FORM 3 EXAM 2022
BIOLOGY PAPER 231/1
MARKING SCHEME

1. Name the tissues whose cells are thickened with:
   (a) Cellulose and pectin (1 Mark)
   Collenchyma;
   (b) Lignin (1 Mark)
   Sclerenchyma;
2. (a) Name parts labeled A and B (2 Marks)
   A - ***Sori; Rej. Sorus***
   B – ***Rhizome;***
   (b) To which division does the plant belong? (1 Mark)
   Peridophyta;
3. State three measures that can be taken to control infection of man by protozoan parasites. (3 Marks)
   Improving sanitation/hygiene; using insecticides to kill vectors; avoiding indiscriminate sexual intercourse; clearing bushes/tall grass around the house; draining stagnant water; proper disposal of household refuse;
4. Explain how the following factors hinder self-pollination in plants:
   (i) Protogyny (1 Mark)
   Stigma matures earlier and is ready to receive pollen grains before the hunters are ready;
   (ii) Dioecism (1 Mark)
   Male and female gametes occur in separate plants;
5. Explain the likely effect of humans and other organisms of untreated sewage discharged into water body that supplies water for domestic use. (2 Marks)
   Contains disease – causing micro-organisms which may cause outbreak of water borne diseases; faecal material is broken down by saprophytes leading to depletion of dissolved oxygen thus suffocation of aquatic organisms; breakdown of matter releases nutrients which enrich the water resulting in eutrophication;
6. State the structural adaptation of the mitochondrion. (2 Marks)
   Inner membrane highly folded/has cristae to provide large surface area for respiratory reaction;
7. (a) Define the term immunity. (1 Mark)
   Ability of the body to identify/recognize foreign antigens and develop mechanisms of destroying them/ability to resist infection;
   (b) Distinguish between natural immunity and acquired immunity. (1 Mark)
   Natural immunity is inborn/inherited/passed from parents to offspring while acquired immunity is obtained in life;
   (c) Identify one immunizable disease in Kenya. (1 Mark)
   Tuberculosis; Poliomyelitis; diphtheria,whooping cough; measles;
8. State three differences between osmosis and active transport. (3 Marks)
   Osmosis involves movement of water/solvent molecules, active transport involves movement of solute molecules; osmosis does not require energy, active transport requires energy; in osmosis molecules move along a concentration gradient, in active transport molecules move against a concentration gradient;
9.
   (a) Name the fluid found in the part labeled Q. (1 Mark)
   Glomerular filtrate;
   (b) Identify the process responsible for the formation of the fluid named in (a) above. (1 Mark)
   Ultra-filtration/pressure filtration;
   (c) Which two hormones exert their effect in the nephron? (2 Marks)
   Antidiuretic hormone/vasopressin; Aldosterone;
10. State three characteristics of members of kingdom Monera that are not found in other kingdoms.(3 Marks)
    Nucleus lack nuclear membrane/organelles not membrane bound; nucleus not organized; mitochondria absent/most organelles absent; cell wall made of mucoprotein;
11. What is meant by the following biological terms?
    (i) Crenation (1 Mark)
    Shrinking of red blood cells/animal cells as a result of water loss by osmosis (when placed in hypertonic solution);
    (ii) Haemolysis (1 Mark)
    Bursting of red blood cells as a result of uptake of water by osmosis(when placed in hypotonic solution);

(iii) Plasmolysis (1 Mark)

Shrinking and pulling away of the cell membrane from the cell wall of plant as a result of water loss by osmosis;

12.

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

Q – Antipodal cell(s);

R – Polar nucleus/body

S – Functional egg cell;

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

Pathway through which male nuclei reach the embryo sac/improves efficiency of fertilization; its tip produce lytic enzyme which dissolves the embryo sac wall to allow entry of male nuclei;

13. (a) State the major factor in the "Global warming) experienced in the world today.

