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KPK Class 11 Biology Conceptual Questions – Chapter 1

Cell structure and Function

Q1: List four main Functions of the Nucleus.

- The nucleus is a crucial organelle in eukaryotic cells. Its main functions include:
 - **Genetic Information Storage:** The nucleus houses the cell's genetic material in the form of **DNA**. This DNA contains instructions for protein synthesis and other cellular processes.
 - **Transcription:** Within the nucleus, **RNA synthesis (transcription)** occurs. RNA molecules are produced based on the DNA template.
 - **Nucleolus Formation:** The nucleolus, located within the nucleus, is responsible for **ribosome assembly**.
 - **Regulation of Cell Activities:** The nucleus controls cellular activities by regulating gene expression and protein production.

Q2: What do you know about Peroxisomes?

- Peroxisomes are membrane-bound organelles found in eukaryotic cells.
- They play a crucial role in **detoxification** and **lipid metabolism**.
- Peroxisomes contain enzymes that break down **hydrogen peroxide (H₂O₂)**, preventing its accumulation and potential damage to the cell.

Q3: Write two differences between Rough Endoplasmic Reticulum (RER) vs. Smooth Endoplasmic Reticulum (SER):

- **Rough Endoplasmic Reticulum (RER):**
 - Studded with ribosomes on its cytoplasmic surface.
 - Involved in **protein synthesis and modification.**
 - Synthesizes proteins destined for secretion or incorporation into cell membranes.
- **Smooth Endoplasmic Reticulum (SER):**
 - Lacks ribosomes.
 - Functions in **lipid metabolism, detoxification, and calcium ion storage.**
 - Synthesizes lipids and steroids.

Q4: What Is Cytoskeleton:

- The cytoskeleton is a network of protein filaments and tubules within the cell.
- Importance:
 - **Structural Support:** It maintains cell shape and provides mechanical strength.
 - **Cell Movement:** Components like microtubules and microfilaments are involved in cell motility.
 - **Intracellular Transport:** Cytoskeletal elements facilitate movement of organelles and vesicles within the cell.

Q5: Cell Is Called the Structural and Functional Unit of Life. Justify the statement.

- Justification:
 - Cells are the **basic building blocks** of all living organisms.
 - All life processes occur within cells.
 - Cells carry out essential functions such as **metabolism, growth, reproduction, and response to stimuli.**

Q6: Why are Chloroplasts found only in Plant Cells?

- Chloroplasts are **unique to plant cells** and some algae.
- They are the sites of **photosynthesis**, where light energy is converted into chemical energy (glucose).
- Chloroplasts contain **chlorophyll**, which captures sunlight for photosynthesis.

Q7: What are the Consequences of Cell losing Cell Membrane?

- If a cell loses its cell membrane:
 - **Cell Integrity:** The cell would lose its structural integrity and shape.
 - **Homeostasis Disruption:** The cell would be unable to regulate its internal environment.
 - **Cell Death:** Without a functional membrane, essential processes like nutrient uptake and waste removal would be compromised, leading to cell death.