 Name the regions in plants where the following take place. (2mks)

i) Primary growth

……

……..

ii) Secondary growth.

……..

……..

13 State **THREE** reasons for classifying organisms. (3mks)

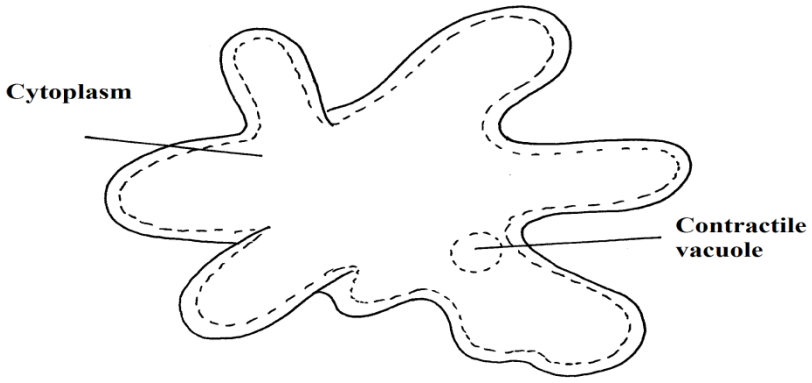
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14 A student observing a drop of water under the high power objective lens of a microscope observed an organism and drew the following organism.



a) Suggest the kingdom to which the organism belongs. (1mk)

……..

……..

b) Identify the organism. (1mk)

……

……..

c) Give an example of a disease caused by the organism. (1mk)

……..

……..

15 In an experiment, the pituitary gland of a rat was removed.

a) State the effect this will have on the quantity of urine produced by the rat. (1mk)

……..

……..

b) Give a reason for your answer in (a) above. (1mk)

……..

……..

16 State the functions of the following parts of a light microscope. (2mks)

a) Objective lens

……..

……..

b) Diaphragm

……..

……..

17 State **THREE** structural differences between arteries and veins in mammals(3mks)

Arteries	**Veins**

18 State **TWO** ways in which plants compensate for their inability to move from one place to another. (2mks)

……..

……..

……..

……..

19 Distinguish between parthenogenesis and parthenocarpy. (2mks)

……..

……..

……..

……..

20 In view of **modern** evolution , explain why Lamarkian theory is unacceptable(2mks)

……..

……..

……..

……..

21 What is the functional difference between a tendon and a ligament? (1mk)

……..

……..

22 Name **TWO** components of blood that are not present in the glumerular filtrate(2mks)

……..

……..

……..

23 a) A person was not able to see far objects clearly but could view near objects clearly. Name the eye defect the person was suffering from. (1mk)

……..

……..

b) How can the defect be corrected? (1mks)

……..

……..

……..

24 a) Name **TWO** sites where gaseous exchange takes place in terrestrial plants. (2mks)

……..

……..

……..

b) State the importance of the following features in gaseous exchange.

i) Cartilage in the trachea. (1mk)

……..

……..

ii) Moisture on the surface of the alveoli. (1mk)

……..

……..

25 Explain how the following adaptations minimize the rate of transpiration.

a) Sunken stomata (1mk)

……..

……..

b) Leaf drooping (1mk)

……..

……..

26 State the role of decomposers in an ecosystem. (1mk)

……..

……..

27 State **THREE** advantages of asexual reproduction in organisms. (3mks)

……..

……..

……..

……..

28 Define the following terms as used in Ecology. (4mks)

i) Biosphere.

……..

……..

……..

ii) Population.

……..

……..

……..

iii) Standing crop.

……..

……..

……..

iv) Carrying capacity.

……..

……..

……..

29 a) Distinguish between Homologous and Analogous structures. (2mks)

……..

……..

……..

b) Give an example in each cases the structures in (a) above. (2mks)

Homologous structure.

……..

……..

Analogous structure.

……..

……..

30 Explain why digestion of starch stops shortly after food enters the stomach.(1mk)

……..

……..

31 Explain why one fails to see clearly on moving from a brightly lit room to a poorly lit room. (2mks)

……..

……..

……..

……..

32 What is the significance of meiosis. (2mks)

……..

……..

……..

33 Explain how the Erythrocytes are adapted to perform their functions. (3mks)

……..

……..

……..

……..

34 State **ONE** function of each of the following parts of the brain. (2mks)

i) Hypothalamus.

……..

……..

ii) Cerebrum.

……..

……..

RDS 4

1. In what two ways does the dark stage of photosynthesis depend on the light stage of photosynthesis. (2mks)

_____

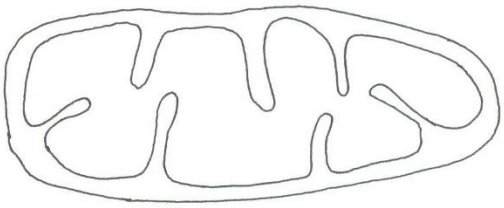
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2. Study the cell organelles below and give their identity and state a function of each cell organelle

(a) 

(b) 

Identity _____

(i) Identity _____

(1 mk)

(ii) Function _____

(1 mk)

(b)

(i) Identity (1mk)

_____

_____

_____

(ii) Function (1mk)

_____

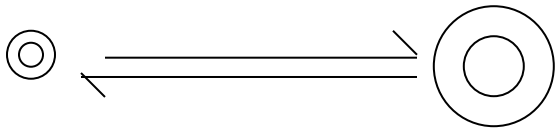
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3. The diagram below represents two states of blood vessels in the human skin under two different environment condition

A

B



(i)

(ii)

(a) Identify process A and B (2mks)

A _____

B _____

(b) What environment conditions would make the vessel to be in the state (i) above (1mk)

_____

_____

_____

4. Identify three shortcomings after a scientist write the name of an organisms as Zilli Tilapia (3mks)

_____

_____

_____

_____

5. A form one student observed that she could see 7 cells along the diameter of her field of view under the light microscope. If her field of view is 4.2mm. Calculate the length of one cell in micrometers. (2mks)

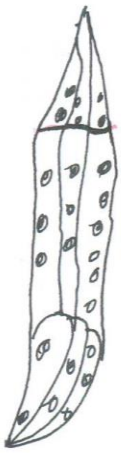
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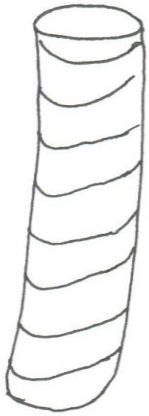
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6. The diagrams below shows some components of xylem



A



B

(a) Identify A and B (2mks)

A _____

B _____

(b) Give one structural difference between the two components (1mk)

_____

_____

_____

7. State three ways by which the gills of the bony fish are adapted for their functions (3mks)

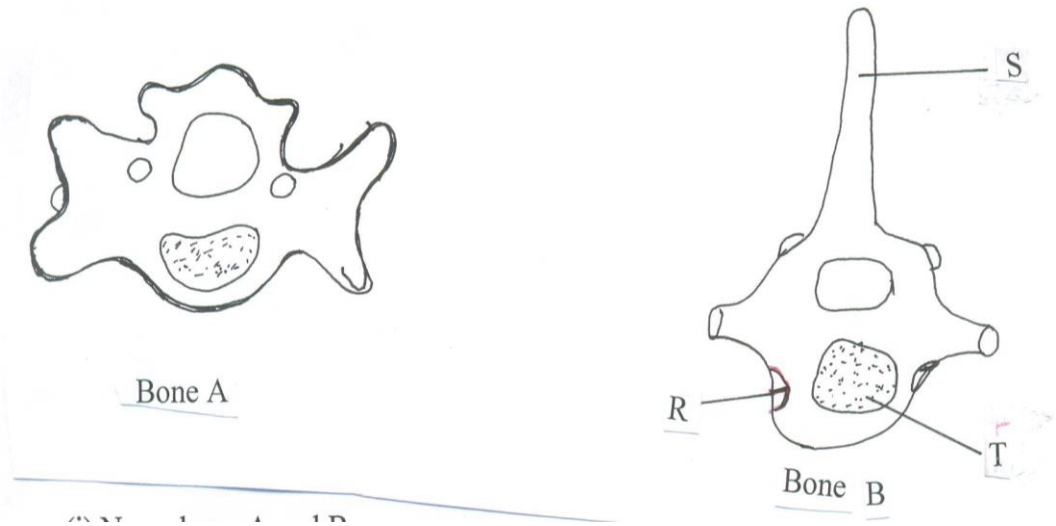
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8. The diagram below shows the anterior view of two vertebrate



(i) Name bone A and B

A _____ (1mk)

B _____ (1mk)

(ii) Name a bone which articulate with the following parts in bone B. (2mks)

(i) T _____

(ii) R _____

9. Explain how the following adaptations of xerophytes assist them to survive in their habitat

(a) Sunken stomata (1mk)

_____

_____

_____

(b) Thick waxy cuticle (1mk)

_____

_____

_____

10. (a) State two features in the insect pollinated flowers that encourage cross pollination (2mks)

_____

_____

_____

_____

(b) Explain how dispersal of seeds and fruits by plants are of economic importance to the species. (2mks)

_____

_____

_____

_____

11. State two biological significance of osmosis in animals (2mks)

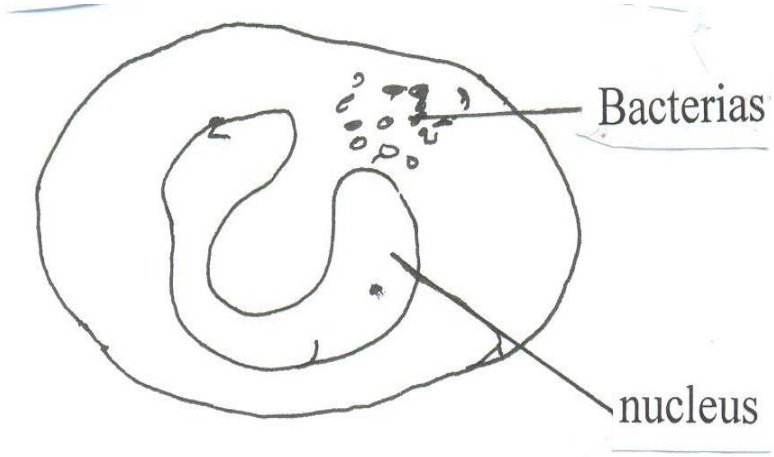
_____

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12. The diagram below shows a white blood cell



(i) Name the type of white blood cell represented above (1mk)

_____

_____

_____

(ii) Which process leads to the entry of bacteria in the cell (1mk)

_____

_____

_____

13. State three characteristics of the pteridophyta (3mks)

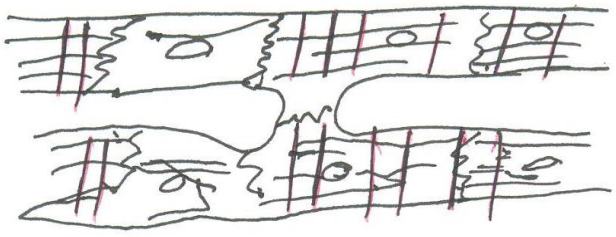
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14. Study the diagram below and answer the questions that follow



(a) Name the type of muscles shown in the diagram (1mk)

_____

_____

_____

(b) (i) State the part of the mammalian body where the above muscle is found (1mk)

_____

_____

_____

(ii) State two adaptations of the above muscle tissue to its function (2mks)

_____

_____

_____

_____

15. (a) Give the difference between primary growth and secondary growth (1mk)

_____

_____

_____

(b) (i) What is intermittent growth (1mk)

_____

_____

_____

(ii) Give one phylum in the kingdom Animalia where its members exhibit intermittent growth (1mk)

_____

_____

_____

16. To estimate the population size of fish in a certain pond; traps were laid at random and 600 fish were caught, marked and released back into the pond. Three days later, traps were laid again and 240 fish were caught. Out of the 240 fish, 80 were found to have been marked,

(a) Calculate the population size of the fish in the pond (2mks)

_____

_____

_____

_____

_____

(b) What is the name given to this method of estimating the population size. (1mk)

_____

_____

_____

17. Explain why the removal of a placenta from the walls of the uterus before birth would result in the death of the foetus. (2mks)

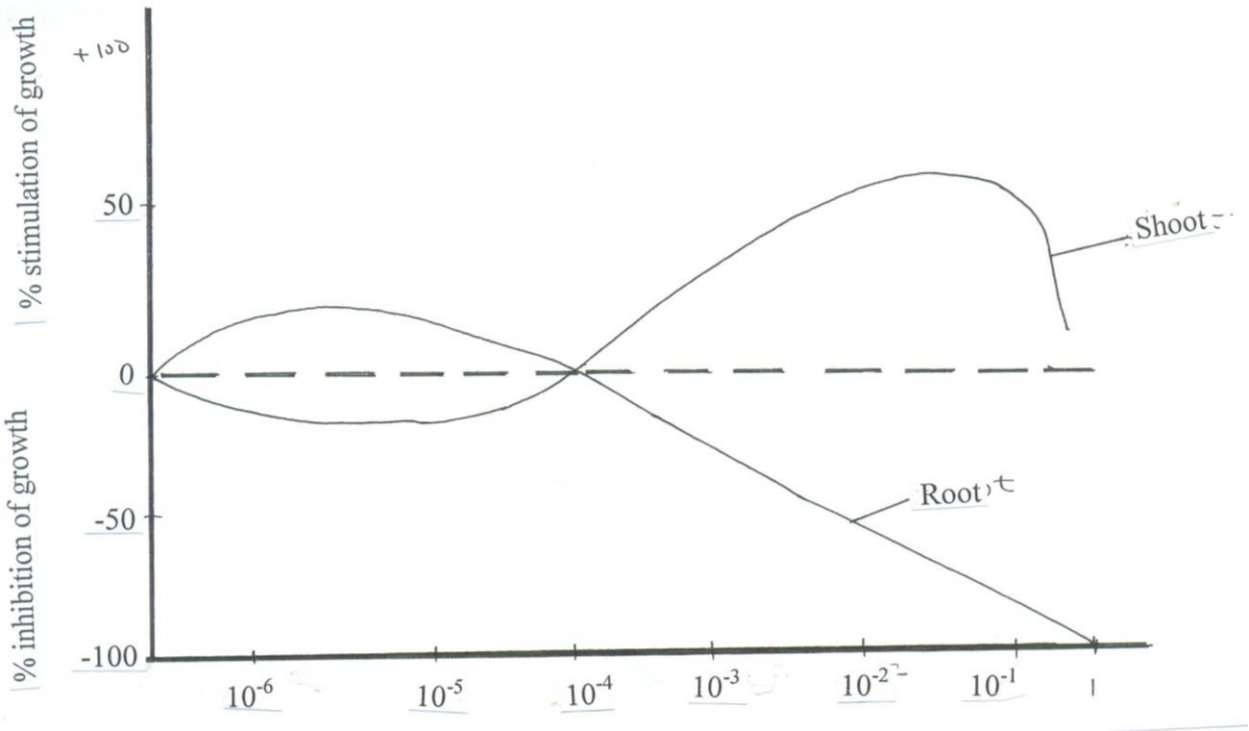
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_____

18. Study the diagram below which shows the effect of auxin concentration on the rate of growth in a plant



(a) Which part of the plant shows increased growth at lower auxin concentration (1mk)

_____

_____

_____

(b) State the relationship between auxin concentration and the rate of growth in

(i) Shoot (1mk)

_____

_____

_____

(ii) Root (1mk)

_____

_____

_____

19. Explain why decomposers are never included in a food chain (1mk)

_____

_____

_____

20. The equation below represents a metabolic process that occur in the mammalian liver

enzyme ⟶ Amino acids Organic compound + Urea

(a) Name the process represented above (1mk)

_____

_____

_____

(b) Identify enzyme X (1mk)

_____

_____

_____

(c) State the importance of the above process in the animal (1mk)

_____

_____

_____

21. During the oxidation of a certain food substance the respiratory quotient was found to be 0.7

(a) Name the type of food substrate being oxidized (1mk)

_____

_____

_____

(b) State two advantages of using the food named in (a) above as a respiratory substrate (2mks)

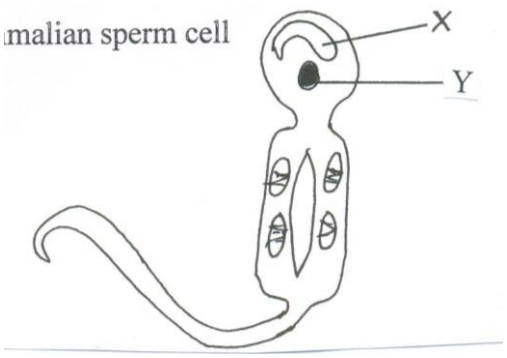
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22. The diagram below represents a mammalian sperm cell



(a) Name the part labeled Y (1mk)

_____

_____

(b) Explain what happens to the part labeled X during fertilization (2mks)

_____

_____

_____

_____

23. Explain why athletes train in high altitude in preparation for competition (2mks)

_____

_____

_____

_____

24. State three applications of genetics (3mks)

_____

_____

_____

_____

25. A patient was found to have the following symptoms

- Bleeding gums

- Poor healing of wounds

(i) What was the deficiency disease the patient was likely to be suffering from. (1mk)

_____

_____

_____

(ii) Suggest the kind of food to be given to rectify the condition (1mk)

_____

_____

_____

26. State the significance of the following features in the human trachea

(i) Rings of cartilage (1mk)

_____

_____

_____

(ii) Presence of cilia (1mk)

_____

_____

_____

27. State two roles of a DNA in a cell (2mks)

_____

_____

_____

_____

28. Differentiate between divergent and convergent evolution (2mks)

_____

_____

_____

_____

29. State the adaptations of herbivores which enable them to digest cellulose. (2mks)

_____

_____

_____

_____

30. State three differences between aerobic and anaerobic respiration (3mks)

_____

_____

_____

_____

RDS 5

1. (a) What is a teat pipette used for in Biology Laboratory Lesson? (1 mark)

……

(b) Give the name of a reagent that is used to test substances and at the same time used as a stain in the laboratory. (1mark)

……

2. A name of a certain garden plant is Duranta Repens

i. What is the meaning of repens? (1mark)

……
……..

ii. Identify one mistake shown by the written name. (1 mark)

……

iii. Distinguish between a *genus* and a *Species* as Taxa used during classification of the Organism. (2marks)

……

……

……

3. A form one student observing Onion epidermal cells under the low power objective counted 5 cells on a field of view measuring 5mm

(a) Estimate the size of one cell. (1 mark)

(b) If the eye piece magnification used was × 10 and that of the objective lens was × 10. What was the magnification of the microscope? Show your working. (2 marks)

(c) Estimate by approximation the Number of cells that would be observed if the objective lens magnification was changed to x 40 (1mark)

……

(d) What is the role of centriole in animal cells? (1mark)

……

……

4. Explain the following statements:

i. The action of ptyalin stops at the stomach. (1mark)

……

……

……

ii. The small intestines contain Villi. (1mark)

……

……

……

iii. High temperatures stop enzyme action. (1 mark)

……

……

……

……

iv. Lack of magnesium leads to yellowing of leaves in plants. (2 marks)

……

……

……

v. The thyroid glands swell, in some individuals (1 mark)

……

……

5. Name one cofactor and one co-enzyme required for a blood clotting process to be normal.

a) Co-factor - …… (1mark)

b) co-enzyme - …… (1mark)

6. What is counter current Mechanism in a Tilapia fish? (2marks)

……

……

……

……

……

7. State three adaptations of the Red blood cell to its function. (3 marks)

……

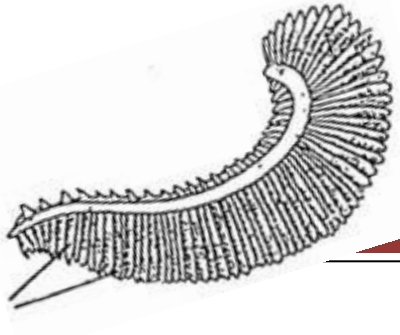
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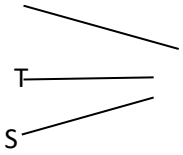
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……

8. The diagram below represents an organ from a finned bony fish. Study it and answer the question that follows

R





S

i. Identify the organ. (1mark)

……

……

ii. State three adaptations of the part labeled **S** to its functions. (3 marks)

……

……

……

……

9. (a) State the importance of pleural fluid in the lung of a mammal. (2marks)

……

……

……

……

(b) What function does the cilia of the trachea play during gaseous exchange in a mammal? (1 mark)

……

(c) What significance does mucus offer a mammal during gaseous exchange? (1 mark)

……

10. The equation below represents a process that take place in plants and animals

$C_6H_{12}O_6 + 6O_2 \longrightarrow 6CO_2 + 6H_2O$

(a) Name the process. (1 mark)

……

……

(b) State two requirements necessary for the process (a) above to process at maximum rate. (2 marks)

……

……

……

(c) What is the role of Cristae in the process above? (1 mark)

……

(d) In which part of the cell does glycolysis and Krebs cycle occur? (2 marks)

Gycolysis - ……

Krebs cycle -

……

11. State the role of each of the following components of the skin. (2 marrks)

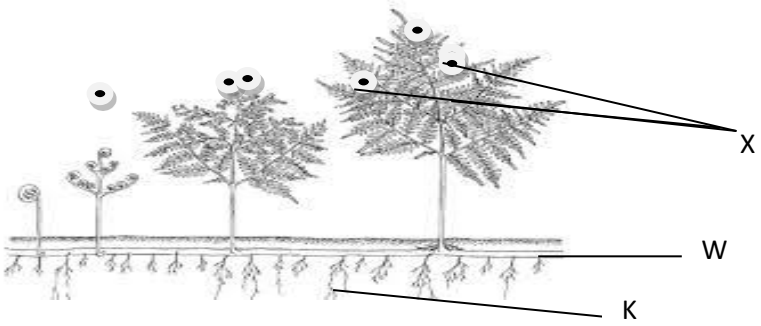
Sebum……

……

Melanin……

……

12. Study the diagram below and answer the questions that follows



i. Name parts. (2marks)

W ……

K ……

ii. Name the division of Kingdom plantae the diagram represent. (1 mark)

……

……

Iii. Give the identity of **X** and state its function (2 marks)

Identify of X -

……

Function -

……

13. State three biotic factors in an ecosystem. (3 marks)

……

……

……

14. Name two specific bacteria involved in denitrification process in a Nitrogen cycle. (2 marks)

……

……

15. Define:

(a) Biosphere (1 mark)

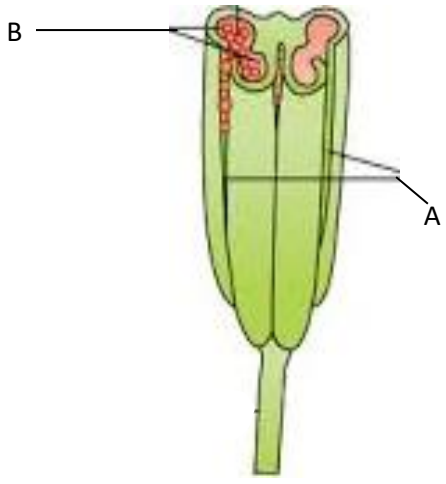
……

(b) Ecological Niche (1 mark)

……

……

16. The diagram below represents a male reproductive transverse section structure in plant



i. Name structures (2marks)
A - ……..

B- ……..

ii. Name the type of cell division taking place in structure A (1 mark)

……

……..

iii. State Two significance of the named type of cell division in (ii) above in Sexual Reproduction. (2marks)

……
……
……

17. State Three applications of Genetic in our day to day life. (3 marks)

……..

……

……

……

18. Give the full Name of the abbreviation. DNA (1 mark)

……..

……..

19. State the Three theories advanced to support the origin of life. (3 marks)

……..

……

……

……..

20. Name three types of Fossils (3 marks)

……
……
……

21. Name a chemical substance required for transmission of impulse in a synapse. (1 mark)

……

22. State the functions of the following structures in neuron.

i. Node of Ranvier (1 mark)

.....

ii. Myelin sheath (1 mark)

.....

23. Name the chemical substances involved in thickening of the following support tissues in plants

i. ..... (1mark)

ii. ..... (1mark)

24. State the Number of the following vertebra in a mammal

i. Cervical Vertebrae (1mark)

.....

ii. Lumbar Vertebrae (1mark)

.....

25. State three functions of Obturator Foramen in the pelvic girdle in a mammal. (3marks)

.....

.....

.....

.....

.....

26. What is a

(i) tendon? (1mark)

.....

(ii) ligament? (1 mark)

.....

RDS 6

1. Identify the type of skeleton that all vertebrates have in common. (1mk)

_____

2. Name two parts in human body with cilia. (2mks)

_____

_____

3. (a) Define the term sex-linkage. (1mk)

_____

_____

(b) Name one sex-linked trait human beings. (1mk)

_____

4. (a) What is meant by the term prokaryote? (1mk)

_____

_____

(b) Give an example of an organism which is prokaryotic. (1mk)

_____

_____

5. Name a carbohydrate that is;

(a) Found in abundance in mammalian blood (1mk)

_____

_____

(b) Stored in plant seeds (1mk)

_____

_____

6. (a) Differentiate between resolving power and magnifying power of a microscope. (1mk)

_____

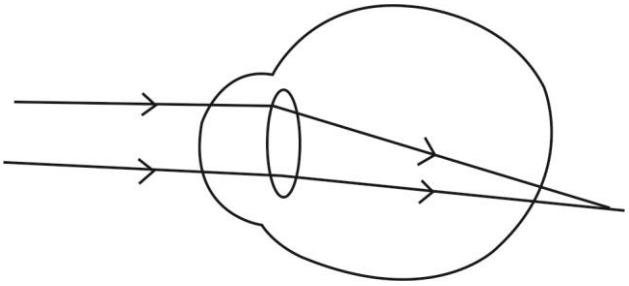
_____

(b) Give a reason why microscopic sections require to be very thin. (1mk)

_____

_____

7. The diagram below shows the position of an image formed in a defective eye



(a) Name the defect. (1mk)

_____

_____

(b) State how the defect named in (a) above can be corrected (1mk)

_____

_____

8. In an experiment some human blood was put in 0.25% sodium chloride for 30min. What observation was made on the number and the shape of erythrocytes assuming that the concentration of human blood is 0.9%?
(2mks)

Number _____

Shape_____

9. The diagram below shows two types of patterns of lignification in xylem vessels.

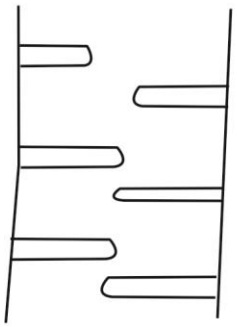


Figure 1

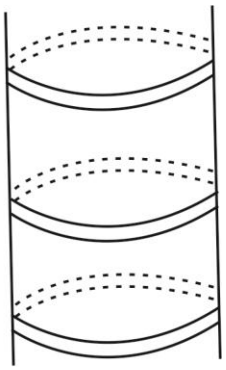


Figure 2

(a) Name the pattern in:

Figure 1_____

Figure 2_____

(b) State the structural difference between the phloem and xylem tissue. (1mk)

_____

_____

_____

_____

10. (a) State the limitation of Lamark's theory, (1mk)

_____

_____

(b) State one advantage of natural selection. (1mk)

_____

_____

11. In a game reserve, it was observed that the carrying capacity for wild animals is higher than that for cattle. Explain.

_____

_____

12. (a) If an organism has an active contractile vacuole, suggest its likely habitat. (1mk)

_____

b) Give a reason for your answer in (a) above

_____

_____

13. Give the role of following during the process of germination

(a) Oxygen. (1mk)

_____

_____

(b) Enzymes. (2mks)

_____

_____

_____

_____

14. State three homeostatic functions of the liver. (3mks)

_____

_____

_____

_____

_____

_____

15. (a) A process that occurs in plants is represented by the reaction below;

$C_6H_{12}0_6 \xrightarrow{} 2C_2H_5OH + 2C0_2 +$ Energy

Glucose Ethanol Carbon (iv) oxide

Identify the process. (1mk)

_____

_____

(b) (i) Name the substance that accumulate muscles when food is broken down with insufficient oxygen. (1mk)

_____

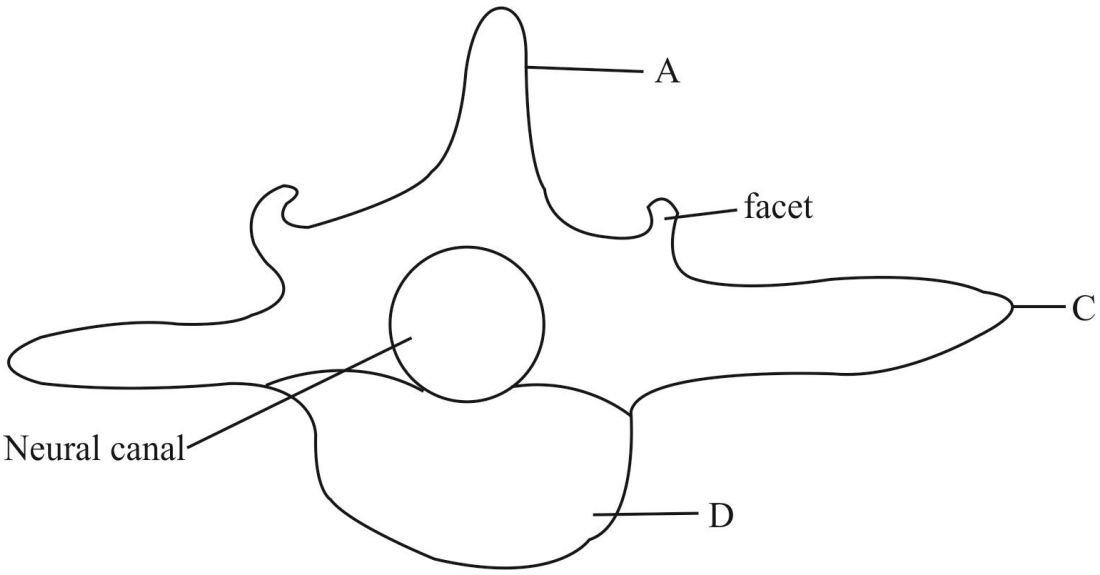
_____

(ii) State a side effect of accumulation of the substance named in (b)(i) above. (1mk)

_____

_____

16. Study the diagram below of the anterior view of a certain bone of a mammal.



(a) Identify it. (1mk)

_____

_____

(b) Name the parts labelled B and D. (2mks)

B_____

D_____

17. Name three types of strengthening tissues found in plants. (3mks)

_____

_____

_____

18. Distinguish between interspecific and intraspecific competition giving example of each. (3mks)

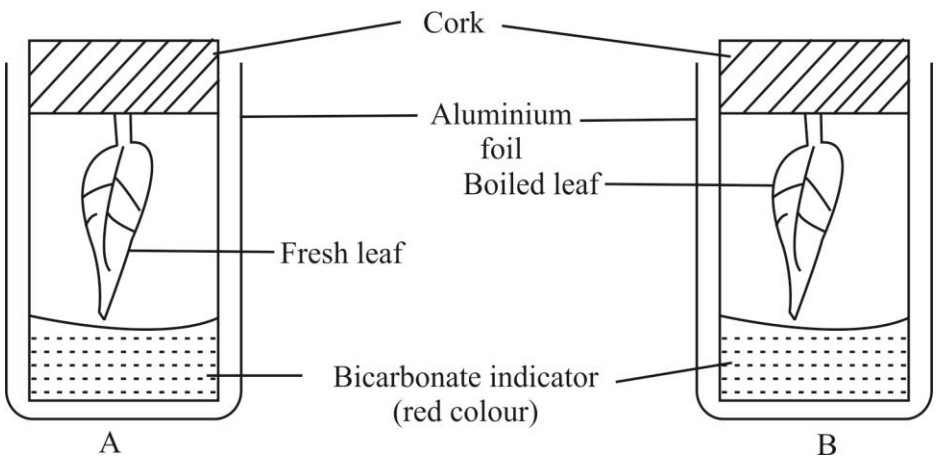
_____

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19. A form two students set up an experiment illustrated below.



(a) State the observation made in the bicarbonate indicator in tubes A and B after 1 hour

A_____

B_____

(b) Explain why the boiling tubes are covered with aluminium foil. (1mk)

_____

_____

20. (a) What is the difference between artificial passive immunity and artificial active immunity? (2mk)

_____

_____

_____

_____

(b) Blood group O is a universal donor. Explain. (1mk)

_____

_____

21. (a) Give two differences between tropism and taxes in plants. (2mks)

_____

_____

_____

_____

(b) State one biological signification of tropism. (1mk)

_____

_____

22. The scientific name of roundworm is ascaris lumbricoides.

(a) Identify two mistakes made in writing the name. (2mks)

_____

_____

_____

_____

(b) State the name given to the scientific system of name used in 22(a) above.

_____

_____

23. Explain how the cell membrane is adapted to carry out functions. (3mks)

_____

_____

_____

_____

_____

_____

24. Name the organelle that perform the following functions

(a) Formation of cilia and flagella. (1mk)

_____

_____

(b) Provides site for synthesis of proteins. (1mk)

_____

_____

25. Study dental formula shown below;

$$\mathbf{I}\,\frac{3}{3}\quad \mathbf{C}\,\frac{1}{1}\quad \mathbf{Pm}\,\frac{4}{4}\quad \mathbf{M}\,\frac{2}{m}$$

(a) How many teeth does the above animal have? (1mk)

_____

_____

(b) Suggest the diet of the animal whose dental formula is shown above. (1mk)

_____

_____

26. What characteristic do alveoli and the mouth cavity of a frog have in common that enable them to be efficient in gaseous exchange? (3mks)

_____

_____

_____

_____

_____

_____

27. State the role played by the following parts in human reproductive system

(a) Epididymis (1mk)

_____

_____

(b) Seminal vesicle (1mk)

_____

_____

(c) Vas deferens (1mk)

_____

_____

28. (a) State two disadvantages of self pollination. (2mks)

_____

_____

_____

_____

(b) Explain how protandry prevents self pollination. (1mk)

_____

_____

29. (a) What is polyploidy. (1mk)

_____

_____

(b) State two advantages of polyploidy in Agriculture. (2mks)

_____

_____

_____

_____

30. (a) What type of evolution do the similarity of wings of bats and those of insects illustrate? (1mk)

_____

_____

(b) (i) Give the term used to describe the structures named in(a) above.

