BIOLOGY

1. THE FUNDAMENTAL UNIT OF LIFE

1. A cell is the structural and functional unit of a living organism.
2. A cell has the capability to divide itself into cells of its own type.
3. Robert Hooke in 1665 noticed the presence of cells in a Cork Slice.
4. The organisms that consists of single cell are called unicellular organisms.

   Eg Amoeba
5. The organisms which contain various cells that perform different functions in the organism are called multicellular organisms Eg: plants fungi and animals.
6. Cells are capable of changing their shape. For example, the white blood cells and amoeba change shape on their own.
7. A cell contains specific components which are called organelles.
8. Cell gets separated from the external environment because it has a plasma membrane.
9. The plasma membrane has the capability to decide which material should enter or leave. That is why it is also called as a selectively permeable membrane.
10. Osmosis is a process in which solvent molecules move from the region of higher concentration to low concentration through semipermeable membrane.
11. Gaseous substances have the tendency to move to areas where their concentration is less from the areas where there is higher concentration and this movement is called diffusion.
12. If concentration of water outside the cell is higher than the concentration of water inside the cell it gains water by osmosis and is called hypotonic solution.
13. If the medium has exactly the same water concentration as cell, there will be no net movement of water across the cell membrane and such solution is called isotonic solution.
14. If the medium has lower concentration of water than the cell, the cell will lose water by osmosis such a solution is known as a hypertonic solution.
15. Plasmolysis is a process in which the contents of cell shrink or contract away from the cell wall. Cell loses water due to osmosis when kept in hypertonic solution.
16. In addition to the plasma membrane plant cells have another rigid outer covering called cell wall.
17. The cell wall is generally made up of cellulose.
18. Nucleus is a prominent, organelle present in cell which is the controlling centre of all activities of cell.
19. There are chromosomes, rod shaped structures present in the nucleus which contain genetic information.

20. **DNA** – This is responsible for organizing and constructing new cell.

    Proteins – These help in packaging and condensation of DNA.

21. Chromatin is thead like material present in a cell.

22. Nucleolus is called as Brain of the Nucleus which helps in the formation of ER which inturn helps in the formation of protein inside the cell.

23. Nucleus with no definite nuclear boundaries is called Nucleoid.

24. Organisms whose cells contain a well-defined nuclear membrane are called Eukaryotes.

25. Organisms whose cells do not have a definite nuclear membrane are called prokaryotes.

26. The plasma membrane has a fluid like substance in it which is called the cytoplasm.

27. The cellular processes occur in cytoplasm such as formation of proteins, it dissolves cellular wastes, movement of substances such as hormone.

28. Rough Endoplasmic reticulum contains ribosomes that are responsible for manufacturing of proteins in cell and they give a rough texture to the cell.

29. The smooth ER manufactures fats or lipids in the cell which allows functioning of cell.

30. The Golgi apparatus consists of stacks of membrane bound vesicles that function in the storage modification and packaging of substances manufactured in the cell.

31. Most plant cells have large membranous organelles called plastids, which are of two types – chromoplasts and leucoplast.

32. Chromoplasts that contain chlorophyll are called chloroplast and they perform photosynthesis.

33. The primary function of leucoplasts is storage.

34. Most mature plant cells have a large central vacuole that helps to maintain the turgidity of the cells and stores important substances including wastes.

35. Lysosomes can digest any foreign material such as food or bacteria and also called as suicide bags.

36. The mitochondria generates ATP (Adenosine Tri Phosphate) which are energy giving molecules of the cell that are often called as energy currency.