Carbon (IV) Oxide ***Rej. Carbon (iv) Oxide***

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

Reducing use of wood/fossil fuels; planting more trees/afforestation or re-afforestation;

14. Explain how the spread of malaria is controlled by the following methods.

(a) Appying oil on stagnant water. (2 Marks)

Cuts oxygen supply to the mosquito larvae; killing them by suffocation;

(b) Replacing male anopheles mosquito with sterile males. (2 Marks)

Reduces members of the mosquitoes; as no more are added as the females cannot be fertilized by the sterile males;

15. (a) Explain how the following adaptation of xerophytes assist them to survive in their habitat.

(i) Sunken stomata (1 Mark)

Allows water vapour/moisture to saturate in the pits depression thus decreasing the diffusion gradient which reduces loss of water by transpiration;

(ii) Thick cuticle (1 Mark)

Increase diffusion distance reducing loss of water by transpiration;

(b) State the structural differences between the root system of the xerophytes and that of the hydrophytes (2 Marks)

Xerophytes have deep/long roots to reach water table; hydrophytes have poorly developed root system;

16. (a) Name a protein and vitamin involved in blood clotting.

(i) Protein (1 Mark)

Fibrinogen;

(ii) Vitamin (1 Mark)

Vitamin K;

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

Most of the red blood cells will have died;

17.

(a) What does the string X and Y represent. (2 Marks)

X – External intercostals muscles;

Y – Internal intercostals muscles;

(b) What is the effect of pulling string X (1 Mark)

Causes the rib and the sternum to move upwards;

18. State two features in the insect pollinated flowers that encourage cross pollination. (2 Marks)

Heterostyl/stigma longer than the stamen, Protandry/stigma mature earlier than anthers; Protogny/stamen mature earlier than the stigma. Monoecous condition; any three

19. (a) What scientific concept was being investigated? (1 Mark)

Photosynthesis;

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

A -Negative test/starch absent; (1 Mark)

B -Positive test/starch present; (1 Mark)

(ii) sodium hydroxide absorbed all the carbon (iv) oxide hence no photosynthesis; (1mk)

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

Control experiment;

20. (a) Explain the importance of transport in plants. (2 Marks)

Supplies water and mineral ions to the (photosynthetic) cells; conduct products of photosynthesis/ nutrients to all parts of the plant/translocation;

(b) What is the role of root hairs in plants? (1 Mark)

Absorption of water and mineral ions from the soil;

21. (a) Identify the source of urea that is removed via the kidneys in healthy human being. (1 Mark)
Deamination of excess proteins/amino acids in the liver;
(b) Explain why a pregnant woman excretes less urea compared to a woman who is non-pregnant (2 Marks)
Amino acids are used in the formation of foetal tissues; thus has less excess to be eliminated;
22. (a) What biological processes are A and B (2 Marks)
A – Condensation
B - Hydrolysis
(b) Identify the product Y. (1 Mark)
Sucrose
(c) State the bond represented by X. (1 Mark)
Glycosidic;
23. Explain the events of the light stage of photosynthesis (3 Marks)
Light energy is absorbed by chlorophyll molecules; used to split water molecule into oxygen and hydrogen atoms/ions; light energy is converted into chemical energy (ATP) and stored;
24. Explain what happens in humans when concentration of glucose in the blood rises above the normal level. (3 Marks)
Insulin is produced which increases oxidation of glucose; facilitate conversion of glucose into glycogen/fats for storage; inhibits conversion of glycogen into glucose;
25. (a) ***cypsela;*** (1 Mark)
(b) Name each of the parts labeled A & B
A – Hook;
B - Pericarp;
(c) Name the agent of dispersal of the fruit.
Animal;
26. (a) State the expected results after 2 weeks (1 Mark)
The auxiliary/lateral buds will sprout/branches formed or form;
(b) Give a reason for your answer in (a) above (1 Mark)
Decapitation removes the hormone/IAA/Auxins which is produced in the terminal bud/stem tip;
Absence/removal of the hormone auxins/IAA promotes branching/development of auxillary buds;
27. (a) What is the name given to the type of graph? (1 Mark)
Intermittent growth curve;
(b) What is the name used to describe point X. (1 Mark)
Moulting
(c) State the importance of part X (1 Mark)
Allows growth to take place