

**EXAM  
DRILL**

# ANSWERS

## SECTION A

- 1.** Cell membrane – Living  
Cell wall – Dead
  - 2.** Vacuoles are found in both animal and plant cell. They are small in animal cell and large in plant cell.
- 3(i) (b)**

**3(iii) Z-Osmosis**

**3(iv)** The plant cell placed in hypertonic solution shrinks due to plasmolysis, as water moves from region of high to low concentration.

**4(i)** This given cell organelle is represents mitochondrion. Mitochondrial matrix contains enzymes of Krebs cycle.

**4(ii)** The given cell organelle is mitochondrial membrane increase the surface area to help in ATP generating reaction.

**4(iii)** X-ribosomes, Y-crista

**4(iv) (d)** ATP (Adenosine triphosphate) is known as the energy currency of the cell.

**5.** *Chlamydomonas* and bacteria

**3(ii) (a)**

**OR**

Robert Hooke observed the cell for the first time in 1665.

6. Chromoplasts impart colour to flower and fruit and help in pollination.
7. (a) : Endoplasmic reticulum facilitates transport of materials from one part of cell to the another.

**OR**

- (a) :** Ribosomes are non-membrane bound organelles found in both eukaryotic as well as prokaryotic cell.
- 8. (b) :** Cytoplasm is a jelly like semi-fluid material that is the part of protoplasm which surrounds the nucleus.
- 9. Nucleus**
- 10.**  $\text{CO}_2$  move by diffusion and water move by osmosis through cell membrane.
- 11. Silver nitrate**

**OR**

## Ribosome

- 12. (c) :** Pseudopodia
- 13. (a) :** Lysosomes contain hydrolytic enzymes. These enzymes are capable of digesting carbohydrates, proteins, lipids and nucleic acid. Lysosomes are also capable of removing the cell debris having dead and worn out cell organelle by digesting them, due to this they are also known as 'scavengers of the cells'.

- 14. (a)** Viruses do not show characteristics of life until they enter in a living organism. Viruses use host cell to reproduce.

## SECTION B

- 15.** (i) Digestive enzymes are capable of digesting carbohydrates, proteins, lipids and nucleic acids.  
(ii) Cellulose provides rigidity to the plant cell and helps it to withstand in dilute medium.  
(iii) Chloroplasts are the sites of photosynthesis. They trap the solar energy which is used for manufacturing the food.
- 16.** The differences between active transport and diffusion are as follows:

| S.No. | Active transport   | Diffusion   |
|-------|--|---|
| (i)   | It is a rapid process.   | It is a slow process.   |
| (ii)  | The material move through a biological (cellular) membrane against the concentration gradient. | The material move from a region of higher concentration to a region of lower concentration. |
| (iii) | It takes place in one direction only.  | It takes place in both directions.  |

**OR**

Smooth endoplasmic reticulum (SER) plays a crucial role in detoxifying many poisons and drugs in a cell by metabolising the toxic substances such as aspirin, insecticides, petroleum products, pollutants, etc.

- 17.** (i) It provides turgidity and rigidity to the cell.  
(ii) It helps in detoxifying many poisons and drugs.  
(iii) It helps in protein synthesis.
- 18.** (i) Antony van Leeuwenhoek discovered free-living cells in pond water using an improved version of microscope.  
(ii) Robert Brown discovered the brain of the cell, *i.e.*, nucleus, which controls all the activities of cell.  
(iii) Golgi bodies were discovered by Camillo Golgi using a weak solution of silver stain.

**OR**

- (a)** Endocytosis is the ingestion of material by the cells through the plasma membrane. It is a collective term that describes two similar processes : phagocytosis (cell eating), pinocytosis (cell drinking).
- (b)** Peroxisomes are specialised organelle for carrying out some oxidation reactions such as detoxification. Peroxisome contains catalase enzymes that catalyses the decomposition of toxic  $H_2O_2$  into water and oxygen.

**19.** A well organised cell maintains homeostasis, *i.e.*, constant internal chemical composition. It is, therefore, able to perform basic functions such as respiration, obtaining nutrition, clearing of waste, forming new proteins, etc. If the organisation of a cell is destroyed, it will not be able to maintain homeostasis and thus will not be able to perform above said basic function and such cell will ultimately die.

**20.**

| S. No. | Type of cell     | Characteristic feature   |
|--------|------------------|--|
| (i)    | Plant cell       | Large vacuole which acts as storage organelle.                         |
| (ii)   | Plant cell       | Cell wall prevents bursting of cell.                                   |
| (iii)  | Prokaryotic cell | Undifferentiated nuclear region and organelles are not membrane-bound. |

**21.** (i) Cell inclusions are non-living components of the cytoplasm *e.g.*, reserve food, excretory or secretory products and mineral matter.

