ASUMBI GIRLS HIGH SCHOOL

 PRE-MOCK

MAY-JUNE

2022

**231/1 BIOLOGY PAPER 1**

**FORM FOUR**

1. A student was viewing a slide preparation of an onion cell under high power of a light microscope and observed that the features of the cell were blurred.
2. Name the part of the microscope the student would use to obtain sharper focus of the features. (1mk)
* **Fine adjustment knob**
1. State the function of mirror in a light microscope. (1mk)
* **Collects and reflects light to the stage/condenser**
1. (a) Guard cells are specialized epidermal cells. State **two** structural features which suit them to their function. (2mks)
* **Inner thick wall and outer thin wall which result into unequal expansion causing opening and closing of stomata.**
* **Presence of many chloroplasts for photosynthesis**
* **Curved shape/bean shape**

(b) Apart from gaseous exchange, give one other function of stomata. (1mk)

* **Permits escape/loss of water vapour from the leaf transpiration**
1. The diagram below is a specialized mammalian cell.



1. Name the parts labeled B and D (2mks)
* **B – Nucleus**
* **D – tail/tail piece**
1. State the function of the following
2. Part labeled A (1mk)
* **Produces/contains lytic enzymes which dissolve, the vitelline membrane/wall of egg cell.**
1. The portion marked C (1mk)
* **Contains numerous mitochondria which provides the necessary energy used to propel the sperm**
1. In an experiment to investigate a product of photosynthesis, the set up was as shown in the diagram below. The apparatus was placed in the sun.

 

1. State the confirmatory test for gas Y. (1mk)
* **Relights a glowing splint/rekindles a glowing splint/reignites a glowing splint**
1. Explain why Elodea is the most suitable plant for this experiment. (2mks)
* **Elodea is aquatic plant which is able to use dissolved carbon IV oxide, and to photosynthesis at low light intensity**
1. State the function of the sodium hydrogen carbonate in the experiment. (1mk)
* **Decomposes slowly releasing carbon IV oxide which is used to photosynthesis/releases carbon IV oxide**
1. (a) Name **one** hormone involved in insect metamorphosis. (1mk)
* **Ecdysone/moulting hormone**
* **Juvenile hormone**

(b) State the importance of metamorphosis to the life of insects. (2mks)

* **The adult and larvae exploit different food niche; help the different stges to avoid competition for resources.**
* **Pupa can survive adverse conditions**
* **Help in regulation of tissue**
1. A student measured the diameter of a mitochondrion on a photomicrograph whose magnification was

X50, 000 to be 1mm. What was the actual size of the mitochondrion in micrometers? (2mks)

* **Magnification =** $\frac{image size }{actual size }$

**=50,000 =**$\frac{1×1000}{x}$

$x=\frac{1000}{50,000}$ **=**$\frac{1}{50}$

$=0.02μm$

1. The diagrams below are of two conducting elements of the xylem tissue.



1. Identify each of them (2mks)
2. **Tracheid**  B**- xylem vessel/vessel**
3. What makes the cellulose side wall of both A and B impermeable to water and solutes? (1mk)
* **Side walls are impregnated/deposited with lignin**

8. State **two** advantages of natural selection to organisms. (2mks)

* **Assist to eliminate disadvantages characteristics/perpetuate advantageous characteristic. allow better adapted organisms to survive (adverse changes) in the environment/less adapted organisms are eliminated by adverse changes in the environment**

9. Study the flow chart below and answer the questions that follow.



1. Name the process taking place in step labeled I (1mk)
* **Gyucolysis**
1. Give **two** reasons why accumulation of substances D in the body leads to an increase in the heart beat. (2mks)
* **T provide the extra oxygen required to breakdown the lactic acid/D: increase supply of oxygen**
* **Speed up the transport of lactic acid /D from tissue, to the liver to be broken down**
1. Identify substance E (1mk)
* **Water**

10. In an experiment to investigate certain physiological process, a student had his experiment set up as shown below.



 To ascertain the occurrence of the physiological process investigated he carried out food test on the water in the beaker. Both starch test and reducing sugar test at the beginning of the experiment were negative. After the set up was left undisturbed for 20 minutes, starch test was still negative but that of reducing sugar was positive.

