

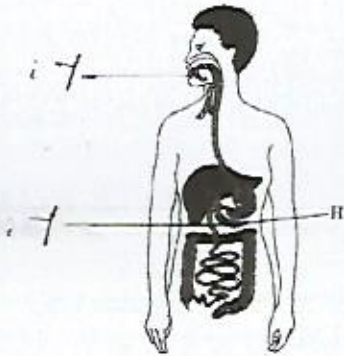

5.3 BIOLOGY (231)

5.3.1 Biology Paper 1 (231/1)

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| 1. | a) Irritability/sensitivity/Response to a stimulus/stimuli; | (1 mark) |
| | b) Reproduction; | (1 mark) |
| 2. | a) <ul style="list-style-type: none"> • Shape of the leaf/lamina (broad/narrow); • (Leaf) margin (smooth/serrated/lobed); • (Leaf) type (simple/compound); • (Leaf) sheath/petiole (absence/presence); • (Leaf) apex (pointed/absent); • Arrangement/phyllotaxis/phyllotaxy; • (Leaf) colour/variegation; (2 x 1) = 2 marks | (2 marks) |
| | b) <ul style="list-style-type: none"> • Has mammary glands; • Body covered by fur/hair; • Gives birth/does not lay eggs/is viviparous; • Has external ears/pinna; • Has sweat glands; (2 x 1) = 2 marks | (2 marks) |
| 3. | a) Nerve cell/motor neurone; | (1 mark) |
| | b) <ul style="list-style-type: none"> • Longer axon to deliver/transmit action potential a long way; • Has (numerous) dendrites for receiving/delivering impulses/transmit impulses; • Myelin sheath for faster transmission of impulses; • Schwann cell for secretion of myelin sheath; • Nodes of ranvier to enhance speed of transfer of impulses; • Cell body to control transmission of impulses; (2 x 1) = 2 marks | (2 marks) |
| 4. | a) Osmosis; | (1 mark) |
| | b) Solution E was hypertonic/had more solute molecules compared to solution F/solution F was hypotonic to solution E; by osmosis, water molecules moved through the semi-permeable membrane, G (from solution F to E); hence the decrease in volume of solution F/increased volume of solution E; | (3 marks) |
| | c) Semi-permeable membrane/visking tubing/slice of a raw potato/pawpaw/pig bladder/cellophane paper/dialysis membrane; | (1 mark) |
| 5. | Selective reabsorption of materials in the kidney tubules is energy-dependent/requires energy; synthesized through the process of cellular respiration/action of respiratory enzymes; whose working (effectiveness) is affected by changes in pH/are denatured at low pH/high acidity;/pH affects the working/permeability of the (kidney tubule cell) membranes; OWTTE (3 x 1) = 3 marks | (3 marks) |

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| 6. | a) Cell/plasma membrane/plasmalemma; | (1 mark) |
| | b) (Amoeba) is a unicellular living organism hence has a large surface area to volume ratio, diffusion (across its cell membrane) is adequate for its respiratory needs/does not require an elaborate respiratory system; | (1 mark) |
| 7. | Chemical digestion entails the action on/break-down of (ingested) food materials (in the alimentary canal) by the action of digestive enzymes (and converted into forms that can be easily absorbed or assimilated into the body system) while mechanical digestion refers to the physical breakdown of (larger) food materials (into smaller forms/pieces) which can subsequently be acted upon by the digestive enzymes; | (1 mark) |
| 8. | a) Mucus – traps foreign particles from the inhaled/incoming air; – Moistens the (in-coming/inhaled) air (for efficient gaseous exchange); | (2 marks) |
| | b) Cartilage rings – keep the wind pipe/trachea open/not to collapse (to allow for continuous flow of air); | (1 mark) |
| | c) Epiglottis – acts as a valve/flap between the larynx and the oesophagus to permit air to enter the air-way to the lungs and food particles to pass into the gut; | (1 mark) |
| 9. | a) | |
| | • Broad leaf blade/lamina; that exposes more stomata for gaseous exchange/provide large surface area for gaseous exchange; | (2 marks) |
| | b) Photosynthesis (within the leaf occurs in the presence of light energy) yielding simple carbohydrates/glucose/sugars which form the main substrates during aerobic respiration, producing energy/ATP; during the process (of respiration), carbon (IV) oxide produced is in turn used as a raw material in photosynthesis; during which process/stage, water is broken down, yielding oxygen; which is used in cellular (aerobic) respiration; | (2 marks) |
| | $\text{Photosynthesis} \begin{array}{c} \xrightarrow{\text{O}_2} \\ \xleftarrow{\text{CO}_2} \end{array} \text{Respiration}$ | (2 x 1) = 2 marks |
| 10. | a) | (2 marks) |
| | (i) Light enables the potted plant to photosynthesize; producing oxygen which is inhaled by the mouse, sustaining it; the illuminated light can further affect/alter some physiological processes in the mouse as a result of the constant, direct beam of light; | 2 |
| | (ii) Absorbs carbon (IV) oxide (mainly) exhaled by the mouse; while at the same time denying the plant the needed raw material, carbon (IV) oxide, to photosynthesize, hence suffocating the mouse/limiting its survival; | (2 marks) |
| | b) Bell jar is transparent, allows penetration of light for the plant to photosynthesize; tin box is opaque, could easily heat up, altering the temperature inside for the mouse/plant; | (1 mark) |

