EXCRETION AND HOMEOSTASIS

1. Pancreatic juice containing digestive enzyme is prevented from reaching food. Insulin (and glucagons), which regulates sugar, is released directly into the blood stream.
2. a) Heat from the body metabolism is not lost to the surrounding through sweating because evaporation of sweat will be low; as air is already saturated with moisture.
   b) Hypothalamus
3. a) Sweat produces does not evaporate due to high humidity and the body does not cool, hence more sweat produces leading to accumulation
   b) Hypothalamus
4. - Elimination of uric acid requires less water than ammonia, hence (more) water is conserved.
   - Uric acid is less toxic than ammonia hence safer to excrete where there is less water.
5. a) Regulation of blood sugar lowers blood sugar level/controls the conversion of blood sugar to glycogen/maintain correct blood sugar level (90-100mg/100cc of blood)
   b) Controls the absorption of water in the kidney (tubules) nephron/regulation of water in the body/osmotic pressure in the blood.
6. More water will enter the amoeba (by osmosis) rate of water discharge by contractile vacuole will increase. Contractile vacuoles will be formed to discharge the excess water.
7. i) Proteins/plasma; protein/fibrinogen; albumin, globulin, prothrombin.
   ii) Blood cells, RBC/white blood cells/Platelets.
8. - Tests/React/Boil urine with Benedicts/Fehlings: positive results/Orange red precipitate is an indication of the disease diabetes mellitus.

- Brick red instead of orange, use of Benedict's solution with boiling/heating.

9. After vigorous activity when blood glucose falls below normal.

10. a) Diabetes insipidus

    b) Anti-diuretic Hormone/ADH/ vasopressin

11. Maintenance of constant level of water, salts, osmotic pressure for optimum conditions for metabolism, suitable condition for cellular functions.

12. Converted into fats and stored as adipose tissue.

13. a) - Most enzymes in the body function with a narrow range of temperature
    - High temperature denatures enzymes
    - Low temperature inactivates/inhibit enzymes

    b) Sugar is a raw material for respiration therefore less sugar leads to low rate of respiration hence less energy available to the body/low rate of metabolism.

14. a) Heat loss by conduction/convection from the blood vessels, the skin enters general circulation cooling the body.

    b) Vasoconstriction, thus less blood flowing to the skin surface thus reducing heat loss. Sweating ceases. Heat produced by shivering through metabolism is retained in the body.

15. a) Sebum

    b) - Cooling the body when water content evaporates.
    - Excrete excess salts, lactic acid and urea.

16. - Regulates the blood sugar level in the body by converting glucose into glycogen.

17. - Adhesion- force of attraction between unlike molecules

- Due to the force of adhesion water tends to stick to the walls of vessels containing it
- Cohesion – forces of attraction between like molecules.
- Cohesion between water molecules prevents the water column from breaking.
- Root pressure-due to pressure generated by the root's endodermis.
- Capillary due to narrowness of xylem
- Transpiration pull-As water evaporates from the leaf's surface, more is absorbed.
- After the water reaches the leaves cells, it passes the cells by osmosis from the xylem.
- Water vapour diffuses out through stomata.

18. a) i) Maintenance of a constant internal environment of cells.
    ii) Regulation of the concentration of water and salts in the body fluid.
    b) - Insulin - Glucagon
19. a) - The amino acids are broken into amino group (NH_2) and carboxyl group (COOH). The amino group combines with hydrogen forming highly toxic ammonia. It immediately carbines with carbon (IV) oxide forming urea that is less toxic.
    - The carboxyl group are converted to carbohydrates and then oxidized or converted into neutral fats and deposited on parts of the human.
    b) - Bowman's capsule
    - Proximal convoluted tubule
    - Distal convoluted tubule
    c) i) Less water reabsorbed in the blood stream and dilute urine is produced.
    ii) Diabetes insipidus
20. a) Excretion is the removal of metabolic waste products from the body of an organism.

b) Secretion is the removal of a substance from a cell where it is formed and its transfer to another part of the body where it serves a useful function

c) Egestion is the removal of undigested food material from the body of an organism.

21. Blood cells and plasma proteins

22. a) Ultra filtration

b) Selective reabsorption

c) Because the pores in the glomerular capillaries are too small for plasma protein to pass through.

d) Blood cells

e) Most of the water in the glomerular filtrate is reabsorbed by the urine is formed whereas very little urea is reabsorbed.

23. As moisture from the urine or saliva evaporates from the surface of the skin, it reabsorbs latent heat of vaporization from the body thus cooling it.

24. Being exothermic, fish do not spend any part of their food intake in the maintenance of body temperature. This is unlike the case with mammals which spend a significant part of their food on temperature maintenance. Therefore fish are able to spend more of their food intake on growth.

25. During hot dry weather, the humidity difference between the surface of the skin and atmospheric between air is high. Under such conditions, sweat evaporates easily from the skin surface. This cools the body due to absorption of latent heat of vaporization. When the weather is hot and humid the humidity difference between the surface of the skin and atmospheric air is low. Evaporation of sweat takes place slowly with the result that sweat accumulates on the person's skin. Therefore the cooling effect of sweat on the body is

greatly reduced.

26. Negative feedback refers to a regulatory mechanism whereby a deviation of the entity being regulated above or below the normal range triggers a sequence of event to bring it back to normal.

27. a) A - Hepatic artery

B - Hepatic portal vein

C - Hepatic vein

b) i) B

ii) B

iii) C

iv) A

v) C

c) During fasting there is no glucose from the alimentary canal making glucose concentration in vessel B low. Vessel C obtains glucose derived from the hydrolysis of glycogen in the liver.