_____

_____

(ii) Many animals have organs that appear to have little or no function at all and are usually reduced in size. What is the scientific name of such organs? (1mk)

_____

_____

31. State three characteristics of merismatic cells. (3mks)

_____

_____

_____

_____

_____

_____

RDS 7

1. (a) What is a specimen? (1mk)

……
……
……

(b) Name the chemical used for preservation of specimen in the laboratory (1mk)

……
……
……

2. Explain how the following cells are specialized to perform their function

(a) Root hair cell. (1mk)

……
……
……

(b) Sperm cell (1mk)

……
……
……

3. Give a reason for the following during investigation of starch in a leaf

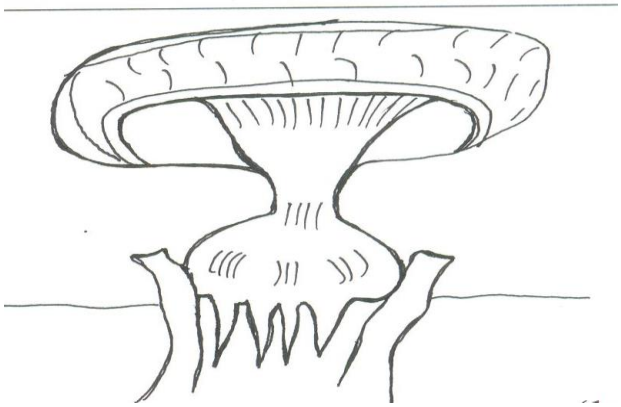
(a) Exposing the leaf to light for a few hours (1mk)

……
……
……

(b) Dipping the leaf in boiling water (1mk)

……
……
……

4. The following diagram represents a plant



(a) To which division does the above plant belong? (1mk)

……
……
……

(b) Give a reason for your answer in (a) above. (1mk)

……
……
……

(c) State one economic importance of the plant above. (1mk)

……
……
……

5. The following is a food chain that was presented by a pupil in a class

Grasshopper ⟶ lizards ⟵ ~~chick~~en ⟶ ~~ha~~wk

State errors that are in the food chain. (2mks)

……
……
……
……
……
……

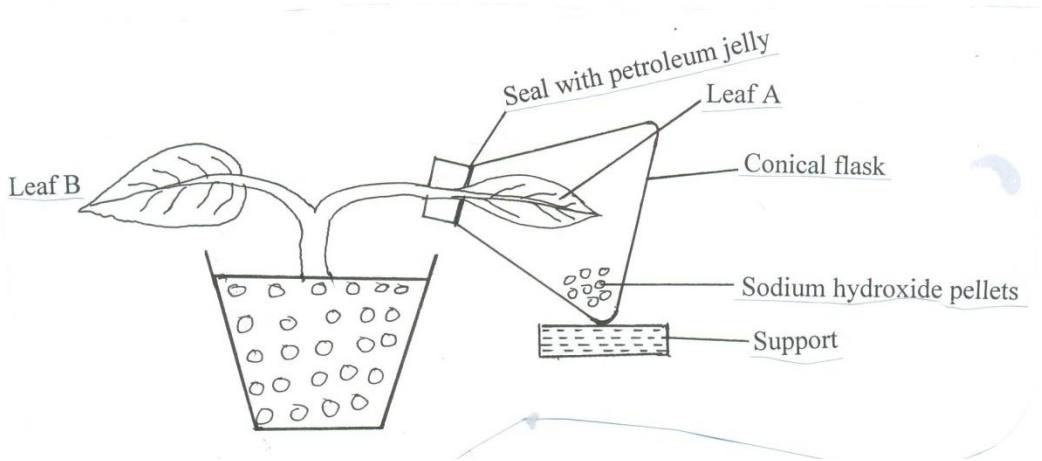
6. After four months of pregnancy, the ovaries of a woman can be removed without terminating pregnancy. However during the first four months of pregnancy the ovaries must remain intact if pregnancy is to be maintained. Explain these observations. (2mks)

……
……
……

7. What is the significance of chiasma formation during meotic cell division? (1mk)

……
……
……

8. Below is an experiment set to investigate a factor necessary for photosynthesis



(a) Suggest the aim of the experiment above (1mk)

……
……
……

(b) Give a reason for

(i) Using sodium hydroxide pellets. (1mk)

……
……
……

(ii) Testing leaf B for starch (1mk)

……
……
……

(iii) Sealing the mouth of the conical flask with petroleum jelly. (1mk)

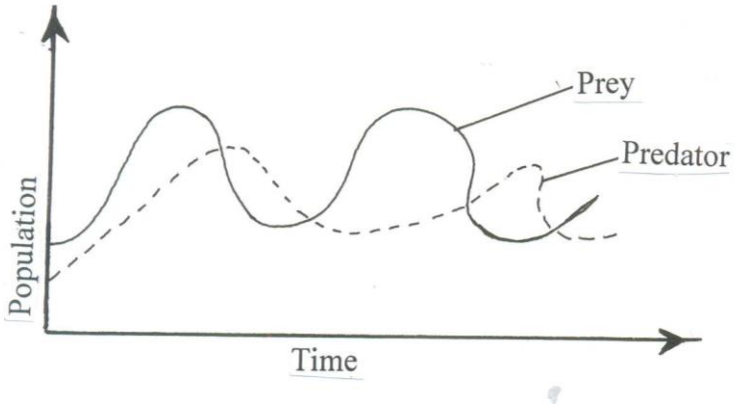
……
……
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9. Mention two differences between pollen grains of wind and insect pollinated flowers (2mks)

……
……
……
……
……
……

10. (a) Distinguish between predator and prey? (2mk)

……
……
……



(b) The figure above shows predator/prey relationship. Study the figure and answer the questions that follow

Describe the relationship between the predator and prey. (2mks)

……
……
……

……
……
……

11. A person who is 30 years old is able to see clearly far objects and not near objects. State the defect and how it can be corrected. (2mks)

……
……
……

12. In a certain bird species, black colour of feather is dominant over the white colour. A heterozygous black bird is crossed over with a homozygous white bird.

(a) State the genotypes of the two parents. Use letter B to represent gene for black colour and b for white colour. (2mks)

……
……
……
……
……
……

(b) (i) Using the information above work out the crossing. (3mks)

13. What is the importance of caecum and appendix in herbivores? (1mk)

……
……
……

14. The table below shows the effect of wind, still air and stomatal opening on the rate of transpiration of a plant in milligrams of water lost per hour dm^2. Study the table and answer the following questions

Stomatal opening (μm)	1	2	3	4	5	6	7
Windy	40	63	74	86	94	110	124
Still air	0	6	12	19	23	27	30

(a) (i) Compare the rates of transpiration in windy and still air conditions (1mk)

……
……
……

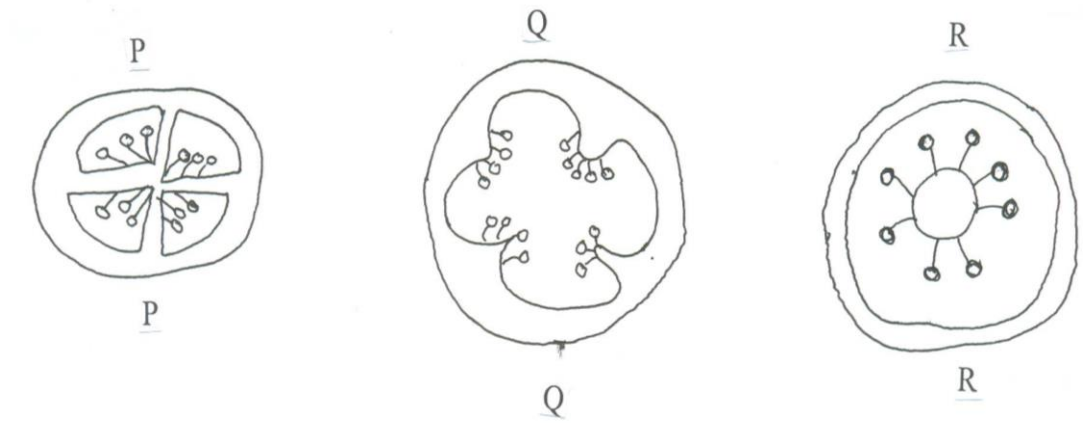
(ii) Explain your observation (2mks)

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(b) How does stomatal opening affect transpiration rate? (2mks)

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15. Below are cross sectional diagrams of fruits



Identify the type of the placentation present in the three diagrams. (3mks)

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16. In a prolonged drought period, forage was scarce. It made animals reach out to higher forage and this way the giraffes got the stretched long necks.

(a) What is the term used for a characteristic such as long necks outlined. (1mk)

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(b) What theory is this? (1mk)

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(c) State its limitation. Explain. (2mks)

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17. (a) What happens when a Rh^+ blood is given to a Rh^- recipient. (2mks)

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(b) Suggest what happens if the same recipient is given another dose of Rh^+ blood in a period

less than two weeks. (1mk)

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18. The table below shows the effect of temperature on the activity of amylase on starch. Six test – tubes each containing a mixture of starch and amylase were placed in water baths maintained at 0^0c, 10^0c, 20^0c, 30^0c, 40^0c and 50^0c and allowed to stand. Study the table and answer the questions that follow

Test –tube	Temperature 0^0c	Time taken for starch digestion (minutes)

1	0	Starch still present after 60 minutes
2	10	22
3	20	11
4	30	5
5	40	3.5
6	50	Starch still present after 60 minutes

(a) How does temperature affect the action of amylase? (1mk)

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……

(b) Give one reason in each case for the results obtained in the tubes kept at:

(i) 0^0c (1mk)

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(ii) 50^0c (1mk)

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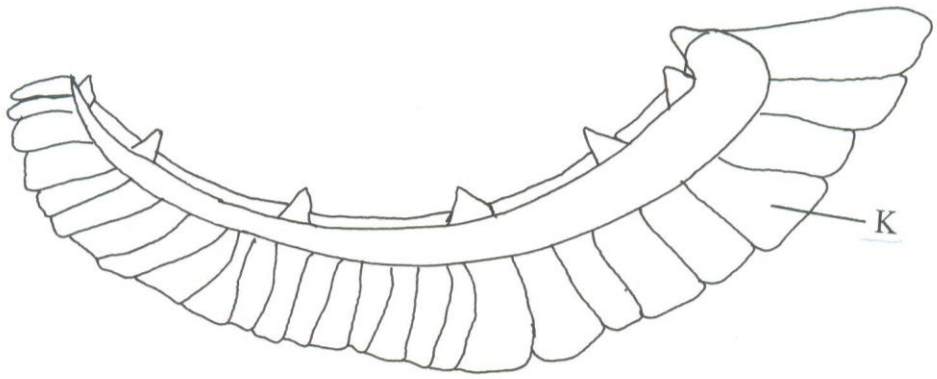
(c) Suggest the time it would take amylase to digest starch if the temperature is kept at 0^0c (1mk)

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19. By which process does the mammalian body maintain a constant temperature? (1mk)

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20. The diagram below represents an organ from the body of a fish. Study it and answer the questions that follow.



(a) Name the organ (1mk)

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……
……

(b) State three ways in which part K is adapted to its function. (3mks)

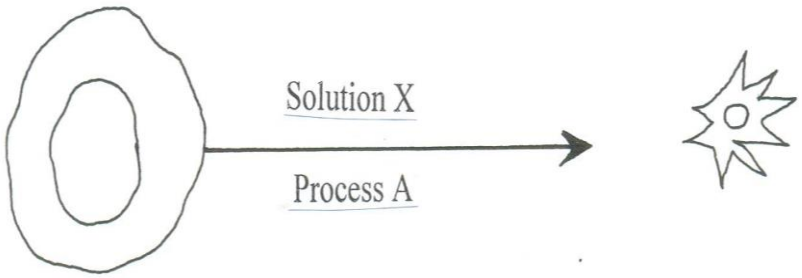
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21. State three functions of mammalian blood (3mks)

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22. The diagram below illustrates the behaviour of a red blood cell when placed in solution X



(a) Suggest the nature of solution X (1mk)

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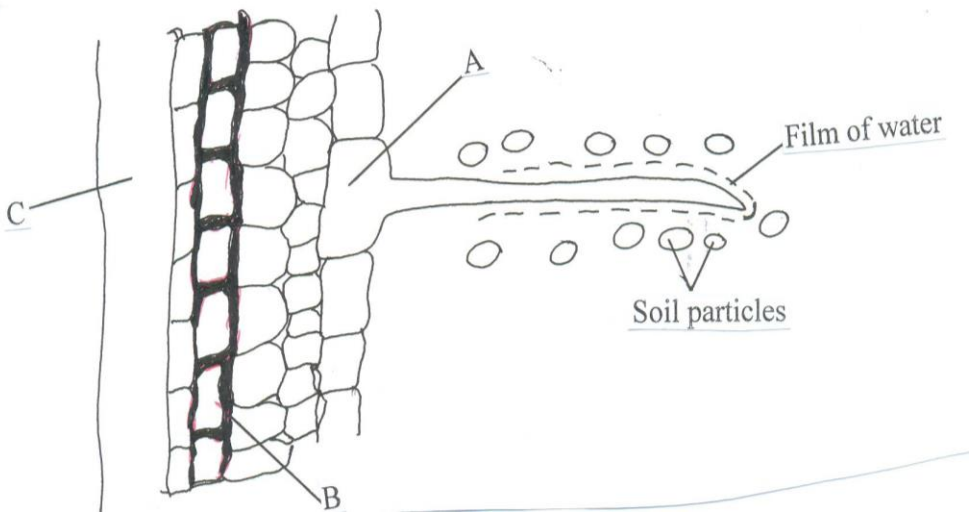
(b) Name process A (1mk)

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……

(c) Account for the appearance of the red blood cell (3mks)

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23. The diagram below illustrates the path way of water from soil into the plant



(a) Name the structures labeled C and B (2mks)

C _____

B _____

(b) State two ways in which the structure labelled A is adapted to its functions. (2mks)

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24. Explain why oxygen is important in the process of active transport in cells (2mks)

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25. State two advantages of metamorphosis to the life of insects (2mks)

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26. The process that occurs in plants is represented by the equation below;

$C_6H_{12}O_6 \longrightarrow 2C_2H_5OH + 2CO_2 + Energy$

(a) Name the process (1mk)

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……

(b) State economic importance of the process named in (a) above. (3mks)

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27. (a) Name two components of blood that are not present the glomerular filtrate (2mks)

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(b) Explain why they are not present in the glomerular filtrate (2mks)

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RDS 8

1. (i) State the importance of starch in plant cells. (1mk)

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(ii) From (i) above name the equivalent in animal cells. (1mk)

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(iii) State two functions of hydrochloric acid in digestion in humans. (2mks)

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2. The experiment below was set up to investigate a certain physiological process,

Beaker visking tubing starch solution iodine solution

After 30 minutes the solution in the visking tubing turned blue-black while that in the beaker remained brown, the colour of iodine solution

(a) Suggest a physiological process that was being investigated (1mk)

……
……

(b) Account for the results after 30 minutes. (3mks)

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3. (i) Name the structures used for gaseous exchange in:

(a) Tadpoles (1mk)

……
……
……

(b) Adult amphibians (1mk)

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……

(ii) (a) What is counter-current flow. (1mk)

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……

(b) What is the importance of counter-current flow. (1mk)

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4. Explain the role of Antidiuretic hormone when there is less water in human body.(3mks)

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5. (a) Explain how the following prevent self-pollination.

(i) Protandry(1mk)

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……
……

(ii) Self sterility (1mk)

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……
……

(b) What is the physiological significance of having testes outside the body of a human male (2mks)

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6. Study the diagram below and answer the questions that follow.

(a) Identify the above bone (1mk)

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……

(b) Name the region of the body from where it was obtained (1mk)

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(c) Give one adaptation of the bone above to its functions. (1mk)

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7. Explain how continental drift is an evidence of evolution (3mks)

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8. State one survival value of each of the following in plants.

(a) Phototropism in shoots. (1mk)

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……
……

(b) Geotropism in roots (1mk)

……
……
……

9. (a) The diagram below represents an experiment that was set up to investigate a certain process in plants

(i) Name the process that was being investigated (1mk)

……
……
……

(ii) Account for the swelling in diagram 2 (1mk)

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(b) State the reasons for the following adaptation of the xylem vessels.

(i) Narrow and long (1mk)

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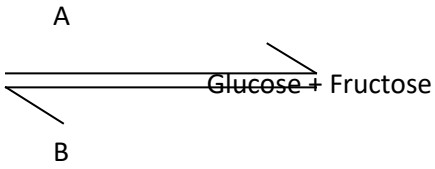
(ii) Lack of cross walls (1mk)

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10. Name the enzyme, the vitamin and the metallic ion required in the clotting of blood. (3mks)

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11. Study the reaction below



(a) Name the process

A _____ (1mk)

B _____ (1mk)

(b) State the form in which energy is stored in living cells. (1mk)

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(c) State the reason why lipids are not used as the main respiratory substrate in living cells (1mk)

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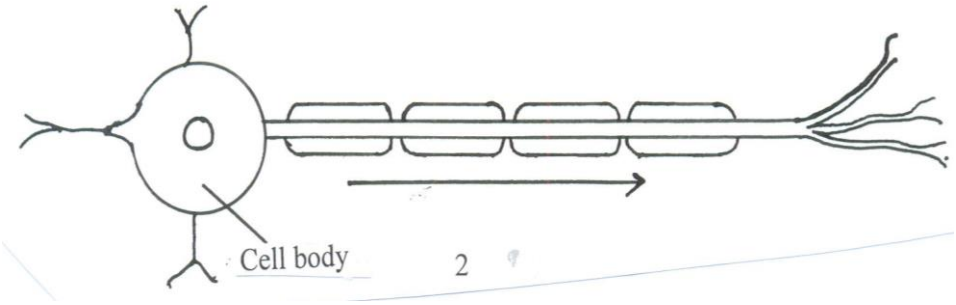
12. (a) Define the term binomial nomenclature. (1mk)

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……

(b) Give two reasons why binomial nomenclature is necessary (2mks)

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……

13. The diagram below represents a nerve cell



(a) Identify the nerve cell (1mk)

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……
……

(b) (i) Give a reason for your answer in (a) above (1mk)

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……
……

(ii) On the diagram show by use of an arrow the direction of flow of the nerve impulses. (1mk)

14. State two environmental problems that are solved by studying Biology as a subject (2mks)

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……
……

15. The following statement represents an analogy of gene mutation.

	Intended message	Actual message
(i)	Eat the meat	Heat the meat
(ii)	This is my team	This is my tea

(a) Identify the type of gene mutation illustrated in

(i) _____ (1mk)

(ii) _____ (1mk)

(b) Name one type of chromosomal mutation that leads to change in chromosome structure (1mk)

……
……
……

16. (a) During an ecological study a student came across an animal with the following characteristics:

4 pairs of walking legs

2 body parts

Simple eyes

Name the :

(i) Phylum _____ (1mk)

(ii) Class _____ (1mk)

(b) Name the division of kingdom plantae with the following spore producing bodies

(i) Sori _____ (1mk)

(ii) Sporangium _____ (1mk)

17. What is meant by natural selection (2mk)

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……
……

18. (a) Differentiate between the apical meristem and the cambium (2mks)

……
……
……

(b) State the role of the following in germination:

(i) Hypocotyl in epigeal germination (1mk)

……
……
……

(ii) Coleoptile in hypogeal germination (1mk)

……
……
……

19. (a) What is a test cross (1mk)

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……
……

(b) List any one disorder in human blood due to gene mutation (1mk)

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……
……

20. (i) State the role of each of the following in photosynthesis. (2mks)

(a) Light

……
……
……

(b) Chlorophyl

……
……
……

(ii) What is the adaptive value of a thick cuticle on a leaf. (1mk)

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……
……

8

21. State the function of the following parts of a light microscope.

(a) Objective lens (1mk)

……
……
……

(b) Diaphragm (1mk)

……
……
……

22. Name the enzyme in red blood cells that speeds up the dissolving of carbon (iv) oxide to form carbonic acid (1mk)

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……

23. State two ways in which the cell membrane is adapted to its function (2mks)

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……

24. (a) What is the role of the following bacteria in the nitrogen cycle

(i) Denitrifying bacteria (1mk)

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……
……

(ii) Nitrifying bacteria (1mk)

……
……
……

(b) Give two reasons as to why biological control is preferred to chemical control in the control of pests and parasites. (2mks)

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25. The following equation represents aerobic respiration

$C_6H_{12}O_6 + 6O_2 \longrightarrow 6CO_2 + 6H_2O + Energy$

(i) Work out the respiratory quotient. (2mks)

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……
……
……

26. Name the section of the Nephrone where the following take place:

(i) Ultrafiltration (1mk)

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……

(ii) Reabsorption of sodium chloride (1mk)

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……

(iii) Effects of Antidiuretic hormone (ADH) (1mk)

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……

RDS 9

1. What is the function of the following in a microscope?

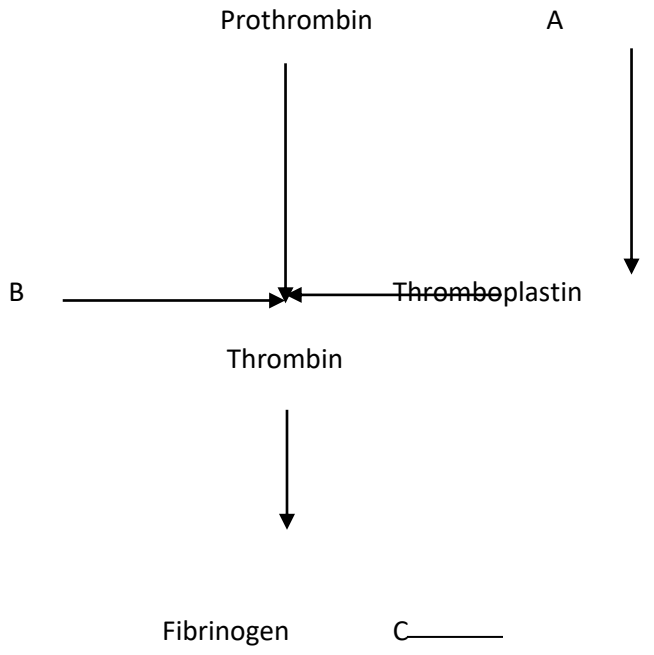
   (a) Mirror (1mk)

……
……
……

   (b) Diaphragm (1mk)

……
……
……

2. Use the chart below to answer the questions that follow



Name: -

(a) The blood cell represented by A (1mk)

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……
……

(b) Metal ion represented by B (1mk)

……..
……..
……..

(c) End product represented by C (1mk)

……
……
……

3. Below is a nucleotide strand

A – A – G – T – C

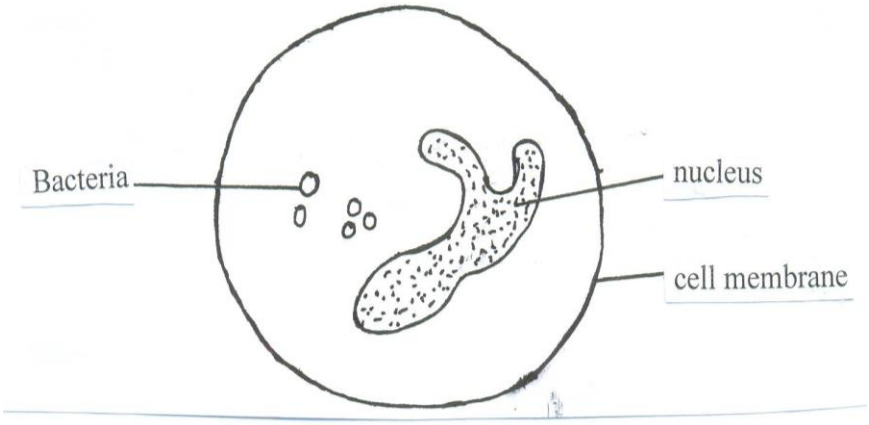
(a) Is it a DNA or RNA strand? Give a reason (2mks)

……
……
……

(b) Give the bases which would appear on the complimentary nucleotide strand (1mk)

……
……
……

4. Below is a diagram of a white blood cell.



(a) Describe how the bacteria got into the cell (2mks)

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(b) What happens to the bacteria once in the cell? (1mk)

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……

5. Give three reasons why mitosis is important in living organisms (3mks)

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6. Give the characteristics which adapt flowers for wind pollination (4mks)

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……

7. Name one waste product that is :

(a) Almost absent in the renal vein but is present in the renal artery (1mk)

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……
……

(b) Transported in the blood but not removed by the kidneys (1mk)

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……
……

8. State two functions of the large intestines in human beings (2mks)

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……

9. The wings of a bird and those of an insect are analogous structures.

(a) What are analogous structures? (2mks)

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……

(b) Name this type of evolution (1mk)

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……

10. Give the main characteristic of each of the following blood disorders:-

(a) Leukemia (1mk)

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……
……

11. Name the agent that causes:-

(a) Cholera (1mk)

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……

(b) Typhoid fever (1mk)

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……

(c) Amoebic dysentery (1mk)

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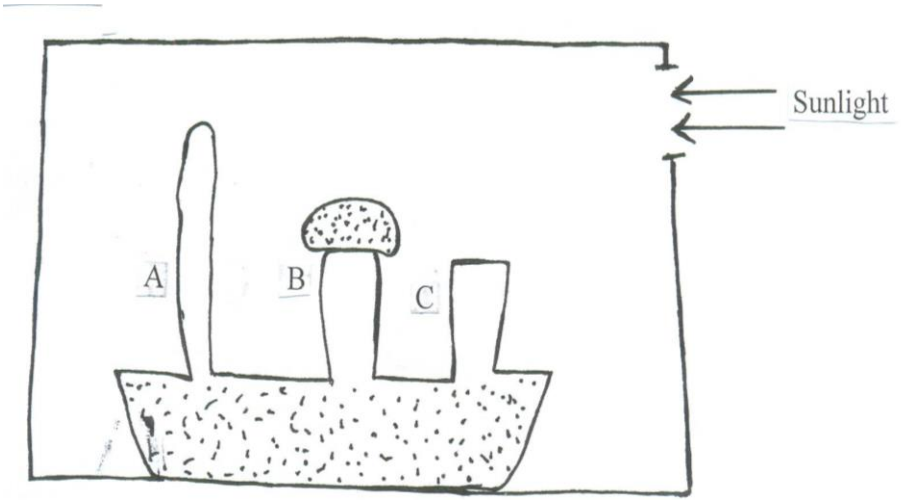
12. Outline three roles of active transport in the human body (3mks)

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……

13. State three ways in which nitrogen in the air is made available for plant use (3mks)

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14. An experiment was set up using three seedlings as shown below.



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

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……

(b) Why were seedlings B and C included in the experiment? (1mk)

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(c) State and explain the observations made in seedling A after seven days (2mks)

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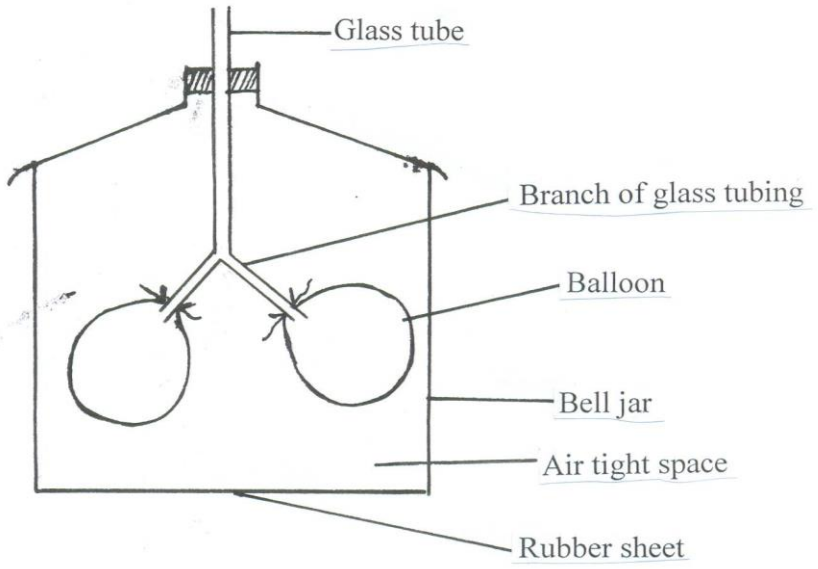
15. (a) Name the hard body covering found in organisms in Arthropoda (1mk)

……
……
……

(b) State three uses of the structure mentioned in (a) above (3mks)

……
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……

16. Study the diagram below and use it to answer the questions that follow



(a) Mention the equivalent of the following in the mammalian breathing mechanisms:-

(i) Bell jar (1mk)

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……
……

(ii) Balloons (1mk)

……
……
……

(b) Does the diagram represent inhalation or exhalation? Give one reason for your answer (2mks)

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17. Explain two advantages of endoderms like man over ectoderms like lizards (2mks)

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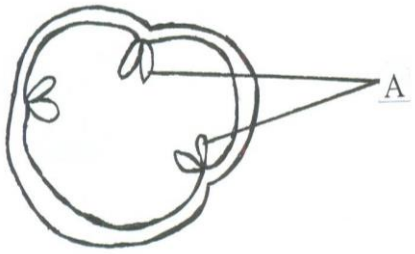
18. (a) Name the property that enables lipids to be stored in tissues of organisms (1mk)

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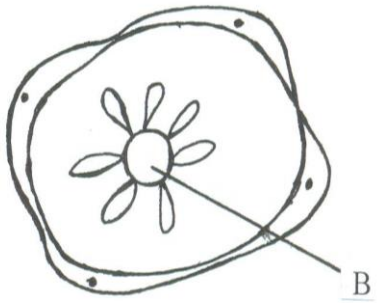
(b) State two reasons why a camel stores large fat reserves in its body (2mks)

……
……
……

19. Below are cross sections of two fruits. Study them and answer the questions that follow



Fruit P



Fruit Q

(a) Name the parts labelled

A_____ (1mk)

B _____ (1mk)

(b) Name the type of placentation in fruit (2mks)

P_____

Q _____

20. Which region of mammalian digestive tract does digestion of fats begin? (1mk)

……
……
……

21. A Rhesus positive man, heterozygous for the trait is married to a rhesus negative woman.

Carry out a genetic cross to show the offsprings of this couple

RDS 10

22. Name the type of skeleton found in

(a) Tilapia fish (1mk)

……
……
……

(b) Earthworm (1mk)

……
……
……

23. State two organelles absent in members of kingdom monera but present in members of kingdom protoctista (2mks)

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……

24. Name the substance produced during anaerobic respiration in animals and state why it should be got rid off immediately (2mks)

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……
……

25. What makes it difficult for seeds to germinate at the following temperatures:

(a) 0^0c

……
……
……

(b) 47^0c

……
……
……

26. State two major functions of adipose tissue (fat) in mammals (2mks)

……
……
……

27. Below is an equation for respiration

$C_{57}H_{104}O_6 + 80O_2 \longrightarrow 57CO_2 + 52H_2O$ + Energy

(i) Name the type of respiration taking place (1mk)

……
……
……

(ii) Calculate the respiratory quotient (RQ) (2mks)

……
……
……

(iii) Identify the type of food being metabolized. (1mk)

……
……
……

28. State one significance of interphase in cell division (1mk)

……
……
……

29. (a) What is the role of light in the light stage of photosynthesis? (1mk)

……
……
……

(b) What are the products of the light stage of photosynthesis? (2mks)

……
……
……

RDS 10

1. State ways by which synaptic transmission can be stopped. (2mks)

.....

.....

.....

.....

2. State two advantages which the endothermic (homoethermic) have over those that are exothermic (poikilothermic). (2mks)

.....

.....

.....

3. a) State one function of red blood cells. (1mk)

.....

.....

.....

c) Give two structural difference between red blood cells and white blood cells (2mks)

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4. Hairs and leaves of sundew, an insectivorous plant curl around and trap insects when they land on the plant.

a) Identify the response shown sundew plants (1mk)

.....
.....
.....

..

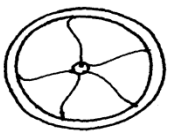
b) Explain the biological importance of the response in (a) above. (2mks)

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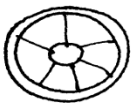
c) Name any one type of neurons. (1mk)

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5. The diagram below gives an external view of the structure of the human eye observed outdoor at midday and midnight.



K



L

a) Which diagram represents the eye as observed during the day? (1mk)

.....

.....

b) Give a reason for your answer in (a) above. (1mk)

.....

.....

6. A student viewed and drew a plant cell of a diameter 4mm using a light microscope whose eye piece lens was marked x1 and objective lens marked x5. How many cells were linearly arranged along the microscope's field of view whose diameter was 8mm .
(show your working) (3mks)

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7. Identify the nucleic and whose base sequence is shown below.

G-A-C-U-A-G-A-C-G

i) Identify the type of nucleic acid as shown below (1mk)

.....

.....

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

.....

.....

iii) Write the base sequence of the DNA strand shown above (1mk)

.....

.....

8. State the function of the following parts of a microscope (3mks)

i) Nose piece.

.....

ii) Condenser.

.....

iii) Diaphragm.

.....

9. Identify the mode of feeding of the animal whose dental formula is given below.

$i\frac{0}{3}, C\frac{0}{1}, Pm\frac{3}{3}, M\frac{3}{3}$ =32.

a) Mode of feeding (1mk)

.....

