

NAME: ADM NO: CLASS:

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ANESTAR SCHOOLS

231/1

BIOLOGY

PAPER 1

FORM FOUR

TERM 1 EXAM YEAR 2020

MARKING SCHEME

1. (a) State three functions of co-factors in cell metabolism.

(1 mk)

Activate enzymes

(b) Give one example of a metabolic co-factor.

(1 mk)

Metabolic ions e.g Fe^{2+} , Mg^{2+} , Zn^{2+} CO_2 etc

2. Industrial wastes may contain metabolic pollutants,. State how such pollutants may indirectly

reach and accumulate in the human body if the wastes were dumped into rivers. (3 mks)

Pollutants are absorbed by aquatic plants/producers; which are eaten by primary consumers e.g fish; man accumulates pollutants by consuming fish regularly.

3. The cell membrane is said to be polarized. State the meaning and significance of a polarized membrane.

(i) Meaning : Polarisation of a cell membrane means it has net positive charge to the outside and a net negative charge to the inside.

(1 mk)

(ii) Significance: - It enables the membrane to detect changes in the environment.

(1 mk)

4. The diagram below represents an organelle.

(a) State the function of the organelle.

(1 mk)

Site for photosynthesis

(b) Label on the diagram the parts of the organelle where:

(i) Oxygen gas is produced as a byproduct.

(1 mk)

grana/granum

(ii) Carbon (iv) oxide is fixed.

(1

mk)

Stroma

5. State the functions of bile salts.

(2

mks)

- Provide an alkaline medium for the functioning of pancreatic enzymes

- Neutralize the acidic chyme from the stomach.

6. State two ways in which pteridophyta differ from spermatophyte.

(2 mks)

Pteridophyta

Spermatophyta

- Produce spores

- Are seed bearing plants

- Have sporangia

- Have flowers and cones

7. Name the distinguishing features of class Aves.

(3 mks)

- Mouth modified to a beak

- Forelimbs modified to wings

- Body covered with feathers

8 (a) Define the term "Alternation of generation".

(1 mk)

- They alternate between gametophyte phase and sporophyte phase.

- Existence in two forms, spore producing (sporophyte) and gamete produced structure

(Gametophyte)

(b) Name two plant divisions which exhibit alternation of generation.

(2 mks)

Pteridophyta

Bryophyta

(c) State the importance of gametophyte to a sporophyte.
mk)

(1

Produces male gametes that undergo fertilization to produce a zytote which develop to sporophyte

9. The equation below represents oxidation of a certain food substance



(a) Calculate the respiratory quotient of the substance being oxidized.

(2 mks)

$$\frac{\text{CO}_2 \text{ produced}}{\text{O}_2 \text{ used}} = \frac{18}{26} = 0.69 = 0.7$$

(b) Name the likely food substance being oxidized. (1 mk)

Lipids

(c) State one reason why respiratory quotient values are important to work out. (1 mk)

- **Provide information on the type of substrate oxidized**
- **Gives information on the type of respiratory/metabolism taking place**

10. Study the section below and answer the questions that follow.

(a) Identify the section. (1 mk)

Dicotyledonous root (reject dicot)

(b) Name the parts labeled M and Q.

(2 mks)

M = Epidermis/piliferous

Q = Xylem

11. State two components of a phloem. (2 mks)

Companion cells

Sieve tubes

12. Define the following terms as used in evolution and give an example in each case.

(a) Homologous structure - (2 mks)

Homologous structures are structures with the same embryonic origin but modified to perform different functions e.g. - Beak of birds and feet of birds - pentadactyl limbs of a horse and human

(b) Analogous structures. (2 mks)

Analogous structures are structures with different embryonic origin but modified to perform similar functions e.g. wings of birds made up of pentadactyl limbs and for insects are made up of toughened vein cuticles.

13. Explain comparative embryology as an evidence of organic evolution. (3 mks)

Comparing embryos of different vertebrates show morphological similarities in structures and forms. The closer the resemblance, the closer the phylogenetic origin.

