2 Cell – The Building Block of Life

Multiple Choice Questions (1 mark each)

1. Who discovered cells?
   A. Newton B. Hooke C. Darwin D. Einstein

2. Powerhouse of cell is:
   A. Nucleus B. Mitochondria C. Ribosome D. ER

3. Cell membrane is:
   A. Rigid B. Permeable C. Selectively permeable D. Solid

4. DNA is present in:
   A. Cytoplasm B. ER C. Ribosome D. Nucleus

5. Plant cells have:
   A. Cell wall B. Centrioles C. Lysosomes D. None

6. Protein synthesis occurs in:
   A. Nucleus B. Golgi C. Ribosome D. Vacuole

7. Smallest cell is:
   A. Bacteria B. Plant C. Animal D. Virus

8. Osmosis is movement of:
   A. Solute B. Water C. Gas D. Protein

9. ER stands for:
   A. Energy Reticulum B. Endoplasmic Reticulum C. External Region D. None

10. Vacuole stores:
    A. Energy B. Protein C. DNA D. Water & food

True or False (1 mark each)

1. Cell is basic unit of life
2. Mitochondria produces energy
3. Plant cells lack cell wall
4. Nucleus stores DNA
5. Osmosis involves solute movement
6. Ribosomes make proteins
7. Animal cells have plastids
8. Golgi apparatus packages substances
9. Prokaryotes have nucleus
10. Vacuole is large in plant cells

Very Short Answers Question (1 mark each)

1. What is a cell?
2. Who discovered the cell?
3. Define prokaryotic cells.
4. What is the function of the nucleus?
5. What is cytoplasm?
6. Define osmosis.
7. What are ribosomes?
8. What is the function of mitochondria?
9. What is cell membrane?
10. What are plastids?

Short Answer Questions (2–3 marks)

1. State the cell theory.
2. Differentiate between prokaryotic and eukaryotic cells.
3. Explain the role of mitochondria.
4. What is endoplasmic reticulum?
5. What are plastids? Name their types.
6. What is the function of Golgi apparatus?
7. Write two differences between plant and animal cells.

Long Answer Questions (5 marks)

1. Describe the structure and functions of a cell.
2. Explain the structure and function of the nucleus.
3. Describe different cell organelles and their functions.
4. Explain diffusion and osmosis with suitable examples.
5. Describe mitosis and meiosis and their importance.
6. Draw and label the plant cell and answer the questions

   Questions:

   a) Label any five parts of the plant cell.

   b) Which structure is responsible for photosynthesis?

   c) Which part gives rigidity to the plant cell?
7. Draw Mitochondria and answer the questions

   Questions:

   a) Label parts of mitochondria.

   b) Describe structure and functions of mitochondria?

   c) Why is mitochondria called the powerhouse of the cell?

Assertion – Reason Questions (1 mark each)

1. A: Cell is basic unit of life
   R: It performs all functions

2. A: Mitochondria called powerhouse
   R: It produces ATP

3. A: Plant cells have vacuole
   R: It stores materials

4. A: Prokaryotes have nucleus
   R: They are simple

5. A: Ribosomes make proteins
   R: They are present in cytoplasm

Answers

MCQs

1. B. Hooke
2. B. Mitochondria
3. C. Selectively permeable
4. D. Nucleus
5. A. Cell wall
6. C. Ribosome
7. A. Bacteria
8. B. Water
9. B. Endoplasmic Reticulum
10. D. Water & food

True or False

1. True
2. True
3. False
4. True
5. False
6. True
7. False
8. True
9. False
10. True

Very Short Questions – Answers

1. Ans: A cell is the smallest unit of life capable of performing all vital functions.
2. Ans: Robert Hooke discovered the cell in 1665.
3. Ans: Cells without a true nucleus and membrane-bound organelles.
4. Ans: It controls cell activities and stores genetic material.
5. Ans: Jelly-like substance where cell organelles are present.
6. Ans: Movement of water across a selectively permeable membrane.
7. Ans: Organelles responsible for protein synthesis.
8. Ans: Produces energy (ATP) for the cell.
9. Ans: A protective boundary that controls entry and exit of substances.
10. Ans: Organelles in plant cells involved in food synthesis and storage.

Short Questions – Answers

Ans 1: The cell theory states that all living organisms are made up of one or more cells, the cell is the basic unit of life, and all new cells arise from pre-existing cells.

Ans 2: Prokaryotic cells are simple cells that do not have a true nucleus or membrane-bound organelles, whereas eukaryotic cells are complex and have a well-defined nucleus along with membrane-bound organelles.

Ans 3: Mitochondria are responsible for producing energy in the form of ATP through cellular respiration and are therefore known as the powerhouse of the cell.

Ans 4: The endoplasmic reticulum is a network of membranous tubules present in the cytoplasm that helps in the transport of materials within the cell, where rough ER synthesizes proteins and smooth ER synthesizes lipids.

Ans 5: Plastids are membrane-bound organelles found in plant cells that are involved in the synthesis and storage of food, and they are of three types: chloroplasts, chromoplasts, and leucoplasts.

Ans 6: The Golgi apparatus modifies, packages, and transports proteins and lipids to different parts of the cell or outside the cell.

Ans 7: Plant cells have a cell wall and plastids, whereas animal cells do not have a cell wall or plastids; additionally, plant cells usually have a large central vacuole, while animal cells have smaller or temporary vacuoles.