.....

b) Give a reason for your answer in (a) above. (2mks)

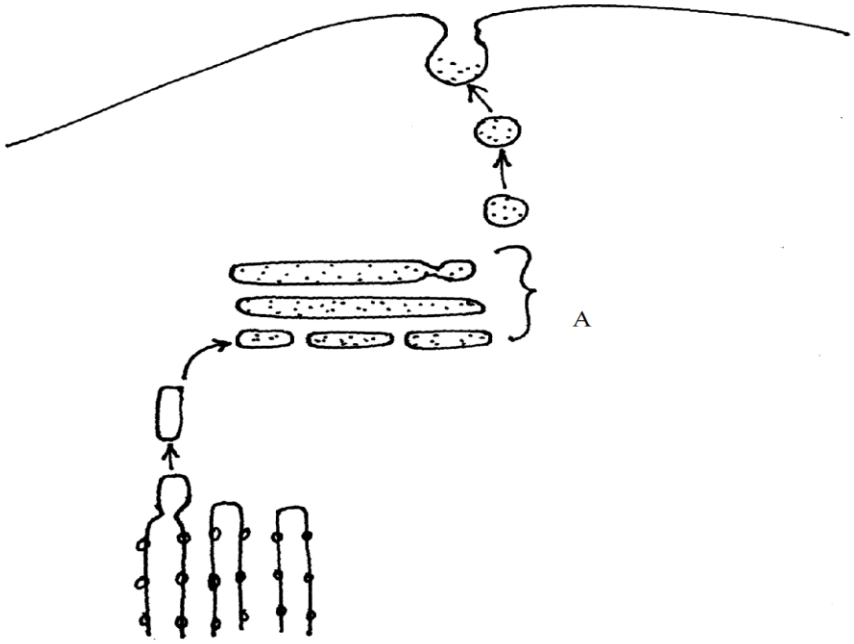
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.....

10. Study the diagram below and use it to answer the questions.



a) Identify the organelle marked A. (1mk)

.....

.....

b) Give three functions of the organelle named in (a) above (3mks)

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.....

11. It was found that during germination of pea seeds 9.3cm^3 of carbon (iv) oxide was produced while 9.1cm^3 of oxygen was used up.

a) Calculate the respiratory quotient (RQ) of the reaction taking place. (2mks)

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.....
.....
.....

b) Identify the type of food substance being metabolized. (1mk)

.....

.....

12. Explain why Lamarck's theory of evolution is not accepted by biologists today. (2mks)

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13. Give three reasons why plants lack complex excretory organs like those of animals. (3mks)

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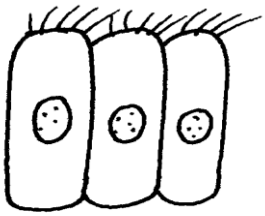
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14. The diagram below shows a type of epithelial tissue.



i) What is the name of the hair-like process? (1mk)

.....

.....

ii) What is the function of the hair-like process. (1mk)

.....

.....

b) Name one part in the human body where the hair-like process are found. (1mk)

.....

.....

15. In an attempt to estimate the number of weaver birds in a small woodland 435 were captured , marked and released. Three days later , 620 were captured 75 of which were marked.

a) What is the name of the sampling method described above. (1mk)

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.....

b) Calculate the approximate size of the weaver bird population in the woodland (2mks)

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c) Give one disadvantage of this method. (1mk)

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16. Give an example of ball and socket joint. (1mk)

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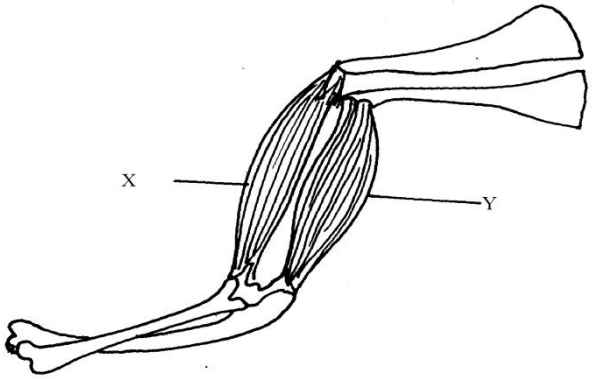
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17. Name two types of strengthening tissues in plants. (2mks)

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.....

18. Study the diagram below, and answer the questions below.



a) Name the muscles labelled X and Y. (2mks)

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b) What happens to each muscle as the arm is straightened? (2mks)

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19. Nocturnal animals such as a leopard are capable of seeing fairly well at night. What two retinal adaptations have made this possible? (2mks)

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20. The table below shows stomata distribution on leaves A and B and their surface area. Use the information to answer the questions that follow.

Leaf	A	B

Number of stomata	Upper surface 25 Lower surface 0	5 20
Surface area.	$30cm^3$	$19cm^3$

b) Identify with reasons the habitats of the plant from which the leaves were obtained (4mks)

Leaf A Habitat.....

Reasons.....

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.....
.....

Leaf B Habitat.....

Reasons.....

.....
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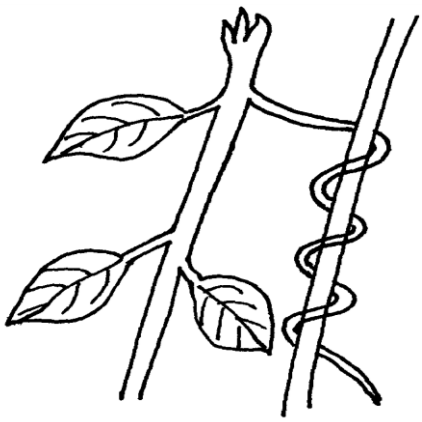
21. A tall bean plant crossed with a dwarf one produces offspring of which about half are tall and other are dwarf . what are the genotypes of parents? Show your working (3mks)

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22. Describe what happens during the dark stage of photosynthesis. (3mks)

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23. The response exhibited by a certain plant tendril is illustrated below.



i) Name the type of response. (1mk)

.....

.....

ii) Explain how the response named in (i) above occurs . (2mks)

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24. State three adaptations of respiratory surfaces. (3mks)

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25. State the parts of the ear involved in:

a) Amplification of sound vibration (1mk)

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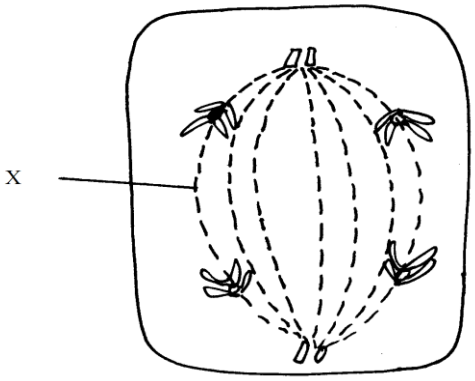
b) balance and posture. (1mk)

.....
.....
.....

26. Explain why the digestion of starch stops after food enters the stomach. (2mks)

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.....
.....

27. The diagram below represents a stage during cell division.



i) Identify the stage of cell division. (1mk)

.....
.....
.....

ii) Give two reasons for your answer (a)i) above (2mks)

.....
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.....
.....

iii) Name the structure labelled M. (1mk)

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.....

28. Bivalent synapsis, crossing over are terminologies used in cell division.

a) Name the stage of meiosis in which the process takes place. (1mk)

.....
.....

b) Distinguish between synapsis and crossing over. (2mks)

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RDS 11

1. Name the branch of Biology that involves the study of: (2mrks)

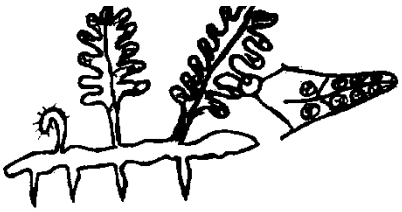
   a) Organisms for the sake of classifying them.

   ……

   b) Microscopic organisms.

……..

2. The diagram below represents a plant



a) Name the division to which the plant belongs. (1mrk)

……..

b) Give **three** reasons for your answer in (a) above.

(3mrks)

……

……

……

3. State **three** parameters that can be used to estimate growth in seedlings. (3mrks)

……

……

……

4. Equal amounts of crushed Irish potato was placed in equal volumes of hydrogen peroxide solution at indicated pH. The volume of the gas produced was measured and recorded as shown in the table below.

pH	4.0	7.0	9.0

Volume of gas (cm^3)	2.7	5.7	7.7

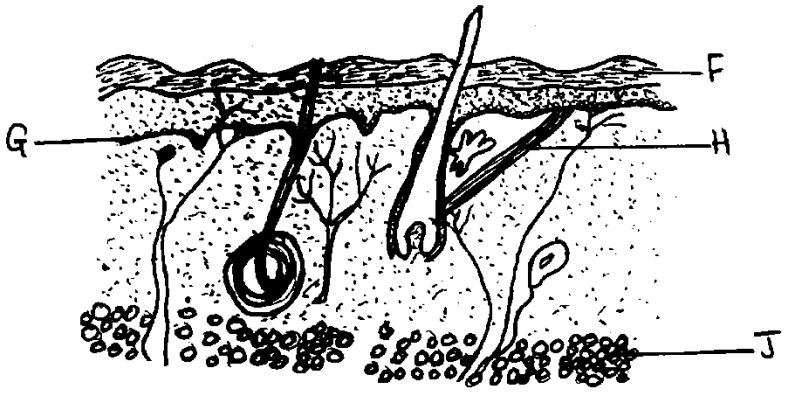
(a) Name the gas that was produced. (1mrk)

……..

(b)Account for the difference in the volume of the gas produced in pH 4.0 and pH 9.0 (2mrks)

……
……
……

5. The diagram below shows a longitudinal section of mammalian skin.



a) Name the parts labelled **F** and **G.** (2mrks)

F……

G……

b) State **one** function of each of the parts labelled **H** and **J** (2mrks)

H ……

J ……

6. What are the names of modified leaves enclosing bougainvillea flowers whose function is to attract insect pollinators? (1mrk)

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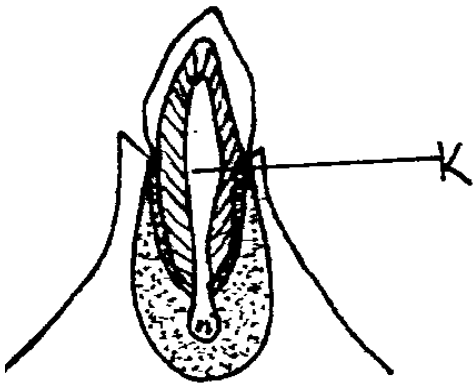
7 (a) A dog weighing 15.2kg requires 216kJ while a mouse weighing 50g requires 2736 kJ per day. Explain. (2mrks)

……
……
……

(b) Under what condition is lactic acid formed in human muscles? (1mk)

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……
……
……

8. The diagram below represents a section through a human tooth.



(a) Name the type of tooth shown. (1mk)

……

(b) Give a reason for your answer in (a) above. (1mk)

……

(c) State the functions of the structures found in the part labelled **K.** (2mks)

……

……

……

9. (a) State Darwin's theory of natural selection. (1mk)

……

……

(b) State **two** advantages of divergent evolution to organisms. (2mks)

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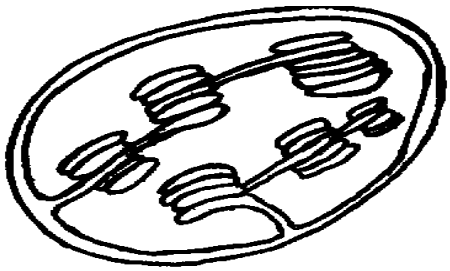
……

(c) What are vestigial organs? (1mk)

……

……

10 Below is a diagram of an organelle. (2mks)



(a) State the function of the organelle drawn above. (1mk)

……..

(b) Name the parts of the organelle where :

(i) Oxygen gas is produced as a by product. (1mk)

……

(ii) Carbon (IV) oxide is utilized. 1mk)

……..

11. (a) What is homeostasis? (1mk)

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……

(b) State **three** processes in humans in which homeostasis is involved. (3mks)

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12. (a) Name the type of eye defect corrected by wearing convex lens. (1mk)

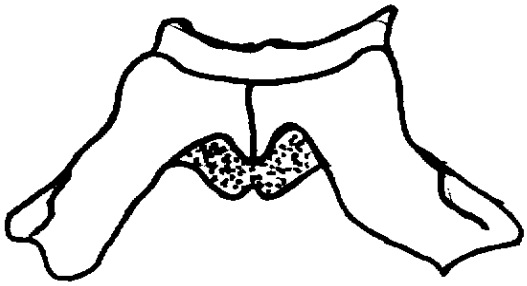
……

(b) State **two** functions of iris. (2mks)

……

……

13.



(a) Identify the bone drawn above. (1mk)

……

(b) Name the types of joint formed by the bone above. (2mks)

……

……

14. Name the parts of the human ear that perform the following functions.

(a) Amplifies sound vibrations. (1mk)

……

(b) Balances air pressure between inner and outer ear. (1mk)

……

(c) Contains hair cells to generate hearing impulses. (1mk)

……

15. (a) Why is the wall of the left ventricle thicker than that of the right ventricle. (1mk)

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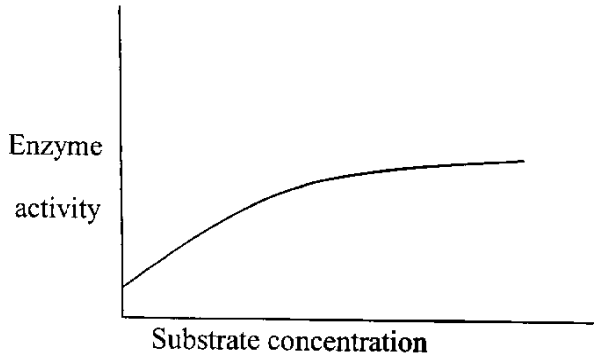
(b) State **three** adaptations of xylem to water transportation (3mks)

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……

……

16 Use the graph below to answer the following questions.



(a) Why does the activity of the enzyme become constant after a while? (1mk)

……

……

(b) State how the activity of the enzyme may be increased in (a) above. (1mk)

……

……

17. Describe capture - recapture method of estimating population. (3mks)

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18 What is meant by self sterility with reference to flowers? (1mk)

……

……

19 Why do plants lack complex excretory system? (3mks)

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……

20 How do herbaceous plants achieve support? Give **two.** (2mks)

……

……

21. In a certain species of pea plants *(Pisum sativum)* the gene for yellow flowers is dominant over the gene for white flowers.

(a) Write the possible genotypes of a yellow flowered pea plant. (2mks)

(Use **R** for yellow flower gene)

……

……

……

(b) State how a yellow flowered pea plant can be confirmed to be heterozygous. (1mrk)

……

……

22. State the importance of active transport in living organisms. (3mrks)

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……

23. Why does carboxyhaemoglobin lead to death? (2mrks)

……

……

24. (a) Name **two** gaseous exchange sites in higher plants. (2mrks)

……

……

(b) State the difference between the amount of oxygen and carbon (IV) oxide that enters and leaves the human lungs (2mrks)

……

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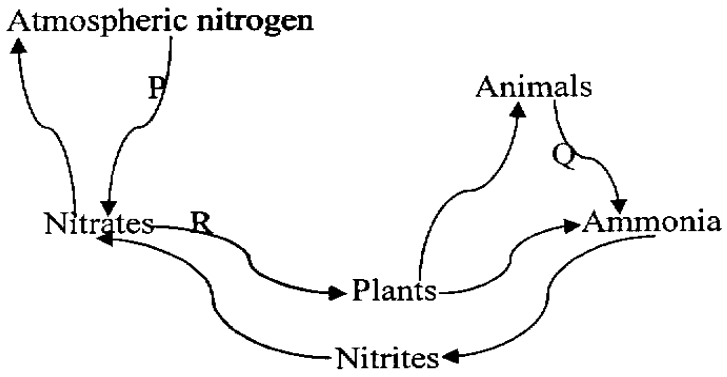
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25. What causes apical dominance? (1mrk)

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26. The diagram below shows a simplified nitrogen cycle



(a) Name the processes labelled **P, Q** and **R** (3mrks)

P………

Q……

R……

27. State the biological importance of geotropism. (2mrks)

……

……

28. Describe the type of chromosomal mutation known as translocation (1mrk)

……

……

……

29. State **two** functions of ovaries in humans. (2mrks)

……

……

RDS 12

1. (a) Define the term 'parthenocarpy'. (1mk)

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(b) Name **two** plant growth hormones that promote parthenocarpy. (2mks)

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2. Name the organelle that performs each of the following functions in a cell

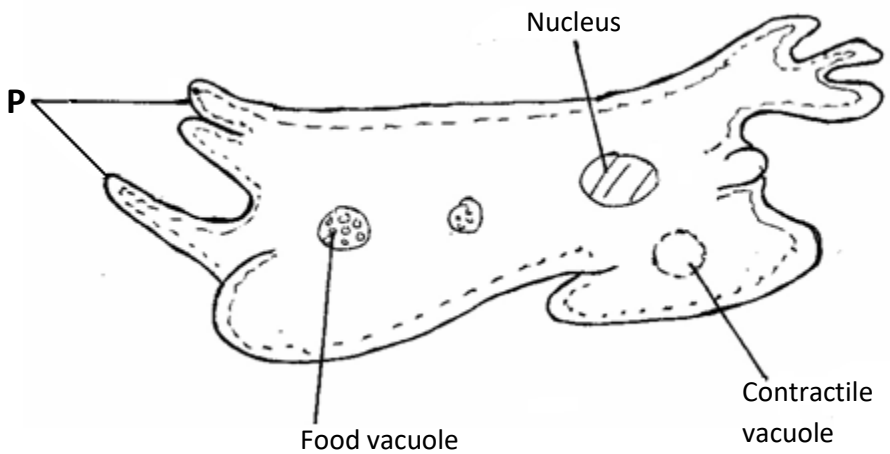
(i) Protein synthesis. (1mk)

.....
.....
.....

(ii) Transport of cell secretions. (1mk)

.....
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.....

3. The diagram **below** represents a certain organism.



(a) Identify the kingdom to which the organism belongs. (1mk)

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(b) Identify the part labeled **P**. (1mk)

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……
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(c) What is the function of contractile vacuole? (1mk)

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4. Other than carbon (IV) oxide, name other products of anaerobic respiration. (2mks)

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5. (a) Name the fluid that is produced by sebaceous glands. (1mk)

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(b) State **two** functions of sweat on the human body. (2mks)

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6. (a) State **two** characteristics that are used to divide the phylum arthropoda into classes. (2mks)

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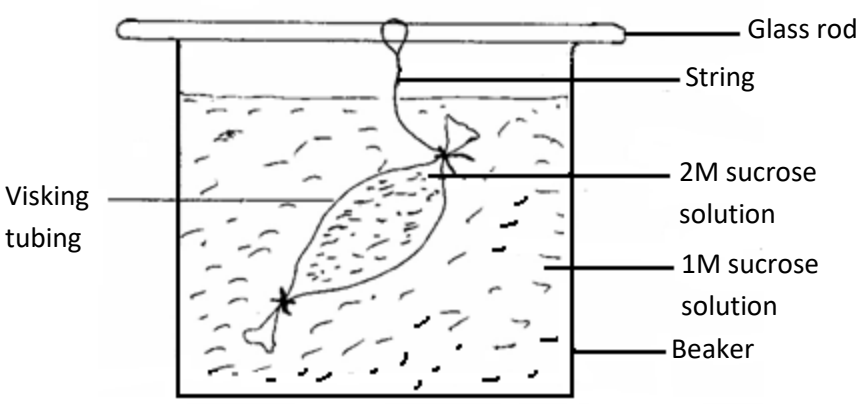
(b) Name the class with the largest number of individuals in the phylum arthropoda (1mk)

……
……
……

7. Why are people with blood group O referred to as universal donors? (1mk)

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……
……

8. An experiment was set up as shown in the diagram **below**.



(a) Which process is being investigated by the above experiment? (1mk)

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……

(b) State the expected results. (1mk)

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……
……

(c) Explain your answer in (b) above. (3mks)

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9. (a) What causes the following diseases?

(i) Diabetes mellitus. (1mk)

……
……
……

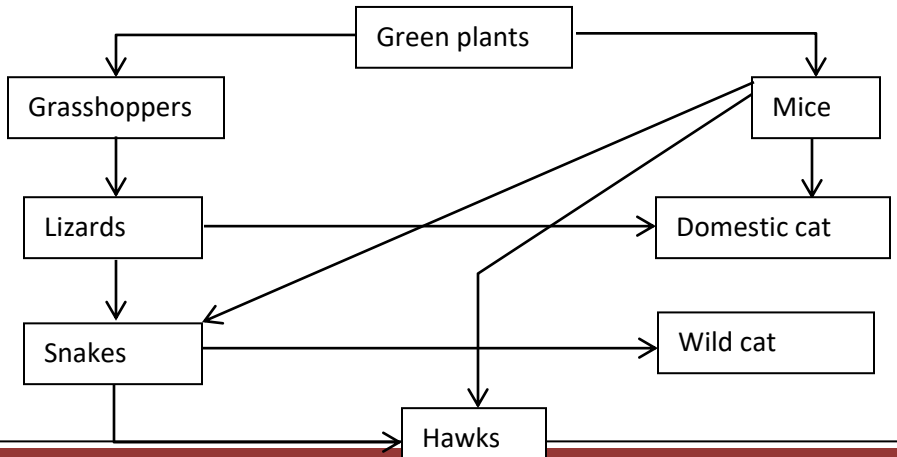
(ii) Diabetes insipidus. (1mk)

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(b) How would you test that someone is a victim of diabetes mellitus in the laboratory. (3mks)

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10. The following chart shows a feeding relationship in ecosystem.



(a) Construct **two** food chains ending with a tertiary consumer in each case. (2mks)

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……
……

(b) Which organism has the largest variety of predator in food web? (1mk)

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……
……

(c) Suggest **three** ways in which the ecosystem would be affected if there was prolonged drought. (3mks)

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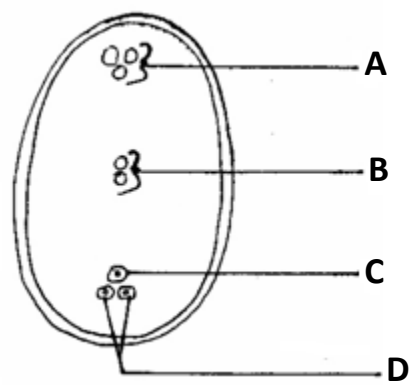
11. A man of blood group A and a woman of blood group B get married.

(a) Using a punnet square show the possible blood groups of their offspring's if both of them are heterozygous for their blood groups. (4mks)

(b) What is the probability that one of the children will be blood group O? (1mk)

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12. The diagram **below** shows a mature embryo sac of a flowering plant.



(a) Name the parts labeled **A** and **D**. (2mks)

A

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……
……
……

B

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……

(b) What is the function of the structure labeled B. (1mk)

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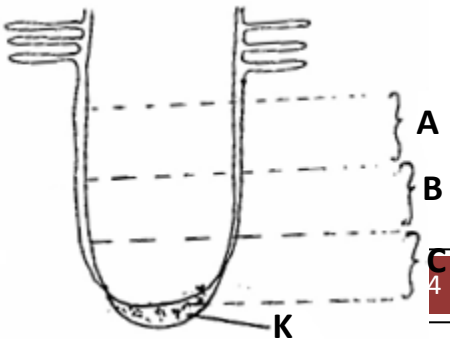
13. (a) Name the tissues that transport water in plants. (1mk)

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(b) How is the tissue you named in **(a) above** strengthened? (1mk)

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……

14. The diagram **below** shows regions of growth in a root. Study it and answer the questions that follow.



(a) Name the zones labeled.

A _____ (1mk)

B _____(1mk)

C _____ (1mk)

(b) State the function of part **K**. (1mk)

……
……
……
……

15. The enzymes pepsin and trypsin are secreted in their inactive forms.

(a) Give the names of these inactive forms. (2mks)

……
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……
……

(b) Why are they secreted in an inactive form? (1mk)

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16. (a) Define the following terms:

(i) Evolution. (1mk)

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……

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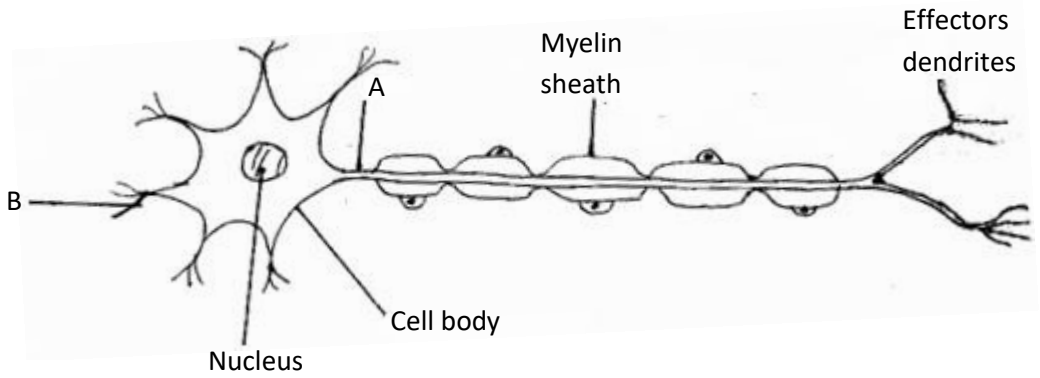
(ii) Analogous structures. (1mk)

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……
……
……

(b) Describe the importance of comparative embryology as evidence of evolution (3mks)

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17. Study the diagram **below** of a neurone in human being.



(a) Identify the neurone. (1mk)

……
……
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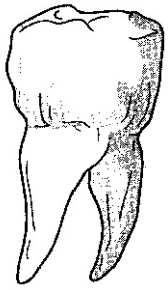
(b) Name the parts labeled.

A _____ (1mk)

B _____ (1mk)

(c) Using an arrow indicate the direction of movement of a nerve impulse along the neurone (1mrk)

18. Study the diagram of the mammalian tooth **below** and answer the questions that follow.



(a) Identify the tooth. (1mk)

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……
……
……

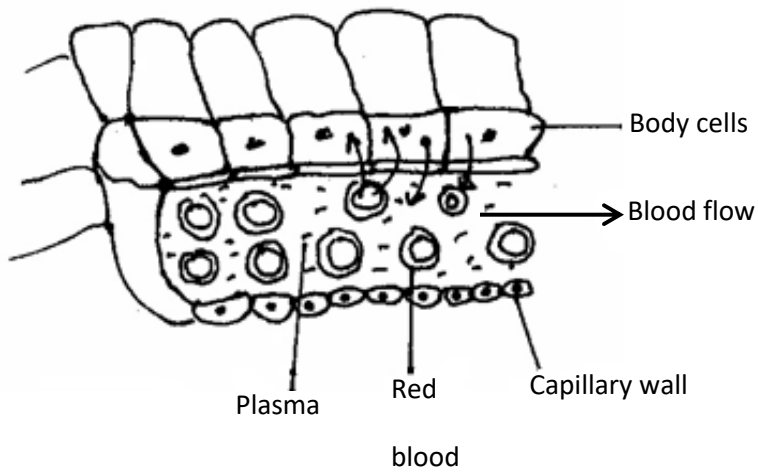
(b) Give a reason for your answer in (a) above. (1mk)

……
……
……
……

(c) State **one** adaptation of the tooth to its function. (1mk)

……
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……

19. The diagram **below** shows gaseous exchange in tissues.



(a) (i) Name the gas that diffuses.

I To the body cells _____ (1mk)

II From body cells _____ (1mk)

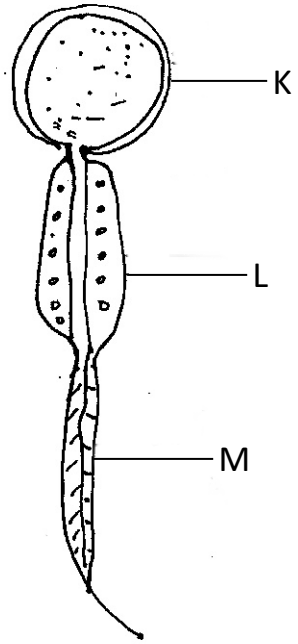
(b) Which compound dissociates to release the gas named in **(a)(i) above**. (1mk)

……
……

(c) What is tissue fluid? (1mk)

……
……
……
……

20. The diagram **below** represents one of the specialized cells found in the human body.



(a) Identity the cell. (1mk)

_____

(b) What is the function of the cell? (2mks)

……
……
……
……

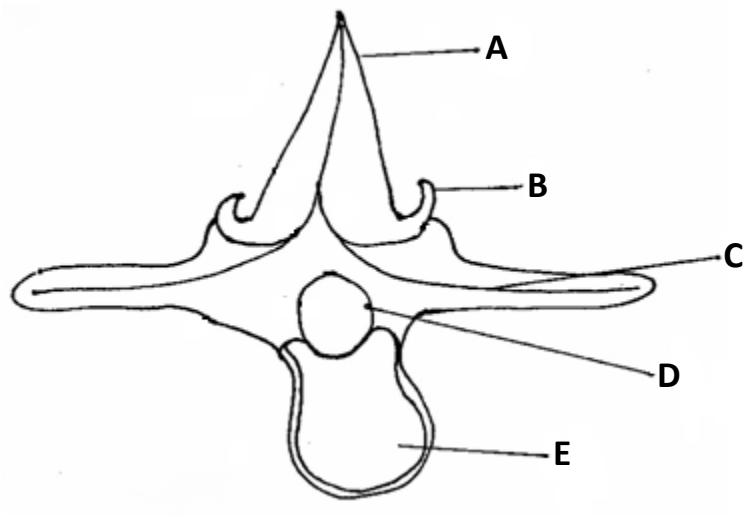
(d) Name the parts labeled.

K _____ (1mk)

L _____ (1mk)

M _____(1mk)

21. The diagram **below** represents the anterior view of a certain vertebra shown **below**.



(a) With a reason, identify the type of vertebra shown **above**. (2mks)

……
……
……
……

(b) Name the parts labeled.

(i) **A** _____(1mk)

(ii) **D** _____(1mk)

(c) State the function of part **E**. (1mk)

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……
……
……

22. Complete the table **below** on mineral nutrition in plants.

Mineral element	Function	Deficiency symptoms
	Synthesis of proteins and protoplasm	Stunted growth and yellowing of leaves
Calcium		
	Forms part of chlorophyll	Yellowing of leaves

(4mks)

RDS 13

1. List any three uses of energy obtained from the process of respiration. (3marks)

.....

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2. State the functions of the following organelles (3marks)

a) lysosomes

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b) Golgi apparatus

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c) Chloroplast

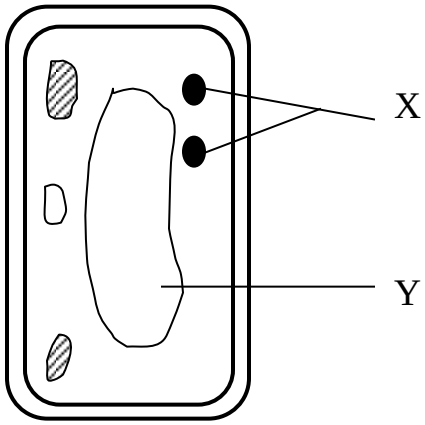
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3. The diagram below represents a cell



a) Name the parts labeled X and Y

X .....

Y ..... (2marks)

b) State why the structures labeled X would be more on one side than the other side.(1mark)

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4. Write the role of the following parts of microscope. (3marks)

i) Mirror

.....

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ii) Diaphragm

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iii) Coarse adjustment knob

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5. Explain why plant cells do not burst when immersed in distilled water.

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6. An experiment was carried out to investigate the rate of reaction shown below

Sucrose ⟶ Fructose +Glucose

For the products; Fructose and Glucose to be formed, it was found that substance K was to be added and the temperature maintained at 37°C.When another substance L was added, the reaction slowed down and eventually stopped.

(a) Suggest the identity of the substances K and L

K .....

L ..... (2marks)

(b) Explain how substance L slowed down the reaction. (1mark)

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7. (a)State the role of light in the process of photosynthesis. (2marks)

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.....

(b) Name one product of dark reaction of in photosynthesis. (1mark)

.....

.....

8. A solution of sugarcane was boiled with hydrochloric acid; sodium carbonate was added; cooled and benedict's solution was added then boiled.An orange precipitate was formed.

(a) Why was the solution boiled with hydrochrolic acid? (1mark)

.....

.....

.....

(b) Why was sodium carbonate added? (1mark)

.....

.....

(c) Name the type of reaction that takes place when simple sugars combine to form complex sugar. (1mark)

.....

.....

9. (a)State two functions of bile juice in the digestion of food? (2marks)

.....

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.....

(b) How does substances concentration affect the rate of enzyme reaction?
(1mark)

.....

.....

.....

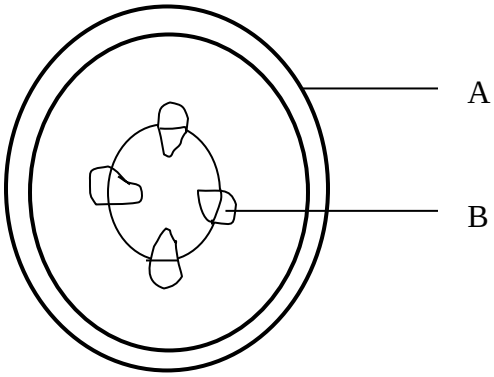
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10. A certain animal has no incisors, no canines, six premolars and six molars in its upper jaw, in the lower jaw there are six incisors, two canines, six premolars and six molars. Write its dental formular?
(2marks)

.....

.....

11. The diagram below represents a transverse section of a young stem.



Name parts labeled A and B

A .....

B.....

12. People can die when they inhale gases from burning charcoal in poorly ventilated rooms. What compound is formed in the human body that leads to such death? (1mark)

.....

.....

13. Name two structures used for gaseous exchange in plants. (2marks)

.....

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14. Name the physiological process by which gas exchange takes place at the respiratory surface of animal and plants. (1mark)

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15. a) Name the substance which accumulates in muscles when respiration occurs with insufficient oxygen. (1mark)

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b) In what form is energy stored in muscles? (1mark)

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16. Explain why the body temperatures of a healthy human being must rise up to 39^0c on a humid day. (2marks)

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17. Name the part of the brain that trigger sweating (1mark)

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18. State two ways in which some fungi are beneficial to humans. (2marks)

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19. A millipede, grasshopper and crayfish all belong to Phylum Athropoda. Mention three major characteristics that they have in common. (3marks)

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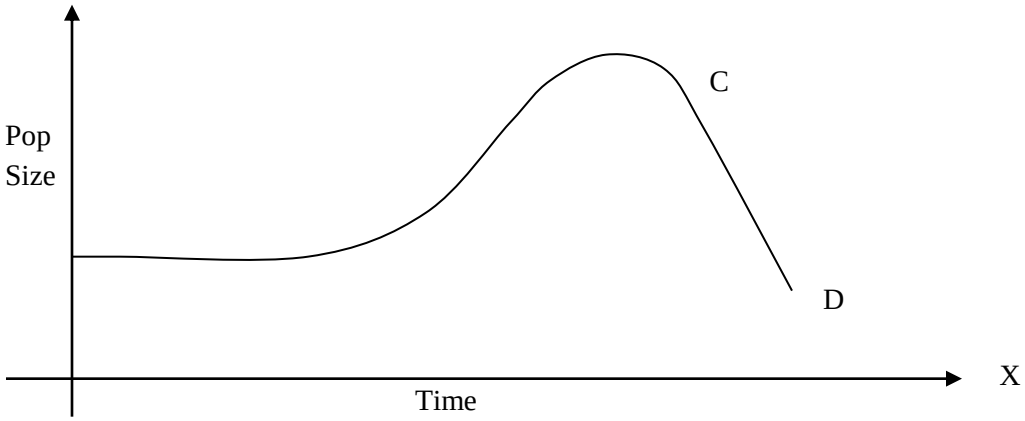
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20. The graph below represents a population growth of a certain herbivores in a grassland ecosystem over a period of time.