14. State the demerits of Lamarck's theory of evolution. (2 mks)

**- Phenotypic changes cannot be transmitted to the offspring.
- Only changes in DNA can cause change in inherited characteristics.**

15. State the functions of the following parts of a germinating seed:

(i) Coleorhiza - **It protects tips of radicles**
(1 mk)

(ii) Coleoptile - (1 mk)
It protects the tips of the plumule

16. (a) Describe the role of hypothalamus in thermoregulation. (2 mks)

**Hypothalamus contain thermo-receptors which detect blood temperature as well as the thermoregulatory centre.
- Hypothalamus initiate changes by transmission of a nerve impulses to the effectors for corrective action.**

(b) State the role of the following hormones in homeostasis:

(i) Insulin - **Insulin stimulates liver cells to convert excess sugar/glucose to stored glycogen when this sugar level of blood rises beyond normal 90mg/100cm³ of blood.** (1 mk)

(ii) Glucagon (1 mk)

Stimulative liver cells to convert stored glycogen to glucose/sugar when this level of sugar in blood falls below the normal, 90mg/100cm³ of blood.

17. (a) State significance of a test cross in genetics. (1 mk)

To establish the genotype of an unknown organism exhibiting the characteristic of the dominant gene.

(b) State the function of Deoxyribonucleic acid DNA molecule. (1 mk)

Store the genetic information in a coded form to enable transfer of genetic material from the parent to the offspring.

18. What is adaptive advantage of sickle cell trait. (2 mks)

Sickle cell shaped red blood cells make the plasmodium parasite unable to survive in them hence the person becomes resistant to malaria attack.

19. (a) Pregnancy continues if the ovary of an expectant mother is removed after the 4th month. Explain. (2 mks)

The placenta takes over the role of the ovary of producing the hormone progesterone which maintains pregnancy.

(b) What is the role of the testes in the mammalian reproductive systems? (2 mks)

**- Production of male gametes/spermatozoa
- Production of androgens i.e. testosterone hormone which influences secondary sexual characteristics.**

20. (a) State two ways in which floating leaves of aquatic plants are adapted to gaseous exchange. (2 mks)

**- Stomata are found on upper epidermis to allow efficient gaseous exchange.
- Presence of large air spaces/aerenchyma tissues to enable it float or for buoyancy and also for storage of air.**

(b) Name two structures for gaseous exchange in aquatic plants. (2 mks)

- **Pneumatophores**
- **Aerenchyma tissues**
- **Cuticle**

21. The diagram below represents a nucleus:

(a) Name the structures labeled E and F. (2 mks)

- E - Nucleous**
- F - Nuclear pore**

(b) State the function of F. (1 mk)

The pores allow and relate movements of molecules between the nucleous and cytoplasm

(c) In reference to the nucleus, state one difference between an animal and a bacterial cell.

(1 mk)

In animals nucleus the nuclear materials are enclosed by a nuclear membrane while in bacteria, nuclear materials are not enclosed within a nuclear membrane.

22. State one use for each of the following apparatus in the study of living organisms.

(a) Pouter - (1 mk)

Sucking small insects/small animals from rock surfaces and barks of trees

(b) Pitfall trap (1 mk)

A trap into which small crawling animals e.g. insects

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

Lactic acid

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

Adenosine triphosphate (A.T.P.)

24. Adult elephants flap their ears twice as much when it is hot. Explain. (2 mks)

- The surface area to volume ratio is higher in calves than in adults; hence adults retain more heat than this calves hence need to have other ways to lose heat.

- The surface area to volume ratio is lower in adults than in calves; hence calves lose more heat than adults.

25. The diagram below represents a plant in the division Bryophyta

(i) Name the parts labeled Band D. (2 mks)

B - Seta

D - Rhizoid

(ii) State one function for each of the parts labeled A and C. (2 mks)

A - Contains spores bearing structures that bears spores

C - Leaf: contains chlorophyll for photo synthesis

26. The diagram below represents a feeding relationship in an ecosystem.

(a) Write down the food chains in which the guinea fowls are secondary consumers



(b) What would be the short term effect on the ecosystem if lions invaded the areas?

(3 mks)

- Lions would compete with leopards since they belong to the same trophic level

- Gazelle numbers would reduce due to high number of predators.

27. How is aerenchyma tissue adapted to its functions?

- Has air spaces which store gases for gaseous exchange and buoyancy.

28. Explain how the following prevent self-pollination.

(i) Protandry (1 mk)

- Male reproduction organ/anthers androecia/stamen mature earlier than female reproduction organ/carpels/stigma pistil?gynoecium in a flower.

(ii) Self sterility

(1 mk)

- Pollen grains are sterile to stigma of the same flower in the plant

29. What name is given to response to contact with surface exhibited by tendrils and climbing stems in plants?

(1 mk)

Thigmotropism/Haptotropism