1. State the physiological process which takes place in the human body illustrated by the set up above. (1mk)
* **Ultra filtration/diffusion**
1. Name the part of the human body where the processes stated in (10) (a) above takes place. (1mk)
* **Kidney/glomerulus of the kidney tubule/nephrone**

11. A group of students were walking in the forest and they came across two organisms A and B showing the following characteristics

|  |  |
| --- | --- |
| A  | B  |
| * two pairs of walking legs per segment
* one pair of antennae
* jointed appendages
 | * one pair of walking legs per segment
* one pair of antennae
* jointed appendages
 |

State the class to which each organism belongs (2mks)

* **diplopoda**
* **chilopoda**

12. (a) Name the principal site of gaseous exchange in the lungs of humans (1mk)

* **alveolus/alveoli**

 (b) State **two** ways in which the structure named in (12) (a) above is adapted to its function (2mks)

* **Highly vascularized (to increase the diffusion gradient) for transporting the gases to and from the surface.**
* **Thin wall (one thick) to reduce diffusion distance for faster exchange of gases**
* **Numerous/highly folded to provide a large area for exchange of gases**

13. An investigation was carried out on a terrestrial ecosystem. The population sizes and species biomass were determined and recorded as shown in the table

|  |  |  |
| --- | --- | --- |
| Species | Population size | Species biomass |
| ABCD | 1$×$1031$×$1031$×$1051$×$10 | 1$×$1031$×$10-11$×$101$×$104 |

1. If these organisms had feeding relationships, construct a simple food chain involving all the organisms (1mk)
* **D A C B**
1. Construct pyramid of numbers using the data provided above. (2mks)

B

C

A

D

**NOTE: A & B must be of the same size**

 **C – Largest**

 **D – smallest in size**

1. State **one** disadvantage of using pyramid of numbers in expressing feeding relationships in ecological ecosystem. (1mk)
* **It is not easy to decide which trophic level an organism belongs to**
* **Range of numbers is so great that it is difficult to draw the pyramid to scale**
* **Very large and small sized producers are given the same states despite the diversity in productivity**
* **Parasitic large sided producers’ pyramids of numbers are usually inverted**

14. Why is excretion of nitrogenous wastes more of a problem to animals than plants? (2mks)

* **Plants are able to store the wastes in their bodies in non-toxic forms**
* **Plants are stationary and** $∴$ **less active hence release less toxic wastes compared to plants which produce a lot.**
* **Plants utilize simple inorganic substances to make their foods in amount required by the body hence less wastes/while animals consume complex compounds whose breakdown releases more toxic wastes.**

15. (a) Give **two** possible ways of establishing the genotype of an organism whose genotype is unknown. (2mks)

* **Selfing/self fertilization as in plants**
* **Test cross acc back cross**

 (b) Why is that a father can only transmit hemophilia to his daughter but not to his son? (1mk)

**Haemophilia is a sex linked characteristic which is only carried by the x-chromosome (and a father can only donate y-chromosome to his daughter but not son)**

16. (a) Explain why swallowing and breathing in cannot occur at the same time. (2mks)

* **During swallowing the bolus is pressed against the soft palate closing the nasal cavity and the glottis (opening into larynx) is closed by the epiglottis thus prevents entry of air into the trachea**

 (b) Why is it necessary that pepsin be produced in its inactive forms? (1mk)

* **To prevent auto digestion/digestion of the protenous wall of the stomach**

17. (a) Name the part of the brain which deals with regulation of body temperature. (1mk)

* **Hypothalamus**

 (b) The graph below shows the temperature of two organisms A and B under different external temperature. Study it and answer the questions that follow.



