SECTION A (40 Marks)

Answer ALL questions in this section in the spaces provided

1. (a) Define the term Denature as used in enzymes. (1 mark)

   Denature change in protein structure so that some of its original properties/configuration stop functioning;

   (b) (i) Optimum temperature 36^0C 1; (ii) At 450 C time taken is more than at 350 C because the enzymes/pepsin is being denatured;

   (c) (i) Pepsinogen; (ii) Digest stomach/digest lumen in its active form (pepsin) in absence of protein food;

   (d) Epidermal tissue; Parenchyma; Sclerenchyma; Xylem tissue; Cholenchyma;

   (e) Provides surface on which food/grass is pressed and cut:

2. (a) Food chain is a linear flow of energy from a producer to a consumer food web is inter-relationship between food chains;

   (b) Organisms-grass; Reason organisms depend on for food. respiration

   :) $Grass \rightarrow Locust \rightarrow Guinea\ fowl \rightarrow vulture$

   $Grass \rightarrow caterpillar \rightarrow Guinea\ fowl \rightarrow vulture$

   $Grass \rightarrow Antelopes \rightarrow Lion \rightarrow vulture$

   (d) Increased composition for grass with other primary consumer (locust/antelopes/caterpillar);

   (e) Secondary consumer /3rd trophic level;

   (f) Decomposition/decay;

3. (a) Loop of Henle;

   (b) It increases the osmotic gradient; this forces water out of the collecting duct by osmosis or diffusion; this increases water reabsorption from the collecting duct;

   (c) Proximal convoluted tubule/Distal convoluted tubule;

   (d) Low sodium concentration increase aldosterone hormone secretion, stimulate reabsorption of chloride;

   (e) Ultrafiltration

4. (a) (i) A stem; - Transport water and mineral salts/manufactured food;/support;

   - B cotyledon; rej seeds. - Stores food/protect the plumule/photosynthesis;

   (ii) Epigeal;

   (b) (i) Respiration/oxidation/breakdown of food substances to provide energy for germination;

   (ii) Soften the seed coat/testa /A solvent for stored food substances/medium for enzymes action/keep cells turgid /medium of transport;

   (iii) Optimum temperature required for enzymes activity/it activates enzymes;

5. (a) X- Vacuole/Sap vacuole;

Y-Tonoplast; Z-Chloroplast;

(b) Cellulose;

(c) Active transport;

(d) The cell sap is hypertonic to the solution/distilled water; hence water molecules move into the cell; by osmosis; making it to swell and eventually burst;

Answer question 6 (compulsory) in the spaces provided and either question 7 or 8 in the spaces provided after question 8.

6. 229 ± 5;
102-97;
=5Kj

(c) Bigger body size, small surface area volume ratio; hence loss less heat to the surroundings; require less energy to compensate for less energy lost; (d) Extra polation; 2.5 kg;

(e) (i) Lower; (iireptiles have poikobilotherms does not requireenergy to maintain body temperature;

(f) -Activity/occupation;

- Sex;
- Age; o State of health;
- (g) Proteins; (h) Provide grip hence prevent constipation; add bulk to the food;

7. **Describe how the mammalian heart is adapted to its function**:

- It has myogenic/cardiac muscles; which contract and relax rhythmically without fatigue (hence continuous pumping)

- Cardiac muscles fibres are interconnected to form network of fibres;to ensure rapid and uniform spread of excitation throughout the walls of the heart; - The heart is divided into four chambers (which are hollow);to accommodate a lot of blood;

- Ventricles wall are thicker than auricle walls; to generate higher pressure to pump blood over longer distance;

- There is a (longitudinal)septum; which separate it into two halves to prevent mixing of (the more) oxygenated blood and the less oxygenated blood/deoxygenated blood;

- It has valves; which prevents backflow of blood;

- Valves are connected with (tough strands of) connective tissue/chordae tendinae/tendons; prevent them from being pushed inside out when ventricles contracts/turning inside out;

- The heart is joined by blood vessels/aorta,vena cava, pulmonary vein, pulmonary artery);which channel blood to and from all body parts; - It has the coronary artery and coronary vein which supply the mycocardium with oxygen and nutrients; remove waste products respectively;

- The fibrous layers of pericardium surrounds the Herat; which keeps the heart in position and prevent over-dilating;

- The inner layer of pericardium secretes pericardiac fluid; which reduce friction between the two layers during systole and diastole; - Outer layer pericardium; is surrounded by a layer of fats; to act as shock absorbers protecting it from mechanical damage;

- It has Sino artricole node (SAN);to acts as pacemaker by regulating rate of beating and excitation of the heart; - Has nerves/vagus nerve and sympathetic nerve; which regulate heartbeat;

8. **Discuss the role of plant hormone in growth and development.** (20 marks)

Auxins/IAA; - Induces pattenocarpy in horticulture;

- Stimulates growth of adventitious roots in cuttings for vegetative, propagation;

- Stimulates cell division and elongation in shoots; promotes growth in stem;

- Selective weed killers; - Inhibits formation of side branches by removing apical bud; used in pruning tea, coffee; - Ripening of fruits;

- Induces leaf fall leaf abscission;
Gibberellins/Gibberellic acid;
- Stimulation of rapid growth; dwarf variety to grow to normal height by cell elongation/cell division;

- Stimulate growth side branches;

- Inhibit growth of adventurous roots;
Cytokinins;
- Promote cell division in presence of auxin(and growth in plant);

- Breaks seed dormancy; - Repair of wounds in plants/cellus tissue;

- Promotes flowering;retards aging;

- Promotes fruit growth;
Absissic acid;
- Promotes fruits fall;

- Promotes leaf fall/leaf abscission;

- Prevents seeds from germinating/dormancy of buds;

- Growth inhibitor;
Ethene;
- Ripening of fruits; - Causes leaf fall/abscission;

- Breaks dormancy in seeds/bud;