**MARKING GUIDE OF BIOLOGY MID TERM TEST S2**

1. a) Cell wall and large vacuole

1. i)Active transport

ii)Diffusion

 iii)Osmosis

2. Cardiac muscle

1. i) Pulmonary artery, aorta

ii)Pulmonary vein, vena cava

3. When oxygen is inhaled in the lungs, the alveoli enable it to be transferred into the blood. A small amount is transported in plasma. Red blood cells contain a protein called haemoglobin which helps the transport of oxygen from the lungs to the tissues. In the lungs, haemoglobin binds with oxygen forming oxyhaemoglobin. In the tissues, oxyhaemoglobin dissociates into oxygen and haemoglobin. The oxygen is used by cells in different metabolic activities. The heart is vital in moving blood around the body pumping 70 times per minute supplying the body with oxygen and removing metabolic waste products from the body.

4. a) Bile – liver

1. Amylase – mouth and pancreas
2. Lipase – pancreas
3. Proteases – stomach and pancreas

5.

|  |  |
| --- | --- |
| **Trophic level** | **Organism** |
| Herbivore | Periwinkle |
| Producer | Seaweed |
| Secondary consumer | Starfish, crab and octopus |
| Top carnivore | Seal, seagull |
| Primary consumer | Limpet, periwinkle |

6.(a) Green colour.

(b)In the chloroplast.

(c)Chlorophyll traps light energy.

7. (a) Osmosis is the movement of water molecules from a medium of high water potential to a medium lower water potential across a semi-permeable membrane.

(b) Because osmosis involves the movement of water molecules only while diffusion involves the movement of all molecules moving down their concentration gradient.

8. Excretion of water is a metabolic product and is removed when in excess and osmoregulation in water is maintained to keep the water potential of blood more or less constant or to maintain water balance, maintain normal blood concentration.

9. An interaction between the pituitary gland and the kidneys provides another mechanism. When the body is low in water, the pituitary gland secretes vasopressin (also called antidiuretic hormone) into the bloodstream. Vasopressin stimulates the kidneys to conserve water and excrete less urine.

10. a) Fishes have the following adaptations: presence of gills, presence of a swim bladder, and presence of fins.

b) Because gills are not adapted to make gaseous exchange in air. The gills will be damaged in air.

11. Sucrose can be hydrolysed to its monosaccharide constituents by **boiling it with dilute hydrochloric acid.** Sucrose is hydrolysed **to glucose and fructose**, both of which are reducing sugars and give the reducing sugar result with the Benedict’s test**. NaOH is added in order to neutralize HCl** because Benedict’s solution **works best in neutral PH.**

12. limiting factors of photosynthesis include:

(a)(i) Light intensity

 (ii) Carbon dioxide concentration

 (iii) Temperature

 (iv) Water

(The student will explain to each point above)

 b) The importance of photosynthesis are:

* Photosynthesis act as a source of energy
* Provides oxygen in air
* Makes carbon available to plants and animals
* Prevents accumulation of carbon dioxide in the air
* It is responsible for the energy stored in coal and petroleum.

**SECTION B.**

13. a) Photosynthesis is a metabolic process by which plants and other autotrophic organisms make their own food using water and carbon dioxide in presence of sunlight and chlorophyll.

1. Conditions necessary for photosynthesis: presence of water, carbon dioxide, suitable temperature, presence of chlorophyll or chloroplasts.
2. Factors that may affect the rate of photosynthesis: water, carbon dioxide, temperature, sunlight and chlorophyll.

14. a) An antigen is a substance that stimulates the production of an antibody.

1. Blood compatibility for transfusion

15. a) Maintenance of blood flow in a mammal

* The automatic stimulation of the pace maker that enables the continuous contraction of the cardiac muscles that allows the pumping of blood out of the heart to the rest of the body parts.
* Difference in ventricular muscles which enables blood to be pumped out of the heart at different pressures depending on the distance to be covered.
* Elasticity of the arteries that allows constrictions which maintains high pressure in arteries.
* Skeletal contractions maintain movement of blood in the veins.
* Thicker walls of arteries which maintain and withstand high pressure of blood.
* Presence of valves in veins and the heart that prevent the back flow of blood.
* Continuous blood supply to the heart muscles by coronary arteries which enables respiration for energy supply to allow the heart contractions.

b)

* Transpiration pull
* Root pressure
* Capillary force
* Osmotic pressure
* Cohesion force
* Adhesion force.

16. a) (i) Hormones are organic substances secreted in minute quantities into the blood stream by endocrine glands or specialized nerve cells and regulate the growth or functioning of specific tissue.

1. Endocrine glands
2. Insulin, glucagon
3. When the blood glucose level increases, the beta cells of the pancreas releases insulin hormone. Insulin facilitates conversion of glucose to glycogen and fats, oxidation to glucose. The blood glucose level decreases to the set point. When the blood glucose level decreases, the alpha cells of the pancreas releases glucagon hormone. Glucagon stimulates the conversion of glycogen to glucose; fats to glucose; amino acids to glucose. The blood glucose level increases to the set point

17. a) Digestion is the breakdown of food substances in the body in a form that can be absorbed into the bloodstream.

1. **Pepsin:** digests proteins into small peptides; **trypsin:** digests proteins into small peptides; **chymotrypsin:** digests proteins into small peptides.

c)

1. Eating high fiber foods which add bulk to the diet, making you feel full faster. Fibers are found in fruits, vegetables, nuts, seeds, bran and barley. They speed up the movement of food through the intestines and stomach, adding bulk to the stool.
2. Eating small and regular meals throughout the day. This make food move smoothly through the digestive tract.
3. Drinking adequate water as it plays a very important role in the process of digestion.
4. Regular exercise can keep food moving smoothly through the digestive system.
5. Avoiding caffeinated and carbonated drinks, too much spice, dairy products (if lactose intolerant), alcohol and smoking.
6. Chewing the food properly in enough time.
7. Eating a balanced a diet.

**SECTION C:**

18. Test of glucose

* Put 1cm3 of test solution suspected to contain glucose in a test tube. /**1mark**
* Add 1cm3 of **Benedict’s solution. /1mark**
* Boil. /**1mark**
* **Observation:** the colour changes from blue, green, yellow, orange and finally red brown precipitate. **/2mark**
* **Conclusion:** glucose is present or any other reducing sugar is present. /**1mark**

## (i)Test of sucrose

* Put 2 cm3 of test solution suspected to contain sucrose**. /1mark**
* Add 2 drops of **hydrochloric acid /1mark**
* Boil. **/1mark**
* Cool /**1mark**
* Add 2 drops of **sodium hydroxide** followed by 2 cm3 of **Benedict’s solution** and boil again. **/3mark**
* **Observation:** the colour changes from blue, green, yellow, orange and finally red brown precipitate. **/1mark**
* **Conclusion:** sucrose is present or any other non-reducing sugar is present.  **/1mark**

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