 Give the terms used to describe organisms A and B (2mks)

* **A – endotherm/homoiotherm**
* **B – ectotherm/poikilotherm**

 (c) What advantage does organism A have over B (1mk)

* **A is capable of being active at all times and can survive in a wide range of habitats**

18. State **two** distinguishing features used in separating members of the phylum Arthropoda into various classes. (2mks)

* **Number of limbs**
* **Number of body parts**
* **Presence or absence of antennae and their number**

19. (a) Name **two** kinds of nuclei found in a mature pollen grain. (2mks)

* **Generative nucleus**
* **Pollen tube/tube nucleus**

(b) State what is meant by double fertilization in flowering plants. (2mks)

* **A kind of fertilization in which the male nucleus divides into male nuclei. One of which fertilizes the functional egg forming a zygote; while the other fuses with the polar nuclei to form a primary endosperm nucleus.**

20. Carbon (iv) oxide can be transported from the tissues t the lungs within the red blood cells. Give **two** advantages of this mode of transport. (2mks)

* **Does not alter the pH of blood plasma**
* **Many to increase surface area for the exchange**
* **Presence of carbonic anhydrase enzyme in the red blood cells**
* **Presence of amine group which forms carbamino hemoglobin which dissociates easily**

21. (a) Differentiate between the primary growth and secondary growth in woody plants. (2mks)

* **Primary growth involves the activity/mitotic division of apical meristematic cells while secondary growth involves the activity of the vascular cambium and cork cambium of woody parts**

 (b) Name **two** tissues responsible for secondary growth in flowering plants. (2mks)

* **Cork cambium**
* **Vascular cambium**
* ***Acc* cambium alone**

22. (a) State **two** significance of myelin sheath. (2mks)

* **Increases the speed of impulse transmission**
* **Insulates the Axon**

 (b) Name the cell that secretes the myelin sheath. (1mk)

* **Schwann cell**

 (c) List the following in order in which they are involved in a simple reflex action. Motor neurone, effectors, stimulus, intermediate (relay) neurone, sensory neuron, impulse, receptor. (1mk)

* **Stimulus, receptor, impulse, sensory neurone, intermediate (relay) neurone, motor neurone, effectors**

23. The diagram below shows part of the mammalian circulatory system.

 

1. Identify the blood vessel marked Q (2mks)
* **Q – mesenteric artery**
1. State **two** differences in the composition of blood in vessel R and P (2mks)
* **P is deoxygenated blood rich in nitrogenic wastes and carbon IV oxide while R is deoxygenated blood rich in food nutrients and minerals salts but less wastes**

24. Name **two** strengthening tissues in woody plants. (2mks)

* **Sclerenchyma**
* **Collenchymas**
* **Xylem tissue**

25. State **three** structural adaptations of a thoracic vertebra to its function (3mks)

* **Long neural spine for attachment of back muscles**
* **Short transverse process with articular facets to articulate with the ribs and for attachment of muscles**
* **Has demifacets for articulation with the ribs**
* **Neural arch for protection of the spinal cord**
* **Centrum to support the weight of the upper parts of the vertebral column**

26. (i) Name the type of response exhibited by the growth of pollen tube towards the ovary in a flowering plant. (1mk)

* **Chemosynthesis**

 (ii) State **two** importance of response named in 26 (i) above to the plants. (2mks)

* **Enables plants to grow towards various chemicals in the soil brigning about their absorption**
* **Enables fertilization to occur when the nuclei of the pollen grain reaches in the ovary**

27. Explain why sweat accumulates on a person’s skin in a hot humid environment. (2mks)

* **Sweat produced does not evaporate due to high humidity and the body does not cool; hence moves sweat produced leading to accumulation**

28. Name the deficiency disease caused by lack of vitamin A in human. (1mk)

* **Night blindness**