2024 MASENO SCHOOL ANNUAL NATIONAL BIOLOGY CONTEST

JUMBO CATEGORY MARKING SCHEME

S/N	ANSWERS
1.	Starch grains; lipid droplets; chlorophyll;
2.	Absorption of water; synthesis of vitamin K; synthesis of amino acids;
3.	Exposure to high temperature above optimum; exposure to extreme acidity or alkalinity;
4.	Release of bile juice by the gall bladder; and secretion of sodium hydrogen carbonate from the Pancreas;
5.	It is made up of xylem vessels; and xylem tracheid; which are modified for transportation of water;
6.	It releases energy which activates specific enzymes; and drives enzyme controlled reaction;
7.	Similarities increases from kingdom to species; differences decreases from higher ranks/kingdom to lower ranks/Species; the number of organisms decreases from higher ranks/kingdom to lower ranks/species;
8.	Mitochondria P; The inner membrane is greatly/highly folded into cristae to increase surface area for attachment of more respiratory enzymes; to yield more energy for rapid cell division of apical meristematic cells to bring about growth in apical regions;
9.	Reduced stomatal transpiration; Can photosynthesize under low light intensity;
10.	a) Stomach; Ileum; colon; b) Villi of duodenum have crypts of Lieberkuhn with Brunner's glands while those of ileum lacks Brunner's gland;
11.	Ethanol; Formalin/Formaldehyde;
12.	a) Diameter/length/width of one cell = $\frac{\text{Diameter of field of view in micrometers (µm)}}{\text{Number of cells counted along the diameter of field of view}}$; b) It assumes that the cells are arranged along the diameter of field of view from one end of the circumference to another; it assumes that the staining agents do not affect the osmotic property of the cell; it assumes that the cells are similar in size and shape yet they may be different;
13.	a) Centriole; b) Euglena; trypanosome;
14.	Sino-atrial node initiates heartbeat by generating waves of excitation; **it** then transmits waves of excitation to atrio-ventricular node; which discharges them down to the Purkinje tissue; which in turn transmits the waves of excitation to the ventricular wall;
15.	Translocation; mineral ions absorption from the soil by root hairs; Apical cell division;
16.	The 16 cm^3 red agar block took a shorter time to turn colorless; the block has smaller volume hence had large surface area to volume ratio, leading to faster rate of absorption of hydrochloric acid by diffusion; The 30 cm^3 red agar block took a longer time to turn colorless; the block has larger volume hence smaller surface area to volume ratio, leading to lower rate of absorption of hydrochloric acid into the block by diffusion;
17.	The plant loses more water than it absorbs; turgor pressure of the plant cells reduces making them to become plasmolysed; hence drooping;