(ii) Genes are functional segments of DNA located on the chromosomes. Genes are bearers of hereditary traits. They transmit traits (characters) from parents to the children (progeny).

**22.** (i) Plastids are spherical or discoidal in shape and are enclosed in double membrane. They are present only in plant cells. They consist of numerous which are membrane lined flattened sacs thylakoids arranged in stack at some points (grana) embedded in a material called the stroma. It contains proteins, lipids, ribosomes, circular DNA, RNA and enzymes.

(ii) The endoplasmic reticulum (ER) is a large network of membrane-bound tubes and sheets. There are two types of ER—rough endoplasmic reticulum (RER) and smooth endoplasmic reticulum (SER). Rough endoplasmic reticulum (RER) has ribosomes attached on its surface for synthesising proteins. Hence, it appears to be rough and smooth endoplasmic reticulum (SER) is without ribosomes and appears smooth.

**23.** The thread shaped structure in the nucleus is known as chromosomes.

The nucleus performs following functions :

- (i) It controls all the metabolic activities of the cell.
- (ii) It brings about growth of the cell by directing the synthesis of structural proteins.

**24.** Chromosomes are thin, thread-like structures present in the nucleus and visible during cell division. Each chromosome is made up of DNA (deoxyribonucleic acid) and proteins. DNA stores all the information necessary for cell to function, to grow and to reproduce. However, the chromatin is nucleoprotein fibrous mass which stains strongly with basic dyes and is present inside the nucleus.

**OR**

- (i) Ribosomes are the sites of protein synthesis and so are called protein factories.

(ii) Resins absorb water due to endosmosis as the concentration of water is low inside the resin as compared to surrounding medium. Therefore, they swell after keeping them in water for sometime.

(iii) The plants have chromoplasts that are responsible for the different coloured appearance of fruit and flowers of different plants.

### SECTION - C

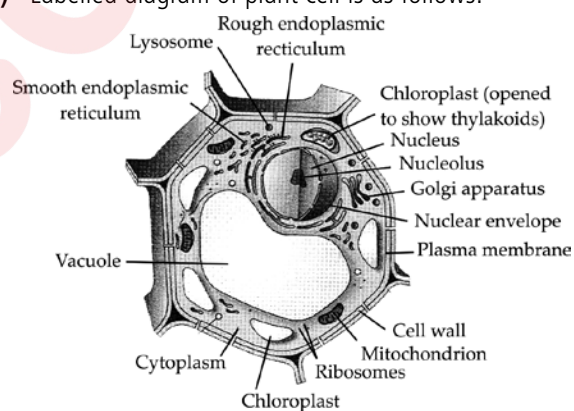
**25.** (i) Plasmodesmata are living connections between neighbouring plant cells which run through very fine pores in the cell wall. They help to establish a continuous system of cytoplasm for transport of substances between cells.

(ii) Diffusion is the movement of molecules or ions of a substance from a region of their higher concentration to a region of their lower concentration. Diffusion can operate in any medium like solid, liquid, gas, etc. It does not require any semipermeable membrane. It is a rapid process in gases and slow process in liquids.

(iii) Osmosis is the movement of water molecules from a dilute solution to a concentrated solution through a semipermeable membrane. Osmosis operates only in a liquid medium. It requires a semipermeable membrane. It is a slow process.

**OR**

(a) Labelled diagram of plant cell is as follows:



(b) Cell wall provides shape and structural strength to the plant.

**26.** Plastids are spherical or discoidal in shape and are enclosed in double membrane. They are present only in plant cells. On the basis of the colour, plastids may be of the following types :

- (i) Chloroplasts: Green-coloured, chlorophyll containing plastids. Chloroplasts are sites of photosynthesis.
- (ii) Leucoplasts : Colourless plastids, which store reserve food in the form of starch, proteins and lipids in them.
- (iii) Chromoplasts : These plastids are yellow or reddish in colour and are present in flowers and fruits. Chromoplasts help in pollination and dispersal of seeds and fruits.

**27. (a)** The cell theory was presented by Schleiden (1838) and Schwann (1839). The cell theory was further expanded by Virchow (1855) by suggesting that all cells arise from pre-existing cells. Cell theory states:

- All living organisms are composed of cells and their products.
- All new cells arise as a result of division of pre-existing cells.
- All cells are basically alike in chemical composition and metabolic processes.

