5. Cell Structure of Organization

1.Choose the correct .option

A. Growth of cell wall during cell elongationtakes place by ....

(a) apposition

(b) intussusception

(c) both (a) & (b)

(d) super position

B. Cell Membrane is composed of .....

(a) proteins and cellulose

(b) protein and phospholipid

(c) proteins and carbohydrates

(d) proteins, phospholipid and some carbohydrates

C. Plasma membrane is fluid structure due to presence of.....

(a) carbohydrates

(b) lipid

(c) glycoprotein

(d) polysaccharide

D. Cell Wall is present in .....

(a) plant cell

(b) prokaryotic cell

(c) algal cell

(d) all of the above

E. Plasma membrane is....

(a) selectively permeable

(b) permeable
(c) impermeable

(d) semipermeable

F. Mitochondria DNA is ...

(a) naked

(b) circular

(c) double stranded

(d) all of the above

G. Lysosomes are not helpful in .....

(a) osteogenesis

(b) cellular digestion

(c) metamorphosis

(d) lipogenesis

H. Which of the following set of organelles contain DNA?

(a) Mitochondria, peroxisome

(b) Plasma membrane, ribosomes)

(c)Mitochondria, chloroplast

(d) Chloroplast, dictyosome

I. Golgi body is absent in .....

(a) prokaryotes

(b) mature mammalian RBCs

(c) akaryotes

(d) all of the above

2. Answer the following questions:

A. Plants have no circulatory system? Then how cells manage intercellular transport?
Ans. (1) Intercellular transport in plants takes place by processes like by diffusion, facilitated diffusion, osmosis and active transport. This transport occurs across the cell membrane.

(2) Cytoplasm of neighbouring cells are connected through cytoplasmic bridges known as plasmodesmata.

(3) Thus, cells manage intercellular transport although they do not have circulatory system.

B. Is nucleolus covered by membrane?
Ans. Nucleolus is not covered by membrane,

C. Fluid mosaic model proposed by Singer and Nicholson replaced Sandwich model proposed by Danielli and Davson? Why?

Ans. (1) According to Sandwich or Trilaminar model, proposed by Danielli and Davson, the cell membrane is made up of three layers, in which a bimolecular layer of lipid is sandwiched between two layers of proteins.

(2) Experimental studies have demonstrated that membrane proteins are insoluble in water and they vary in size. Such proteins would not be able to form on even and continuous outer layer.

(3) This model also fails to explain the fluidity and selective permeability of plasma membrane.

(4) Hence, it was replaced by fluid mosaic model given by Singer and Nicholson.

(5) According to fluid mosaic model, cell membrane consists of phospholipid bilayer associated with intrinsic and extrinsic proteins.

(6) According to fluid mosaic model, quasifluid nature of lipid enables lateral movement of proteins.

(7) This ability to move within the membrane is measured as fluidity.

(8) Selective permeability of cell membrane is because of its carrier proteins and pumps, which are involved in passive and active transport of specific molecules

and ions respectively.

D. The RBC surface normally shows glycoprotein molecules. When determining blood group do they play any role?

Ans. (1) AB0 blood grouping is based on the type of glycoprotein present on the surface of red blood cells.

(2) Glycoproteins present on the surface of RBCs are antigens.

(3) Individuals with blood group A have A antigen on the surface of their RBCs.

(4) Individuals with blood group B have B antigen on the surface of their RBCs.

(5) Individuals with AB blood group have both A and B antigens on the surface of their RBCs and individuals with blood group O have neither of them.

E. How cytoplasm differs from nucleoplasm in chemical composition?

Ans. (1) The cytoplasm contains water, sugars, amino acids, vitamins, enzymes, nucleotides, minerals, waste products and various organelles.

(2) Nucleoplasm contains nucleic acids, proteins, minerals, salts and enzymes required for DNA replication, It contains chromatin network and nucleolus.

3. Answer the following questions.

Smooth Endoplasmic Reticulum	Rough Endoplasmic Reticulum
1. Ribosomes are not attached to smooth ER.	1. 80S ribosomes are attached to rough ER.
2. It develops from rough endoplasmic reticulum.	2. It develops from outer nuclear membrane.
3. It is actively engaged in lipid metabolism.	3. It is actively engaged in protein synthesis.