Suggest two factors that could have caused the population change between C and D.

(i)

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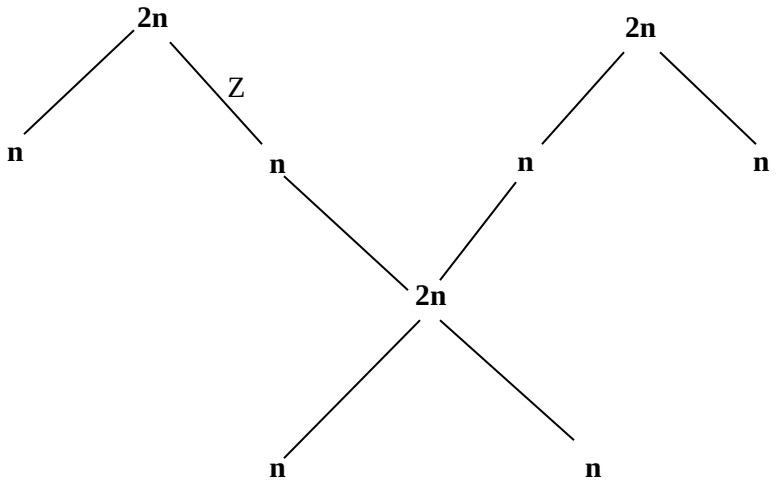
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(ii

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21. The chart below shows the number of chromosomes before and after cell division and fertilization in a mammal.



a) What type of cell division takes place at Z? (1 mark)

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b) Where in the body of a female does process Z occur? (1marks)

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22. State two physiological processes that are brought about by the application of gibberellic acid on plants. (2marks)

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23. The figure below is a structural diagram of apportion from nucleic acid strand

C ———— G ———— U———— C

a) Giving a reason, name the nucleic acid to which the strand belongs

Name

.....

Reason

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b) Write down the sequence of bases of a complimentary strand to that shown above, (1mark)

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24. Explain why Lamarck's theory of evolution is not accepted by Biologists today. (2marks)

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b) Distinguish between homologous and analogous structures. (4marks)

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25. Name the hormone responsible for apical

a) Dominance (1mark)

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b) Euglena is positively phototactic, of what biological significance is this characteristic. (1mark)

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26. a) How are xylem vessels adapted for support? (1mark)

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b) Give the name of special muscles that make the heart. (1mark)

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27. State four ways in which respiratory surfaces are suited to their function. (4marks)

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28. State the role of insulin hormone in the body. (3marks)

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29. How would one find out from a sample of urine whether a person is suffering from diabetes mellitus (2marks)

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30. a) The action of ptyalin stops at the stomach. Explain (1marks)

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b) State a factor that denatures enzymes (1mark)

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c) Name the features that increase the surface area of small intestines. (2marks)

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31. a) State two characteristics that researchers select in breeding programmes. (2marks)

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b) In a maize the gene for purple colour is dominant to the gene for white colour. A pure breeding maize plant with purple grains was crossed with heterozygous plant. Using letter G to represent the gene for purple colour work out the genotypic ratio of the offspring.

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RDS 14

1. State the function of the following cell organelles:-

   (a) Golgi apparatus (2mks)

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   ……

   (b) Ribosomes (1mk)

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2. Give a reason for each of the following actions when preparing temporary slides in microscopy work;

   (a) Cutting thin sections (1mk)

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   ……
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   (b) Staining the sections (1mk)

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   (c) Keeping the sections wet during preparation (1mk)

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3. What are the functions of a cell sap vacuole in a cell? (3mks)

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4. In actively photosynthesising cells, the sugars formed are quickly converted to starch.

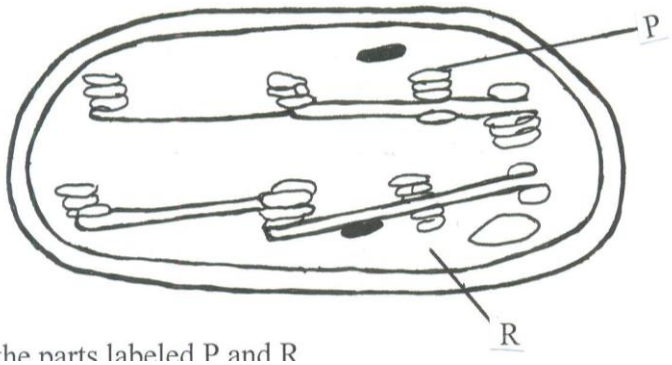
What is the biological advantage of it happening? (2mks)

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5. Why is osmosis regarded as a special kind of diffusion? (2mks)

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6. The diagram below shows an organelle in a plant cell.



ıe the parts labeled P and R

(a) Name the parts labeled P and R (2mks)

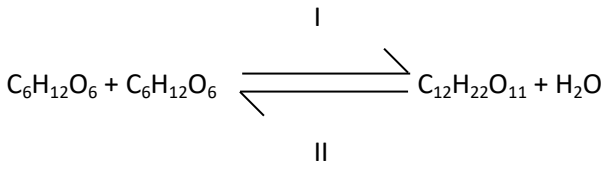
P _____

R _____

(b) Write a word equation of the reaction taking place in R (1mk)

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7. The following equation represents a biochemical reaction carried out in a laboratory



(a) Identify process I and II (2mks)

I _____

II _____

(b) Briefly explain how the process is carried out in a laboratory. (1mk)

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8. What are the primary functions of a stem? (2mks)

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9. State four adaptations of the xylem to its function (4mks)

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10. How is it possible that organisms in kingdom monera and protoctista survive without a circulatory system? (2mks)

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11. How does haemophilia lead to death of an individual? (3mks)

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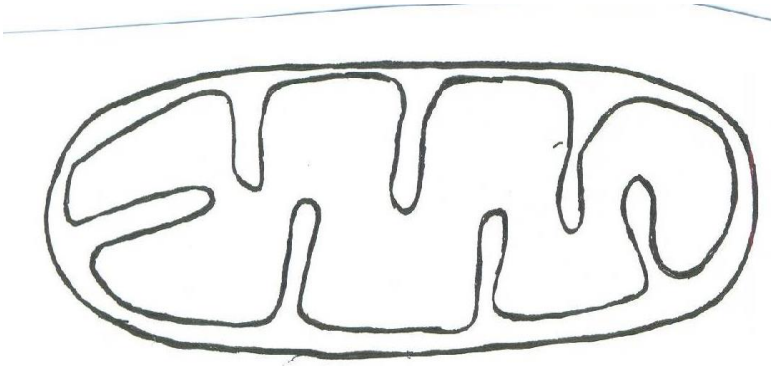
12. State two ways in which stomata are adapted to their function (2mks)

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13. Counter current flow in fish is advantageous rather than parallel flow. Explain. (2mks)

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14. Study the diagram below



(a) Identify the organelle (1mk)

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(b) How is the organelle shown above suited to its function? (2mks)

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15. Give three main reasons why plants do not require an elaborate excretory system like animals (3mks)

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16. What is the significance of an organism having:-

(a) A long loop of henle (1mk)

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(b) Few glomeruli (2mks)

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17. What advantage do birds have for excreting uric acid rather than ammonia. (2mks)

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18. State four economic importance of organisms of kingdom fungi. (4mks)

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19. A student carrying out an ecological study in a school came across an organism which he identified as belonging to class Diplopoda. State three characteristics that he used to place the organisms in that class. (3mks)

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20. (a) Name the micro-organism found in the root nodules of leguminous plants (1mk)

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(b) State the association of the micro-organisms named in (a) above and the plant. (1mk)

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(c) What is the role of the micro-organism you have named in (a) above to the organism? (1mk)

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21. Name three conditions that encourage cross pollination and fertilization (3mks)

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22. How can you differentiate between seed and a fruit? (1mk)

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23. Give two disadvantages of sexual reproduction (2mks)

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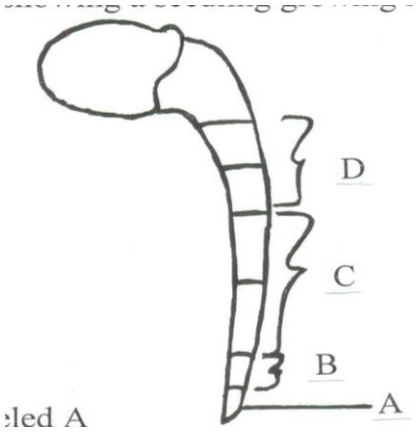
24. (a) What is seed viability? (1mk)

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(b) State three conditions which may lead to loss of viability in a seed (3mks)

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25. Below is a diagram showing a seedling growing in the school compound.



led A

(a) Identify part labeled A (1mk)

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(b) What are the characteristics of cells found in part labeled B? (3mks)

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26. Name three disorder due to chromosomal mutation in human (3mks)

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27. What are the importances of fossils in the study of evolution? (3mks)

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28. State two functions of ear ossicles. (2mks)

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29. (a) Why do some individuals read a magazine at 9m length but are not able to read clearly if placed too close to their eyes? (2mks)

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(b) How could the condition be corrected? (1mk)

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RDS 15

1. a) Name the organelle where Kreb's/ citric cycle take place in a cell. (1mark)

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   (b) Where are lysosomes synthesized (1mark)

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2. Distinguish between ecological niche and habitat. (2mark)

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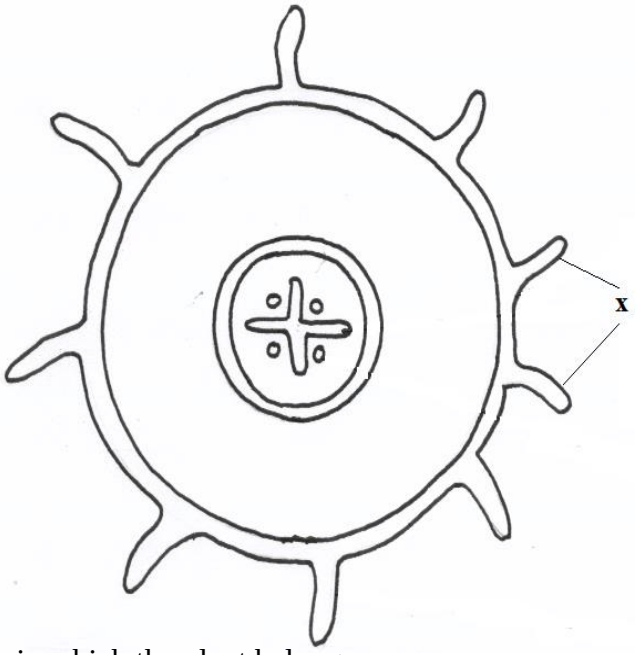
3. State the importance of osmo - regulation in organisms (2 marks)

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4. Explain why unicellular organisms such as paramecium lack complex organs for gaseous exchange. (2marks)

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5. The diagram below represents a transverse section of a plant part. Study it and answer the questions that follow.



a) Name the class in which the plant belongs. (1marks)

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b)Give a reason for answer (a) above (1mark)

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……

c) State one adaptation for the structures labeled X to their functions. (1mark)

……

……

6. State the function of the following structures in the human n ear.

(a) Semi – circular canals. (1mark)

……

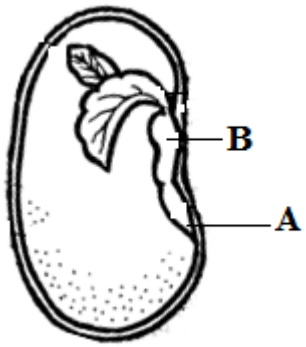
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(b) Eustachian tube. (1mark)

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7. The diagram below shows the internal structure of a broad bean seed. Study it and answer the questions that follow.



(a) Name the part labeled B. (1 mark)

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……

(b) Why is it important that the part labeled A develops first during germination? (2 mark)

……

……

8. Explain what causes global warming. (3 marks)

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9. The diagram below represents a mammalian bone.



(a) Identify the bone (1mark)

……

……

(b) i) Name the bones that articulate with this bone at points K and L (2 marks)

K

……

L

……

10. The equation below represents a metabolic process that occurs in the mammalian liver.

Amino Acids ⟶ Organic + Urea Compounds

(a) Name the process (1 mark)

……

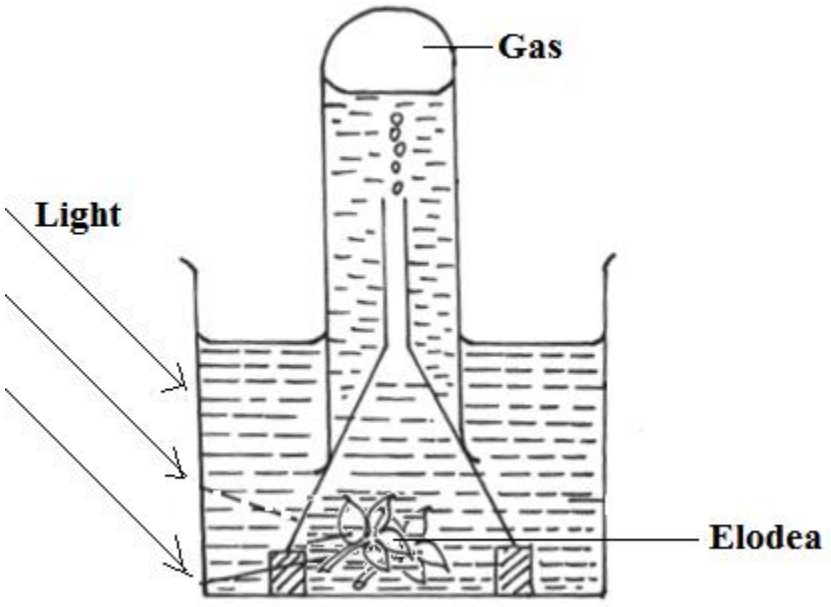
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(b) What is the importance of the process to the mammal? (2marks)

……

……

11. The diagram below represents a set up that was used to investigate a certain process in a plant.



(a) State the process that was being investigated. (1 mark)

……

……

(b) Other than the factors shown, state two factors that would affect the process named in (a) above. (2 mark)

……

……

12. Give an example of the sex linked trait in humans on

Y – Chromosomes (1mark)

……

X – Chromosomes (1 mark)

……

13. Explain why a rat has a higher food intake compared to a lizard of the same body weight. (4 marks)

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14. (a) Mutua and Mwende used a light microscope to observe guard cells in a leaf surface. They indicated a magnification of X 450 .Given that the eye piece was marked X10, work out the objective

lens magnification. (2 marks)

(b) State the function of fine adjustment knob. (1mark)

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15. State two structural differences between skeletal and smooth muscles. (2 marks)

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16. Outline two roles of active transport in human beings. (2 marks)

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17. State three advantages of asexual reproduction in plants. (3 marks)

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18. a).Name the causal organism for amoebic dysentery. (1 mark

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……

b)state three preventive measures of schistosomiasis in human beings (3 mark)

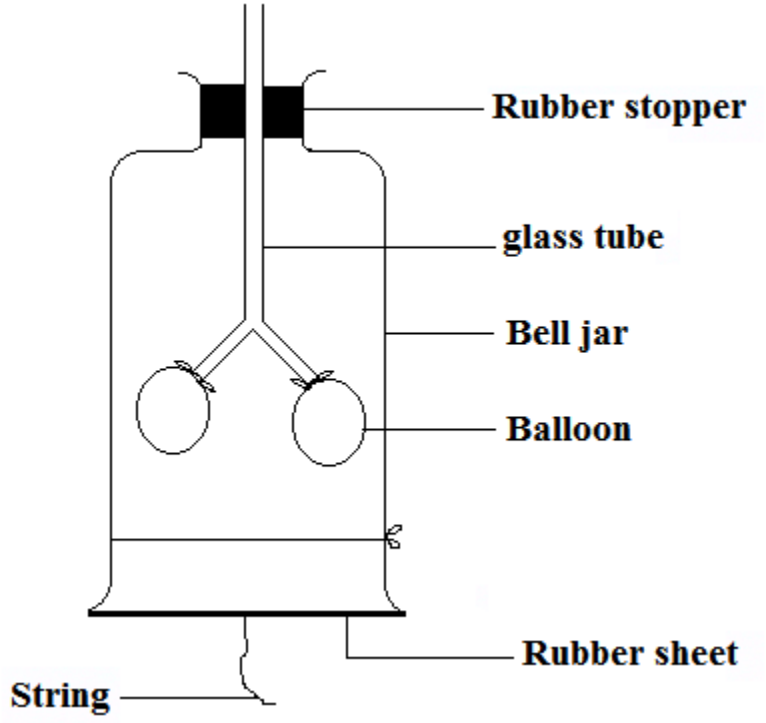
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19. Tom, a form two students set up the apparatus shown below to demonstrate the breathing mechanism in a mammal.



(a) What structure in a mammal is represented by each of the following? (2marks)

i) Glass tube

……

ii) Rubber sheet

……

(b) Explain what will happen to the balloons if the rubber is pulled down wards. (2 marks)

……

……

20. a) What is adaptive radiation? (2marks)

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……

b) Explain why crossbreeding is important in animal breeding. (2 marks)

……

……

21. a) state the most suitable biological tool for collecting the following organisms:-

i) A moth from a coffee farm. (1 mark)

……

……

ii) Ants from a tree trunk. (1 mark)

……

……

b) State two distinguishing characteristics of the kingdom protoctista. (2 mark)

……

……

22. a) Name the hormone that stimulate the maturation of the graafian follicles to release a mature ovum in female

reproductive cycle. (1mark)

……

……

……

b) Explain why menstruation does not take place after fertilization in human beings. (2marks)

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23. How does sunken stomata help in lowering transpiration? (3marks)

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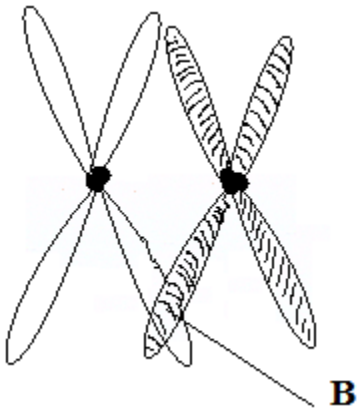
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24. The diagram below shows a phenomenon which occurs during cell division.



a) Identify the stage of cell division in which this phenomenon occurs.(1 mark)

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b) State the importance of the phenomenon taking place in the part labeled B. (2 marks)

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25. a) An organism was found to have a dental formula

$$i\ \frac{0}{3}\quad c\ \frac{0}{1}\quad pm\ \frac{3}{2}\quad m\ \frac{3}{3}$$

i) State the mode of feeding of the organism. (1mark)

……

……

ii) Give a reason for your answer in (i) above. (1 mark)

……

……

b) Name the vitamin which plays an important role in the formation of blood cells. (1mark)

……

……

26. a) State **one** advantage of double circulation over single circulation. (1mark)

……

……

b) State **two** adaptations of blood capillaries to their functions. (2marks)

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27. a) Name a growth hormone that has inhibitory effects in plants growth. (1mark)

……

……

b) State two characteristics of a meristematic cells.

(2marks)

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……

28. Write down two functions of exoskeleton in the phylum Arthropoda. (2 marks)

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RDS 16

1. Insects' blood is noted to lack a respiratory pigment. Explain (1 mark)

   ……

   ……

2. State the function of the following parts of a nephron.

   (i) Loop of Henle (1 mark)

   ……

   ……

   (ii) Distal convoluted tubule. (1 mark)

   ……

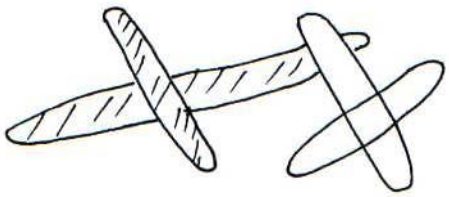
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3. Most terrestrial plants do not grow well in water logged soils. Give a reason for this (1mark)

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4. The diagrams below show a pair of homologous chromosomes. Study them and answer the questions that follow.



i) State the phenomenon shown above (1mark)

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……

……

(ii) What is the genetic significance of the phenomenon above? (2 marks)

……

……

5. Give two destinations of food translocated from the leaves of plants. (2 marks)

……

……

6. Name the organelle that is likely to be found in abundance in:

   (a) An enzyme secreting cell.

   ……

   (b) Cells producing lipid related secretions.

   ……

   (c) Areas where the cells have raptured

   ……

7. A small boy remarked that his dog looks larger on cold days than on hot days. Give a biological explanation for this. (2 marks)

   ……

   ……

8. The table below shows the percentage composition of carbon (IV) oxide and oxygen in inhaled and exhaled air.

Gases	Inhaled air	Exhaled air
Oxygen	20 %	17%
Carbon (IV) oxide	0.04%	4.0%

   Explain the differences in percentage of the two gases in inhaled and exhaled air.

   (a) Oxygen (2 marks)

   ……

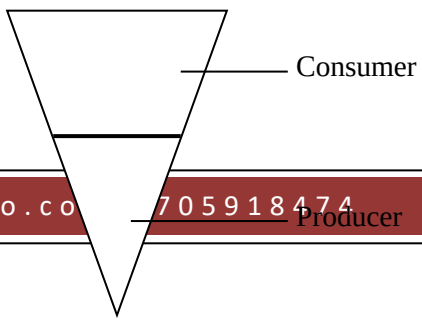
   ……

   (b) Carbon (IV) oxide (2 marks)

   ……

   ……

9. The diagram below represents a pyramid of biomass derived from a certain ecosystem.



(a) Suggest the type of ecosystem from which the pyramid was derived (1 mark)

……

……

(b) State the significance of short food chains in an ecosystem. (1 mark)

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10. State two features of neurones that increase the rate of impulse transmission (2 marks)

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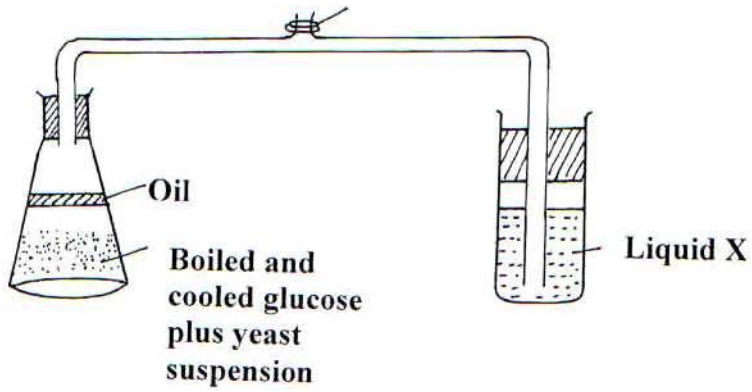
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11. Distinguish precisely between diabetes mellitus and diabetes insipidus (2 marks)

……

……

12. The set up below shows apparatus to demonstrate a certain biological process



(a) What biological process was being investigated in the experiment (1 mark)

……

……

(b) Write down a word equation that represents the reaction above. (1 mark)

……

……

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(c) In the above set up, why was it important to boil and cool glucose before adding yeast? (1 mark)

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……

13. Explain how the following occur during gene mutation.

i) Substitution (2marks)

……

……

ii) Insertion (2marks)

……

……

14. (a) What are meristems? (1mark)

……

……

(b) (i) what is the role of cork – cambium in secondary growth? (1mark)

……

……

ii) Name the meristem that is responsible for increase in length of stems (1mark)

……

……

15. State two functions of the spleen (2 marks)

……

……

16. Name the excretory products eliminated by the following animals.

(i) Tilapia. (1 mark)

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……

(ii) Chicken. (1mark)

……

……

17. State the functions of the following parts of the human ear.

(1mark)

(a) Ossicles (1mark)

……

……

(b) Pinna (1mark)

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……

……

18. Name the causative organism of the following diseases.

(i) Malaria (1mark)

……

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(ii) Bilharzia (1mark)

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……

19. Identify the part of light microscope which serve each of the functions described below

(i) Making rough focus (1mark)

……

……

(ii) Reflecting light from the source (1 mark)

……

……

20. State two characteristics of aerenchyma tissue. (2marks)

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21. What is the significance of transpiration in plants? (3marks)

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22. State two ways in which xylem vessels are adapted to their functions. (2marks)

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……

23. Distinguish between convergent and divergent evolution (1mark)

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……

24. State the characteristics that distinguish the following organisms into their respective classes (3 marks)

Millipedes,spider and tsetse fly.

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25. How do identical twins and fraternal twins arise?

(i) Identical twins (2 marks)

……

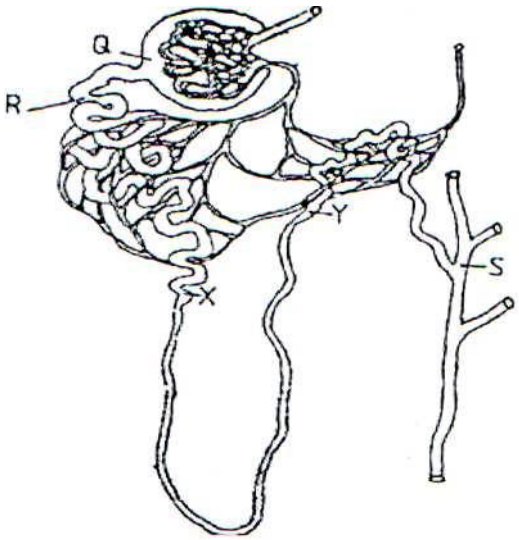
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(ii) Fraternal twins. (2 marks)

……

……

26. The diagram below illustrates part of a nephron from a mammalian kidney.



(a) Name the fluid found in the part labeled Q. (1 mark)

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(b) Identify the process responsible for the formation of the fluid named in (a) above (1mark)

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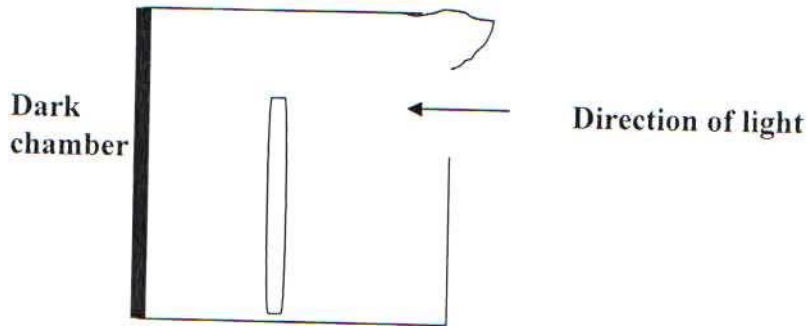
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(c) Which two hormones exert their effect in the nephron? (2 marks)

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27. The diagram below shows a tip of a plant coleoptiles with light coming towards it from one side.



(a) How would the plant respond to light? (1 mark)

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(b) Give the name of such a response (1 mark)

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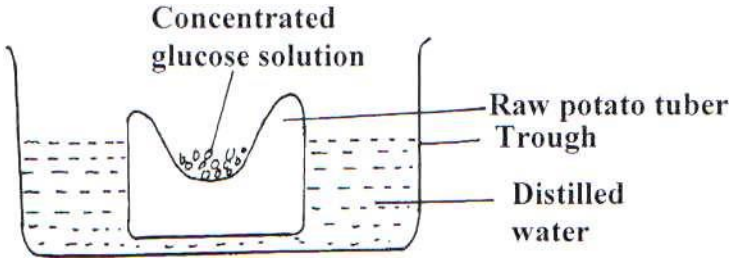
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(c) What is the advantage of plants responding in this way? (2marks)

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28. The experiment illustrated below was set up to investigate a certain physiological process using a raw tuber.



(a) Suggest a possible physiological process that was being investigated. (1 mark)

……

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(b) Explain the results obtained in the above experiment after a few hours (2 marks)

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(c) State the observations that would have been made if the experiment was repeated using boiled potato.

……

……

29. (a) Give two functions of blood as a tissue. (2 marks)

……

……

(c) The figures below illustrate specialized cells in an animal body.



M



N

(i) Identify the cells M and N (2 marks)

M

……

N

……

(ii) State the structural differences between M and N (2marks)

……

……

(iii)Which of the above specialized cells is found in the gut? (1mark)

……

……

RDS 17

1. Name the blood vessel that supply:

(a) The heart with nutrients. (1mk)

……

(b) The foetus with oxygen (1mk)

……

2. Explain why it is important to stain specimen to be observed under a light microscope. (2mks)

……

……

3. What is wilting? (2mks)

……
……
……
……

4. State the significance of the following steps while testing for discharge in food sample. (2mks)

(a) Addition of dilute hydrochloric acid

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……
……
……

(b) Addition of sodium bicarbonate.

……
……
……
……

5. a) (i) Name the fluid produced by sebaceous gland. (1mk)

……

…….

(ii) State **two** function of the fluid name din 5 a) (i) above. (2mks)

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……

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.....

b) Explain malpigtian layer of the skin is adapted to perform its function. (1mk)

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.....

6. A certain animal had one cell from its alimentary canal observed under light microscope. A total of 40 chromosomes were seen.

(a) State the number of chromosomes in

(i) The spermatozoon of this animal (1 mk)

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.....
.....

(ii) One of cells in the tongue. (1mk)

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(b) Name a structure in mature plant where meosis takes place. (1mk)

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7. A biological washing detergent contain enzymes which remove stain like mucus and oil from clothes which are soaked in water with the detergent.

(a) Explain why stain would be removed faster with detergent in water at $35^{o}C$ rather than $50^{o}C$ (1mk)

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.....
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.....

(b) Why is boiling clothes with the detergent less likely to remove stain. (1mk)

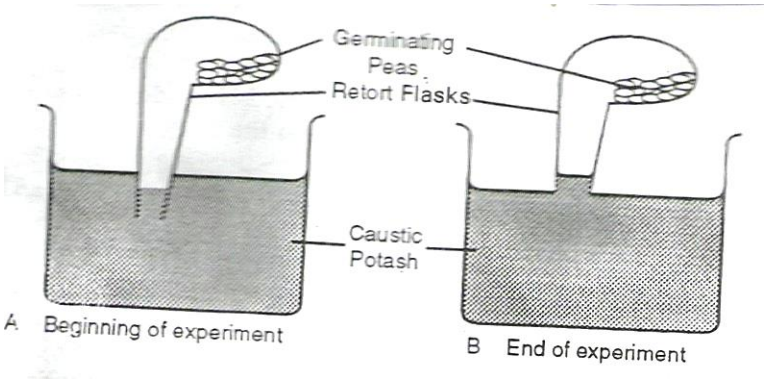
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(c) Name an enzyme that catalyses the decomposition of sodium hydrogen carbonate to facilitate transportation of carbon (IV) Oxide. (1mk)

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8. Form 2 students from samba secondary school set up an experiment as shown below.



a) Explain the change observed at the end of the experiment. (2mks)

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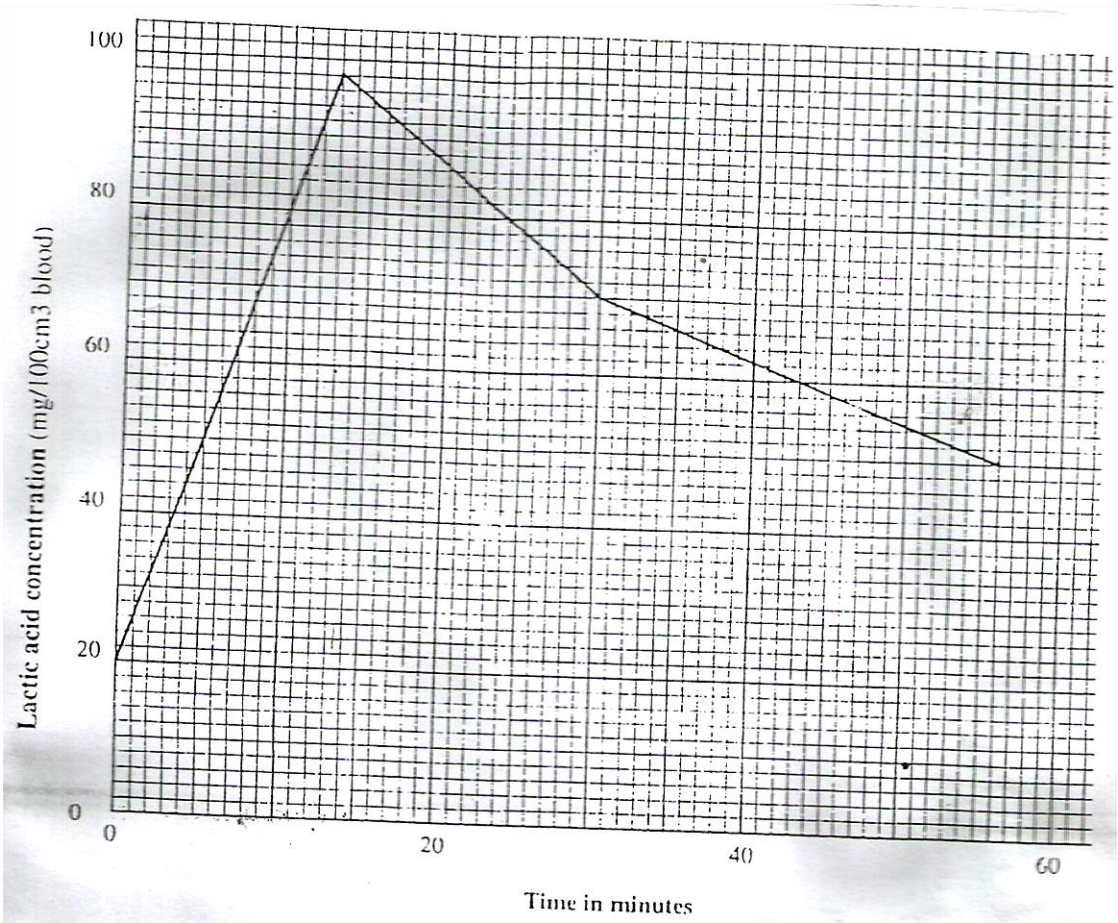
b) Explain what would happen if water has been used instead of potassium hydroxide. (2mks)

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9. State **two** advantages of metamorphosis to the life cycle of insects. (2mks)

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10. The concentration of lactic acid in blood during and after an exercise was determined. The results are shown in the graph below.