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| 11. | a) During/after the exercises, one sweats (profusely, to cool the body/eliminate some nitrogenous wastes); a lot of water is lost through this/one is dehydrated; the little water that is left in the body system is further (selectively) reabsorbed in the kidney tubules; resulting in less, concentrated urine. | (3 marks) |
| | b) A rabbit has a higher surface area to volume ratio; hence has a bigger surface exposed for heat loss to the environment; it is also more active than the camel hence need more oxygen to (aerobically) respire to synthesize the needed energy to support its active lifestyle; | (3 marks) |
| 12. | a) Respiration (aerobic/anaerobic); | (1 mark) |
| | b) The lime water/calcium hydroxide solution in the test tube formed a white precipitate/ turned milky turbid; plants respire, producing carbon (IV) oxide (which forms a white precipitate with lime water); | (2 marks) |
| 13. | a) 47 chromosomes; | (1 mark) |
| | b) Non-disjunction/ failure of homologous chromosomes to separate/segregate/sister chromatids fail to separate/segregate; resulting in having an extra sex chromosome (X-chromosome) in a cell/having (XXX) instead of (XX) ; OWTTE | (2 marks) |
| | c) <ul style="list-style-type: none"> • Infertile/ovary abnormalities; • Taller than the average female; • Developmental delays; • Higher voice pitch; • (More pronounced) signs of obesity; | (2 marks) |
| 14. | (a) <ul style="list-style-type: none"> • Partial/entire decomposition of dead organisms/organic matter/fossils; • Some parts of or entire dead organisms are eaten by scavengers • Soft-bodied organisms do not fossilize; • Natural disasters, like earthquakes/earth movements; | (3 marks) |
| | (b) Comparative physiology/biochemistry/cell biology/serology; | (1 mark) |
| 15. | a) Guttation is the process by which plants lose (excess water) through their leaves in form of water droplets through hydathodes on the leaves' surfaces (such plants are mostly found in water-logged areas) while during transpiration water is lost in form of water vapour/moisture through the stomata in the leaves or lenticels on the plant stems; | (1 mark) |
| | b) <ul style="list-style-type: none"> • Enables the plant to get rid of excess water; • Creates a suction force/helps in the uptake of water/mineral salts from the soil; • Cools the plant; (2 x 1) = 2 (2 marks) | (2 marks) |
| 16. | <ul style="list-style-type: none"> • Can bring about beneficial/advantageous traits; • Increases heterozygosity (and size of gene pool)/increase variation; | (2 marks) |

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| 17. | <ul style="list-style-type: none"> Geographical distribution; made the animals adapt to survive in different environments (cold/hot), with those having thicker fur being adapted to colder regions (for insulation); Genetic/being passed on from the parents to the offspring; | (2 marks) |
| 18. | Canine; | (1 mark) |
| 19. (a) |  <ul style="list-style-type: none"> Salivary glands (in the mouth); Pancreas; | (2 marks) |
| | b) Endocrine (function); secretes (insulin and glucagon) hormones; responsible for blood sugar regulation/osmoregulation; OWTTE | (3 marks) |
| 20. (a) | Scales – Taper/overlapping/facing backwards to provide a smooth surface for easier movement/are slimy/covered with mucous for easier/smooth movement in water /reduce friction/resistance; | (1 mark) |
| | (b) Body shape – streamlined body shape to reduce friction/pointed (stiff) head for easier penetration/movement in water; | (1 mark) |
| 21. |  <p>Simple; Bilobed; Serrated; (3 marks)</p> | (3 marks) |

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| 22. | a) Carbon (II) oxide/CO; | (1 mark) |
| | b) Oxyhaemoglobin is unstable/freely dissociates, releasing oxygen to the tissues/dissociates leaving haemoglobin molecules free to take up more gaseous molecules; (hence constantly supplying the much needed oxygen to the respiring tissues) Carboxyhaemoglobin is stable/binds itself/holds on the haemoglobin molecules/does not dissociate, hence starving the tissues/cells of the oxygen, leading to suffocation/death; OWTTE | (2 marks) |
| 23. | <ul style="list-style-type: none"> • Thermoregulation/temperature regulation; • Blood sugar balance; • Protein/amino acid/fat regulation; | (3 marks) |
| 24. | a) They can interbreed; because they belong to the same genus (though they belong to different species); | (2 marks) |
| | b) The malaria-causing parasites over time, become resistant to some malarial drugs; due to gradually changing their genetic constitution (because of mutation) which, with time, results in the evolution and eventual perpetuation of the new strains of vectors, hence necessitating the discovery of a more effective drug to counter the new/emerging strains; OWTTE | (2 marks) |
| 25. | (a) <ul style="list-style-type: none"> • Spindle shaped; • Lack striations/not striated; • Uninucleated/one nucleus; (1 x 1)= 1 (1 mark) | (1 mark) |
| | (b) <ul style="list-style-type: none"> • Striated; • Cylindrical shaped; • Numerous mitochondria; • Multinucleated; (1 x 1)= 1 (1 mark) | (1 mark) |

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