B. Mitochondria are called the power house of the cell.

Ans. (1) Energy released during complete oxidation of one molecule of glucose during aerobic respiration, is used to synthesize 38 ATP molecules.

(2) 36 ATP molecules out of these 38 molecules are synthesized in mitochondria.

(3) Acetylation of pyruvate and Krebs cycle occur in mitochondrial matrix.

(4) $NADH_2$ and $FADH_2$, generated during glycolysis, acetylation of pyruvate and

Krebs cycle, are oxidized with the help of electron carriers and enzymes of electron transfer system.

(5) ETS is located on inner membrane of mitochondria.

(6) Oxysomes (complex V of ETS) are present along mitochondrial cristae.

(7) Foot (F0) of oxysome acts as a proton channel

(8) Head (F) of oxysome is a site for oxidative phosphorylation (ATP synthesis)

(9) Oxidation one NADH2 through ETS leads to the synthesis of three ATP molecules.

(10) Oxidation one FADH2 through ETS leads to the synthesis of two ATP molecules.

(11) Hence, mitochondria are called the power house of cell.

C. What are types of plastids?

Ans. Plastids are of three types - Chromoplast, chloroplasts and leucoplasts.
(1) Leucoplasts : Leucoplasts store nutrients in them.

(a) Amyloplasts store starch.

(b) Elaioplasts store oils.

(c) Leucoplasts store protein.

(2) Chromoplasts :

(a) Chromoplasts contain pigments like carotene and xanthophyll.

(b) They impart red, yellow or orange colour to flowers and fruits.

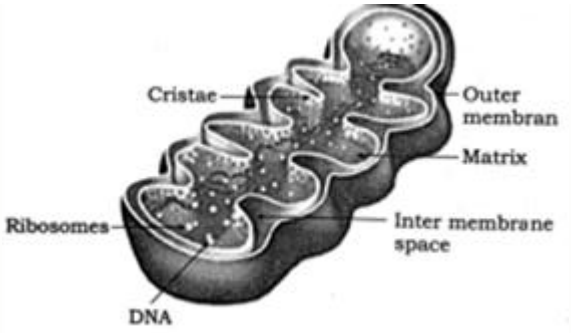
(3) Chloroplast :

(a) Chloroplasts contain chlorophyll and carotenoid pigments.

(b) They are the site of photosynthesis.

4. Lable the diagram and write down the details of concept in your word.

A.



(1) The given diagram is of a mitochondrion.

(2) Mitochondrion is a double membrane bound organelle.

(3) The outer membrane is permeable to various metabolites whereas the inner membrane is selectively permeable to few substances only. (4) Space between outer and inner membrane is called outer chamber, or intermembrane space.

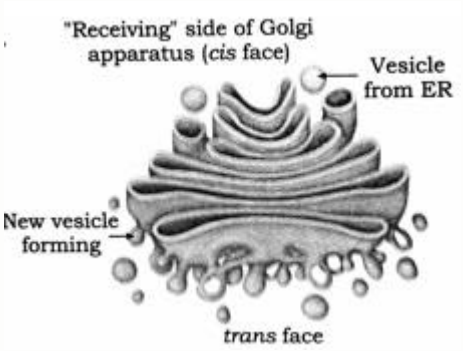
(5) Inner membrane is folded into finger like or plate like folds known as cristae. (6) Inner membrane bears numerous oxysomes and cytochromes/electron carriers of electron transfer system (ETS)

(7) Inner chamber, contains a fluid called matrix.

(8) Matrix contains circular DNA, RNA, 70S types of ribosomes, lipids and enzymes of Krebs cycle and other pathways.

(9) Mitochondria are power house of the cells. They produce ATP by oxidative phosphorylation.

B.



(1) The given diagram is of Golgi complex.

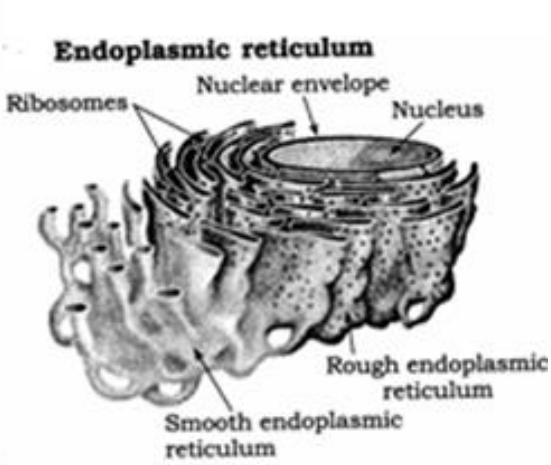
(2) Golgi complex consists of stacks of membranous sacs called cisternae and vesicles.

