

**Biology**  
**CH-5 The Fundamental Unit of Life**  
**Exercise Questions**

**Question 1:**

Make a comparison to write down ways in which plant cells are different from animal cells.

**Answer 1:**

The cells of animals and plants have the following differences:

Animal cell	Plant cell
1. Animal cells are generally small in size.	1. Plant cells are larger than animal cells
2. Cell wall is absent	2. The plasma membrane of plant cells is surrounded by a rigid cell wall of cellulose
3. Except the protozoan Euglena, no animal cell possesses plastids	3. Plastids are present
4. Vacuoles in animal cells are many, small and temporary	4. Most mature plant cells have a permanent and large central sap vacuole
5. Animal cells have a single highly complex and prominent Golgi apparatus	5. Plant cells have simpler units of Golgi apparatus, called Dictyosomes.
6. Animal cells have Centrosome and centrioles	6. Plant cells lack Centrosome and centrioles.

**Question 2:**

How is a prokaryotic cell different from a eukaryotic cell?

**Answer 2:**

Difference between prokaryotic cell and eukaryotic cell:

Prokaryotic cell	Eukaryotic cell
1. Cell size is generally small (1-10 $\mu\text{m}$ )	1. Cell is generally large (5-100 $\mu\text{m}$ )
2. Nuclear region is called nucleoid and is not surrounded by a nuclear membrane	2. Nuclear region is surrounded by a nuclear membrane
3. Only a single chromosome is present	3. More than one chromosome is present
4. Nucleolus is absent	4. Nucleolus is present
5. Membrane bound cell organelles are absent	5. Membrane bound cell organelles are present
6. Cell division by fission or budding	6. Cell division by mitosis or meiosis

**Question 3:**

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

**Answer 3:**

Plasma membrane is a selectively permeable membrane of the cell that maintains its homeostasis, i.e., constant internal composition of the cell. If it ruptures or breaks down the constant internal chemical composition of the cell will be lost and it will not be able to perform its basic functions. Such a cell with ruptured plasma membrane is killed.

**Question 4:**

What would happen to the life of a cell if there is no Golgi apparatus?

**Answer 4:**

The materials synthesized in the ER are stored, sorted, modified, packaged and dispatched to various targets inside and outside the cell through the Golgi apparatus packs products in vesicles, the secretory vesicles. In some cases complex sugars e.g. cellulose, may be made from simple sugars in Golgi apparatus. The Golgi apparatus is also involved in the formation of the cells which will not be possible if Golgi apparatus is not there.

**Question 5:**

Which organelle is known as the powerhouse of the cell? Why?

**Answer 5:**

*Mitochondria* are known as the powerhouse of the cell because they contain enzymes that are needed for stepwise oxidation of food stuffs (carbohydrate, fats and lipids) present in the cells to CO<sub>2</sub> and water. Oxidation of food releases energy which is used to form high-energy ATP (*adenosine triphosphate*) molecules. ATP is known as Energy Currency of the cell and it is used as cellular fuel. Energy stored in ATP is used to bring about energy requiring activities of the cell such as photosynthesis, protein synthesis and muscle contraction.

**Question 6:**

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

**Answer 6:**

Rough Endoplasmic Reticulum (RER) - synthesizes proteins constituting cell membrane.  
Smooth Endoplasmic Reticulum (SER) - synthesizes lipids constituting cell membrane.

**Question 7:**

How does *Amoeba* obtain its food?

**Answer 7:**

*Amoeba* has flexible cell membrane. It enables amoeba to engulf in food by the process called *endocytosis*.

**Question 8:**

What is osmosis?

**Answer 8:**

The diffusion of water or solvent through a semi-permeable membrane from a solution of lower concentration of solutes to a solution of higher concentration of solutes, to which the membrane is relatively impermeable, is called osmosis.

**Question 9**

Carry out the following osmosis experiment:

Take four peeled potato halves and scoops 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 9**

- 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 concentrations should be higher than the other.

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