

BIOLOGY PAPER 1
FORM 4
Marking scheme

END TERM 1, 2022

INSTRUCTION. Answer all questions in the spaces provided after the question.

1. (a) Explain why a person discharges urine more frequency when environmental temperatures are lower than when they are high. (2mks)
When environmental temperatures are low, water loss through sweating is reduced leading to increase in urine output; in high temperature water is lost through sweating hence low urine output.

(b) Name the nitrogenous waste product excreted by a fresh water fish. (1mk)

Ammonia

2. Explain how the xylem vessels are adapted to their functions. (3mks)
- **Lignified to prevent collapsing of its walls.**
 - **Pits to allow lateral movement of water**
 - **Narrow to enhance capillarity**
 - **Lack cross walls for faster movement of water.**

3. State three evidences of organic evolution (3mks)
- **Fossil records; comparative anatomy; comparative embryology geographical distribution; cell biology**

4. In an experiment, it was found that when maggots are exposed to light, they move to the dark areas.
- a) Name the type of response exhibited by the maggots. (1mk)
- **Negative photo taxis**

b) State the survival value of the response in (a) above. (1mk)

- **To avoid predation**

5. (a) What is meant by oxygen debt. (2mks)
- **Is the amount of oxygen required to oxidise lactic acid which accumulates in the body tissues of animals; during anaerobic respiration; when oxygen supply is less than demand.**

(b) State one factor that affects basal metabolic rate. (1mk)

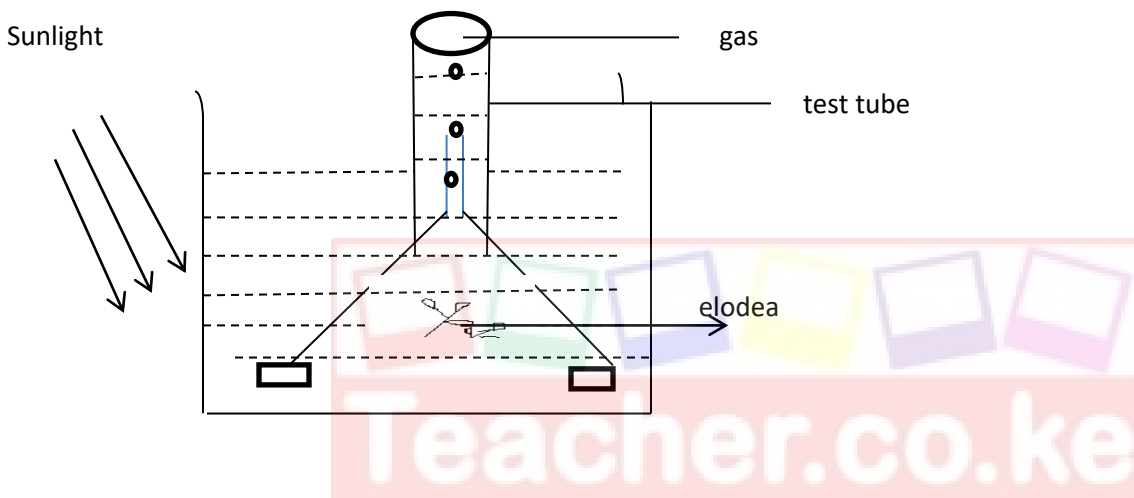
sex, age, body size; health; activity/occupation, hormones.

6. Explain what would happen to red blood cells when they are placed in hypotonic solution. (3mks)

Absorbs water through osmosis; swells and bursts

7. State the organelle that perform the following functions. (3mks)
- (i) Synthesis of ribosomes
Nucleolus
 - (ii) Transport of lipids
- **Smooth endoplasmic reticulum**
 - (iii) Package and transport of gloco-proteins
Golgi apparatus
8. What are structural units of lipids. (2mks)
Fatty acids, glycerol
9. (a) State the major factor in the ‘Global warming’ experienced in the world today. (1mk)
Carbon iv oxide
- (b) Suggest the ways of reducing the global warming (2mks)
- Reducing emission of carbon (iv) oxide and other green house gases**
Reducing use of wood and other fossil fuels
Planting more trees
10. State the role of the following in Homeostasis. (2mks)
- i) ADH:.....
Presence of ADH makes kidney tubules permeable to reabsorption of water
 - ii) Aldosterone.....
Regulates the re-absorption of sodium ions
11. Explain why cells of an endosperm are triploid and not haploid. (2mks)
The two polar nuclei, each haploid are fertilized by a haploid male nucleus; making the endosperm cell triploid
12. State four ways in which respiratory surfaces are suited to their functions (4mks)
- **Thin wall (epithelium) for faster diffusion of gases.**
 - **Moist to dissolve gases**
 - **Large surface area for max diffusion**
 - **Highly vascularized to facilitate diffusion**
13. State three structural modifications of nephrons found in desert mammals. (3mks)
- **Long loop of henle**
 - **Small glomeruli**
 - **Few glomeruli**

14. How would you find out from a sample of urine whether a person is suffering from diabetes mellitus. (3mks)
- **To 1cm³ of urine sample, add equal amount of Benedicts solution; Boil; colour changes from Blue, green, yellow, Brown hence presence of reducing sugar thus positive for diabetes mellitus.**
15. What are the advantages of fruit and seed disposal (2mks)
- **Prevent competition/overcrowding**
 - **Occupy new habitats/colonization of new areas**
16. The diagram below represents a set-up that was used to investigate a certain process in a plant.

