**SET 2**

BIOLOGY PAPER 2 MARKING SCHEME

1. *Below is a diagram of a*
2. *Identify the structure labeled K,X and Y (3mks)*

*K- Cell wall****✓1mk***

*X- Chloroplast****✓1mk***

*Y- Cell wall/ sap vacuole****✓1mk***

1. *Explain why structure X are more on one side than the other*

* *To receive maximum amount of light****✓1mk***
* *Prevent bleaching of chlorophyll when light is very bright****✓1mk***

1. *What is the role of the material in structure Y*

* *Storage of salt and other dissolved substances****✓1mk***
* *Contribute to osmotic pressure of the cell.* ***✓1mk***

1. *Other than transport give any other function of vascular bundles in plants*

* *Support****✓1mk***

1. *A shoot of seedling exposed to light on one side bends toward source of light as it grows.*
2. *Identify the response shown by the shoot*

* *Phototropism****✓1mk***

1. *Explain how the bending toward source of light occurs*

* *Auxins from tip of the shoot moves from light side to dark side ;* ***✓1mk*** *high concentration of the dark side causes more cell elongation /growth than light side ;* ***✓1mk*** *hence curvature towards the direction of light****✓1mk***

1. *Identify a control experiment which could be set for this experiment*

* *Put a similar set on a clinostat* ***✓1mk***

1. *When a car descends rapidly downhill one feels an unpleasant sensation in the ear.*
2. *Explain how the unpleasant sensation occurs*

* *As the car moves downhill atmospheric pressure increases; causing imbalance of air pressure on outer ear and middle ear; resulting in inward building of ear drum.* ***✓1mk***

1. *How can the sensation be relieved*

* *By swallowing or yawning****✓1mk***

1. *Pure breed black cow was crossed with a white bull. The resultant was offspring with a coat of roan color (mixture of black and white).*
2. *Using letter B for black color and W for white color work out genotypic ratio of F2 generation and selfing*

*Parental genotype BB WW*



*Gamete B B W W*

*F1 BW BW BW BW*

*Parental genotype BW X BW*



*Gamete B W X B W*

*F2 BB BW BW WW*

*Genotype ratio 1BB : 2BW : 1WW*

1. *Give the name given to condition where two genes express themselves equally in heterozygous state*

* *Co dominance. Rej incomplete dominance, equal dominance, partial dominance****✓1mk***

1. *Identify a trait in human being that exhibit the condition identified in 3(b) above*

* *AB blood group inheritance.* ***✓1mk***

1. *What is back cross*

* *A cross between one parent and its offspring meant to determine genotype of the parent of known phenotype.* ***✓1mk***

*4. a) Distinguish between pyramid of numbers and pyramid of biomass*

* *Pyramid of numbers is pictorial representation of organisms number at each trophic level in an ecosystem****✓1mk*** *while pyramid of biomass is pictorial representation of dry weight of organism species at each trophic level of an ecosystem****✓1mk***

*b) From an ecological study, students formed the following food web*

*Green plants→ caterpillar→ small insect→ lizard→ hawk****✓1mk***

*Decaying leaves→caterpilar→small insect→ lizard→ hawk****✓1mk***

*c i). Which organism has the least biomass in the ecosystem*

* *Hawk* ***✓1mk***

1. *Give reasons for your answer*

* *Some energy lost during respiration as heat****✓1mk***
* *Defecation****✓1mk***
* *Source energy from structure / tissues which could not be passed over to the next level.* ***✓1mk***

*5. a) Give 3 structural differences between muscles found on the rib cage and the ones in endothelium of artery of a mammal*

***Rib cage Artery muscle***

*Multiple nucleus single nucleus****✓1mk***

*Striated Lack striation****✓1mk***

*Long fibres short fibres****✓1mk***

*Cylindrical spindle shaped*

*b) What is the difference between ball and socket joint & hinge joint*

*- Ball and socket joint allows movement in all direction of up to 3600  while hinge joint allow movement only on one plane up to 1800* ***✓1mk***

*c) Give two functions of synovial fluid*

*- Reduce friction during movement****✓1mk***

*- Shock absorption****✓1mk***

*d) State two advantages of having an exoskeleton*

*- Prevent dehydration/desiccation****✓1mk***

*- Control organism size****✓1mk***

*- Protection against infection and mechanical damage* ***✓1mk***

1. *An experiment was carried out to investigate the effect of temperature on rate of reaction catalyzed by an enzyme .The results are as shown below*
2. *On the graph provided draw a graph of rate of reaction against temperature (6mks)*
3. *Determine when the rate of reaction is 2.5mg of product per unit time( 2mks)*
4. *Account for the shape of the graph between*
5. *50c – 400c*

*As the temperature increases, the rate of reaction increases; as rise in temperature activates enzymes****✓1mk***

1. *450c – 600c (2mks)*

*Rate of reaction decreases; as temperature above optimum lead to denaturing of enzymes****✓1mk***

*d) -Increase enzyme concentration****✓1mk***

*- Increase substrate concentration****✓1mk***

*e) i. Identify a digestive enzyme in human that requires acidic conditions for its working*

*- Pepsin/rennin/chymosin* ***✓1mk***

*ii. Explain how the acidic condition above is achieved*

* *Hydrochloric acid secreted from wall of stomach / gastric gland/* ***✓1mk***
* *i. Bile juice/ any correct salt e.g sodium bicarbonate* ***✓1mk***

*ii. Duodenum* ***✓1mk***

*g. i) - Substances that increase rate of reaction of enzymes.* ***✓1mk***

*ii) Identify one metallic element used as enzyme cofactor*

* *Copper/magnesium/zinc/iron****✓1mk***

***ANS 7****. Pollen grain stick on the stigma surface; stigma produces chemical substance which stimulate pollen grain to germinate; it also provides nourishment to the pollen grain.*

*Tube nucleus then develop the pollen tube that grows down the style from where it gets nourishment; generative nucleus undergo mitosis to produce two generative nuclei ; on reaching the micropyle tube nucleus burst open the embryo sac and disintegrate; giving way to the generative nucleus. Once generative nucleus fuses with egg cell to form the zygote which develops into embryo; the other generative nucleus fuses with the two polar nucleus forming triploid nucleus which develop into primary endosperm. This process involves double fertilization.*

***b)*** *- integument changes into seed coat/test; - Zygote develops into embryo; - Ovary wall into fruit; - Ovule develop into seed; -Triploid nucleus into endosperm; -Style, corolla and stamen dries up.*

***ANS 8.*** *Cornified layer which is the top layer of epidermis made up of dead cells that protect against dehydration, mechanical damage and entry of pathogen.*

*Presence of granular layer made of living cells that give rise to cornified layer; Malphigian layer made of actively dividing cells that give rise to epidermal cell; contain melanin pigment that protects the skin against strong ultra violet rays.*

*Sweat glands in dermis that secrete sweat which on evaporation help reduce body temperature; Also in sweat are salts and excretory products like urea hence sweating help in osmoregulation and excretion.*

*Has follicle which trap air when erect resulting from contraction of erector Pilli muscle and this help in thermoregulation.*

*Presence of sebaceous gland that secrete sebum which is antiseptic; also help maintain skin soft and give hair follicle its water repellant characteristic.*

*Has nerve endings which are sensitive to stimulus like heat, pain, pressure and touch.*

*Presence of subcutaneous fat layer that insulate the body against heat loss.*

*Has superficial vessels which undergo vasodilation or vasoconstriction depending on*

*prevailing environmental condition for thermoregulation; also supply nutrient and oxygen to*

*the living tissues as well as removing their excretory products.*