BIOLOGY FORM 3 MARKING SCHEME

1. State the use of each of the following. (3mks)
2. Ribosomes - ***site for protein synthesis***
3. Mitochondria - ***site for respiration in a cell***
4. Lysosome – ***contains lytic enzymes that destroys worn out cells/cell organels***
5. A ‘dolf’ is an offspring between a wolf and a dog. This animal is infertile. Give a reason for this. (1mk)

***Because the wolf and the dog do not belong to the same species hence they give rise to infertile offsprings.***

1. a) What is a hypotonic solution? (1mk)

***solution having less solutes than solvent molecules compared to cell sap.***

b) Explain the changes that will be observed if a drop of human blood is added to this solution. (3mks)

***The RBC will be hypertonic to the solution. Water molecules from solution will move into RBC by osmosis. The cell swell, enlarge and burst since they lack cell wall.***

 c) State four importance of osmosis to plants. (3mks)

* ***Helps in the opening and closing of the stomata.***
* ***Aid in uptake of water by root hairs from the soil .***
* ***Facilitates feeding in insectivorous plants.***
* ***Enhances turgidity of cells in herbaceous plants giving them support.***
* ***Assist in movement of water from cell to cell***
1. Give two main branches of Biology. (2mks)
* ***Botany***
* ***zoology***
1. A certain animal has no incisors and no canine but has six premolars and 6 molars in the upper jaw. In the lower jaw there are 6 incisors, 2 canines, 6 premolars and 6 molars.
2. What is the dental formula of the animal? (1mk)

***i***$^{ 0}/\_{3}$ ***c*** $^{0}/\_{1}$ ***pm*** $^{3}/\_{3}$ ***m*** $^{3}/\_{3}$

1. Calculate the total number of teeth. (1mk)

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1. Giving reasons, state the mode of feeding. (2mks)

***Herbivorous/herbivory, they lack upper incisors and canines***

1. State and explain three environmental factors that affect transpiration. (6mks)
* ***Humidity – at high humidity, the rate of transpiration is low while at low humidity the transpiration rate is high***
* ***Wind – transpiration rate is higher during a windy day because of increased evaporation on leaf surface.***
* ***Temperature – at high temperature, transpiration rate is high while at low temperature the transpiration rate is low***
1. A man is of group A+.
2. What type of antigen does his blood have? (1mk)
* ***Antigen A, rhesuss factor***
1. What types of antibodies are present in his blood? (1mk)
* ***Antibody b***
1. Which blood groups can he receive blood from? (2mks)
* ***A+ and O+***
1. (a) How is the mitochondrion adapted to its function? (2mks)
* ***Has cristae which provide large surface area for attachment of respiratory enzymes.***
* ***Has matrix which contains numerous respiratory enzymes***

 (b) In which part of the mitochondrion does aerobic respiration take place? (1mk)

* ***Matrix***
1. State four structural differences between arteries and veins. (4mks)

|  |  |
| --- | --- |
| Arteries  | Veins  |
| * Have narrow lumen
 | * Have a wide lumen
 |
| * Lack valves except at the base of the aorta and pulmonary artery
 | * Have valves at intervals
 |
| * Have thick elastic walls
 | * Have thin and less elastic walls
 |

1. State three characteristics of a respiratory surface. (3mks)
* ***Thin epithelium for rapid diffusion of respiratory gases***
* ***Large surface area for rapid diffusion of respiratory gases***
* ***Moist surface for respiratory gases to dissolve***
* ***Well vascularised to transport respiratory gases***
1. The diagram below illustrates the structure of a gill from a bonny fish.



1. Name the structures labelled A, B and C and give their functions. (6mks)

A: ***Gill bar – hold gill filament and rakers in position***

B: ***Gill rakes – protect delicate gill filament from damage***

C: ***Gill filament site for gaseous exchange***

1. How is structure labeled C adapted to its function? (1mk)
* ***Numerous providing large surface area for gaseous exchange.***
* ***Have thin epithelium lining thus reducing distance over which gases diffuse***
* ***Have rich supply of blood vessels to transport respiratory gases/ create a steep diffusion gradient***
1. State the functions of the following parts of a microscope. (3mks)
2. Diaphragm***it regulates the amount of light passing through the condenser to the specimen***
3. Condenser  ***concentrates light rays into state to illuminate the specimen on stage***
4. Fine adjustment knob

***Raises and lowers body tube over short distance to bring image into shaper focus.***

1. The diagram below represents a transverse section of a part of a young plant and seen under light microscope.



1. From which part of the plant was the specimen obtained? (1mk)
* ***(Dicotyledonous )stem***
1. Name the parts labelled J,P and M. (3mks)

J***: Epidermis***

P: ***cambium***

M: ***xylem***

1. Name the functions of the part labelled M. (1mk)
* ***Transports water and mineral salts.***
1. State three factors that determine the amount of energy a human requires in a day. (3mks)
* ***Basal metabolic rate***
* ***Sex***
* ***Age***
* ***Occupation***
* ***Body size***
1. State two defects of circulatory system. (2mks)
* ***Varicose veins***
* ***Hypertension***
* ***Thrombosis***
* ***Arteriosclerosis***

b) State three adaptations of erythrocytes to their functions. (3mks)

* ***Have biconcave shape that crates a large surface area for diffusion of gases***
* ***Contains haemoglobin which readily combines with oxygen***
* ***Lack nucleus which creates more space for packaging of haemoglobin***
* ***Numerous to offer a large surface area for diffusion of gases.***
* ***Thin for the respiratory gases to take short distance in movement by difussion***
1. A jet aeroplane is able to move and oxidise fuel to carbon (IV) oxide and water yet it is not classified as a living thing. List other characteristics of living things not shown by a jet aeroplane. (3mks)
* ***Growth***
* ***Reproduction***
* ***Irritability***
* ***Feeding***
1. Outline three applications of anaerobic respiration. (3mks)
* ***Manufacturing of organic acids***
* ***Sewage treatment***
* ***Making of silage***
* ***Production of biogas***
* ***Baking industry***
* ***Brewing industry***
1. Define the following terms. (3mks)
2. Excretion:***removal of metabolic waste products from the body of an organism***
3. Secretion:***production of substances from cells which are useful to the body***
4. Homeostasis:***it is maintenance of constant internal conditions despite fluctuations in the external environment***
5. The diagram below illustrates a nephron from a mammalian kidney.



1. Name the parts labelled A, B,C and D. (4mks)

A: ***bowman’s capsule***

B: ***glomerulus filtrate***

C***: loop of henle***

D***: collecting duct***

1. Name the process represented by arrows. (1mk)

***Ultrafiltration***

1. Name three substances that are completely reabsorbed in the part labelled W in a normal human being. (3mks)
* ***Amino acids***
* ***Vitamins***
* ***glucose***
1. Name the components of blood that do not enter the renal tubule in mammals. (1mk)
* ***Blood cells***
* ***Plasma proteins***
1. How does the part labelled C of a camel compare with that of a hippo? (2mks)
* ***it is long and penetrates deep in medulla while in a hippo it is short and confined to the cortex***