

# BIOLOGY FORM TWO

## OPENER EXAM TERM 2 2023

### MARKING SCHEME

1. i) Sap vacuole: store sugars and salts/solutes; Maintain turgor pressure/Turgidity/Support to the cell; Maintain Osmotic Pressure of the cell;  
ii) Contractile Vacuole: Excretion (of wastes); Osmoregulation/ Expel excess water molecules/Water Balance;
2. a) Light is important for photolysis/breaks down water into hydrogen ions and Oxygen; Light provides energy important in the dark phase reactions;  
b) restore amount of Oxygen in the atmosphere; Help regulate amount of Carbon (IV) Oxide in the atmosphere;
3. a) Q – Mitochondrion; *Reject mitochondria*  
b) i) Muscle – Q; ii) Palisade – P;  
c) Supplies Glucose that is a respiratory substrate; Supply Oxygen necessary for Oxidation of food/glucose/substrate;
4. a) Root hair (cell);  
b) i) Create a steep concentration gradient/Increase osmotic pressure/make the cell cytoplasm hypertonic to enhance movement of water molecules into the cell by osmosis/Influence osmosis of water into the cell;  
ii) Increase surface area over which the root hair cell absorbs water molecules/mineral ions diffuse;
5. a) Diffusion; b) Is plasmolysed/Cell membrane detached from the cell water/Cytoplasm has shrunk; due to excess loss of water molecules by osmosis; to the surrounding hypertonic surrounding; *Penalise for use of loose instead of loss/lose*  
c) Placed in hypotonic/less concentrated solution/distilled (water over time)
6. a) Resolution;  
b) Magnification/Enlargement of Image;  
*Reject Magnification/Enlargement of Object*
7. i) Has root hairs;  
ii) Xylem and phloem alternate/radial/arranged in a circular manner around the pith; Lack vascular Cambium; Has pith;
8. a) Polarised/Has both positive and negative charges; Semi-permeable/Selectively permeable; Denatured by temperature beyond optimum/extreme pH; *Mark 1<sup>st</sup> 2*  
b) Organism, Organ system, Organ, Tissue, Cell, Organelle
9. Kill bacteria in the food; Offer optimum/acidic pH; Neutralize the alkaline food pH; Activate/Convert pepsinogen to pepsin; *Mark 1<sup>st</sup> 2*
10. a) Investigate the effect of temperature on enzyme action;  
b) B, C; *Mark as a whole*

c) Iodine solution retained its brown colour/No colour change/No observable change/No Starch; Since starch had been digested/broken down/Converted to maltose (by salivary amylase); *Reject No Observation*

11. a) i) A- Annular;      ii) C- Reticulate;  
 b) Strengthen/Support;  
 c) Made of dead cells in order not to utilize water molecules during transport; Narrow lumen to increase capillarity of water; Lignified wall to keep the lumen open for water molecules movement; *Mark 1<sup>st</sup> 2*

12.

Test Tube	Result	Explanation
<b>C</b>	Blue	Protein present; No digestion took place due to lack of enzyme protease;
<b>D</b>	Purple	Protein absent; Since all protein was hydrolysed/digested/converted to peptide;

13. a) proteases/pepsinogen are released in their inactive form/pepsinogen; Stomach lining is coated by mucus;  
 b) No starch-digesting enzyme/amylase/ptyalin is secreted in the stomach; Hydrochloric acid/Acidic pH in the stomach denatures/destroys amylase/ptyalin;  
 c) Blood pressure is higher than the atmospheric pressure leading to rupturing/bursting of blood capillaries in the nasal region;  
 d) Breaks down stored fats into metabolic water used in body metabolism;
14. water-dissolves soluble nutrients in the food/moisten food; mucus-lubricates food bolus for easy swallowing; Salivary amylase/ptyalin-digests/hydrolyses starch/convert starch to maltose; mineral ions-create alkaline pH; *Mark component and function as a whole*
15. a) Prevent evaporation of water;  
 b) Will weigh less/amount of water in tube will reduce; since water molecules will be absorbed by the plant then lost via transpiration (through the stomata/cuticle/lenticels);
16. Systemic circulation is a case where blood flows from the heart to other parts of the body (except the lungs) then back to the heart;  
 Pulmonary circulation is where the blood flows from the heart to the lungs then back to the heart; *Award 0, 1 or 2*
17. a) Offer a shorter distance over which molecules diffuse;  
 b) Increase kinetic energy of molecules;
18. a) Name: Villus; *Reject plural*  
 Function: Absorption of soluble nutrients/products of digestion (In the ileum);  
 b) thin to shorten distance over which soluble nutrients diffuse into the bloodstream;
19. a) Prevent mixing blood in the left and right heart chambers/Prevent mixing of blood with low Oxygen/High Carbon (IV) Oxide with that of high Oxygen/Low Carbon (IV) Oxide concentration; *Reject when Oxygenated and Deoxygenated are used*  
 b) Tricuspid valve: Prevent back flow of blood from the right ventricle to right auricle/atrium (during systole);

20. Cooling effect/regulate temperature; Facilitate transpiration pull/Conducting of water up the stem to the leaves; Expel/excrete excess water; Enhance water absorption by the roots; *Mark 1<sup>st</sup> 2*

21. 7 cells measure 37mm

Therefore, 1 cell will measure:  $(1 \text{ cell} \times 37 \text{ mm}) \div 7 \text{ cells};$   
 $= 5.29 \text{ mm};$

Mag = image length  $\div$  Actual length

Therefore,

Actual length = Image length  $\div$  Mag  
 $= 5.29 \text{ mm} \div \times 400;$   
 $= 0.013 \text{ mm};$

22. a) Children: Are more physically active; High growth rate/rate of cell division;

b) Males: Have more muscles that utilize a lot of energy;

23. a) i) Calcium ions; *Reject symbol*

ii) Vitamin: Vitamin K;

b) Prevent excess blood loss; Prevent entry of pathogens/disease-causing micro-organisms;

24. a) Carnivorous;

b) Feed proteins; that require a shorter time to process;

25. i) Lacked Oxygen; since all had been used up by the candle;

Accumulated a lot of carboxyhaemoglobin; due to a lot of Carbon (II) Oxide thus poor Oxygen transport to various tissues;

ii) Green plants undertook photosynthesis; thus removed the toxic Carbon (IV) Oxide/thus supplied the mouse with Oxygen for cell metabolism