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1. (a) Binomial nomenclature is a system of naming organisms by giving them two scientific names; the generic and the specific names.
- (b) - It makes it easier to identify an organism
- It is easier to describe an organism as it is based on characteristics of the organism
- Large number of organisms is divided into smaller groups depending on characteristics
- The whole world uses the same groupings, so that everyone understands each other

2. (a) Drawing Magnification =  $\frac{\text{Length of the drawing}}{\text{Length of the object}}$

(b) It is adding a dye to the specimen to make the feature clearer and distinguishable.

3. Plant cells have cell membrane and cell wall. When the cell is placed or immersed in distilled water, the water is absorbed by osmosis. As cell becomes turgid, the cell creates an inward force, wall pressure that prevents the cell from bursting.

4. Form vesicles that transport materials to other parts of the cell e.g. proteins
  - Transport secretions to the cell surface for secretion e.g. enzymes and mucus
  - They form lysosomes

5.

Diffusion	Osmosis
<ul style="list-style-type: none"> <li>• Involves movement of particles of molecules of liquid or gas</li> <li>• It may be through a membrane or in air</li> <li>• Not affected by PH changes</li> </ul>	<ul style="list-style-type: none"> <li>• Involves movement of solvent molecules</li> <li>• It takes place through a semi-permeable membrane</li> <li>• Rate affected by PH changes</li> </ul>

6. Takes place in the grana of the chloroplast. Light is absorbed and used to split water molecules into hydrogen ions and oxygen, photolysis. Energy is formed and is stored in form of ATP.

7. (a) (i) - Premolar tooth
- (ii) - Presence of two roots
- (iii) - Presence of cusps on the crown

- (b) - Has nerve cells that increase sensitivity of the tooth to heat and pain  
 - Has a blood vessel that provides nourishment to the tooth and remove waste products
8. (a) Vitamin D, Vitamin K
- (b) - Transmission of nerve impulses  
 - Ionic balance / osmotic balance  
 - Contraction of muscles
9. Absence of cuticle to allow diffusion of water  
 - Thin walled to reduce distance of diffusion  
 - Elongated to increase surface area for absorption of water and mineral salts  
 - Presence of large vacuole to increase concentration gradient between cell sap and soil water
10. (a) Phloem tissues
- (b) K - Companion cell  
 L - Sieve tube
- (c) Supply nutrients and energy to the sieve tubes
11. (a) Presence of valves
- (b) Have biconcave shape to increase surface area for absorption of gases  
 - Thin capithelium to reduce distance of diffusion of gases  
 - Absence of nucleus and other organelles  
 - To increase packaging of haemoglobin  
 - presence of red pigment haemoglobin that has high affinity for oxygen
12. (a) - Pneumatophores  
 - Aerenchyma tissues  
 - Cuticle
13. (a) (i) Ethanol and carbon (iv) oxide  
 (ii) Lactic acid
- (b) It is the state when human body undergoes anaerobic respiration producing lactic acid. Oxygen has to be taken into the body to break the lactic acid
14. (a) (i) Maintenance of a concentration of water and salts ion in the body fluid
- (b) - Insulin  
 - Glucagon
15. (a) Population - It is all members of a given species in a particular habitat at a particular time

Community - all organisms belonging to different species interact in the same habitat

- (b) (i) Capture and recapture method  
(ii) Line transect

- Produce large number of eggs for increased survival
- Produce enzymes to digest human skin when penetrating
- Can withstand low oxygen concentration
- Have hook-like structures to attach to the intestinal walls

16. (a) (i) Anaphase I  
(ii) Homologous chromosomes separate at the equator  
(iii) Chromosomes start migrating to opposite poles  
(iv) Sister chromatids attached at the centromere

(b) Spindle fibres

17. - Harmful characteristics from the parents may be passed on to the offspring  
- Takes a longer time  
- Few offspring are produced at a time

18. (a) - Absence of water (moisture)  
- Unsuitable temperature  
- Lack of oxygen  
- Lack of light

(b) Hypocotyl

19. (a) It is an alternative form of a chromosome, similar in structure but may have different composition

- (b) (i) Occurs when some nucleotides of a part of a gene break off and disappear  
(ii) Occurs when the nucleotides of a part of a gene become inverted by taking a 180° turn

(c) Testing the genotype of an individual by crossing with the recessive trait

20. (a) When organisms of the same origin become adapted (modified) in different ways in order to fit in the environment. The organisms are separated due to natural factors

(b) When an organism is exposed to drug for sometime it becomes modified (adapted) to living in presence of the drug. The offspring produced therefore survive in presence of the drug. Hence drug resistant

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21. (a) In the central nervous system (spinal cord)
- (b) (i) Motor neuron  
(ii) P - Dendrites  
Q - Axoplasm (Axon)
- (c) Insulates the axon
22. (a) Auxin
- (b) Growth response due to touch of a part e.g. tendrils
23. (a) Have short neural spines
- (b) Xylem tissues  
- Collenchyma tissues  
- Sclerenchyma tissues  
- Parenchyma tissues
24. (a) In the stomach there is acid medium and ptyalin only acts at slightly alkaline medium
- (b) High temperature above 40°C
- (c) - Villi  
- Microvilli
25. - During birth  
- Breast feeding