Long Questions – Answers

Ans 1:

- A cell is the basic structural and functional unit of life and consists of three main parts: the cell membrane, cytoplasm, and nucleus.
- The cell membrane forms the outer boundary and is selectively permeable, controlling the movement of substances in and out of the cell.
- The cytoplasm is a jelly-like substance that contains various organelles and is the site of metabolic activities.
- The nucleus is the control center of the cell and contains genetic material (DNA).
- Cells perform important functions such as respiration, growth, reproduction, and maintaining life processes.

Ans 2:

- The nucleus is a spherical organelle surrounded by a double-layered nuclear membrane that separates it from the cytoplasm.
- It contains a dense structure called the nucleolus and thread-like chromatin, which carries DNA.
- The nuclear membrane has pores that allow exchange of materials.
- The nucleus controls all cell activities, stores hereditary information, and plays a key role in cell division.

Ans 3:

- Cells contain several organelles, each with specific functions.
- Mitochondria produce energy and are called the powerhouse of the cell.
- Ribosomes synthesize proteins.
- The endoplasmic reticulum (ER) helps in transport, where rough ER makes proteins and smooth ER makes lipids.
- The Golgi apparatus modifies and packages materials.
- Lysosomes digest waste materials.
- In plant cells, plastids help in photosynthesis and storage, and vacuoles store water and nutrients.
- All these organelles work together to ensure proper functioning of the cell.

Ans 4 :

- Diffusion is the movement of particles from a region of higher concentration to a region of lower concentration, such as the spreading of perfume in a room.
- Osmosis is the movement of water across a selectively permeable membrane from a region of higher water concentration to a region of lower water concentration.
- For example, when a potato is placed in salt solution, it shrinks due to loss of water. These processes are essential for the transport of substances in cells.

Ans 5:

- Mitosis and meiosis are two types of cell division.
- Mitosis produces two identical daughter cells and is important for growth, repair, and maintenance of the body.
- Meiosis produces four daughter cells with half the number of chromosomes and is essential for reproduction.
- Meiosis also creates genetic variation, which helps in evolution. Both processes are necessary for the survival and continuity of life.

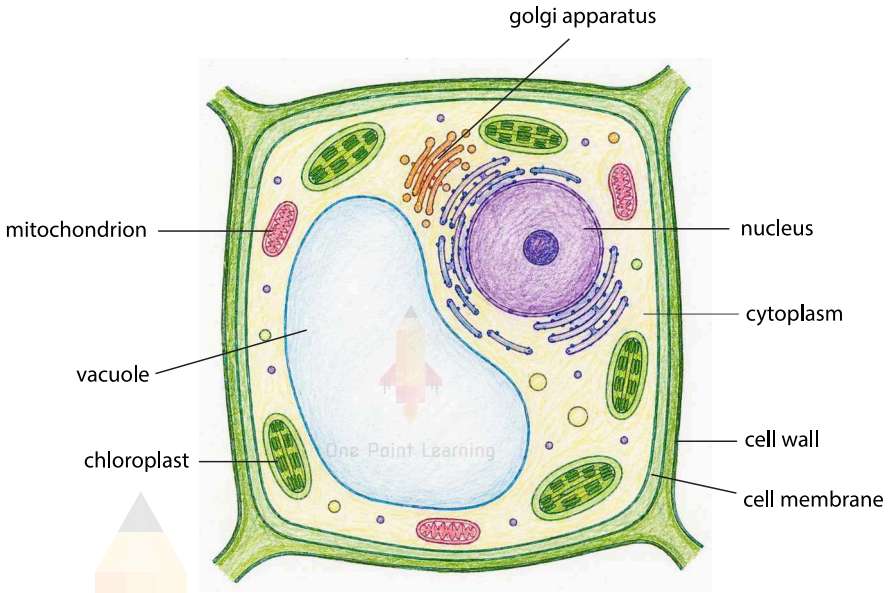
Ans 6:

a) Any five parts:

- Cell wall
- Cell membrane
- Nucleus
- Chloroplast
- Vacuole
- Cytoplasm

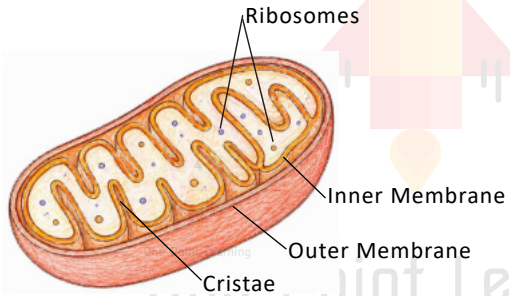
b) Chloroplast is responsible for photosynthesis

c) Cell wall gives rigidity to the plant cell



Ans 7:

a)



b) Mitochondria are rod-shaped or oval organelles found in the cytoplasm of eukaryotic cells. The main function of mitochondria is to produce energy in the form of ATP (adenosine triphosphate) through the process of cellular respiration. They help in breaking down food molecules to release energy required for various life processes such as movement, growth, and repair.

c) Mitochondria are called the powerhouse of the cell because they generate most of the cell's energy in the form of ATP during cellular respiration. This energy is used by the cell to perform all essential activities, such as synthesis of molecules, transport of substances, and cell division. Without mitochondria, the cell would not be able to carry out its functions efficiently.

Assertion – Reason

1. Both true, R explains A
2. Correct
3. Correct
4. A false, R true
5. Both true