

LANJET 2022

MARKING SCHEME BIOLOGY PAPER 1 AUGUST-SEPTEMBER 2022

1. Explain why:
 - (a) Red blood cells burst when placed in distilled water while plant cells remain intact. (2mks)
 - **Red blood cells takes in water by osmosis. They swell and exert pressure on the fragile plasma membrane which then burst a process called haemolysis.**
 - **Plant cell take in water by osmosis and swell but do not burst. It has a cell wall made up of cellulose which makes it to be turgid.**

2. State why the following processes are essential in living organism.
 - (a) Irritability (1mk)
 - **Enable organisms to detect and adjust to changing environmental conditions.**

 - (b) Respiration (1mk)
 - **Provide cells with the energy to carry out the various life processes.**

3. The diagram below shows a type of epithelial tissue.
 - (a) What is the name of the hair-like processes (1mk)

Cilia

 - (b) What is the function of the hair-like processes? (1mk)
 - **To move/waft materials over the epithelial**

 - (c) Name two mammalian organs where this type of epithelium is found. (2mks)
 - **Trachea**
 - **oviduct**

4. Differentiate between a competitive and non- competitive enzyme inhibitors. (2mks)
 - **Competitive enzyme inhibitors they bind temporary to the enzymes active site them by preventing the normal substrate from binding, the inhibitors compete with the normal substrates**
 - **Noncompetitive inhibitors binds at a site different from the active site in such that it alters the shape of the active site. It prevent the normal substrate from binding to the active site.**

5. What is the importance of photosynthesis in nature? (2mks)
 - **Through photosynthesis plants make organic compounds, these forms the sources of food for animals**

- **Through photosynthesis oxygen is released in the atmosphere which is used by animals for respiration to yield energy.**
6. Explain what happens to glucose formed by photosynthesis in a dicotyledonous leaf. (2mks)
- **Glucose is broken down to carbon (iv) oxide and water during respiration providing energy for the various energy requiring processes.**
 - **Glucose is converted to sucrose and transported to other parts of the plant where it is used for respiration.**
7. A patient whose blood group A died shortly after receiving blood from a person of blood group B. Explain the possible cause of death of the patient. (3mks)
- **The patient's red blood cells have antigen A on their membrane and his plasma has anti-bodies. The donor's red blood cells have antigen B on their membrane and his plasma has anti-antibodies. After transfusion, the anti –b antibodies. In the patient's plasma related with B antigens on the donor's red blood cell membrane. This led to clumping together of the donor red blood cells a process called haemagglutination.**
 - **This may have caused blockage of capillaries in a vital organ like the heart or brain leading to death.**
8. The diagram below is a transverse section of a certain part of a plant.
- (a) Which part of the plant was the section made from (1mk)
- **Young Dicotyledonous root**
- (b) Give a reason for your answer in (a) above (2mks)
- **Presence of a star-shaped xylem with phloem strand lying between the arms of the star.**
 - **The presence of root hairs.**
9. Explain why water logging of the soil may lead to death of plants. (2mks)
- **Water logging causes air spaces in the soil be occupied by water. Roots fail to obtain oxygen thus preventing respiration This cause death of the roots and finally the plant also dry up.**
10. Explain why smokers are more prone to respiratory tract infections than non-smokers. (2mks)
- **Cigarette smokes is known to inhibit the action of cilia in the respiratory tract.**
 - **The result is accumulation of dust particularly bacteria and mucus. The bacteria may invade the cells of the mucous membrane causing diseases. As a result smokers get frequent respiratory tract infections.**
11. (a) In mammals hemoglobin is confined to red blood cells. Give two advantages of this (2mks)
- **If hemoglobin were dissolved in plasma, the osmotic pressure of blood would increase considerably. This will interfere with physiological processes.**
 - **Hemoglobin were dissolved in plasma, the viscosity of blood would increase considerably.**

(b)The blood of insects does not contain an oxygen carrying pigment. Give an explanation for this. (2mks)

- **In insect, the tracheal system takes oxygen directly to the tissues. For this reason, it is not necessary for their blood to have an oxygen binding pigments.**

12. In a man, aerobic breakdown of glucose yields 2880kj- of energy whereas anaerobic breakdown yields 150kj-. Give an explanation to account for this difference. (3mks)

- **During aerobic respiration, glucose is completely oxidized to carbon (iv) oxide and water with the release of large amount of energy.**
- **During anaerobic respiration, glucose is partially oxidized lactic acid, this releases only part of the energy present in the glucose molecule while the rest remain locked up in the bonds of lactic acid molecule.**

13. Give any two excretory organs in mammals and name the substrate they excrete. (2mks)

<u>Excretory organs</u>	<u>Substance excrete</u>
Skin	water, urea and salts
Lungs	carbon (iv) oxide and water
Kidney	urea, water and salts
Liver	Bile pigments (bililrubin & bilirubin)

14. Name two classes of animals that excrete

a) Nitrogenous waste products mainly in the form of uric acid. (2mks)

- **Aves**
- **Reptilia**
- **insecta**

b) Give two advantages of excreting nitrogenous waste products in the form of uric acid as compared to urea. (2mks)

- **Uric acid is insoluble and non-toxic and therefore requires very little water to eliminate. This will conserve water in animal's body.**
- **Since uric acid requires only a little water to eliminate, animals that excrete it do not need to carry a lot of water in their cells.**

15. What are the excretory organs of insects (1mk)

Malpighian tubules

16. Insects are found in almost all parts of the world. List three features that make them very successful animals. (3mks)

- **A hard exoskeleton which supports the insect above the ground.**
- **A water proof waxy layer over the exoskeleton which reduce evaporation thus conserving water.**

- **An efficient tracheal system for gaseous exchange**
- **Ability to fly in most insects which makes it easier for them to spread to new areas**
- **Internal fertilization which eliminate the need for water to achieve successful reproduction.**
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17. Explain why only a small part of the food materials taken up by herbivores is passed on to secondary consumers. (3mks)

- **Herbivores feed on [plant material. Most of the food they eat passes through the digestive tract as undigested matter that is removed as faeces. The digested materials are absorbed into the bloodstream and conveyed to various tissues of the body. Most of the absorbed food materials are used in respiration. The materials are broken down into carbon(iv) oxide and water with release of energy. It account, for only small portion of the consumed food that can pass on to the secondary consumer**

18. Explain the following terms. (2mks)

(a) Nitrifying bacteria.