37. Chloroplasts contain photosynthetic pigment called chlorophyll.

38. Vacuoles are the places where cells can store liquids and solids.

39. Ribosomes are cell organelles responsible for protein synthesis.

40. Cells in organisms divide for growth of body for replacing dead cells, and for forming gametes for reproduction.

2. TISSUES

1. A group of cells that are similar in structure and work together to achieve a particular function forms a tissue.
2. Plants are stationary or fixed. They are upright and they have large quantity of supportive tissue.
3. Animals on the other hand move around in search of food, mates and shelter.
4. Most of the tissues in animals are living
5. A group of cells in most plants containing undifferentiated cells, found in zones of the plant where growth can take place forms the meristematic tissue.
6. Meristematic cells are active, they have dense cytoplasm, thin cellulose walls and prominent nuclei.

   a. Apical Meristem is present at the growing tips of stems and root.

   b. The girth of the stem or root increases due to lateral meristem (cambium.

   c. Intercalary meristem is the meristem at the base of the leaves or internode (on either side of the node on twigs.
7. The tissue that are made from meristematic tissue which takes up permanent change and differentiation to form permanent tissue.
8. Permanent Tissue are classified as:

   i. Simple Permanent Tissue which includes Parenchyma, Collenchyma and Schlerenchyma

   ii. Complex Permanent Tissue which includes Xylem and Phloem.
9. Simple Permanent Tissue contains a few layers of cells formed from basic packing tissue. This tissue is called as parenchyma a type of permanent tissue.
10. Chlorenchyma is a type of parenchyma tissue which provides support to the plant and also stores food. In some situations it contains chlorophyll and performs photosynthesis.
11. Aerenchyma is also a type of parenchyma tissue present in aquatic plants with large air cavities present in parenchyma to give buoyancy to the plant to keep them floating.
12. The flexibility in plants due to permanent tissue known as collenchyma. It also provides mechanical support to plant.
13. Sclerenchyma is a permanent tissue which makes plants hard and stiff. The cells of sclerenchyma tissue are dead. Eg. Husk of coconut.
14. Complex Permanent Tissue: Such tissue are made up of more than one type of cells.
15. Xylem conduct water from roots to different parts of plants. Xylem consist of 1. trachieds, 2. Xylem vessel, 3. Xylem parenchyma, 4. Xylem fibres

16. Phloem conducts food from leaves to different parts of plants. Phloem consists of following elements: 1. Sieve tubes 2. Companion cells 3. Phloem fibres 4. Phloem parenchyma.

17. Animal Tissue is of four types

    a. Epithelial Tissue b. Connective Tissue

    c. Muscular Tissue d. Nervous Tissue

18. Epithelial tissue cells are tightly packed and form a continuous sheet.The functions are a. Permeability of cells, b. Regulating the exchange of material between body and external environment.

19. Types of epithelial tissue are a. Squamous Epithelial Cells b. Cuboidal Epithelial Cells c. Columnar Epithelial Cells d. Stratified Squamous Epithelial Cells:

20. Simple squamous epithethelial cells are extremely thin flat and form a delicate lining. It is present in mouth and oesophagus.

21. Cuboidal are cube shaped cells and form the lining of kidney tubules and duct of salivary glands where it provides mechanical support.

22. Startified cells are pillar like structures. They are present in inner lining of intestine.

23. Squamous cells consists of flat epithelial cells arranged in layers upon a basal membrane. Only one layer is in contact with basement membrane, the other layers adhere to one another to maintain structural integrity.

24. Types of Connective Tissue are Areolar Connective Tissue, Adipocyte tissue Compact bone, Hyaline Cartilage and Blood

25. Areolar Connective Tissue is found between the skin and muscles and around the blood vessels and nerves and in the bone marrow.

26. Adipocytes store fat globules in the body. Fat storing adipose tissue is found below skin and between internal organs.

27. Compact bone is another example of connective tissue. It forms the frame work that supports the body.

28. Hyaline Cartilage are made of soft bone which have very less calcium deposition as compared to compact bone.

29. Blood is the fluid connective tissue of the body. Blood contains blood cells (RBC, WBC and plaletets.

30. Types of Muscular Tissue are Striated muscles, Smooth muscles, Cardiac muscles.

31. In Striated muscles alternate dark and light bands are present. Eg. Skeletal muscles which are voluntary in action.

32. In Smooth muscles, no dark band and light bands are seen, Single nuceli muscles are present which are Involuntary in action Eg. Alimentary Canal

33. Cardiac muscles are striated muscles which are involuntary in action. They are located only in Heart.

34. Nervous Tissue is made of Specialised cells which have the ability to respond when stimulated.