The function of an organism as a whole is the outcome of the combined activities and interactions of the constituent cells. Cell is the structural and functional unit of all living beings.

**(b)** Genes are the segments of DNA occupying specific positions on the chromosomes. These are hereditary units which are transmitted from one generation to another by chromosomes. They are responsible for determining specific cell function.

OR

The difference between protoplasm, cytoplasm and cytosol are as follows:

| S. No. | Protoplasm   | Cytoplasm   | Cytosol   |
|--------|--|---|---|
| (i)    | The living material of the cell.   | It is the fluid content inside the plasma membrane.                                     | Cytoplasmic matrix in which organelles are suspended is known as cytosol. |
| (ii)   | It includes cell contents within and including the plasma membrane but usually taken to exclude large vacuoles, secretory material or ingested material. | It includes all cell contents, including the plasma membrane, but excluding any nuclei. | It includes the fluid and semi-fluid matrix of the cytoplasm.             |

**28. (a)** Plasma membrane is made up of a bilayer of phospholipids. Two types of protein molecules 'floated about' in the fluid phospholipid layer: intrinsic proteins, which completely span the lipid bilayer and extrinsic proteins, which occur on the outer surface of the lipid membrane.

Functions of plasma membrane :

- It acts as a selectively permeable membrane, allowing entry and exit of some selective substances.
- It helps to maintain the shape of the cell.
- It helps in maintaining the internal environment of the cell.

**(b)** When a cell is placed in hypotonic solution, the water molecules move from external solution into the cell by osmosis so that the cell swells up. This shows the phenomenon of endosmosis (i.e., water enters into the cell). On the other hand, when a cell is placed in a hypertonic solution, the water leaves the cell and moves outside so that the cell shrinks. This shows the phenomenon of exosmosis.

**29.** Three major functional regions of cells are :

- Nucleus
- Mitochondria
- Golgi body.

(i) **Nucleus** : It is located near the centre of the cell. Its chief components are chromatin material and nucleolus. Chromatin when condenses form rod like structures called chromosome. Chromosomes contain hereditary units genes which in turn are made up of DNA. Nucleus controls the various activities of the cell.

(ii) **Mitochondria** : It is a double membranous structure. Its outer membrane is smooth and inner membrane have folds known as cristae. Mitochondria is known as the powerhouse of the cell as respiration occurs in this organelle and energy is released.

(iii) **Golgi body** : It consists of a set of smooth flat sac like structures called cisternae. Main functions of Golgi body is secretion storage and packaging. It also forms lysosome and peroxisome.

**30.** The endoplasmic reticulum (ER) is a complex network of membranous system in the cytoplasm of eukaryotic cells. At places, it is connected with plasmalemma as well as nuclear envelope. Endoplasmic reticulum is abundantly present in metabolically active cells like cells of liver and pancreas but is absent in prokaryotic cells and mature RBCs of mammals. ER has three components : Cisternae (flat, interconnected sac like parts) vesicles (oval or rounded sacs) and tubules (tube-like extensions which may be connected with cisternae or vesicles).

ER is of two types :

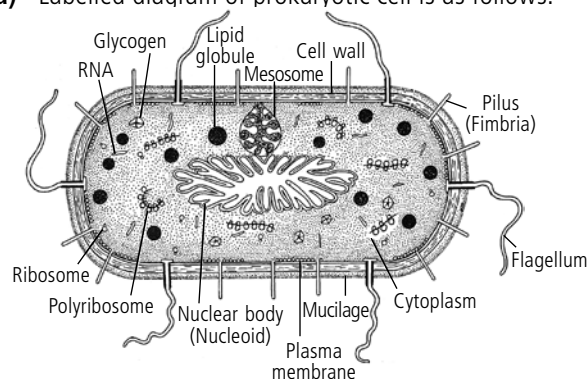
- Rough endoplasmic reticulum (RER) with ribosomes
- Smooth endoplasmic reticulum (SER), without ribosomes

Functions of ER as follows:

- The network of ER separates cytoplasm of the cell into several small compartments. This compartmentalisation of cytoplasm helps a cell to perform specific functions within specific chambers excluding others.
- The ER gives mechanical support to the cytoplasm by providing a kind of cytoskeleton to maintain the shape of cell.
- The ER offers extensive surface for the synthesis of proteins and lipids. It also helps in the transport of materials.

OR

**(a)** Labelled diagram of prokaryotic cell is as follows:



**(b)** The nucleus region in some cell are poorly defined due to the absence of a nuclear membrane, it contain only nucleic acid. This undefined nuclear region with nucleic acid in it is called nucleoid.