- **There are class of bacteria that oxidize ammonium compounds to nitrates e.g nitrococcus and nitrobacter**

(b) Nitrogen fixing bacteria.

- **These are bacteria that convert atmospheric nitrogen into ammonia gas. Eg Rhizobium**

19. Explain why petals and sepals are referred to as the accessory parts of a flower. (2mks)

- **They are not directly involved in the reproductive process. They assist in process with sepals protecting the young flowers and the petals attracting pollinating insect.**

20. If the ovaries of a woman are removed during the first four months of pregnancy miscarriage is very likely to occur. However if they are removed after the forth monthly pregnancy an proceed normally. Explain (3mks)

- **During the first four months of pregnancy the corpus luteum which is found in the ovary is the main source of progesterone and oestrogen. These hormones are responsible for maintain the inner lining of the uterine wall in such a way that it is able to provide nourishment for the developing foetus. By about fourth month of pregnancy, the placenta takes over as the source of the two hormones. When ovaries are removed during the first four months, secretion of progesterone and oestrogen cease. This will lead to shedding of the inner lining of the uterine wall causing miscarriage. When ovaries are removed after fourth month, they will not have major effect on the level of progesterone and oestrogen and pregnancy will proceed normally.**

21. Animals with external fertilization produce large number of eggs whereas those with internal fertilization produce fewer eggs. Suggest an explanation for this differences. (3mks)

- **Animals with external fertilization, eggs are released in water. The chances of an egg meeting with a sperm are low. To ensure that a substantial number of eggs are fertilized which is important for the survival of the species. Very large numbers are produced. For animals with internal fertilization, the sperms in the female's reproductive tract where they meet the egg. This increases chances of fertilization removing the need of producing many eggs.**

22. State the difference between the composition of foetal blood entering the placenta (2mks)

- **Foetal blood entering the placenta is rich in waste products like carbon dioxide and urea and poor in oxygen and nutrients like glucose and amino acids. Foetal blood leaving the placenta is rich in oxygen and nutrients and poor in waste products. (Metabolic waste)**

23. Man hammered a nail two meters from the ground surface in the stem of a ten metres tall tree. Two years later, the tree had grown taller and thicker. Explain where would expect to find the nail.

(2mks)

- **The nail would be at the same height of two metres above the ground surface. This is because a tree grows vertically through the addition of new tissues at the tip of the shoot. The nail would however be embedded inside the stem. This is because a tree increases in width through the addition of new tissues at the periphery burying the old tissues on the inside.**

24. The cells shown below were obtained from different parts of a young root tip. Give the name of the zone from which each cell was obtained. (3mks)

- (i) 1 **Zone of cell elongation**
- (ii) 2 **zone of cell division**
- (iii) 3 **zone of cell differentiation**

25. The letter A and a represent the dominant and recessive genes for a particular trait. Write down the genotype of the following

- a) **Homozygous dominant**

AA

- b) **Heterozygous dominant**

Aa

- c) **Homozygous recessive**

aa

26. Write reference to the inheritance of genetic

- a) **Defects, explain what a carrier is. (1mk)**

- **Is a phenotypically normal organisms that carries a recessive gene for a certain defeat in a heterozygous state and can pass it to the next generation?**

- b) **Hemophilia is more common in men than in woman. Suggest reasons to account for this. (2mks)**

- **Male require to have only one hemophilic gene, which they can get from a carrier mother to get the disease. Females must have two of the genes, one from the father and one from the mother. There is a very little chance of females inheriting the hemophilic gene from the father.**

27. a) What is meant by natural selection? (2mks)

- **It is a process whereby nature selects those organisms that are well adapted to the prevailing environmental conditions enabling them to survive to reproductive maturity. The organisms will reproduce and pass the favourable characteristics to their offsprings.**

(b) In what way does Lamarck's theory fail to agree with modern scientific evidence? (1mk)

- **Modern scientific evidence has proved that characteristics acquired during an organism's lifetime cannot be passed on to its offspring.**

28. The diagram below shows the structure of a neurone. Study it and answer questions below.

a) Name the type of neurone (1mk)

- **Motor neurone**

b) Name the parts labelled (2mks)

D – Myelin sheath

E- Schwann cell

c) State whether the axon of this neurone transmits impulses away from the cell body or towards the cell body. (1mks)

- **Away from the cell body.**

29. In what ways do plants compensate for their inability to move? (2mks)

- **They are able to transfer pollen grains from one plant to another through pollination**
- **They are able to disperse their seeds or fruits and to undergo vegetative growth**
- **They are able to respond to stimuli tropic and nastic movement**
- **They are able to utilize localized nutrients through photosynthesis.**

30. Distinguish between tendons and ligament (2mks)

- **Tendons are cord-like structures that attach skeletal muscles to bones. They are made of tough, inelastic connective tissue fibres.**
- **Ligaments are fibrous structures that hold two bones together in a joint. They are made of tough but elastic connective tissues.**

31. Name the following organelle according to the following functions. (2mks)

i) that synthesizes protein

Ribosomes

ii) that synthesizes ATP

Mitochondrion