(a) (i) By how much did the lactin acid increase at the end of 10 minutes? (1mk)

.....
.....
.....
.....

(ii) After how many minutes was the lactin acid concentration 78mg/100cm^3 (2mks)

.....
.....
.....
.....

(iii) What would be the concentration of lactin acid at the 60th minutes. (1mk)

.....
.....
.....
.....

Give a reason for the high rate of production of lactic acid during the exercise. (1mk)

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.....

11. Name the part of human brain that perform the following function (2mks)

(a) Controls peristalsis

.....
.....
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.....

(b) Control intelligence

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.....

12. Outline the differences between darwin's theory and Lamendi's theory of evolution. (2mks)

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13. Give **three** functions of cystokinin hormone in plant (3mks)

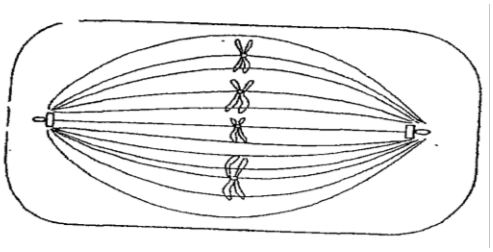
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14. Explain why plants do not require specialized excretory organ. (3mks)

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.....

15. The diagram below represents a stage in cell division.\



(a) Identify the stage of cell division (1mk)

.....

(b) Give a reason for your answer (1mk)

.....

16. Outline **three** functions of colon . (3mks)

.....
.....
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.....
.....
.....
.....

17. State **two** advantages of closed circulatory systems in mammal. (2mks)

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.....

18. The diagram below shows a mammalian bone.



(a) Identify the bone (1mk)

……

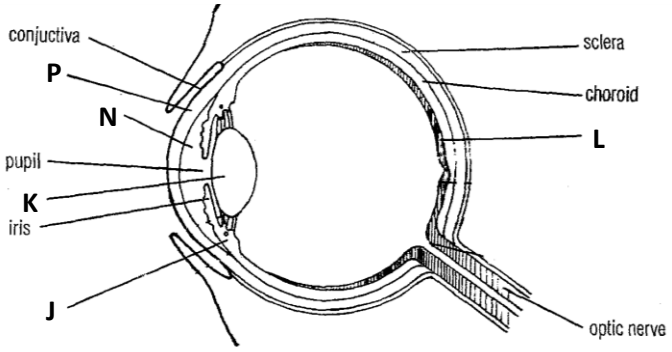
(b) Give a distinctive reasons for your answer in (a) above. (1mk)

……

(c) Name the bone that articulate with the bone drawn above at the proximal end. (1mk)

……
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……
……

19. The diagram below shows a mammalian eye.



(a) Name the parts labeled J,K, and L (3mks)

J……

K……

L……

(b) Explain how the following parts are adapted tot heir function.

(i) N ……(1mk)

(ii) P……(1mk)

(c) Name the eye defect caused by short eyeball and less refractive lens. (1mk)

……

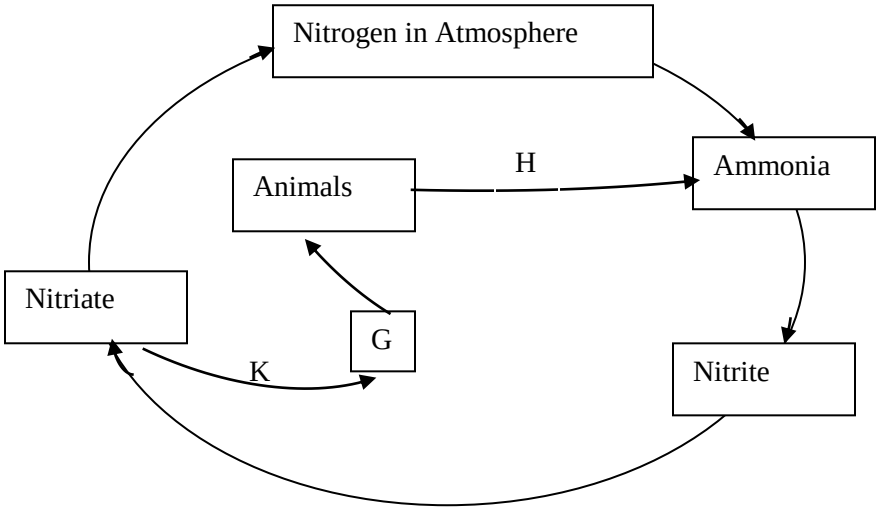
……

20. Explain damsel fertilization as used in flowering plants. (2mks)

……

……

21. The diagram below shows a simplified nitrogen cycle.



(a) Name the process represented by

P ……

K ……

H ……

(b) Name the organisms involved in process J (1mk)

……

…….

(c) Name organisms represented by G (1mk)

……

22. (a) Explain how mammalian trachea is adapted to its function (2mks)

……

……

……

……

(b) Name the gases exchange site in bony fish. (1mk)

……

……

……

……

23. Explain the role of the following hormone in homeostain

(a) insulin (3mks)

.....
.....
.....
.....

(b) Antidimetic hormone (ADH) when there is less water in blood stream. (2mks)

.....
.....
.....
.....

24. Outline **three** difference between plant divisions bryophyte and Pteridophyta
(3mks)

.....
.....
.....
.....
.....
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.....
.....

25. Name **two** products of light stage of photosynthesis that are useful in dark stage. (2mks)

.....
.....
.....
.....

26. State **two** functions of xylem tissue. (2mks)

.....
.....
.....
.....

27. State **two** function of golgi apparatus (2mks)

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RDS 18

1. Name the branch of biology that deals with the study of: (2 marks)

   a) Fungi

.....

   b) Classification

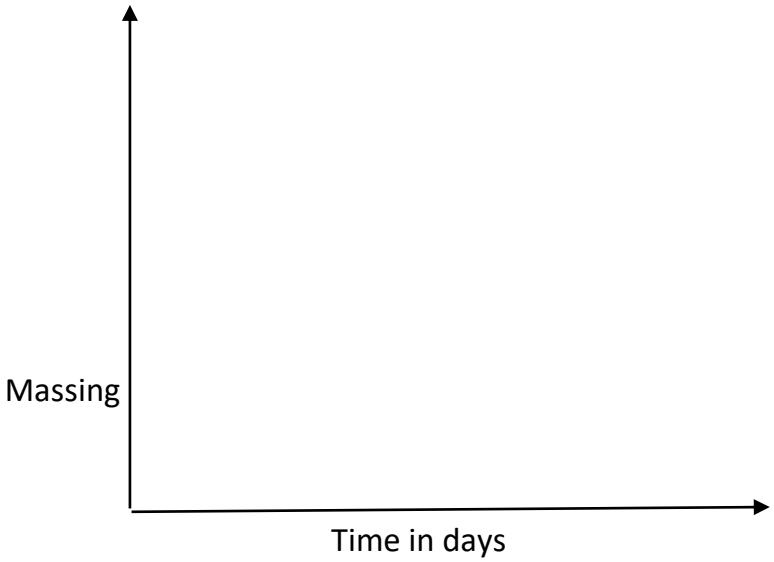
.....

2. Why are xylem vessels more efficient in transportation of water than tracheids? (1 mark)

   .....

   .....

3. The graph below represents the growth of animal in a certain phylum



   a) Name the type of growth pattern shown on the graph '(1 mark)

……

……

b) Identify the process represented by X (1 mark)

……

……

4. a) Define binomial nomenclature (1 mark)

……

……

b) State **four** reasons why classification is important in biology (4 marks)

……

……

……

……

5. a) What is holozoic nutrition (2 marks)

……

……

b) Describe what happens in the light independent stage of photosynthesis (3 marks)

……

……

……

……

6. Study the diagram below of a neurone in human being

a) Name the parts labelled: (2 marks)

Q ……

R ……

S ……

T ……

b) Using an arrow on the diagram, indicate the direction of movement of a nerve impulse along the neurone.
(1 mark)

……

……

c) State how Q and P are involved in the transmission of impulses
(2 marks)

Q ……

……

R ……

……

7. Name **two** main sites in plants through which gaseous exchange take place
(2 marks)

……

……

8. a) Explain why a person discharges urine more frequently when environmental temperatures are low than when they are high (2 marks)

……

……

b) Name the nitrogenous waste product excreted by a fresh water fish
(1 mark)

……

……

9. During a biology lesson the teacher provided students with the following apparatus

- A pooter
- A scalpel
- Specimen bottle
- Forceps
- Sweep net
- Chloroform

a) Give **two** precautions the biology teacher gave to students before the practical on collection of specimens began.
(2 marks)

……

……

b) What was the function of; (2 marks)
(i) Forceps
(ii) Pooter

……

……

……

……

10. In body cells of all organisms chromosomes occur in pairs. Members of each pair have a characteristic length and shape.

a) What is the scientific name of such a chromosome pair? (1 mark)

……

……

b) What name is given to a cell that contains one member of each pair of chromosomes?

(1 mark)

……

……

c) Name the part in human females where meiosis takes place (1 mark)

……

……

11. a) Give **two** possible ways of establishing the genotype of an organism whose genotype is unknown
(2 marks)

……

……

b) Give the genotype of a male who could be born hemophiliac
(1 mark)

……

……

c) What is the importance of crossing over (1 mark)

……

……

12. a) What is organic evolution (1 mark)

……

……

b) Using examples explain what is meant by;

(i) Adaptive radiation (2 marks)

……

……

……

……

(ii) Convergent evolution (2 marks)

……

……

……

……

13. In what ways are gill filaments of fish adapted to their function (3 marks)

……

……

……

……

14. State the role of the following hormones in menstrual cycle: (3 marks)

a) Follicle stimulating hormone

……

……

b) Progesterone

……

……

c) Oestrogen

……

……

15. Explain what happens to excess glucose in the body (3 marks)

……

……

……

……

16. Carefully study the apparatus below which was made to rotate making one revolution in 15 minutes. A seedling with a straight shoot was attached to the apparatus as shown in the figure.

a) What is the name of the apparatus shown? (1 mark)

……

……

b) Considering all other factors constant, explain the expected results after five days.

(3 marks)

……

……

……

……

17. Name the strengthening substances in following. (2 marks)

(i) Exoskeleton

……

……

(ii) Human bone

……

……

18. Name the type of muscle in human being found in the;
(2 marks)

a) Artrium

……

……

b) Oviduct

……

……

19. Briefly describe the role of the hypothalamus in osmoregulation (2 marks)

……

……

……

……

20. a) Give **two** reasons why higher animals need an internal transport system (2 marks)

……

……

……

……

b) In what form is oxygen transported from lungs to the tissues? (1 mark)

……

……

21. The figure below represents a mammalian bone

a) Identify the bone labelled X (1 mark)

……

……

b) Which bone articulates with bone X at point Y? (1 mark)

……

……

c) Name the type of joint formed with the above bone at point Y
(1 mark)

……

……

22. What is the importance of seed dormancy (2 marks)

……

……

……

……

23. Explain the importance of the following in fish;

a) Myotomes on either side of the body (1 mark)

……

……

b) Scales overlapping backwards (1 mark)

……

……

c) Paired fins (1 mark)

……

……

24. Name the type of response shown by leaves of (*Mimosa Podica*) when they fold after being touched. (1 mark)

……

……

25. a) State **two** features of a ball and socket joint (2 marks)

……

……

b) Name the bone that allows the head to;

(i) Node (1 mark)

……

(iii) Turn sideways (1 mark)

……

26. Explain how the following affect the rate of diffusion (2 marks)

(i) Temperature

……

(ii) Thickness of the membrane

……

27. State the importance of tactic responses (2 marks)

……

……

RDS 19

1. Name **one** factor in nature that increases the process of evolution. (1mk)

……..

2. What is meant by the term "oxygen debt"? (2mks)

……

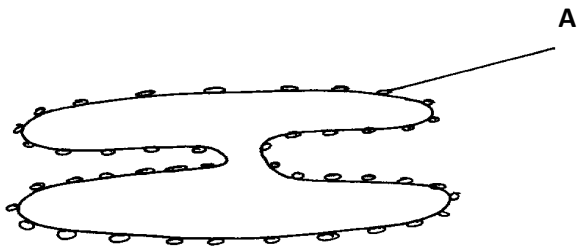
……

3. Differentiate between characteristics of members of Monera and those of Protoctista. (2mks)

……..

……..

4. Study the structure drawn below and answer the question that follows.



(a) Name the organelle drawn above. (1mk)

……

(b) State the function of the structure labelled **A**. (1mk)

……..

……..

5. In an experiment, the pituitary gland of a rat was removed.

(a) State the effect that will have on the quality of urine produced by the rat. (1mk)

……..

……..

(b) Give a reason for your answer in (a) above. (2mks)

……

……

6. State the function of the diaphragm in the microscope. (1mk)

……..

7. The lungs and ileum are adapted for absorption. State **three** features they have in common which facilitates absorption. (3mks)

……

……..

……

8. Explain why food is stored in an insoluble form in the cells of living organisms.
(1mk)

……

9. (a) State the importance of the following features in gaseous exchange : (1mk)

……..

(i) Cartilages in gaseous exchange. (1mk)

……..

(ii) Moisture on the surface of alveoli. (1mk)

……..

(b) Name the site where gaseous exchange takes place in terrestrial plants.
(2mks)

……..

……..

10. (a) Explain how the following adaptations minimize the rate of transpiration :

(i) Sunken stomata (1mk)

……..

……..

(ii) Leaf drooping (1mk)

……..

……..

(b) State **two** environmental factors that influence the rate of transpiration.
(2mks)

……

……..

11. State the role of decomposition in an ecosystem. (2mks)

……

12. An animal was found to have a large glomeruli and short loop of henles.

Account for the presence of:

(i) Large glomeruli. (1mk)

……..

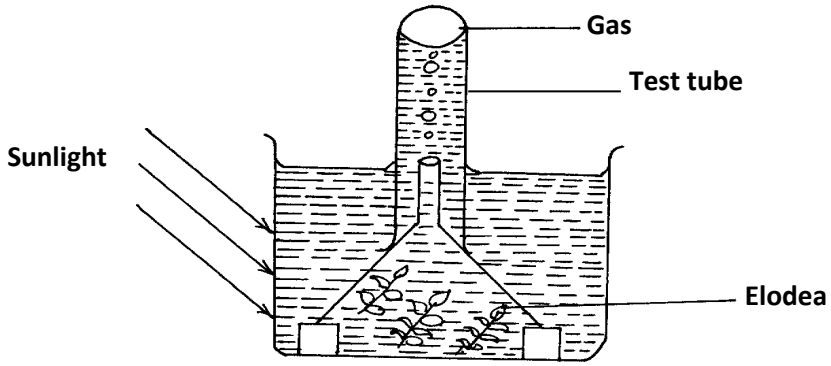
(ii) Short loop of henle. (1mk)

……

(iii) State the possible habitat for the organism. (1mk)

……

13. The diagram below represents a set-up that was used to investigate a certain process in a plant.



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

……

(b) Name the gas collected in the gas jar. (1mk)

……

(c) What is the confirmation test for the gas in (b) above? (1mk)

……..

(d) State **two** factors that would affect the process. (2mks)

……

……

14. Name the region in plants where the following take place: (2mks)

(i) Primary growth.

……..

(ii) Secondary growth .

……

15. (a) Explain why pepsin in stomach of man is secreted in inactive form. (1mk)

……..

(b) Which gland secretes pepsinogen. (1mk)

……..

16. The figure below illustrate a portion of chromosome with genes **A**, **B**, **C**, **D**, **E** and **F**

A	**B**	**C**	**D**	**E**	**F**

Using diagram similar to the one above, illustrate the changes that the above chromosome would undergo if the following mutation occurred on gene **C** and **D**

(a) Deletion (1mk)

……..

(b) Inversion (1mk)

……

(c) Duplication (1mk)

……

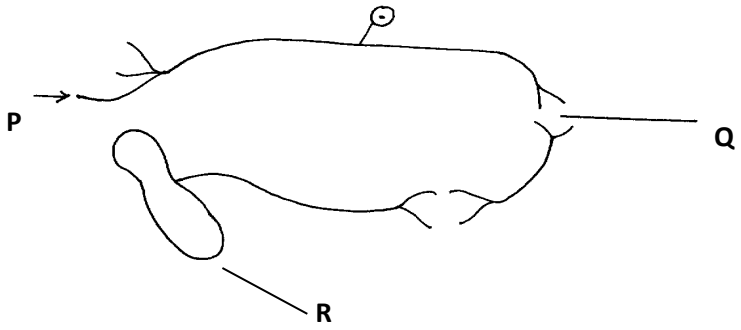
State **two** ways in which genetic engineering is applied in the field of medicine.

(2mks)

……

……

17. The diagram below represents a reflex arc in human beings



(a) Name the parts labelled **Q** and **R** (2mks)

Q ....

R .....

(b) What is the function of the part labelled **P**? (1mk)

.....

18. State **two** features of petals that enhances insect pollination. (2mks)

.....

.....

19. Give **two** adaptations of halophytes to survival in their habitats. (2mks)

.....
.....
.....
.....

20. State **two** functions of chloroplasts. (2mks)

.....
.....
.....
.....

21. (a) State **two** functions of an ovary in human female. (2mks)

.....

.....

(b) State **two** advantages of internal fertilization in mammals.
(2mks)

.....

.....

22. (a) State the part of the eye involved in : (3mks)

(i) Colour vision.

……

(ii) Maintaining the shape of the eyeball.

……

(iii) Change in diameter of the lens.

……..

(b) A person was not able to see far objects clearly but could view near objects clearly. Name the eye defect the person had. (1mk)

……..

(c) How could the defect in **22(b)** above be corrected? (1mk)

……..

23. State **three** differences between Osmosis and Active transport. (3mks)

Osmosis	**Active transport**
1.	
2.	
3.	

24. Explain why cells of an endosperm are triploid and not diploid. (3mks)

……

……

……

25. State the functions of the following hormones:

(i) Luteinising hormone. (1mk)

……

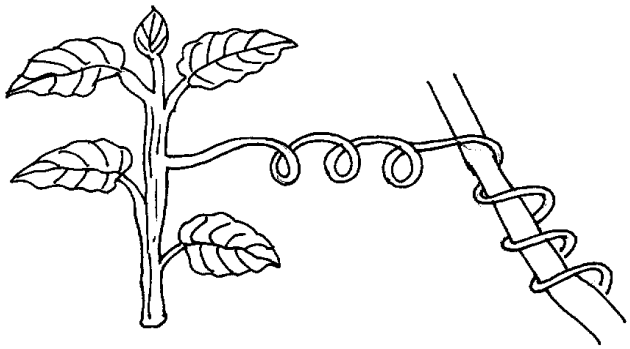
(ii) Oxytocin. (1mk)

……

(iii) Progesterone. (1mk)

……

26. A response exhibited by a certain plant tendril is illustrated below:-



(i) Name the type of response. (1mk)

……

(ii) Explain how the response named in (i)above occurs . (3mks)

……
……
……
……
……

……
……

27. An organelle was magnified 800 times by an electron microscope. Its diameter was 2 millimeters. Calculate the actual diameter in micrometers. (2mks)

……..

……..

28. Name the antigens that determine human blood group. (1mk)

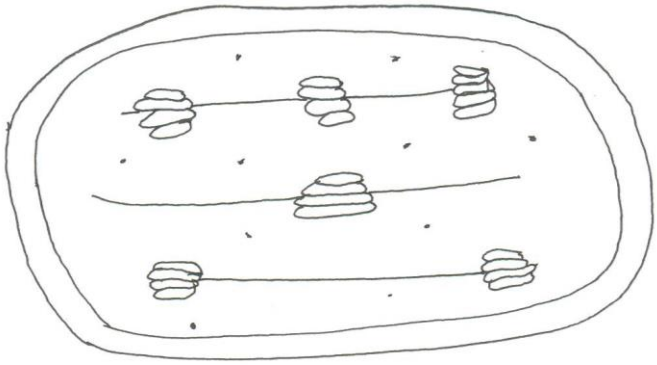
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29. The scientific name for a domestic cat is felis Catus. Outline the rule that were never followed in writing the name. (3mks)

……
……
……
……

RDS 20

1. The diagram below represents an organelle in a plant cell.



(a) What is the role of the above organelle? (1mk)

_____

_____

_____

(b) Give two ways in which the organelle is adapted to its functions (2mks)

_____

_____

_____

_____

2. What is the name of the structures parasitic fungi use to obtain food from the host tissue? (1mk)

_____

_____

_____

3. State one economic importance of each of the following excretory products of plants. (2mks)

(a) Tannins

_____

_____

_____

(b) Nicotine

_____

_____

_____

4. (a) What is meant by the term alternation of generation? (1mk)

_____

_____

_____

(b) The most usual type of alternation of generation is between sexual and a sexual generations.

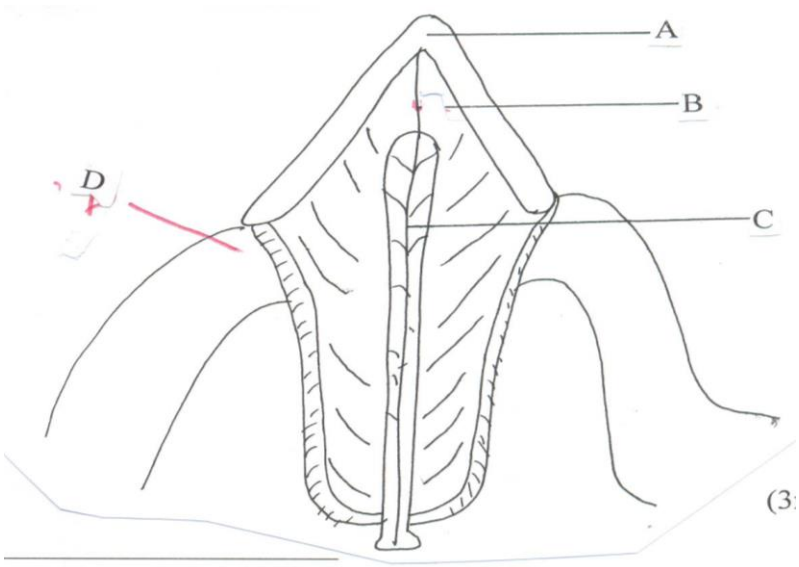
Which two plant divisions show this type of alternation? (2mks)

_____

_____

_____

5. The diagram below represents internal structure of a mammalian tooth



Name the parts labeled B and D (3mks)

A _____

B _____

D _____

6. State three evidences that support the theory of organic evolution (3mks)

_____

_____

_____

_____

7. Explain how sunken stomata lower the rate of transpiration (2mks)

_____

_____

_____

_____

8. State the role of the following bacteria in the nitrogen cycle.

(a) Nitrosomonas (1mk)

_____

_____

_____

(b) Nitrobacter (1mk)

_____

_____

_____

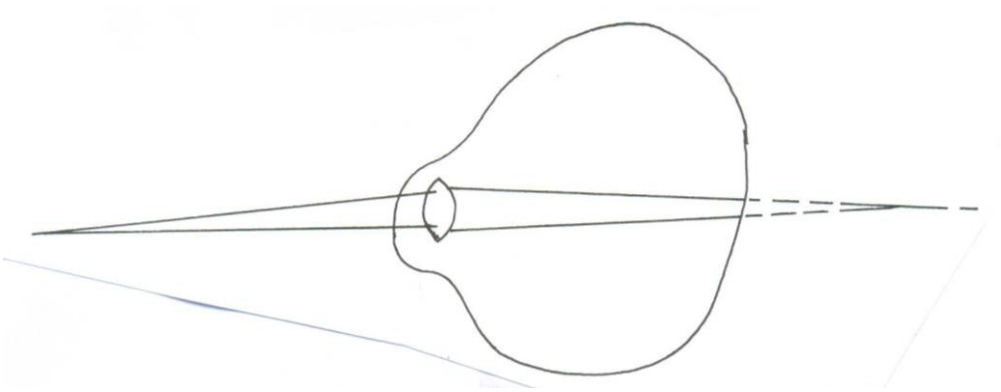
(c) Azotobacter (1mk)

_____

_____

_____

9. The diagram below shows the position of an image in a defective eye



(a) Name the defect (1mk)

_____

_____

_____

(b) What is the cause of the defect (1mk)

_____

_____

_____

(c) How is the defect in (a) above corrected (1mk)

_____

_____

_____

10. What is the effect of auxins on shoots of plants (2mks)

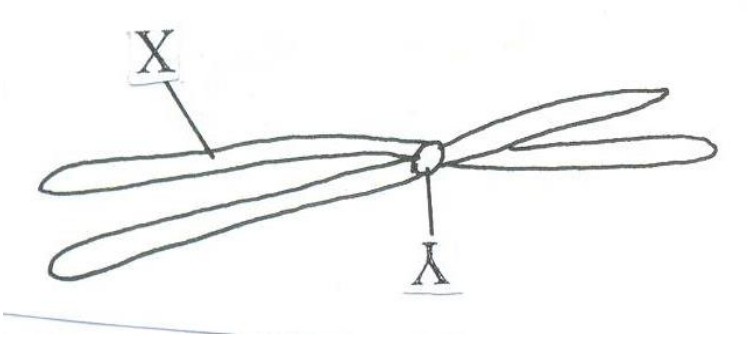
_____

_____

_____

_____

11. Below is a structure found in the cell nucleus



(a) Identify the above structure (1mk)

_____

_____

_____

(b) Name the parts labeled X and Y (2mks)

X _____

Y _____

12. Name animal organs that are rich in

(a) Lysosomes (1mk)

_____

_____

_____

(b) Golgi body (1mk)

_____

_____

_____

13. Some wastes from the industries contains metallic pollutants. Explain how such pollutants indirectly reach and accumulates in the human body once dumped into rivers. (3mks)

_____

_____

_____

_____

14. From the equation given below, calculate the respiratory quotient (RQ)

$$2C_{51}H_{98}O_6 + 145O_2 \longrightarrow 102CO_2 + 98H_2O + \text{Energy}$$

Show your working (2mks)

_____

_____

_____

_____

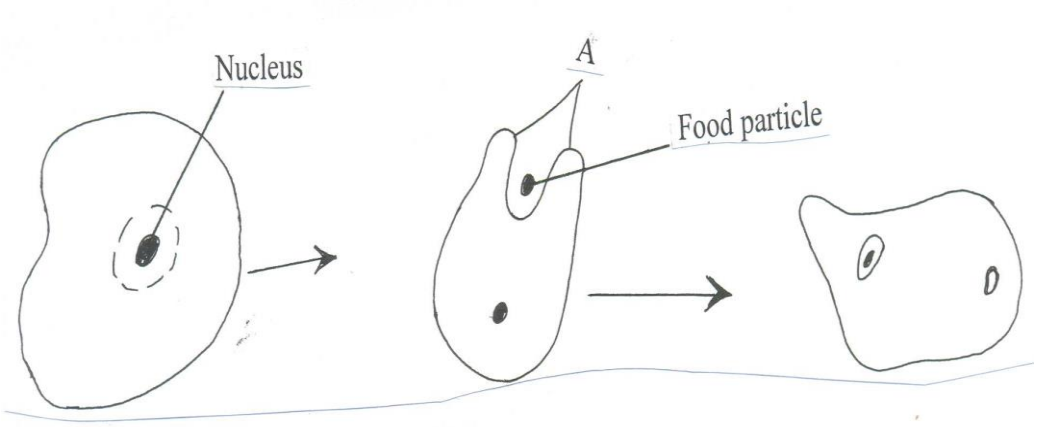
(b) Identify the substrate respired in the above equation (1mk)

_____

_____

_____

15. The diagram below shows a feeding process in an organism



(a) Name structures labeled A (1mk)

_____

_____

_____

(b) Name the type of feeding process shown in the diagram (1mk)

_____

_____

_____

(c) Name one organism that feeds using the type of nutrition in (b) above (1mk)

_____

_____

_____

16. Name the parts of the flower that are responsible for production of gametes (2mks)

_____

_____

_____

_____

17. A child of blood group O is born to a woman of blood group A and a man of blood group B.

What are the genotypes of the parents. (2mks)

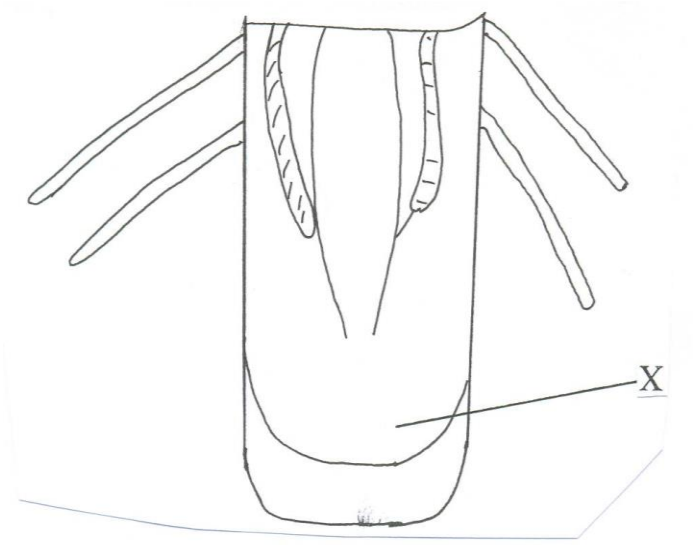
_____

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18. The diagram below shows a longitudinal section of a plant organ



State three characteristics of cells found at the part labeled X. (3mks)

_____

_____

_____

_____

19. Explain why athletes practicing at high altitude zones have a higher number of red blood cells than those at sea level. (3mks)

_____

_____

_____

_____

20. Name two metallic ions which are involved in nerve impulse transmission (2mks)

_____

_____

_____

_____

21. (a) Other than having many characteristics in common, state the other characteristic of a species (1mk)

_____

_____

_____

(b) What is binomial nomenclature (1mk)

_____

_____

_____

22. (a) State two environmental problems that can be solved by studying biology. (2mks)

_____

_____

_____

_____

(b) State two precautions taken during collection of specimen (2mks)

_____

_____

_____

_____

23. G – A – C – A – G – U – A – C represents the base sequence of a segment of a nuclei acid

(i) Which nuclei acid does the above segment represents? (1mk)

_____

_____

_____

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

_____

_____

_____

(iii) Write down the complementary base sequence of the strand (1mk)

_____

_____

_____

24. State three advantages of metamorphosis to the life of an insect (3mks)

_____

_____

_____

_____

25. (a) Name the process by which urea is formed in the liver (1mk)

_____

_____

_____

(b) What is the importance of excreting urea from the body (1mk)

_____

_____

_____

(c) Young growing children excrete less nitrogen compared to what they consumed.

Explain (2mks)

_____

_____

_____

_____

26. Name causative agent of each of the following diseases. (3mks)

(i) Pneumonia

_____

_____

_____

(ii) Whopping cough

_____

_____

_____

(iii) Gonorrhoea

_____

_____

_____

27. State two adaptations of palisade mesophyll to photosynthesis. (2mks)

_____

_____

_____

_____

28. The diagram below represents a mammalian bone



(a) Identify the bone shown above (1mk)

_____

_____

_____

(b) State the function of the parts labeled R and S (2mks)

_____

_____

_____

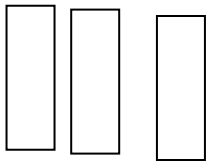
(c) State the region of the body in which the bone is found (1mk)

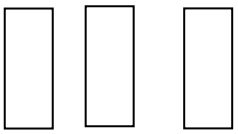
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29. Potato cylinders were weighed and kept in distilled water overnight. They were then reweighed.





At the beginning of the experiment at the end of the experiment

(a) Calculate the average mass of the potato cylinders after reweighing, show your working(2mks)

_____

_____

_____

_____

(b) Explain why mass of the cylinders had increased (2mks)

_____

_____

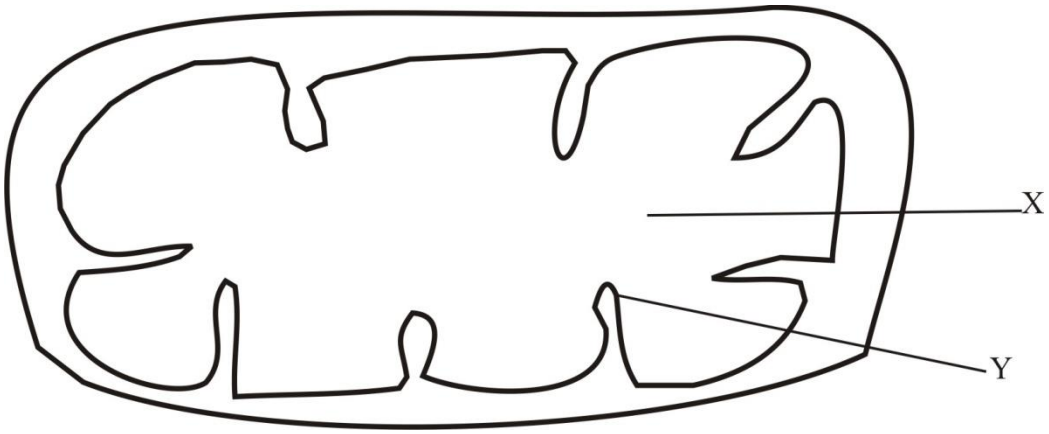
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RDS 21

1. State the name given to the study of
   (a) Chemical changes in living organisms
   ……..(1mark)

   (b) Insect…….……....(1mark)

2. Below is a diagram of an organelle that is involved in respiration



   (a) Name t he organelle ……..... (1mark)

   (b) Name the part labeled **X**…… (1 mark)

   (c) What is the purpose of the part labeled **Y** (1 mark)

   ……
   ……
   ……
   ……
   ……
   ……

3. Explain what would happen to an amoeba when placed in distilled water
   (3 marks)

   .....
   .....
   .....
   .....