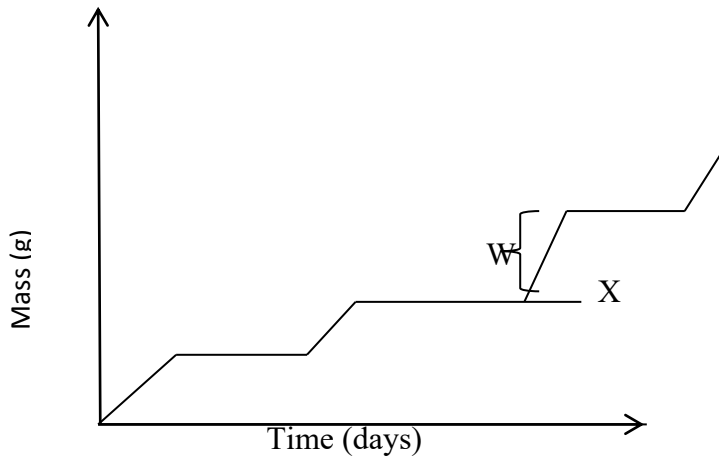


- a) What was the aim of the experiment. (1mk)
- **To investigate the gas produced during photosynthesis**
- b) Name the gas collected in the gas jar. (1mk)
- Oxygen (rej chemical symbols)**
- c) What is the confirmation test for the gas in (b) above? (1mk)
- **Rekindles/ relights a glowing splint**
- d) State two factors that would affect the process. (2mks)
- **Temperature changes**
 - **Light intensity**
 - **Carbon (iv) oxide concentration**
17. Name the antigens that determine human blood group. (2mks)
- **Antigen A**
 - **Antigen B**
18. a) Explain why pepsin in stomach of man is secreted in inactive form (1mk)
- To avoid digestion of stomach wall/Auto digestion**

- b) Which gland secretes pepsinogen?
Gastric glands in the stomach wall

(1mk)

19. The graph below represents its growth of animals in a certain phylum.



- a) Name the type of growth pattern shown on the graph.
Intermittent growth

(1mk)

- b) Identify the process represented by x.
Moulting/ecdysis

(1mk)

- c) Name the hormone responsible for the process in (b) above.

(1mk)

Ecdysone (rejmoulting hormone)

20. A student smeared Vaseline jelly on the lower epidermis of a leaf of a potted green plant which had been kept in the dark for 24hrs. She then transferred the plant to the light for six hours starch test on the leaf of the plant were negative. Account for the observation. (3mks)

Keeping the plant for 24 hours in darkness destarched the plant.

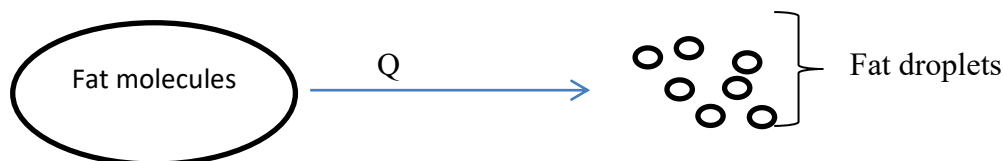
The Vaseline smeared on the lower epidermis closed/blocked the stomata and therefore carbon (iv) oxide gas could not diffuse into leaf hence no photosynthesis took place

21. State the three different types of blood cells.

(3mks)

- **Red blood cells**
- **White blood cells**
- **platelets**

22. The following cell are found in living organisms. (2mks)
- Identify the parts labeled V and U. (2mks)
 - v- **Acrosome**
 - U- **Nucleus**
 - State the function of part labeled S. (1mk)
 - **To propel the sperm cell forward**
 - State one cell organelle which is most abundant in the structure and explain its role. (2mks)
 - **Mitochondrion; to generate a lot of energy for movement of the sperm cell**
23. a) Explain briefly Lamarck's theory of evolution. (2mks)
- **Theory based on 'use' and 'disuse' of structures. Used structures become strong and complex and are inherited while disused structures disappear.**
- b) State a reason why Lamarck's theory of evolution has been disapproved by scientists. (1mk)
- **Phenotypically acquired traits/characteristics cannot be inherited**
- c) Below is an equation showing the aerobic breakdown of fat. (2mks)
- $$2C_{51}H_{98}O_6 + 145O_2 \xrightarrow{\text{Energy}} 102CO_2 + 98H_2O$$
24. Calculate the respiratory quotient of the breakdown above. (2mks)
- $$RQ = \frac{\text{Volume of } CO_2 \text{ produced}}{\text{Volume of } O_2 \text{ consumed}} = \frac{102}{145} = 0.703$$
25. (a) What are vestigial structures? (1mk)
- Organs that have ceased to function due to disuse and are reduced in size.**
- b) Give two examples of vestigial structures found in man. (2mks)
- Appendix's coccyx; ear muscles/pinna**
26. Give two limitations of fossil records as evidence of evolution. (2mks)
- **Missing links**
 - **Distortion**
 - **Destruction due to geological forces**
27. The diagram below illustrates a physiological process that occurs in the alimentary canal of man.



a) Name the process Q above. (1mk)
Emulsification

b) Explain the biological importance of the above process. (1mk)
Increases surface area for enzyme action

c) Name the substance that helps the process name in (a) above (1mk)
Bile juice

28. List 3 features that make man the most dominant species on earth. (3mks)

- **Ability to communicate through speech**
- **Upright posture**
- **A modified forelimb to form hand with an opposable thumb.**