(3) The cisternae in Golgi body are not physically connected to each other.

(4) Each cistern has a forming or 'cis' face (cis : on the same side) and a maturing or 'trans' face (trans : the opposite side).

(5) Golgi complex is involved in manufacturing, modifications, packaging and secretion of cellular materials.

C.



(1) The given diagram is of endoplasmic reticulum.

(2) It is a network of tubules and cisternae.

(3) Endoplasmic reticulum (ER) extends from nuclear envelope to cell membrane.

(4) If ribosomes are attached to its outer surface, it is called rough endoplasmic reticulum. (RER)

(5) Outer nuclear membrane is connected with RER.

(6) Smooth endoplasmic reticulum (SER) has no ribosomes on its surface.

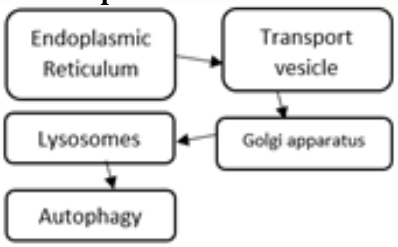
(7) ER acts as intracellular supporting framework

(8) RER is involved in protein synthesis.

(9) SER is involved in synthesis of lipids and steroidal hormones. SER helps in detoxification of drugs and poisons in liver cells.

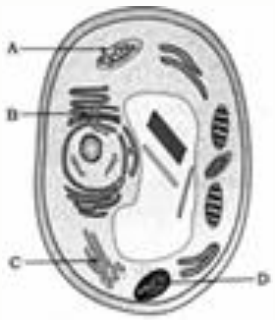
(10) ER helps in maintaining position of various cell organelles in the cytoplasm.

5. Complete the flow chart [Ans.]



6.Label the A, B, C and D in the given diagram and write the functions of organelles A and B.

Ans.



A : Mitochondrion

B: Rough endoplasmic reticulum

C: Golgi complex.

D: Amyloplast Functions :

Functions:

(A) Mitochondria act as power house of a cell. They are involved in synthesis of ATP by oxidative phosphorylation.

(1) Endoplasmic reticulum (ER) acts as intracellular supporting framework.

(2) It helps in maintaining position of cell organelles in the cytoplasm.

(3) In secreting cells of adrenal cortex, testes and ovaries (SER), helps in synthesis of lipids and steroidal hormones.

(4) SER helps in detoxification of drugs and poisons in liver cells.

(5) It is involved in storage of calcium ions in muscle cells.

(6) Rough ER is primarily involved in protein synthesis. (e.g. pancreatic cells that secrete insulin).

(7) ER gives rise to transport vesicles which carry secretory proteins.

(8) Rough ER is also involved in formation of membrane for the cell. Parts of expanded ER membrane are transferred to other members of endomembrane system.

7.Identify each cell structures or organelle from its description below.

(i) Manufactures ribosomes.

(ii) Carries out photosynthesis.

(iii) Can bud of vesicles, which form the Golgi apparatus.

(iv) Manufactures ATP in animal and plant cells.

(v) Selectively permeable.

Ans. (i) Manufactures ribosomes - **Nucleolus.**

(ii) Carries out photosynthesis - **Chloroplast**.

(iii) Can bud of vesicles, which form the Golgi apparatus - **Endoplasmic reticulum**.

(iv) Manufactures ATP in animal and plant cells - **Mitochondria**.

(v) Selectively permeable - **Plasma membrane.**

8. Onion cells have no chloroplast. How can we tell they are plants?

Ans. (1) Onion cells have a distinct cell wall.

(2) They contain a large vacuole at the centre and nucleus is at periphery.

(3) Small starch granules may be observed in the cytoplasm. They develop blue-black or purple colour on staining using iodine solution.

(4) Hence, we can say that they are plant cells, although they have no chloroplasts.