4. (a) State the category of variation into which the following traits fall (2 marks)

(i) Skin pigmentation
……

(ii) Blood group
……

(b) Give **two** possible genotypes of blood group A. (1 mark)

……
……
……
……
……
……

5. State **three** characteristics of monera that are not found in other kingdoms (3 marks)

i)……

ii)…….....

iii)
……

6. (a) Name **two** excretory products produced by both plants and animals (2 marks)

i)……

ii)…….....

(b) What is the name given to the process in which excess amino acids are broken in the liver.

…….(1 mark)

7. (a) What is meant by the following terms?

(i) Autoecology……(1mark)

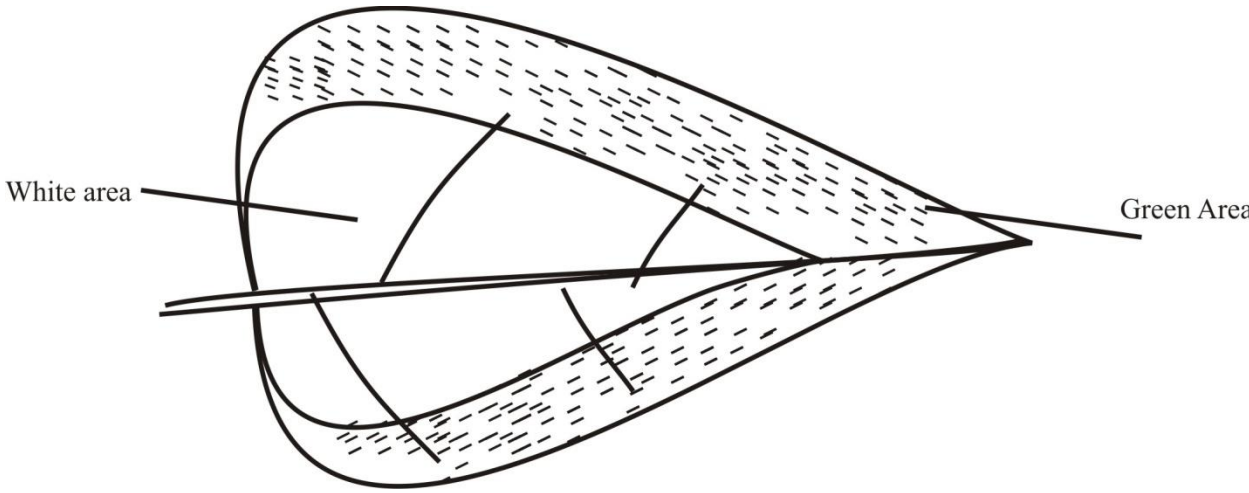
(ii) Habitat……(1mark)

(b) State **two** ways in which floating leaves of aquatic plants are adapted to gaseous exchange (2marks).

……

.....
.....
.....

8. In an experiment to investigate a certain factor necessary for photosynthesis, a leaf shown below was used.



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

.....
.....
.....
.....

(b) What term is used to describe such a leaf?.....(1 mark)

(c) In the space provided below, sketch the expected observations when starch test is carried on the leaf (2 marks)

.

9. The equation below represents a chemical process which occurs in the mammalian body

$$2H_2O_2 \longrightarrow 2H_2O + 2O_2$$

Name the;

(a) Enzyme that controls the reaction
……....(1 mark)

(b) Major organ in which the reaction occurs……(1mark)

(c) What is the importance of the process? (1mark)
……
……
……
……

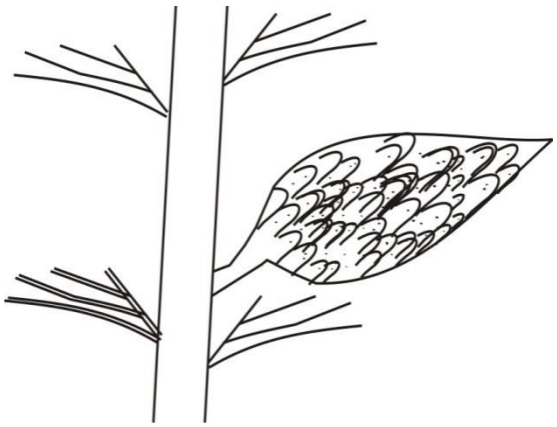
10. Name the hormones which control the following

(a) Development of male secondary characteristic……(1 mark)

(b) Inhibits side branching in plants……(1 mark)

(c) Moulting in insects …….(1mark)

11. During a biological excursion a group of form three students collected a plant specimen, whose reproductive organ is shown below.



(a) Name the sub-division of the plant from which the above specimen was obtained (1 mark)

……

(b) Other than the presence of the above characteristic, state **two** characteristics of the plants in the sub-division name above (2 marks)

i)……

ii)…….....

12. The shirt of a student was stained by a solution of DCPIP. A friend advised him to wash with lemon juice. Explain (2 marks)

.....
.....
.....
.....

13 (a) State **one** distinguishing feature of fungal cells (1 mark)

……

(b) State **one** similarity between members of kingdom animalia and fungi (1mark)

……

14 State the functions of each of the following parts of the axial skeleton

(a) Odontoid process (1 mark)

.....
.....
.....
.....

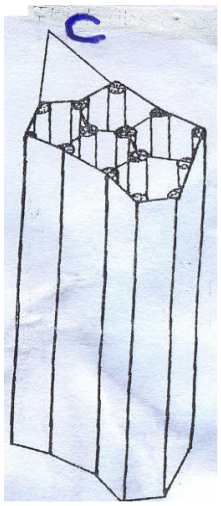
(b) Zygapophyses (1 mark)

.....
.....
.....
.....

15 Antibiotics are used to treat people with bacterial infections. Explain the danger of the widespread use of antibiotics to treat disease (3 marks)

.....
.....
.....
.....
.....
.....
.....
.....

16 (a)(i) Identify the plant support structure illustrated below (1 mark)



(ii) Name the part labeled **C**……... (1mark)

(b) State **three** biological importance of tropism in plants (3 marks)

……
……
……
……

17 (a) Define the term oxygen debt (2 marks)

……
……
……
……

b) State what happens to the lactic acid produced by active muscles during anaerobic respiration (2 marks)

……
……
……
……

18 Give a reason for each of the following

(a) The trachea of the tracheal system have circular rings of chitin (1 mark)

.....
.....
.....
.....

(b) Tracheoles of the tracheal system lacks rings of chitin (1 mark)

.....
.....
.....
.....

19(a) What is the meaning of the term organic evolution? (2 marks)

.....
.....
.....
.....

(b) Explain the following terms;

(i) Analogous structures (1 mark)

.....
.....
.....
.....

(ii) Comparative embryology (1 mark)

.....
.....
.....
.....

20 The figure below represents a type of muscle

(a)(i) **Identify** the type of muscle ……. …… (1 mark)

(ii) Give **one** reason for your answer in (a)(i) above (1mark)

……..

(b) Name **two** parts of the human body where this type of muscle can be found. (2marks)

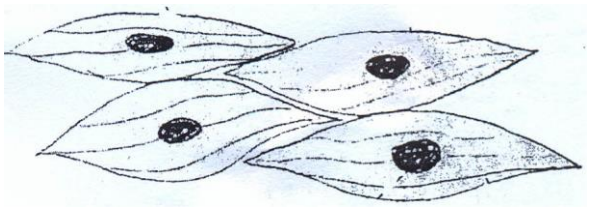
……
……
……
……

21 Describe how turgor pressure builds up. (3marks)

……
……
……
……

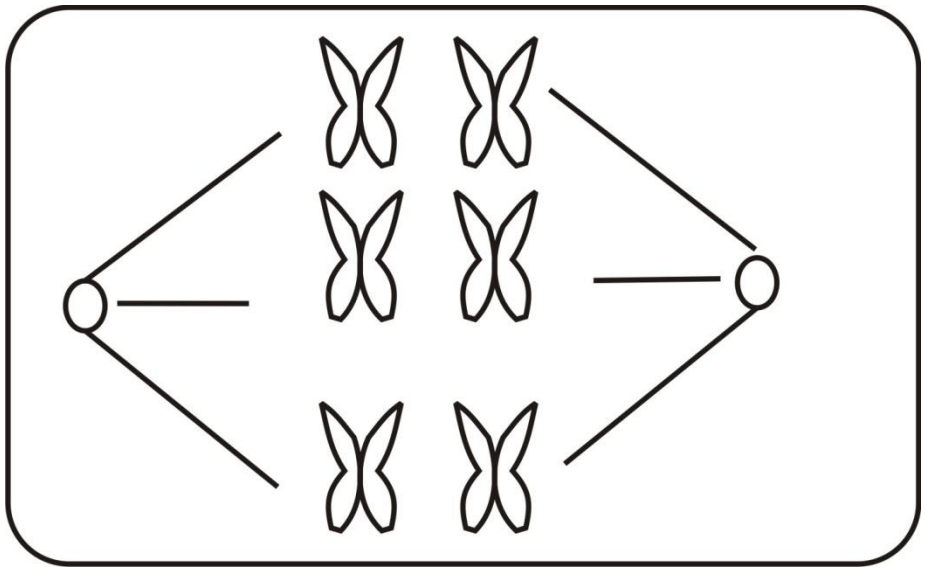
……
……

22 Name the flower part that produces male gamets (1 mark)



……

23 (a) The diagram below shows a cell undergoing a stage in cell division



(a) With reason, identify this stage (2 marks)

Identity

……

Reason

……

(b) Draw a diagram to show the next stage of cell division (1mark)

24. Name the parts of the brain that perform the following functions

(a) Controls secretion of hormones by pituitary glands …… (1 mark)

(b) Controls muscular movements body posture and balance…….. (1mark)

(c) Controls reflex activities…… (1mark)

25 Name the vector and causal organism of bilharzia (2 marks)

Vector…….

Causal organism……

26 (a) Name an end product of photosynthesis that may be found in the intercellular air spaces of a leaf ……(1 mark)

(b) State what happens to the product named in (a) above (2 marks)

……

……
……
……

27. Name **two** structures in the mammalian ear that are used in body balance and posture (1mark)

……
……
……
……

28 What characteristics do gills of a fish and the mouth cavity of a frog have in common that enables them to be efficient in gaseous exchange. (3 marks)

……
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……

RDS 22

1. State the functions of each of the following organelles.

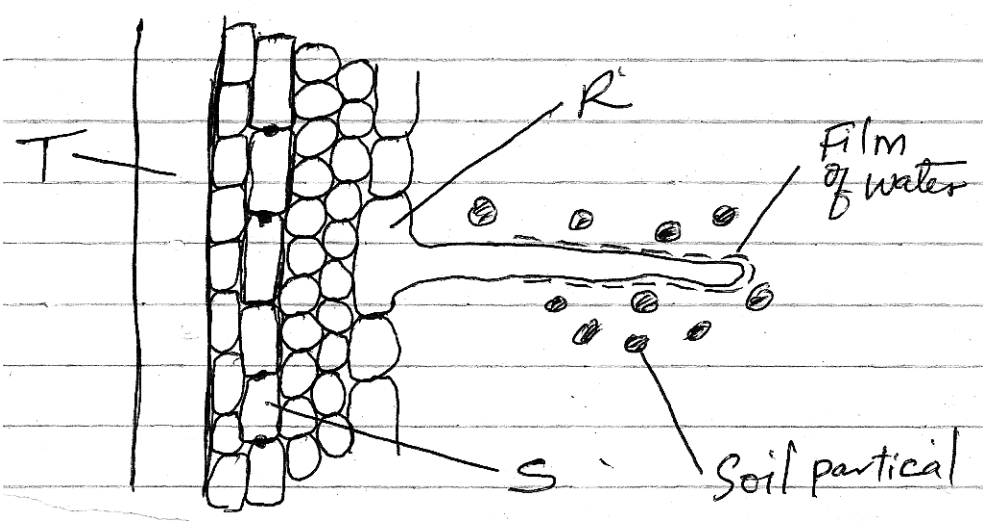
   (i) Ribosomes (1mk)

   ……

   (ii) Golgi apparatus (1mk)

   ……

2. The diagram below represents the pathway of water from soil into the plant.



   (a) Name the structures labeled T and S.

   T:……(1mk)

   S:……(1mk)

   (b) State **two** ways in which the structure labeled R is adapted to its functions. (2mks)

   ……

   ……

3. A student added equal amounts of blood to equal volumes of salt of different concentrations. She observed and counted the red blood cells at the beginning of the experiment and at end of the experiment. The results were as shown:-

Set up	Concentration of salt	Beginning	After 30 mins
A	0.1mol	500	500
B	0.01mol	500	250

   Account for the results in:

(a) Set up A (2mks)

……

……

(b) Set up B (2mks)

……

……

4. Below is a dental formula of certain organisms. Use it to answer the questions that follow.

I $^{0}/_{3}$, C $^{0}/_{1}$, PM $^{3}/_{2}$, M $^{3}/_{3}$

(i) Calculate the total number of teeth in the mouth of the organisms. (2mks)

(ii) Name the organisms. (1mk)

……

(iii) Identify the mode of nutrition of the organisms. (1mk)

……

5. (a) Give a reason why glucose does not normally appear in urine even though it is filtered in mammalian Bowman's capsule. (2mks)

……

……

(b) Which hormones are involved in the salt-water balance in human body? (2mks)

……

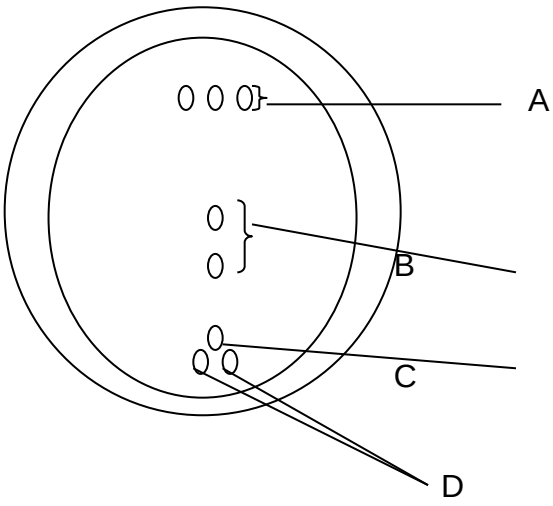
……

6. State **two** precautionary measures to control the outbreak of cholera. (2mks)

……

……

7. The diagram below shows a mature embryo sac of a flowering plant.



(a) Name the Parts: (2mks)

(i) A:……

(ii) D:……

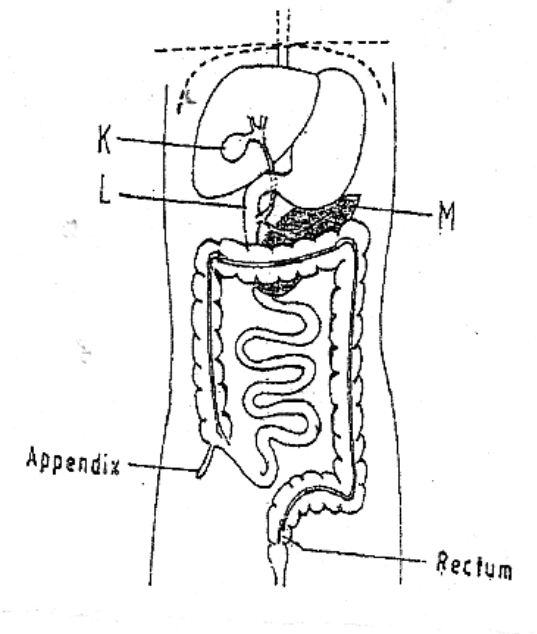
..

(b) What is the function of the structure labeled B? (1mk)

……

.

8. The diagram below represents part of the human digestive system.



Name the organs labeled L and M. (2mks)

L:……

M:……

9. What is meant by the following terms?

(a) Ecology (1mk)

……

……

(b) Carrying capacity (1mk)

……

……

10. Explain why individuals with smaller body sizes requires more energy per kg of body weight than those with large body sizes.

(3mks)

……

……

.

11. Explain how each of the following serves as evidence for evolution.

(i) Fossil records. (2mks)

……

……

.

(ii) Comparative embryology. (2mks)

……

……

.

12. Give **two** differences between skeletal and smooth muscles. (2mks)

……

……

13. (a) State **two** characteristics of the Kingdom Monera that are not found in other Kingdoms. (2mks)

……

……

.

(b) Name the class to which a termite belongs. (1mk)

……

14. State **one** way in which aerenchyma tissues in aquatic plants are adapted to their function. (1mk)

……

……

15. (a) State **two** functions of the blood other than transport. (2mks)

……

……

(b) Name **one** defect of the circulatory system in humans. (1mk)

……

16. Give an example of a moveable joint in humans. (1mk)

……

17. (a) Define the term natural selection as used in evolution. (2mks)

……

……

……

(b) State **two** examples of natural selection in action. (2mks)

……

……

.

18. (a) Name the carbohydrate that is stored in Mammalian muscles. (1mk)

……

.

(c) List down **two** differences between polysaccharides and Monosaccharides.(2mks)

(d)

Polysaccharides	Monosaccharides
……	……
……	……
……	……
……	……

19. Describe how the following parts of the mammalian ear are adapted to their functions

(a) Pinna (1mk)

……

……

(b) Tymphanic Membrane (1mk)

……

……

20. (a) State **two** ways in which human body is naturally protected against harmful bacteria. (2mks)

……

……

(b) State **one** way in which the composition of blood in the pulmonary artery and that of pulmonary vein differ. (1mk)

……

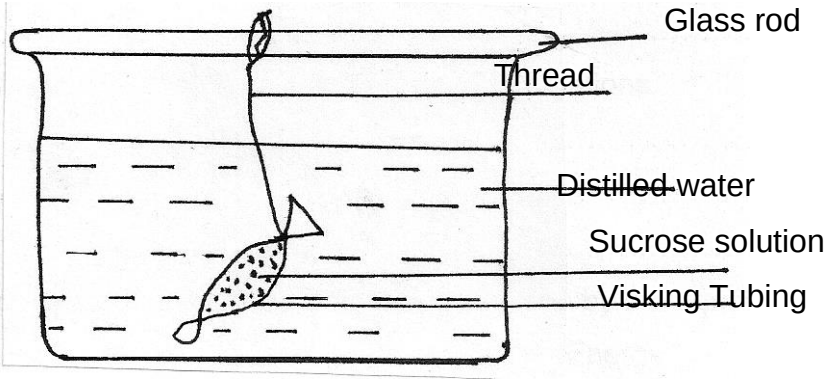
21. Describe the path taken by Carbon (iv) Oxide released from the tissues of a cockroach into the atmosphere. (2mks)

……

……

……

22. Form One student set up an experiment shown below to investigate a certain physiological process. The set up was left for 30 minutes.



(a) Name the process under study. (1mk)

……

(b) State the expected results after 30 minutes. (1mk)

……

(c) Explain your answer in (b) above. (3mks)

……

……

……

23. (a) Give another name of the oviduct. (1mk)

……

.

(b) Name the hormone responsible for production of milk after perturation. (1mk)

……

24. Below is an example of a food chain.

Nappier grass ⟶ Mouse ⟶ Snake ⟶ Hawk

Identify the trophic level occupied by:

(a) (i) Nappier grass (1mk)

……

…

(ii) Hawk (1mk)

……

.

(b) What would happen if snakes are removed from the food chain?

(2mks)

……

……

25. (a) Define the term mutation. (1mk)

……

(b) Name **two** sex-linked traits in humans attached to Y-chromosomes. (2mks)

……

……

.

26. Explain why athletes train in high altitudes in preparation for competition. (2mks)

……

……

27. Briefly describe **three** characteristics of populations. (3mks)

……

……

……

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

$C_6H_{12}O_6 \longrightarrow 2C_2H_5OH + CO_2 + Energy$

Name the above process. (1mk)

……

29. State **two** beneficial effects of transpiration to a plant. (2mks)

……

……

RDS 23

1. (a) What is haemophilia? (1mk)

……

……

(b) State **two** symptoms of the condition above (2mks)

……

……

2. (a) Name **two** photo chemical cells in the human retina (2mks)

……

……

(b) Name one chemical substance and two mineral ions involved in impulse transmission in mammals (3mks)

Chemical substance (1mk)

……

Mineral ions (2mks)

……

3. State **three** characteristics of a species (3mks)

……

……

……

4. State why iodine is necessary for complete development of a tadpole into adult (3mks)

……

……

5. Name the main feature that differentiate the axis from other cervical verterbrates (1mk)

……

6. The illustration below show a biological process in animals

(i) Name the process (1mk)

……

(ii) State the biological significance of the above process in (i) above (2mks)

……

(iii) Name the salts that aid in the above process in (i) above (2mks)

……

7. State the names used to describe the following leaf arrangements

8. Name the monosaccharides that make up the disaccharides below

(a) Sucrose (1mk)

……

(b) Lactose (1mk)

……

(c) Maltose (1mk)

……

9. State the stage of cell division in which the following events occur

(i) Replication of the genetic material (1mk)

……

(ii) Exchange of genetic material (1mk)

……

10. The reaction represented by equation below occurs in the body

$$\text{Hydrogen peroxide} \xrightarrow{\textbf{Enzyme}} \text{Oxygen + Water}$$

(a) Name enzyme **Z** (1mk)

……

(b) Name an organ in the human body where this reaction occurs (1mk)

……

(c) State the biological importance of the reaction above (1mk)

……

11. Name the digestive enzyme found in the human mouth (1mk)

……

12. Study the experiment below that was set to investigate a certain process in plants

(a) State the aim of the experiment above (1mk)

……

(b) What changes would be observed if the set up was left to stand for six hours (1mk)

……

……

(c) State **one** precaution observed when setting up the experiment (1mk)

……

(d) Suggest a suitable control experiment for the one above (1mk)

……

13. State **one** use of the following excretory products of plants (2mks)

(i) Latex

……

(ii) Colchicine

……

14. Briefly explain evolution by cell biology (3mks)

……

……

15. (a) Define respiratory quotient (1mk)

……

……

(b) Given the equation below, calculate the respiratory quotient (eq) (2mks)

$C_6H_{12}O_6+6O_2 \longrightarrow 6H_2O+6CO_2+2880kJ$

16. The diagram below represents a specialized cell. Use it to answer the following questions

(a) Identify the cell (1mk)

……

(b) State **two** adaptations of the cell above to its functions (2mks)

……

……

17. State how each of the cells below are specialized to carry out their functions

(a) Palisade cell (1mk)

……

(b) A sperm cell (1mk)

……

18. What is the meaning of the following terms

(a) Homeostasis (1mk)

……

(b) Osmoregulation (1mk)

……

19. State the functions of the following parts of microscope

(i)Condenser (1mk)

……

(ii) Body tube (1mk)

……

20. (a) Differentiate between epigeal and hypogeal germination (2mks)

……

……

(b) Name **two** hormones that are responsible for breaking seed dormancy (2mks)

……

……

21. The photographs labeled K and L below are bones from a mammal

(a) Identify the bones above (2mks)

K ……

L ……

22. State the importance of the following

(i) Reversed stomatal rhythm to desert plants (1mk)

……

(ii) Closing of stomata on a hot dry sunny day (1mk)

……

(iii) How does wind affect transpiration rate? (1mk)

……

……

23. Study the diagram below representing a plant structure and answer the following questions

(a) Name the part labeled T (1mk)

……

(b) Name the structure that performs the same function as the stoma in a woody stem (1mk)

……

(c) How is part u adapted to its function S? (2mks)

……

……

24. State **two** sites used for gaseous exchange in sub-merged aquatic plants (2mks)

……

……

25. The figure below shows a secretion of a nucleic acid strand

With a reason, identify the type of nucleic acid shown above (2mka)

Type

……

Reason

……

26. A flower was found to have the following characteristics

Inconspicuous petals

Long feathery stigma

Small light pollen grains

(a) What is the likely agent of pollination of the flower? (1mk)

……

(b) What is the significance of the long feathery stigma in the flower (1mk)

……

27. Explain the role of the following in germination

(a) Oxygen (1mk)

……

(b) Cotyledons (2mks)

……

28. State **three** structural differences between arteries and veins (3mks)

……

……

29. Differentiate between the following ecological terms

(a) Population (1mk)

……

(c) Community (1mk)

……

(c) Niche (1mk)

……

RDS 24

1. State the name given to the study of (2mks)
   (i) the blood

   ……

   ……

   (ii) classification of living organisms.
   ……

   ……

2. (a) Name the products of complete hydrolysis of sucrose. (1mk)
   ……

   ……

3. (b) What happens to these products named in (a) above, when they are excess in the body of man. (2mks)
   ……

   ……

3. (a) State the roles of light in plant nutrition. (2mks)

   ……

   ……

   (b) Give a reason why glucose formed at the end of photosynthesis is converted at once into starch. (1mk)

   ……

   ……

4. (i) What is respiration? (1mk)
   ……
   ……
   ……
   ……

……
……

5. (ii) State any **two** importance of respiration. (2mks)

……
……
……
……

6. (a) State the formula for calculating linear magnification of a specimen when using a hand lens. (1mk)

……
……
……
……

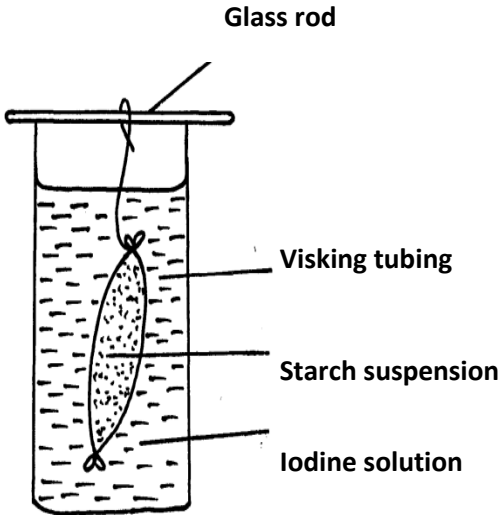
7. (b) Give **one** functional adavantgae of use of the following microscopes. (2mks)
(i) Light Microscope

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……
……
……

(ii) Electron Microscope.

……
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……
……

8. An investigation was set up as shown in the diagram below.



After 30 minutes, starch suspension had turned blue-black while iodine solution retained its colour.

(a) Name the physiological process that was being investigated in the experiment. (1mk)
……
……
……

(b) Account for the results observed after 30 minutes. (3mks)
……
……
……
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……
……

9. a)(i) Name the bacteria found in the root nodules of leguminous plants. (1mk)
……
……
……
……
……
……

(ii)What is the nutritional relationship between this bacteria and the leguminous plant. (1mk)
……
……
……
……

10. (a) Distinguish between homodonts and heterodonts. (1mk)
……
……
……

11. (b)A certain mammal has no incisors, no canines, 6 premolars and 6 molars in the upper jaw.
In the lower jaw, there are 6 incisors, 2 canines, 6 premolars and 6 molars.

(i) Write down the dental formular of this mammal . (1mk)
……
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……
……
……

(ii) What is the mode of nutrition of this mammal? (1mk)
……
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……

12. (a) (i) Name the blood vessel that supplies the cardiac muscles with its requirements. (1mk)

……
……
……
……

(ii) State the corgenical defect of the above blood vessel resulting from prolonged large intake of cholesterol in the blood. (1mk)

……
……
……
……
……
……
……

(b) What is the importance of the thicker muscular wall of the left ventricle of a mammalian heart? (2mks)

……

……

13. (a) (i) Name the respiratory surface in insects. (1mk)

……
……
……
……

(ii)State any **one** feature that adapts the structured named in a(i) above to its function. (1mk)

……

(b) Why are the fish gills highly vascularized? (1mk)

……
……
……
……
……
.

14. a) (i) what would happen if a person secreted lee A.D.H? (1mk)

……

……

……

(ii) Name the condition described in a(i) above. (1mk)

……

……

(b)What is the role of the loop of Henle in homeostasis? (1mk)

……

……

15. (a) Name the products of anaerobic respiration in plants. (1mk)

……

……

……

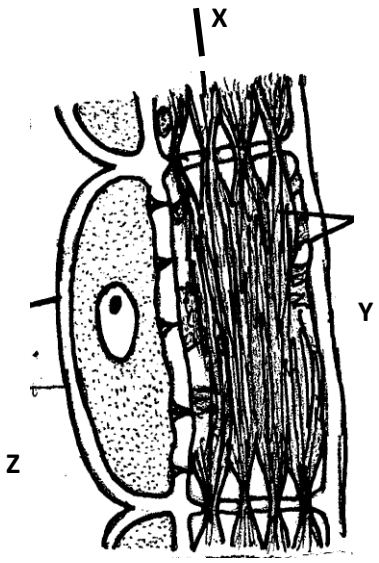
16. (b)Give any **two** economic importances of the products named in (a) above. (2mks)

……

……

……

17. The diagram below illustrate part of phloem tissue.



(a) Name the parts labeled. (2mks)

X……

Y……

(b)State the function of the part labeled **Z** (1mk)

……
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18. State **two** roles of water in germination? (2mks)

……
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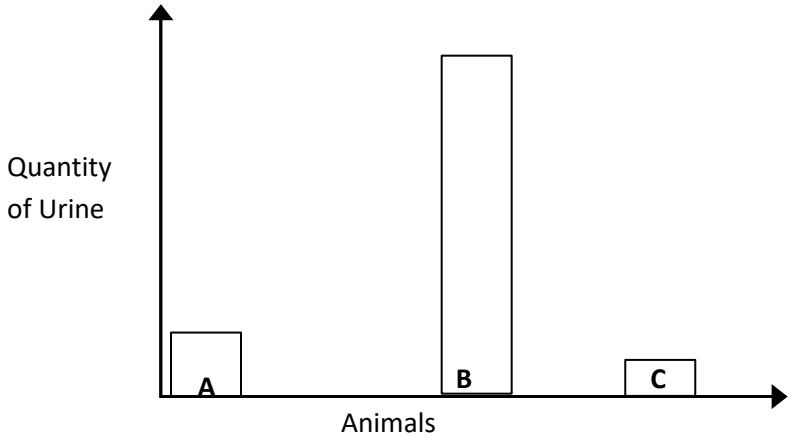
19. (a) State any **one** role of the pollen tube during fertilization. (1mk)

……
……
……
……
……
……

(b) A female frog lays many eggs, spaced out along jelly – like straw.
State **two** importance of this. (2mks)

……
……
……
……

20. The following charts illustrate the quantity of urine passed out by four mammals of different species in different habitats.



(a) Name the forms in which the following organisms are likely to excrete their nitrogenous wastes.

(2mks)

Animal **B**

……

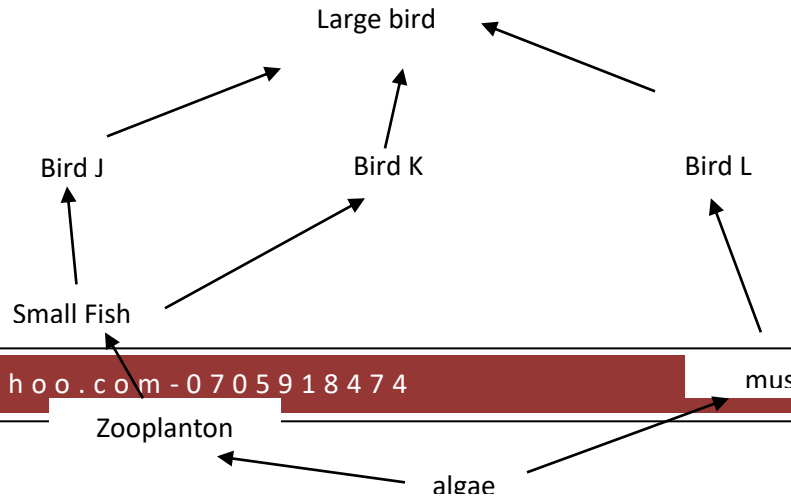
Animal **C**

……

(b) Give **two** structural modification of the nephron of animal B that enables it to survive in its habitat. (2mks)

……
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……
……
……
……

21. After an ecological study of nutritional relationships in an ecosystem, a student constructed the following food web.



(a) Name the ecosystem in which the ecological study was done. (1mk)

……
……
……
……
……

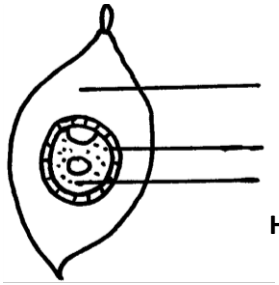
(b) State **one** short term effect of the eradication of all mussles from this ecosystem. (1mk)

……
……
……

(c) Some organisms which play a role in the ecosystem were not included. Name **one** of them. (1mk)

……
……
……
……
……

22. The diagram below represents the vertical section of a fruit.



(a) Suggest the possible agent of dispersal of this fruit. (1mk)

(b) ……
……
……
……
……

(c) Explain **two** observable features that adapt the fruit to its mode of dispersal.

