CHAPTER 5

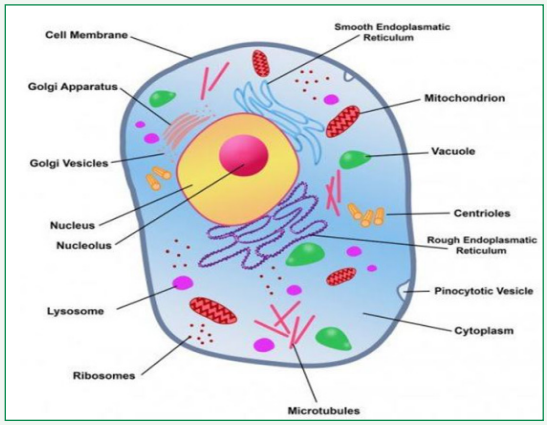
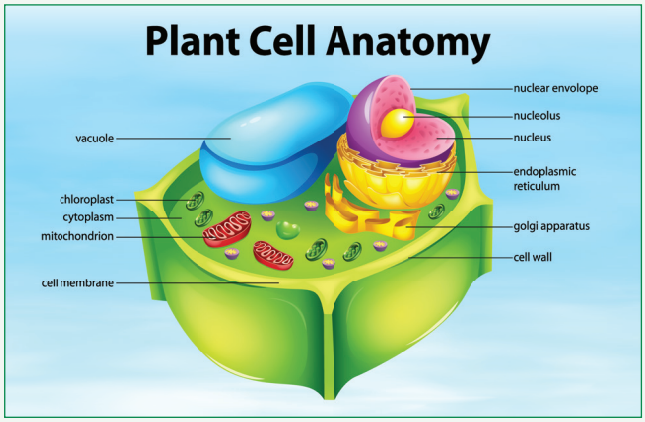
THE FUNDAMENTAL UNIT OF LIFE

CLASS 9TH

NCERT EXERCISE AND SOLUTIONS - SCIENCE

Q. 1. Make a comparison and write down ways in which plant cells are different from animal cells.

ANSWER:-

Animal cell	Plant cell
Animal cells are smaller compared to plant cells.	Plants cells are comparatively larger.
Cell wall is absent.	Cell wall is present.
Except Euglena, plastids are absent.	Plastids are present.
Vacuoles are smaller in size and more in number.	One central large vacuole is present
	

Q. 2. How is prokaryotic cell different from an eukaryotic cell?

ANSWER:-

Prokaryotic cell	Eukaryotic cell
Unicellular	Multicellular
Small in size	Comparatively larger
Nuclear membrane absent or the cell lacks a true nucleus.	True nucleus bound by a nuclear membrane is present in the cell.
It contains a single chromosome.	It contains more than one chromosome.
The nucleolus is absent.	The nucleolus is present.
Membrane-bound cell organelles are absent.	Cell organelles are present.

Cell division occurs only by mitosis.	Cell division occurs by mitosis and meiosis.
Prokaryotic cells are found in bacteria and blue-green algae.	Eukaryotic cells are found in fungi, plants, and animal cells.

Q. 3. What would happen if the plasma membrane ruptures or breaks down?

ANSWER:-

Since the plasma membrane controls the movement of substances in and out of the cell through diffusion or osmosis, any rupture in the membrane could lead to the leakage of cellular contents.

Q. 4. What would happen to the life of a cell if there was no Golgi apparatus?

ANSWER:-

Without the Golgi apparatus, protein packaging and structural protein arrangement would not occur within the cell. The absence of protein transport would disrupt cellular metabolism, ultimately leading to cell death.

Q. 5. Which organelle is known as the powerhouse of the cell? Why?

ANSWER:-

Mitochondria are referred to as the powerhouse of the cell because they generate the energy needed for various life-sustaining chemical activities. They release energy in the form of ATP molecules, which the body utilizes for synthesizing new chemical compounds and performing mechanical functions.

Q. 6. Where do the lipids and proteins constituting the cell membrane get synthesised?

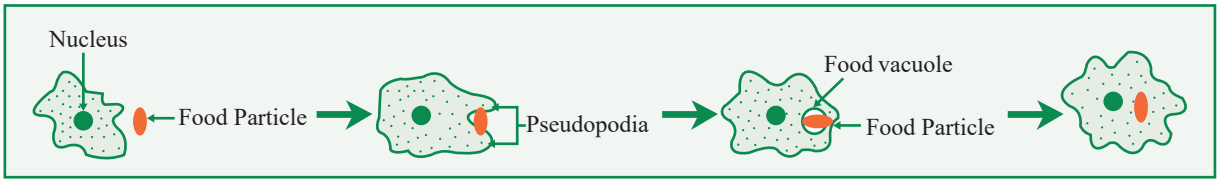
ANSWER:-

Lipids are synthesised in smooth endoplasmic reticulum whereas proteins are synthesised in rough endoplasmic reticulum.

Q. 7. How does an *Amoeba* obtain its food?

ANSWER:-

Amoeba obtains its food through endocytosis, a process in which its flexible plasma membrane allows it to engulf food particles and other substances from the surrounding environment.



Q. 8. What is osmosis?

ANSWER:-

Osmosis is the movement of water molecules across a selectively permeable membrane from an area of higher water concentration to an area of lower water concentration until equilibrium is achieved.

Q. 9. Carry out the following osmosis experiment:

ANSWER:-

Take four peeled potato halves and scoop each one out to make potato cups. One of these potato cups should be made from a boiled potato. Put each potato cup in a trough containing water. Now,

(a) Keep cup A empty

(b) Put one teaspoon sugar in cup B

(c) Put one teaspoon salt in cup C

(d) Put one teaspoon sugar in the boiled potato cup D.

Keep these for two hours. Then observe the four potato cups and answer the following:

(i) Explain why water gathers in the hollowed portion of B and C.

(ii) Why is potato A necessary for this experiment?

(iii) Explain why water does not gather in the hollowed-out portions of A and D.

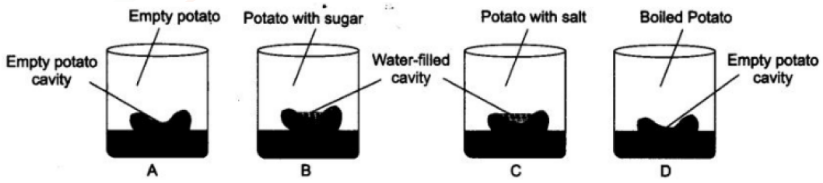
ANSWER:-

(i) Water gathers in B and C because in both the situations there is difference in the concentration of water in the trough and water in the cup of Potato. Hence, osmosis takes place as the potato cells act as a semi-permeable membrane.

(ii) Potato A is necessary for this experiment for comparison, it acts as a control.

(iii) Water does not gather in the hollowed out portions of A and D. As cup of A does not have change in the concentration for water to flow. For osmosis to occur one of the concentration should be higher than the other.

In cup D, the cells are dead and hence the semi-permeable membrane does not exists for the flow of water and no osmosis takes place.



Q. 10. Which type of cell division is required for growth and repair of body and which type is involved in formation of gametes?

ANSWER:-

The process of mitosis is required for growth and repair of the body. In mitosis, one cell divides into two identical daughter cells, helping in replacing old or damaged cells.

On the other hand, the formation of gametes (sperm and egg cells) requires meiosis. In meiosis, the cell divides to produce four new cells with half the number of chromosomes, ensuring genetic variation in offspring.