(d) ……
……
……

……

……

23. State **one** function of each of the following hormones. (3mks)

(i) Follicle stimulating hormone

……

(ii) Oxytocin

……

(iii) Oestrogen

……

24. State **two** advantages of natural selection. (2mks)

……

……

25. (a) What are alleles? (1mk)

……

……

(b) State any **two** advantages of hybrid vigour. (2mks)

……

……

26. What is meant by the term vestigial structures? (1mk)

……

……

(a) Name the type of evolution illustrated by (3mks)

(i) Hind limbs of birds

……

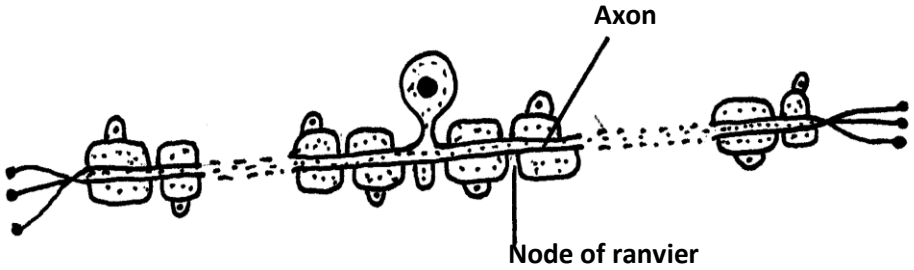
……

(ii)Wings of birds and insects

……

……

27. The diagram below illustrate a neurne



(a) Name the neurone drawn above. (1mk)

……
……
……
……
……

(b) (i) What is the function of the neurone named in (a) above? (1mk)

(c) ……
……
……
……
……

(ii)What is the role of the node of ranvier? (1mk)

……
……
……

28. (a) Distinguish between a hinge-joint and a ball and socket joint. (1mk)

……
……
……

29. (b)(i) Name the cartilage found between the bones of the vertebral column. (1mk)

……
……
……
……
……

(ii) State the function of the cartilage named in b.(i) above. (1mk)

……
……
……

30. In an experiment, it was observed that when termites are exposed to light, they move to darker areas.

(a)Name the type of response exhibited by the termites. (1mk)

……

(b) What are survival values of the type of response exhibited by the termites? (2mks)

……
……
……

26. Oil can be applied on stagnant water to control the spread of malaria.

(a) How does this practice control the spread of malaria? (1mk)

……
……
……

(b) Give a reason why this practice should be discouraged. (1mk)

……
……
……

27. Give three reasons for the loss of energy from ne trophic level to the next in a food chain. (3mks)

……
……
……
……
……
……

RDS 25

1. State two functions of the cell sap. (2 marks)

   ……

   ……

2. Briefly explain the role of the external ear (Pinna) in the hearing process. (2 marks)

   ……

   ……

3. Distinguish between homologous and analogous structures. (2 marks)

   ……

   ……

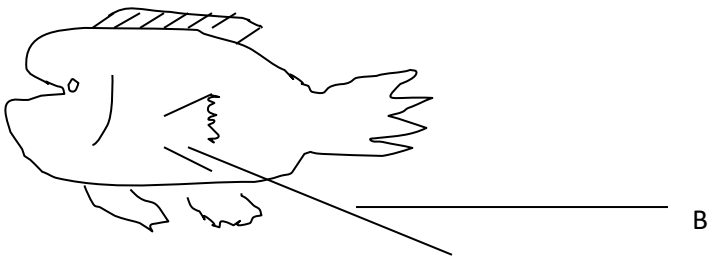
4. An organelle magnified 4000 times by an electron microscope measured 2mm in diameter. Calculate its real diameter in micro-meters.
   (2 marks)

   ……

   ……

   ……

5. The diagram below shows the external structure of Tilapia.



   a) A part from swimming, state other functions of the fins labelled A & B

……

……

   b) State two functions of swim bladder in a fish. (2 marks)

……

……

6. State two main differences between a millipede and centipede. (2 marks)

……

……

……

7. Which substance causes ripening and falling of fruits (1 mark)

……

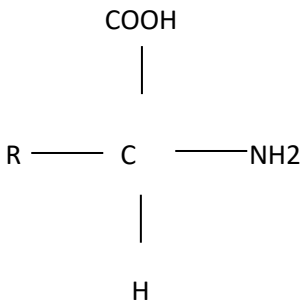
……

8. Explain the immediate reaction of the body bathed in cold water. (2 marks)

……

……

9. Below is the general structure of an amino group



What do the following refer to?

COOH –…….

NH2 –……..

10. State the functions of vascular bundles in plants. (2 marks)

……..

……

11. State two methods by which fossils were formed. (2 marks)

……

……..

12. State three ways of breaking seed dormancy

……

……

……

13. (i) What is a habitat?

……

……

(ii) Differentiate between population and a community.

Population –……

……

Community –……

……..

(iii) 600 flies were caught and marked. After 24 hrs 400 flies were caught out of which 120 had the marks.
Estimate the population size of the flies in that house. (2 marks)

……

……

……

14. (i) State three importance of DNA molecule.

……

……

(ii) What is DNA replication?

……

……

(iii) A DNA strand sequence had the following base sequence TAC GCT. What is the sequence of M- RNA strand copied from this DNA portion.

……

……

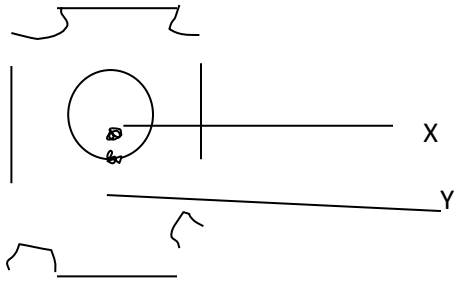
……

15. Give THREE features that hinder self pollination and self fertilization. (3 marks)

……

……

16. The diagram below shows a mature pollen grain



State the function of the structure labelled. (2 marks)

X……

Y……

17. Differentiate between aerotaxis and rheotaxis (2 marks)

Aerotaxis……

Rheotaxis……

18. Which structure in the ear detects
    a) Sound waves ……(1 mark)

    b) Change in posture…….. (1 mark)

19. The diagram below shows some changes in the external views of the mammalian eye. Study them and answer the question that follows.



to

    a) Name the stimulus that resulted into the change above (1 mark)

……..

……..

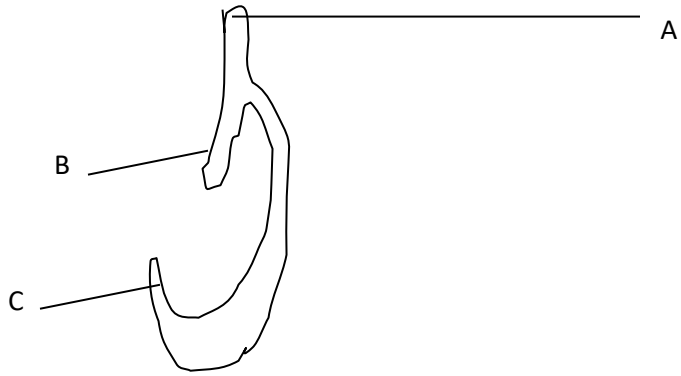
    b) Explain the events that led to the change above. (3 marks)

……..

……..

……..

20. Below is a diagram of mammalian rib



(i) Label the part

a) ……..

b) ……

(ii) Name the type of bone where part C articulates. (1 mark)

……

21. What will happen to a small section of fresh pumpkin stem placed in hypotonic solution? (2 marks)

……..

……..

22. State two functions of secretion from sebaceous gland of mammalian skin. (2 marks)

……

……..

23. A person consumes a lot of sugar in tea. Briefly explain the feedback mechanism in order to bring the sugar level to norm.

……
……
……

24. Given the equation of respiration:

$C_6H_{12}O_6 \longrightarrow 2C_2H_5OH + 2CO_2 + Energy$

a) Name the type of respiration taking place. (1 mk)

……

b) Calculate the respiratory quotient (RQ) , use the equation. (2 marks)

……

……

c) Give three (3) economic importance of the process in a above. (3 marks)

……

……

……

25. (a) What do similarity of wings of bats and those of insects illustrate? (1 mark)

……

……

(b) Name three evidences that show that organic evolution has taken place. (3 marks)

……

……

……..

26. Name TWO sites in the mammalian body where red blood cells are manufactured. (2 marks)

……

……

27. State three effects of drug abuse. (3 marks)

……
……
……
……
……

28. State three adaptations of aquatic plants to photosynthesis. (3 marks)

……..

……..

……..

29. What causes diabetes inspidus? (1 mark)

……..

……..

30. Differentiate between tendons and ligaments. (2 marks)

Tendons ……..

……..

Ligaments ……

……..

RDS 26

1. State two properties of the cell membrane. (2mks)

_____

_____

_____

2. Outline two precautions taken during collection and observation of live specimens. (2mks)

_____

_____

_____

3. (a) What is the formula for calculating linear magnification using a light microscope. (1mk)

_____

_____

(b) State two functions of centrioles. (2mks)

_____

_____

_____

4. Describe how diffusion gradient affects the rate of diffusion. (3mks)

_____

_____

_____

5. What is a guard cell? (2mks)

_____

_____

_____

6. State the specific sites in which the following reactions occur: (2mks)

(i) Light stage.

_____

_____

(ii) Dark stage.

_____

_____

7. Plants relatively have less waste to excrete than animals. Giving two reasons to explain this Observation. (2mks)

_____

_____

_____

8. (a) Name the gap in the lower jaw of a herbivore that facilitate movement of the tongue during chewing. (1mk)

_____

_____

_____

(b) Name two substances absorbed into the blood from the stomach in man. (2mks)

_____

_____

_____

9. (a) Give two reasons why lower organisms such as bacteria and simple multicellular Organisms do not have an elaborate transport system. (2mks)

_____

_____

_____

(b) Explain how the shape of erythrocytes helps it to function efficiently. (1mk)

_____

_____

10. Explain leaf fall as a factor affecting transpiration rate. (3mks)

_____

_____

_____

11. List three structures where gaseous exchange occurs in amphibians. (3mks)

_____

_____

_____

_____

12. State two causes of Asthma. (2mks)

_____

_____

_____

13. Give two factors affecting the rate of respiration. (2mks)

_____

_____

_____

14. (a) Aerenchyma tissues and pneumatophores are found in plants occupying different

Habitats, Identify these habitats. (2mks)

_____

_____

_____

(b) What is the function of pneumatophores? (1mk)

_____

_____

_____

15. Name two excretory products produced by both plants and animals. (2mks)

_____

_____

_____

16. What is the meaning of the following terms as they apply to cells

(i) Eukaryotes. (1mk)

_____

_____

(ii) Prokaryotes. (1mk)

_____

_____

_____

17. What is the effect of anti-diuretic hormone (ADH) in the human body. (2mks)

_____

_____

_____

18. State two classes of the phylum chordata where all members are endothermic. (2mks)

_____

_____

_____

19. State two ways in which parasitic worm of the genus schistosoma gains entry into the body of human beings. (2mks)

_____

_____

_____

20. (a) Name the stage in mitosis where chromatids collect together at the two opposite ends of the spindle fibres. (1mk)

_____

_____

(b) State two roles of the placenta in humans. (2mks)

_____

_____

_____

21. Describe the censor mechanism of seed dispersal. (2mks)

_____

_____

_____

22. The diagram below shows the internal structure of a bean seed

A B C

(a) Name the parts labeled A and B. (2mks)

_____

_____

_____

(b) What is the role of the structure labeled C? (1mk)

_____

_____

_____

23. (a) Define the following term

Incomplete metamorphosis. (1mk)

_____

_____

(b) State one function of each of the following hormones (2mks)

(i) Juvenile hormone.

_____

_____

_____

(ii) Ecdysone.

_____

_____

_____

24. State the category of variation into which the following traits fall (2mks)

(i) Blood group.

_____

_____

_____

(ii) Skin pigmentation.

_____

_____

_____

25. Differentiate between heterozygosity and homozygosity. (2mks)

_____

_____

_____

26. Explain “struggle for existence” and “survival of the fittest” as they apply to natural Selection. (4mks)

_____

_____

_____

_____

_____

_____

27. State three differences between transmission through the endocrine system and nervous System. (3mks)

_____

_____

_____

_____

28. (a) (i) Which eye defect is corrected by bifocal lens. (1mk)

_____

_____

(ii) Name one cause of the eye defect. (1mk)

_____

_____

29. State three reasons why plants need support. (3mks)

_____

_____

_____

30.

(a) Identify the type of muscle shown above (1mk)

_____

_____

(b) Name two parts in the human body where the type of muscle named in (a) above is found (2mks)

_____

_____

_____

31. (a) Name two components of the endoskeleton (2mks)

_____

_____

_____

(b) The exoskeleton limits continuous growth. Explain (1mk)

_____

_____

_____

32. What is the function of a swim bladder in fish? (2mks)

_____

_____

_____

RDS 27

1. (a) Explain why lysosomes are sometimes called 'suicidal bags' 1 mark

.....
.....
.....

(b) Why are lysosomes more frequent in the phagocytotic cells than in other cells?2 marks

.....
.....
.....

2. Distinguish between osmosis and active transport 2 marks

.....
.....
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.....
.....
.....

3. The diagram below shows the base sequence of part of a nucleic acid strand.

T–T–A–G–C–T–G–A

(a) Giving a reason state whether it is part of a DNA or a RNA strand. 1 mark

.....
.....
.....
.....
.....

(b) Show the complementary RNA strand. 1 mark

.....
.....
.....
.....
.....

4. State **three** structural differences between biceps muscles and muscles of the gut. 3 mark

.....
.....
.....

……
……
……

5. Sugar was detected in the urine of a patient during a laboratory test.

(a) Name the type of sugar that was detected 1 mark

……

Name the hormone that is likely to have been deficient. 1 mark

……

(b) What is the name given to the condition the person was suffering from? 1 mark

……

6. Name the causative agent of the following human diseases. 3 marks

i) Pneumonia

……

ii) Cholera

……

iii) Gonorrhoea

……

7. Name **two** classes of phylum arthropoda which have a cephalothorax. 2 marks

……

……

8. State **three** adaptations of the proximal convoluted tubule to its function. 3 marks

……
……
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……...

9. (a) What is single circulatory system? 1 mark

……
……
……

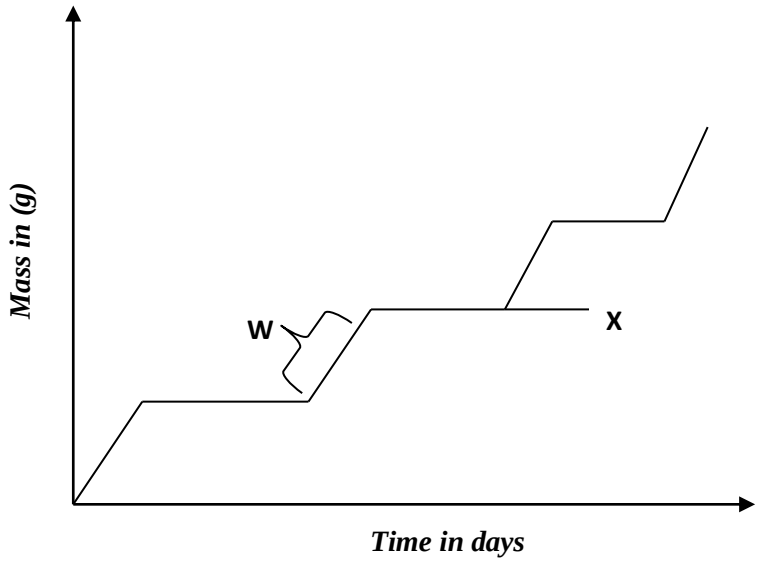
(b) Name an organism which has single circulatory system. 1 mark

……

(c) Name the opening to the chamber of the heart of an insect 1 mark

……

10. The graph below represents the growth of animals in a certain phylum



(a) Name the type of growth pattern shown on the graph. 1 mark

……

(b) Identify the process represented by X. 1 mark

……

(c) Name the hormone responsible for the process in (b) above 1 mark

……

11. (a) State the meaning of the following terms used in floral biology: 3 marks

(i) Incomplete flower

……

……

(ii) Actinomorphic flower

……

……

(iii)Zygomorphic flower

……

……

12. Explain why Lamarck's Theory of evolution is not accepted by biologists today.2 marks

……

……

……

……

13. State **two** types of movable joints found in mammals. 2 marks

……
……
……

14. State how alveolus of the lungs of a mammal is adapted to its function. 2 marks

……
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……
……
……

15. Two heterozygous pea plants were crossed. 40 seeds were collected

(a) How many of these seeds were likely to be homozygous? 1 mark

……

(b) How many different genotypes are there in the offsprings? 1 mark

……

16. (a) Name **three** types of cells that carry out photosynthesis. 3 marks

……

……

17. (a) What is environmental degradation? 1 mark

……

……

(b) State **three** cases of environmental concern that have resulted from the increased human population
in recent years 3 marks

……

……

……

18. Explain the role of the following factors in breaking seed dormancy 2 marks

(a) Light

……
……
……

(b) Soaking in water

.....
.....
.....

19. (a) What is meant by the term *sex-linkage?* 2 marks

.....
.....
.....

(b) Name two sex-linked traits in humans 2 marks

.....
.....
.....

20. What is the role of vascular bundles in plant nutrition? 3 marks

.....
.....
.....

21. (a) Where in a mammal is the ovum fertilized? 1 mark

……

(b) State **three** adaptations of human spermatozoa that enhances the process of fertilization 3 marks

.....
.....
.....

22. Enzyme + Substitute $\rightleftharpoons$ Enzyme + Product

From the equation above name **two** properties of enzymes exhibited in the equation 2 marks

.....
.....
.....

23. For each of the following types of cells state **one** way in which it is different from a typical animal cell. State the function of each type of cell.

a. Cell lining the trachea (windpipe) 1 mark

.....
.....
.....

b. Red blood cell 2 marks

.....
.....
.....

24. (a) What is homeostasis? 1 mark

.....
.....
.....

(b) Name **three** processes in the human body in which homeostasis is involved. 3 marks

.....
.....
.....

25. (a) State **two** ways by which plants compensate for their inability to locomote 2 marks

.....
.....
.....

(b) Explain why herbaceous plants don't grow to great heights 1 mark

.....
.....
.....

26. Give reasons why a woman excretes less urea when she becomes pregnant 2 marks

.....
.....
.....

27. State the functions of the following parts of the microscope 2 marks

a. (i) Condenser

.....
.....
.....

(ii) Mirror

.....
.....
.....

b. State the importance of the following in microscopy: 2 marks

(i) Cutting thin sections

.....
.....
.....

(ii)Staining

.....
.....
.....

RDS 28

1. (a) Why are cross- sections of a leaf for examination under light microscope cut using a sharp blade?

(1 mark)

……

……

(b) Name **two** organelles in plant cells that can be seen under low power objective lens. (2 marks)

……

……

2. State **two** roles of light stage of photosynthesis. (2 marks)

……

……

3. (a) If an organism has an active contractile vacuole, suggest its likely habitat. (1 mark)

……

(b) Give a reason for your answer in (a) above. (2 marks)

……

……

4. How would you prove that, a species of weaver birds in Tanzania belongs to the same species with a similar looking weaver birds in Kenya? (2 marks)

……

……

……..

5. The diagram below represents a cross- section through a certain part of a flowering plant.

(a) (i) Identify the part of the plant from which the cross- section was made. (1 mark)

……..

(b) In the diagram, shade the region which would be stained with dye if the plant was left to stand in a

solution of the dye for two hours. (1 mark)

6. (a) Name a factor that would denature enzymes. (1 mark)

……

(b) Give a reason why digestion of starch stops shortly after it enters the stomach. (1 mark)

……

……

(c) Give a reason why food particles do not normally get into the trachea yet the anterior opening leads

to the pharynx. (1 mark)

……
……
……

(a) Name a blood vessel with capillaries at both ends. (1 mark)

……

(b) Explain how blood pressure is maintained in arteries. (2 marks)

……
……
……

7. Name **three** processes by which water moves up in xylem vessels. (3 marks)

……

……

……

8. State **two** ways in which auto digestion in human beings is prevented. (2 marks)

……

……

9. The diagram below is an illustration of certain cells and surrounding cells.

(a) (i) Name cell Q (1 mark)

……

(ii) State the function of structure P (1 mark)

……

……

(b) Explain how structure named in a (i) above is adapted to function. (2 marks)

……

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10. State the ecological niche of earthworm. (2 marks)

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……

11. A patient was given a drug which caused afferent arteriole entering the glomerulus to dilate while efferent arteriole constricted. Explain the effect the drug had to the amount of urine produced. (3 marks)

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12. Distinguish between sex- linked and sex- limited traits. (2 marks)

……

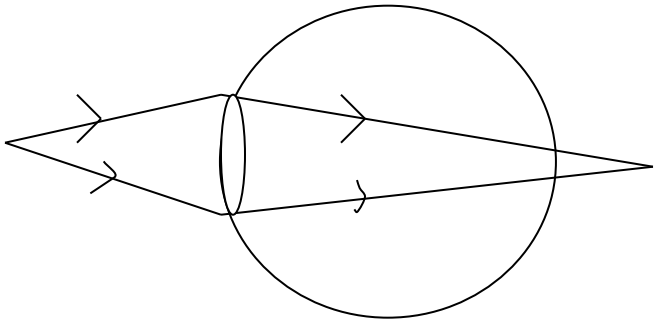
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13. The diagram below represents an eye defect.



(a) Identify the defect. (1 mark)

……

(b) Explain how the defect stated in (a) above can be corrected. (1 mark)

……

……

14. State the role of complete metamorphosis in insects. (2 marks)

……

……

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15. State **two** causes of mutations. (2 marks)

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16. A seedling was left on horizontal position. After a few days the growth pattern shown below was observed.

Explain the results shown above for the radical. (3 marks)

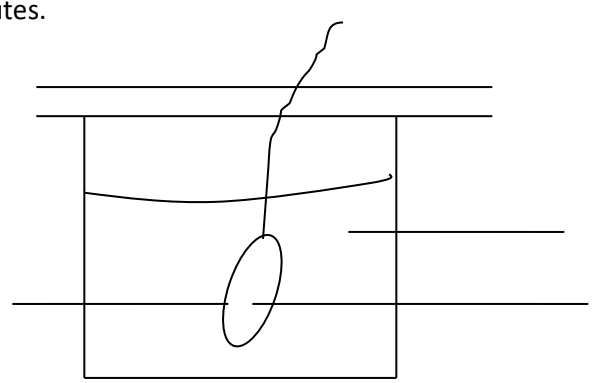
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17. A certain acaricide was continuously used in a cattle dip to control ticks that transmit East coast fever. After several years, the incidence of E.C.F in the cattle in the same location was higher than before. Suggest reasons why the incidence of the disease increased after several years. (3 marks)

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18. A student mashed a piece of ripe banana and made it into paste by adding water, placed the paste in a visking tubing and suspended it in a beaker containing iodine solution as shown below. The set-up was left for 40 minutes.



(a) State the physiological process under investigation. (1 mark)

……

(b) Account for the result obtained in the table. (2 marks)

……
……
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…

19. Explain how air currents increase the rate of transpiration. (2 marks)

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……
……

20. Name two methods which can be used to estimate the population of large animals in open grassland.

(2 marks)

……

……

21. State three major observable features of members of phylum arthropoda. (3 marks)

……

……

……

22. Below is a diagram of a certain plant. Study it and answer the questions that follow.

(a) Name the most likely habitat for the above plant. (1 mark)

……

(b) Explain how the plant is adapted to habitat you named in (a) above. (2 marks)

……

……

……

23. Explain how the following parts of a female reproductive system are adapted to function.

(i) Fallopian tube. (2 marks)

……

……

……

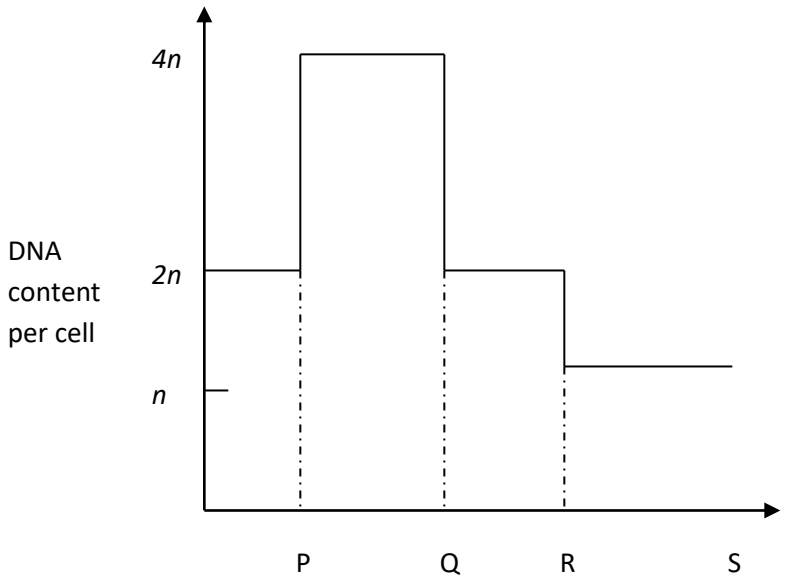
(ii) Uterus (1 mark)

……

……

……

24. The amount of DNA present per cell during several nuclear divisions is represented diagrammatically as shown below.



(a) What type of nuclear division is represented by the diagram? (1 mark)

……

(b) Name the phases represented by: (2 marks)

(i) P ……

(ii) R ……

25. What is greenhouse effect? (1 mark)

……

……

……

26. State **two** ways in which fungi are harmful to man. (2 marks)

……

……

……

……

27. State **two** differences between biceps and iris muscles of the eye. (2 marks)

……

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……

……

28. Explain why a crocodile can survive on 4 kg meat for a week yet this may not be enough for man for one day. (2 marks)

……

……

……

……

29. Explain why drug addicts are prone to HIV infection. (2 marks)

……

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……

……

30. State the role of insulin in human body. (1 mark)

……

31. What is artificial selection? (2 marks)

……
……

32. Give the two aspects of dichogamy in flowers. (2 marks)

……
……
……

RDS 29

1. What is meant by the term sex linkage. (1mk)

   ……

2. Part of one strand of DNA molecule was found to have the following sequence

   G-C-C- G – A – T- T – T – A – C – G – G

   What is the sequence

   (i) of the complimentary DNA strand? (1mk)

   ……

   (ii) On a m-RNA strand copied from this DNA portion? (1mk)

   ……

3. State **three** regions ion a plant where the end products of photosynthesis are translocated to? (3mks)

   ……
   ……
   ……
   ……
   ……

4. With reference to circulatory system only give **two** reasons why birds and mammals are more active compared to other organisms? (2mks)

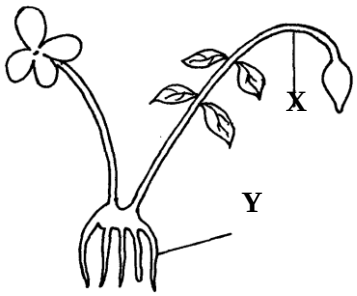
   ……
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5. (a) What **three** characteristics are used to divide the phylum arthopoda into classes? (3mks)

   ……
   ……
   ……
   ……
   ……

6. (b) The diagram below shows an organisms from a division in Kingdom plantae. Study it and answer

   the questions that follow.



(i) Identify the division from which the plant was obtained. (1mk)

……

(ii) Name the parts labelled **X** and **Z** (2mks)

X……..

Z……

7. What is the relationship between a genus and a species? (1mk)

……
……
……
……
……

8. A drawing of 3 cm was made of a giant spider whose actual length was 7cm. calculate the magnification of the drawing? (3mks)

9. Explain why osmosis is described as a special type of diffusion? (1mk)

10. ……
……
……

……
……

11. The following table shows the estimated number of organisms recorded in a dam.

Organisms	Number
Small fish	**3500**
Microscopic algae	**12000**
Crocodiles	**100**
Large fish	**950**
Mosquito larvae	**8900**

(a) Construct a possible food chain for the dam? (1mk)

(b) Construct a pyramid of numbers for the given data? (1mk)

(c) Explain the shape of pyramid obtained? (2mks)

……
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……

12. (a) Explain why leaves of most plants are thin and broad. (2mks)

……
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……

(b) State the function of the following enzymes during digestion in the stomach?

(i) Pepsin (1mk)

……

(ii)Renin (1mk)

……

13. Explain the following:

(i) Respiratory surface must be moist? (1mk)

……

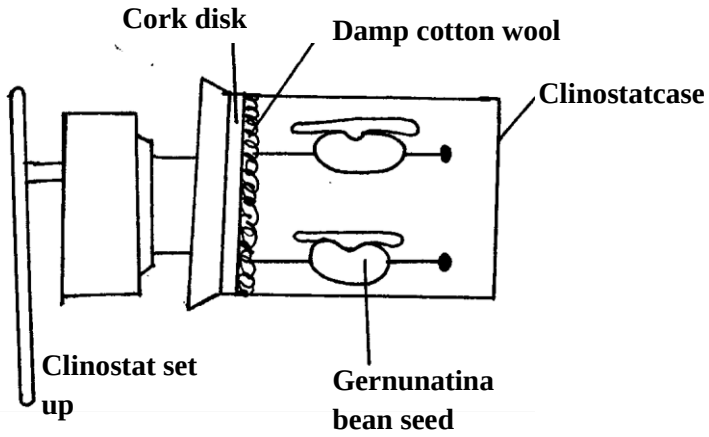
(ii) Respiratory surface must be thin (1mk)

……

(iii) Palisade cells are cylindrical shaped and arranged with long axis perpendicular to the leaf surface. (1mk)

……

14.



Germinating beans seeds were placed in the clinostat as shown in the diagram and left for three days.

(a) What is a clinostat. (1mk)

……

(b) The Clinostat was switched on and left to run for the three days. Suggest the direction the seedling will be facing at the end of the three days. (1mk)

……

(c) Give a reasons for your answer in (b) above? (1mk)

……

15. Explain why the body temperature of a healthy person rises slightly during humid days? (2mks)

……

……

16. Nocturnal animals such as owl are capable of seeing fairly at night. What **two** retinal adaptations have made this possible? (2mks)

……

……

17. State the function of the following organelles:

(i) Granulated Endoplasnic reticulum (1mk)

……

….

(ii) Nucleolus (1mk)

……

….

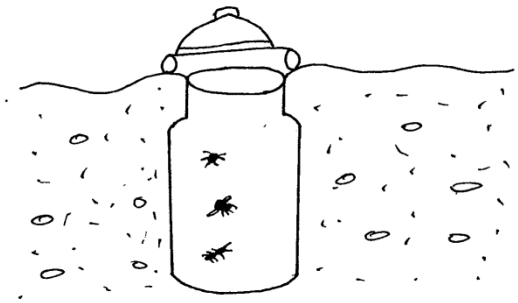
18. State **three** gaseous exchange sites in plants? (3mks)

……

……

……

19. The diagram below shows an apparatus used during collection of specimen or biological study.



(a) Identify the apparatus? (1mk)

……

(b) What is the use of the apparatus named above? (1mk)

……

20. List **three** limitations of fossil records as an evidence of organic evolution? (3mks)

……
……
……

21. Distinguish between enzyme co-factors and co-enzymes? (2mks)

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……

22. Give **two** reasons for the rapid growth during the exponential phase of growth curve? (2mks)

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……

23. Give **two** reasons why *Carolus Linneaus* preferred the use of latin language in the scientific naming of living organisms. (2mks)

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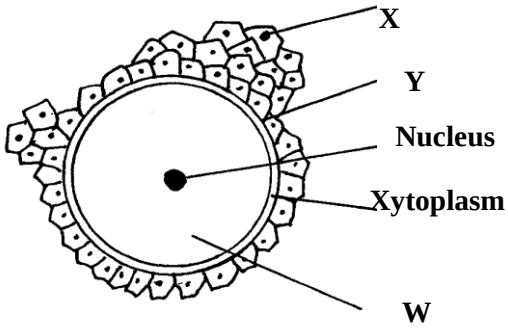
24. State **three** roles played by active transport in living organisms. (3mks)

……
……
……

25. List **three** factors affecting the rate of respiration? (3mks)

……
……
……

26. Study the diagram below and answer the questions that follow.



(a) Identify the cell (1mk)

.....
.....
.....

(b) Label the parts **X,Y** and **W** (3mks)

X

……

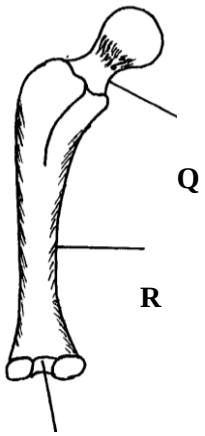
Y

……

W

……

27. The diagram below shows a bone of the hind limb. Study it and answer the questions that follow.



(a) Name the bone (1mk)

……

(b) Name the parts labelled **Q** and **A** (2mks)

Q……

A……

(c) Name the structure that articlualtes with the part labelled **Z** and the joint formed? (2mks)

Structure

……

Joint

……

.

28. List **two** functions of inter-vertebral discs between two adjacent vertebrae. (2mks)

……
……
……

29. Explain why it is becoming more difficult to treat malaria using chloroquine? (4mks)

……
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……
……
……

30. State **four** ways by which the ileum is adapted fro absorption of food materials? (4mks)

……
……
……

31. Name **two** processes that contribute to variation during gamete formation? (2mks)

……
……
……

RDS 30

1. State **three** ways in which protein are important to plant. (3marks)

   ……

   ……

   ……

2. Define **binominal nomenclature**. (1marks)

   ……

   ……

   ……

3. Name any **two** problems that animal species overcome by their dispersion. (2marks)

   ……

   ……

   ……

4. Explain why tropical forests do not have undergrowth (2marks)

   ……

   ……

   ……

5. How is blood pressure generated and maintained in a vein? (2marks)

   ……

   ……..

6. What is the function of catalase? (2marks)

   ……

   ……

   ……

7. (a) State the important of cross-pollination to flowering plants. (1mark)

   ……

   ……

   ……

(b) How is self-pollination a disadvantage to flowering plants? (1mark)

……

……

8. What is the role of light energy in autotrophic nutrition in spermatophyte? (2 marks)

……

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……

9. How is fur important to desert animal, other than in the regulation of their body temperature? (1mark)

……

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……

10. What are the functions of named product of white blood cells? (3 marks)

……

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……

11. Explain three adaptations of caridiac muscles to their function. (3 marks)

……

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12. (a) How does the placenta **maintain** pregnancy in human females? (1mark)

……

……

……

(b) State one **other** function of the placenta. (1mark)

……

……

……

13. What is **tidal volume** in ventilation in man? (1mark)

……

……

……..

14. Define peristalsis and state its importance in the nutrition of mammals. (2 marks)

……

……

(a) Name the structures on labeled on the diagram. (2 marks)

(b) State the importance of the length of the structure shown in the diagram. (1 mark)

……

……

…….

15. Why is the liver part of the digestive system? (2 marks)

……

……

…….

16. Explain why the pancreas is both an endocrine and an exocrine organ. (2 marks)

……

……

……

17. How is a nerve impulse transmitted from one neurone to the next? (2 marks)

……

……

……

……

18. State the importance of cytoplasmic filaments in sieve tube elements. (1 mark)

……

……

……

19. State any two characteristics of populations. (2marks)

……

……

……

……

20. Describe any **two** functions of mitosis? (2 marks)

……

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……

21. (a) What are alleles? (1 mark)

……

……

……

(b) Name a trait, in man, that is controlled by multiple alleles. (1mark)

……

22. What are the general causes of variations in species? (3 marks)

……

……

……

……

23. What are the external conditions needed, by root hair cells, for the uptake of mineral salts ions from the soil? (2 marks)

……

……

……

24. (a) what is the name of the structures present in the middle ear of man? (1mark)

……

……

……..

(b) What is the function of the structures in (a) above? (1mark)

……

……

…….

25. Suggest two reasons for the appearance of glucose in the urine of a man. (2 marks)

……

……

26. (a) What is the main function of meristems in shoot apices (1mark)

……

(b) How is the function you stated in (a) above influenced by auxins? (1mark)

……

……

27. Name two vestigial structures in man. (2marks)

……

……

28. (a) State the source Carbon (IV) oxide in aquatic ecosystems. (2 marks)

.....

.....

(b) State the importance of Carbon (IV) oxide to aquatic ecosystems. (2 marks)

……

……..

29. Study the diagram of the structure below end use it to answer the question that follow

(a) Name the class to which the specimen belongs. (1 mark)

……

……..

(b) State any two distinguishing characteristic of the phylum from which the structure was obtained. (2 marks)

……

……

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……..

30. What is the homeostatic importance of cuticles of leaves? (2marks)

……

……

……...

31. Explain why the wings of birds and those of insects are not homologous. (1mark)

……

……

……..

32. Outline two functions of parenchyma cells in herbaceous plants. (2 marks)

……

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……..

33. Distinguish between incomplete and complete metamorphoses. (1 mark)

……

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……

34. What is the important of diffusion to red blood cells? (2 marks)

……

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……

35. Account for the thick wall and narrow lumen of an artery. (2marks)

……

……

36. How do pathogens that enter the body through the respiratory tract in man prevented from causing diseases? (1mark)

……

……

37. Where does the detoxification of ammonia take place in mammals? (1mark)

……

……

38. The diagram below shows a cell of the Kingdom Protoctista use it to answer the questions that follow it.

(a) Name the cell …… (1 mark)

(b) Explain how it maintains its osmotic pressure. (1mark)

……

39. Name the processes that take place in the grana of chloroplast. (2marks)

……

……

RDS 31

1. (a) What is meant by the term sex-linkage? (1 mark)

……

……

b) State the first law of inheritance. (2 marks)

……

……

……

2.State the role of the following bacteria in the nitrogen cycle. (3mks)

(a) Nitrosomonas

……

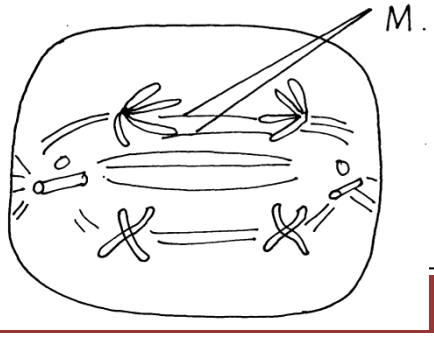
(b) Nitrobacter

……

(c) Azotobacter

……

3. The diagram below represents a stage during cell division.



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

……..

ii) Give **two** reasons for your answer in **a(i)** above. (1mk)

……

……

4. Below is the diagram of a bone. Study it and answer the questions that follow.



(a) Identify the bone. (1mk)

……

(b) Name the joints that would be formed in the posterior and anterior end of this bone. (2mks)

Posterior end ……..

Anterior end…….

5.Give necessity of support in plants. (3mks)

……

……

……

6.Name two structures in herbaceous stems that enhance their support. (2mk)

……

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……

7. a) Define the term immunity. (1mk)

……

……

……

……..

b) Distinguish between natural immunity and acquired immunity. (1mk)

……

……

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……

c). Identify one immunizable disease in Kenya. (1mk)

……

8.State three differences between osmosis and active transport. (3mk)

……

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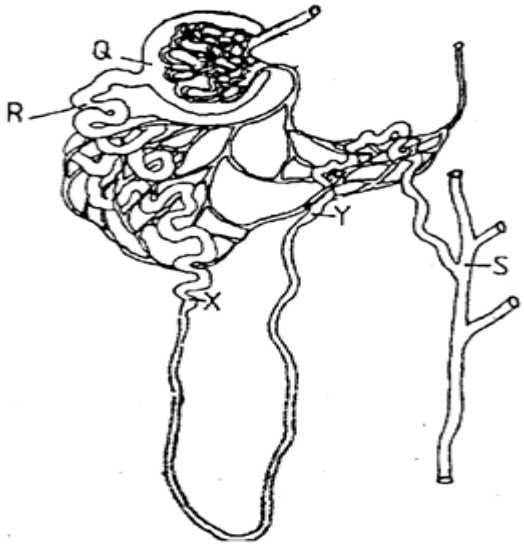
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9.The diagram below illustrates part of a nephron from a mammalian kidney.



a) Name the fluid found in the part labeled Q. (1mk)

……
.

b) Identify the process responsible for the formation of the fluid named in (a) above.(1mk)

……

c) Which two hormones exert their effect in the nephron? (2mk)

……

……

10.State three characteristics of members of kingdom Monera that are not found in other kingdoms.

(3mk)

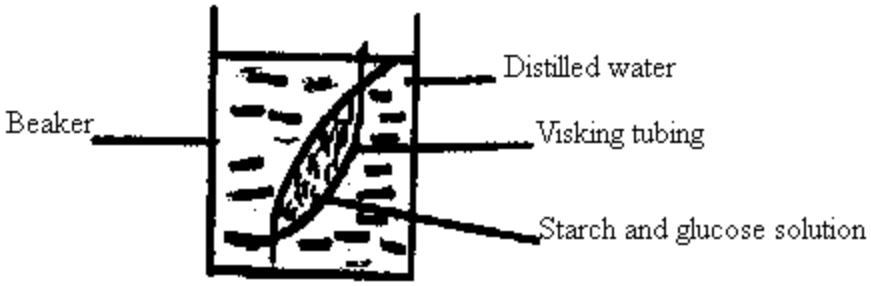
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11 An experiment set-up shown below were to investigate a certain process



After 20 minutes; a student tested the sample from the beaker for starch and glucose. The results were recorded in the table below.

Time	Start	after 20 minutes
Starch	Absent	Absent
Glucose	Absent	Present

a) Explain the presence of glucose in the water sample. (1 mark)

……

……

……

……

b) What change occurred in volume of liquid in:-

i) Beaker (1 mark)

……

……

…….

ii) Visking tubing (1 mark)

……

……

12. Write the sequence of messenger RNA (M-RNA) that would be coded from the DNA strand shown below.
(1 mark)

_____C_____A_____T_____G_____A_____A_____G_____T

Sequence of RNA.

13 Give the role of the following parts of the male reproductive system. (3 marks)

a) Epididymis

……

b) Prostrate gland

……..

c) Urethra

……...

14. Fill the blanks in the table below.

ORGAN	HORMONE	FUNCTION
PITUITARY		i) Causes ovulation ii) Stimulate production of progesterone
OVARIAN TISSUE	OESTROGEN	
PITUITARY	FOLLICLE STIMULATING HORMONE	

(3mks)

15. Name the fins that prevent the following movements of fish during swimming. (3mks)

i) Yawing……...

ii) Pitching……

iii) Rolling…….

16.a) Name **two** disorders in humans caused by gene mutation. (2mks)

……....

……

b) Describe the following chromosomal mutations; (2mks)

i) Inversion……

……

ii) Translocation……

……

17. State **three** reasons for loss of energy from one trophic level to another in a food chain. (3mks)

……
……
……
……
……
……

18 a) Name the part of the eye where image is formed. (1mk)

……

b) State **two** characteristics of the image formed on the retina. (2mks)

……
……
……

19. Name a support tissue in plants that is thickened with cellulose. (1mk)

……
……
……

20. State **two** functions of luteinizing hormone in reproduction. (2mks)

……

……

……

……

21. Give the meaning of the following terms. (2mks)

i) Protandry……

……

ii) Self-sterility……

……

22.a) State the difference between ball and socket and hinge joint. (1mk)

……
……
……

b) State the functions of synovial fluid. (2mks)

……..

……...

23.The diagram below shows the teeth of a certain animal. Use it to answer the questions that follow.



a).Identify the mode of feeding exhibited the animal shown above. (1 mark)

……
……

b). Give a reason for your answer in (a) above. (1 mark)

……

……

……

24. Enzymes are important in various physiological processes in living things

a). Differentiate between an enzyme and a hormone. (2 marks)

……

……

……

……

……

b). Name the property of an enzyme exhibited by the Lock and Key Hypothesis. (1 mark)

……

……

25. State the role of each of the following features found in the human gaseous exchange system (2mks)

a). Goblet cells

……

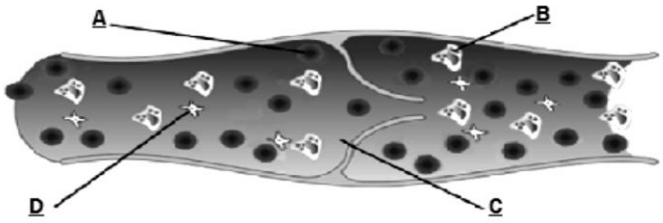
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b). Rings of cartilage

……

……

26. The diagram below show a blood vessel



a) Giving a reason, identify the blood vessel shown above. (2 marks)

……

……

b) Name the enzymes present in A and D. (2 marks)

……

……

27. Oil is one of the pollutants of water in major water bodies

a). In what ways is oil as a pollutant affect the following organisms:

i. Fish (1 mark)

……

……

ii. Mosquito larvae (1 mark)

……

……

iii. Aquatic birds (1 mark)

……

……

28. Name two sites for gaseous exchange in floating aquatic plants. (2 marks)

……

……

29.Explain what happens to a tadpole when there is insufficient iodine. (2 marks)

……

……

……

30. Name the diseases caused by the following organisms.

a) Wucheraria bancrofti (1 mark)

…….

b) Treponema pallidum (1 mark)

……..

RDS 32

1 State two features of each of the following taxa (4mks)

i) Insect

……

……

ii)Pteridophyta

.....

.....

(iii) State three factors that cause seed dormancy? (3mks)

……

……

……

……

(iv) How are red blood cells adapted to their function? (3mks)

……

……

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……

……

……

(v) In what ways do muscle fibres of the biceps differ from those of the stomach? (4mks)

……

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……

……

……

(vi) What is adaptive radiation? Give two examples (3mks)

……

……

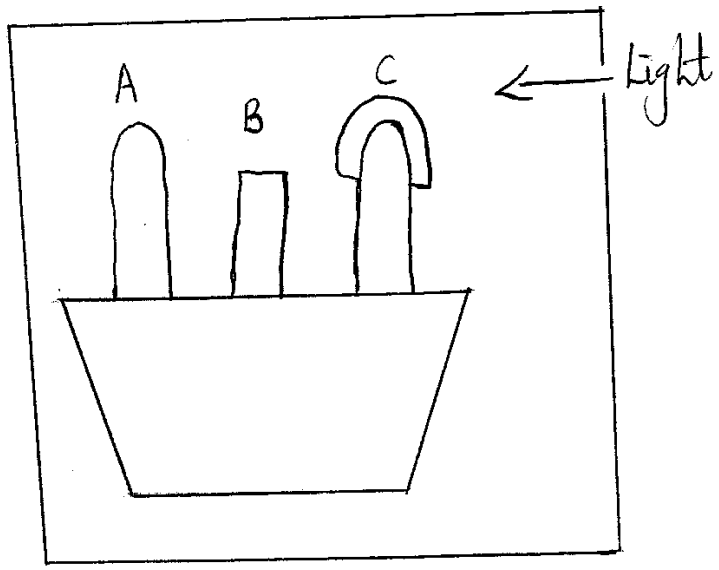
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(vii) An experiment was set up as shown using wheat seedlings



A – Left intact.
B – Tip decapitated
C – Tip covered with aluminium foil.

State the role of each of the following seedlings

(i) Seedling A (1mk)

……

(ii) Seedling B (1mk)

……

(iii) Seedling C (1mk)

……..

(viii) Name the organelles in which the following process occur (3mks)

a) Synthesis of ribosomes

……..

b) Synthesis of lysosomes

……..

c) Packaging of secretions

……

(ix) Define the following terms as used in evolution (2mks)

a) Vestigial structures

……..

b) Isolation

……

(x) i) Explain the importance of contraction of erector pili muscle of a mammal skin. (1mk)

……..

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……

ii) Give two functions of sebum (2mks)

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(xi) Distinguish between diffusion and active transport (2mks)

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11. i) What is excretion (1mk)

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ii) State three nitrogenous wastes excreted by animals (3mks)

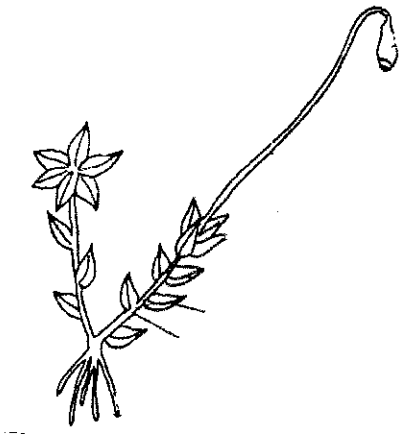
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12. The figure below represents a member of a plant kingdom.



i) Name the division (1mk)

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……

ii) State two characteristics of members of the division (2mks)

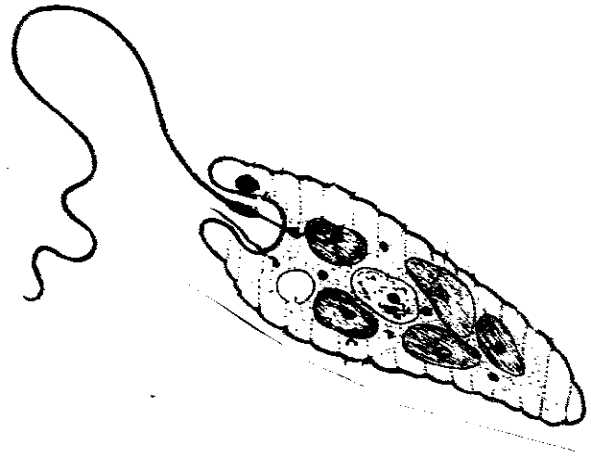
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13. The diagram below represents an organism



a) Name the kingdom to which the organism belongs (1mk)

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b) Suggest the habitat in which the organism lives (1mk)

……..

c) Give two reasons of your answer (2mks)

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14. State two factors that denature enzymes (2mks)

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15. State the importance of the following process that take place in the nephron of a human Kidney

a) Ultrafiltration (1mk)

……

……

b) Selective reabsorption (1mk)

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16. State three factors that affect the rate of active transport (2mks)

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17. a) What is a chromosal mutation? (1mk)

……

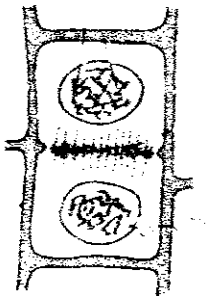
……

b) State two causes of chromosal mutations (2mks)

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……

18. The diagram below shows a state of cell division in a plant structure.



a) Name the stage of cell division (1mk)

……

b) Name the part of the plant in which this cell division takes place. (1mk)

……

19. State two functions of the pituitary glands (2mks)

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20. Explain why a person suffering from malaria easily gets muscle cramps. (2mks)

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21. Describe two biotic factors in ecosystems (2mks)

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22. Account for the following phases of a sigmoid curve of growth of organisms.

a) Lag phase (2 mks)

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……

b) Exponential phase (2 mks)

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c) Plateau phase (1 mk)

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23. Describe the process of double fertilization in flowering plants (4mks)

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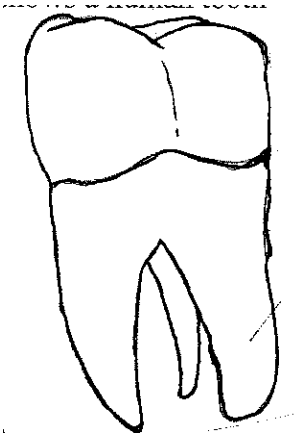
……

24. State the products of the light reaction stage of photosynthesis (2mks)

……

……

25. The diagram below shows a human tooth



a) Identify the tooth (1mk)

……..

b) How is the tooth adapted to its function (2mks)

……

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26. Write a chemical equation summarizing the process of anaerobic respiration in plants. (1 mk)

……

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27. Name one animal cell that has no nucleus when fully development. (1 mk)

……

……

28. Define heteroflyly. (1 mk)

……

……

29. State two factors within the seed that would cause seed dormancy. (2 mks)

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30. What two ideas are propoised byJean Baptiste Lamarck's theory? (2 mks)

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31. Outline one reason why blood clotting does not occur inside blood vessels.

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RDS 33

1 State the role of light in photosynthesis (1mk)

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2. Name **two** functions of sodium in human body (2mks)

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……

3. List down the processes responsible for ; (2mks)

(i) The formation of glomerular filtrate

……

……

(ii) (ii) Absence of glucose and amino acids in urine.

……

……

4. (a) State the functions of the following parts in a cell (2mks)

(i) Nucleolus

……

……

(ii) Smooth endoplasmic reticulum

……

……

(b) Name an organelle that would be found in large numbers in cells of secretory glands (1mk)

……

……

5. Identify the use of the following apparatus (3mks)

(i) Bait trap

……

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(ii) Specimen bottle

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(iii) Pitfall trap

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6. (a) Why is osmosis regarded as a special case of diffusion (1mk)

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(b) List down two importance of active transport in animals (2mks)

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7. (a). Define the term allele 1mk)

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a dominant gene and a recessive gene (2mks)

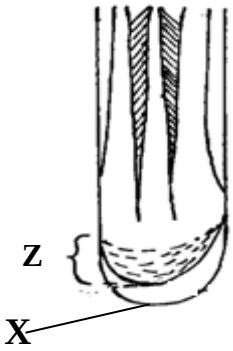
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8 Study the diagram below and answer the following questions.



(a) (i) Identify the part labelled **X** (1mk)

……

……

(iii) State the function of part **X** above (1mk)

……

……

(b) List down **two** characteristics of cells in the region labelled **Z** (2mks)

……

……

……

9(a) What is meant by the following terms; (2mks)

(i) Ecosystem

……

……

……

(ii) Carrying capacity

……

……

(b) Give **two** ways on how hydrophytes are adapted to the process of gaseous exchange (2mks)

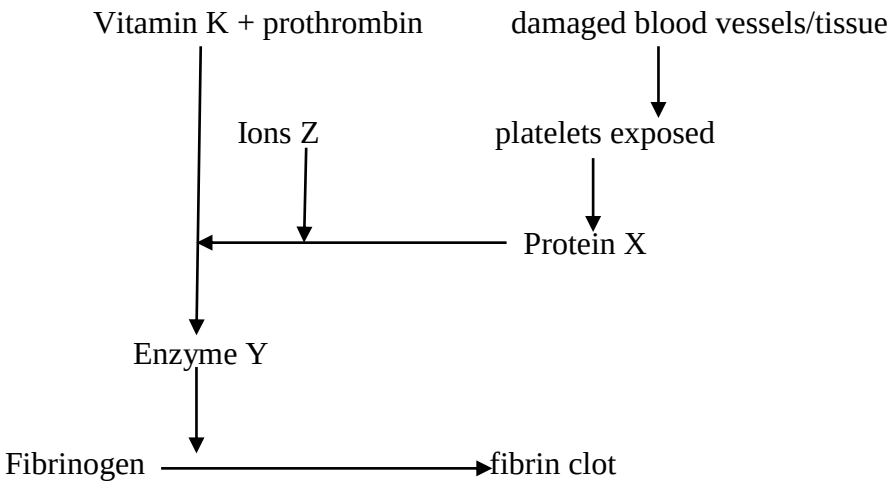
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10. The scheme below illustrates the blood clotting process;



(a) Identify the following; (2mks)

(i) Protein X

……

(ii) Enzyme Y

……

(b) State down the role of ions Z in the scheme above

(1mk)

……

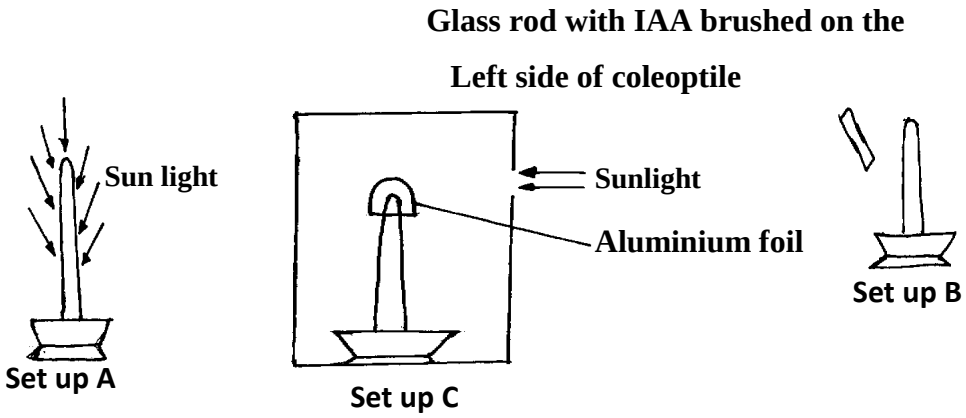
(iii) Name a trait in humans determined by multiple alleles

(1mk)

……

11. Oat coleoptiles were used in the experiment set ups shown below. Study the set-ups and answer

The following questions.



(a) What type of response was being investigated above?

(1mk)

……

(b) Which of the set up above would act as a control experiment?

(1mk)

……

(c) Explain what happened in set up B after 24 hours

(2mks)

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12. The equation below represents a process in a mammalian liver

Amino acid ⟶ Organic compound+ Urea

(a) Name the process shown by the equation above (1mk)

……

(b) List down a carbohydrate that is;-

(i) Stored in the mammalian liver (1mk)

……

(ii) Found in abundance in mammalian blood (1mk)

……

13. a) Distinguish between homologous structures and analogous structures (2mks)

……

……

b) State a major shortcoming in Jean Baptiste de Lamarck's theory of evolution (1mk)

……

14. a) List down **two** differences between closed and open circulatory systems (2mks)

……

……

b) Name **two** ways in which heart muscles are special (2mks)

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……

15. a) State **two** physiological mechanisms of controlling the human body temperatures during a hot day (2mks)

……

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b) Name **two** ways in which loop of henle is adapted to its function (2mks)

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16. a) State the function of Juvenile hormone in insect metamorphosis (1mk)

……

b) Give a reason why most insects are serious crop pests at the larval stage (1mk)

……

(ii) What happens at growth phase in insects growth curve (1mk)

……

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17. What are the effects of releasing excess nutrients into lake Naivasha by the nearby flowers farms? (3mks)

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18. State **three** ways how HIV and AIDS is transmitted in human population (3mks)

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19. List **three** characteristics that distinguish arthropods from organisms in kingdom Monera (3mks)

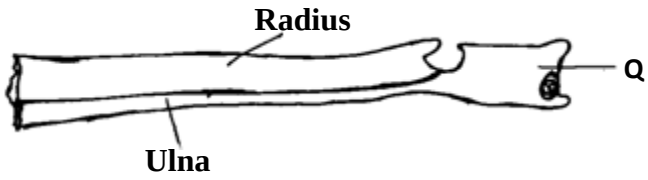
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20. Study the bones below and answer the questions that follow;



(a) Identify the function of the part labeled **Q** (1mk)

……

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(b) Name the bone that circulates with the bone above at the proximal end (1mk)

……

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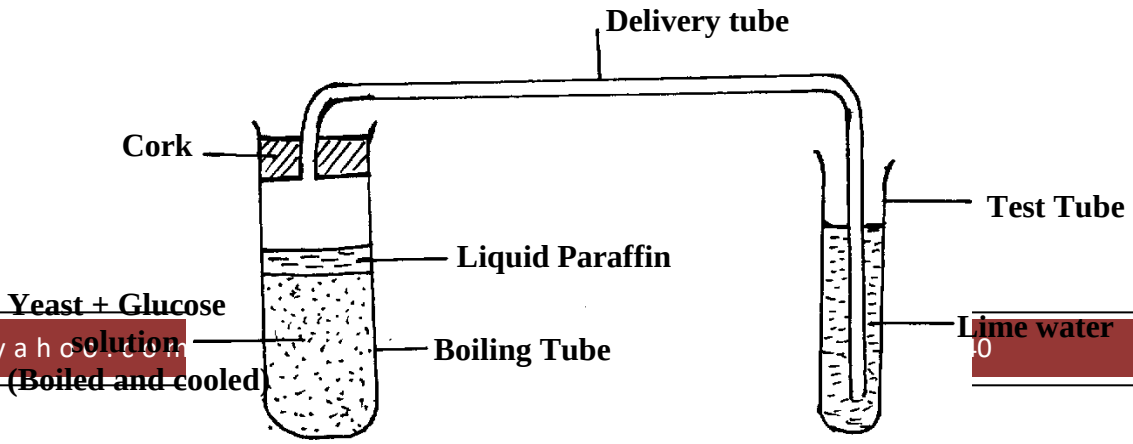
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(c) List down **two** types of support tissue in plants (2mks)

……

……

21.Form two students set up an experiment as shown in the diagram below;



stanleymuthamia@yahoo.com

(a) Which process was being investigated? (1mk)

……

……..……

(b) Why was it necessary to boil the glucose solution? (1mk)

……

……

(c) Write a word equation representing the chemical reaction taking place above in the boiling tube (1mk)

……

……

22. Name **two** types of active immunity (2mks)

……

……

……

……

23. State how the following parts of the mammalian ear are adapted to their functions. (3mks)

(i) Pinna……

(ii) Eardrum……..

(iii) Cochlea……..

24. (a) A passager was involved in a road accident. He couldn't move his limbs and neck. Which part of the brain was affected? (1mk)

……

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……

(b) (i)State **two** functions of cerebrospinal fluid. (2mks)

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25. State the importance of breathing through the nose than through the mouth .(2mks)

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26. a) Identify the type of asexual reproduction exhibited by yeast cells (1mk)

……

b) List down the functions of the following parts; (3mks)

i Testis……

ii) Fallopian tube……

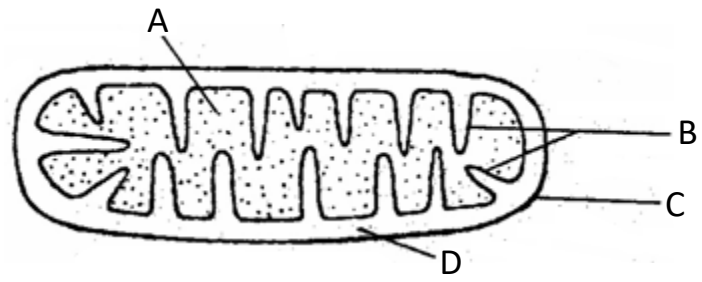
iv)Urethra……

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1. Name the causative agent of cholera. (1 mark)

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2. The diagram **below** represents a cell organelle.



(a) Identify the organelle. (1 mark)

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.....

.....

(b) Name the part labelled **B**. (1 mark)

.....

.....

.....

.....

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

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3. State the functions of the following parts of a light microscope.

(a) Condenser. (1mark)

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.....

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.....

(b) Diaphragm. (1 mark)

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.....

4. (a) Explain **three** ways in which a red blood cell is adapted to its function. (3 marks)

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(b) In which form is carbon (IV) oxide transported. (1 mark)

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5. State the functions of the following organelles.

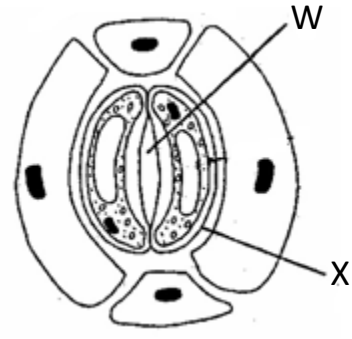
(i) Centriole. (1 mark)

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.....
.....
.....

(ii) Nucleolus. (1 mark)

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.....

6. The diagram **below** shows part of plant tissue.



(a) Name cell labelled **X** and part labelled **W**. (2 marks)

X _____

W _____

(b) State **two** adaptations of cell labelled **X** to its function.

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.....

7. (a) Differentiate between hypogeal germination and epigeal germination. (2 marks)

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(b) State **two** causes of dormancy in seed. (2 marks)

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8. (a) Define polyploidy. (1 mark)

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(b) Name **three** disorders resulting from gene mutations. (3 marks)

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9. (a) Distinguish between homologous and analogous structure. (2 marks)

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(b) Explain the term continental drift as used in evolution. (2 marks)

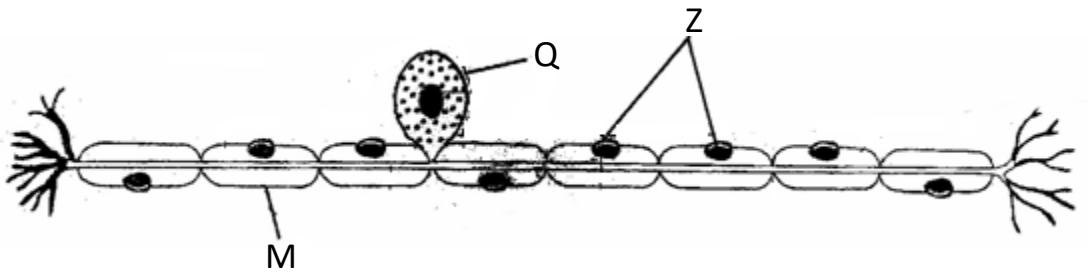
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10. The diagram **below** represents a sensory cell.



(a) Identify with a reason the type of neurone above. (1 mark)

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Reason: (1 mark)

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(b) Name parts labelled. (2 marks)

Q _____

Z _____

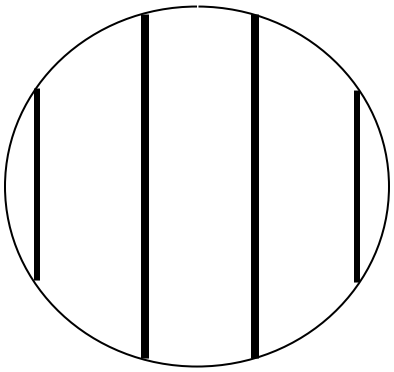
11. (a) Name **three** supportive tissues in plants. (3 marks)

(i) _____
(ii) _____
(iii) _____

(b) Name the type of muscles found in the gut. (1 mark)

_____

13. A form one student trying to estimate the size of onion cells observed the following on the microscope's field of view.



(a) Define the term resolving power. (1 mark)

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(b) If the student counted 20 cells across the field of view calculate the size of one cell in micrometers. (2 marks)

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13. (a) Distinguish between transpiration and guttation. (2 marks)

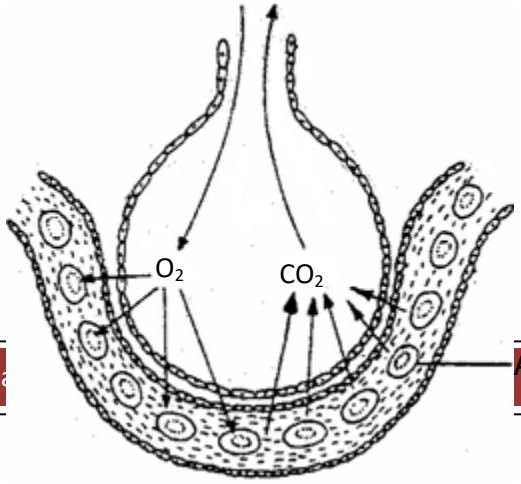
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(b) State **two** importance of guttation in hydrolytes. (2 marks)

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14. The diagram **below** shows the exchange of gases in alveolus.



(a) State how the alveoli are adapted to their function. (3 marks)

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(b) Name the cell labelled **A**. (1 mark)

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15. (a) Distinguish between respiratory quotient and oxygen debt. (2 marks)

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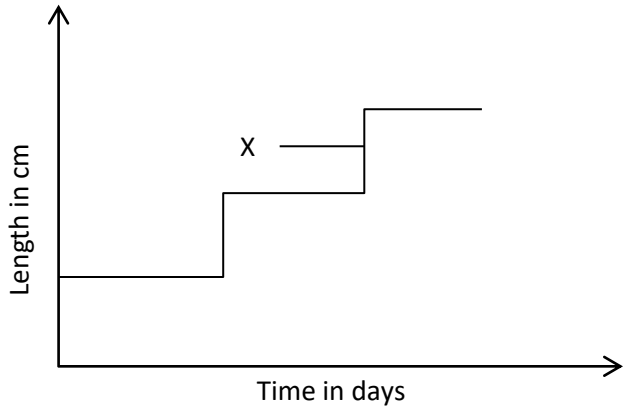
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(b) Name the site where anaerobic respiration occurs in the cell. (1 mark)

_____

16. Study the graph **below** and answer the questions that follow.



(a) What is the name given to the type of graph? (1 mark)

_____

(b) What is the name used to describe point **X**. (1 mark)

_____

(c) State the importance of part **X**. (1 mark)

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(d) Name the phylum in which the graph represented in above occurs. (1 mark)

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17. (a) Define the term natural selection. (1 mark)

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(b) Name **three** evidence of organic evolution. (3 marks)

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18. State **one** adaptation of the following parts of mammalian eye.

(i) Fovea centralis. (1 mark)

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(ii) Sclera. (1 mark)

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(iii) Cilliary body. (1 mark)

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19. Name the cartilage found between vertebrae of the vertebral column. (1 mark)

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.....

20. (a) Differentiate between gaseous exchange and ventilation. (2 marks)

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(b) Name the respiratory sites of the following:

(i) Fish (1 mark)

_____

(ii) Insects (1 mark)

_____

21. (a) Name **two** cardiovascular diseases. (2 marks)

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……
……

(b) If the nerve supply to the heart of a mammal is severed the rythymic heart contraction and relaxation will go on and heart continues to beat. Explain why.(2 marks)

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22. Name **two** major branches of Biology. (2 marks)

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23. (a) State the functions of the following apparatus.

(i) Bait trap. (1 mark)

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.....

(ii) Pooter. (1 mark)

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24. State **two** structural adaptations of veins to their function. (2 marks)

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25. Name the process that results to formation of tissue fluid. (1 mark)

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26. What is serum? (1 mark)

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