# Chapter 1

## Cell-The Structural and Functional Unit of Life

**Question 1**

Assertion. Human red blood cells are circular and biconcave.

Reason. This shape prevents the easy passage of these cells through blood capillaries.

a) Both A and R are true.
b) Both A and R are False.
c) A is true and R is False.
d) A is False and R is true.

Answer

c) A is True and R is False.

Explanation

The disc like shape of red blood cells i.e., circular and biconcave shape helps it to easily pass through the blood capillaries.

**Question 2**

Assertion. Nucleolus does not produce ribosomes.

Reason. Nucleolus participates in protein synthesis by forming and storing R.N.A.

a) Both A and R are true.
b) Both A and R are False.
c) A is true and R is False.
d) A is False and R is true.

Answer

d) A is False and R is True.

Explanation

The nucleolus is primarily responsible for producing and assembling ribosomes. It contains the genes that encode ribosomal RNA (rRNA). The ribosomes serve as site of protein synthesis.

**Question 3**

Assertion. Iodine solution makes the nucleus more distinct.

Reason. Nucleus contains starch which becomes blue-black upon absorbing the iodine solution.

a) Both A and R are true.
b) Both A and R are False.
c) A is true and R is False.
d) A is False and R is true.

Answer

c) A is True and R is False

Explanation

Iodine solution is a common stain used in microscopy to enhance the visibility of certain cellular structures, including the nucleus.

The enhanced visibility of the nucleus with iodine staining is not due to the presence of starch. Instead, iodine binds to various cellular components, including nucleic acids, making the nucleus more visible under a microscope.

**Question 4**

Assertion. Cell membrane is freely permeable.

Reason. Cell membrane permits free movement of the solutions across the membrane when two solutions of different tonicity are separated through it.

a) Both A and R are true.
b) Both A and R are False.
c) A is true and R is False.
d) A is False and R is true.

Answer

b) Both A and R are False.

Explanation

A cell membrane is semi-permeable. It selectively allows the passage of some molecules while preventing others. Solutions of different tonicity will result in osmotic movement of water, but not necessarily the free movement of solutes across the membrane.

**Question 5**

Assertion. Scattered Golgi body in animal cells are called as 'dictyosomes'.

Reason. Plant cells have dictyosomes because the entire central space is occupied by a large vacuole.

a) Both A and R are true.
b) Both A and R are False.
c) A is true and R is False.
d) A is False and R is true.

Answer

d) A is False and R is true.

Explanation

Scattered Golgi body in plant cells are called as 'dictyosomes'. Plant cells have dictyosomes because the entire central space is occupied by a large vacuole. They play a role in cell plate formation during cell division.

## Very Short Answer Type

**Question 1**

Identify the cellular structures with the help of the following clues:

(a) It synthesizes the respiratory enzymes.
(b) It is made up of lipoprotein.
(c) A non-living rigid layer surrounding the plasma membrane.
(d) Supportive framework for the cell.
(e) It consists of cisternae, vesicles and vacuoles.
(f) It destroys foreign substances.
(g) It gives turgidity to the plant cells.
(h) It is made up of DNA threads.
(i) It contains chromatin fibres.
(j) It initiates and regulates cell division.

Answer

(a) Mitochondria
(b) Cell membrane/plasma membrane
(c) Cell wall
(d) Endoplasmic reticulum
(e) Golgi apparatus

(f) Lysosomes
(g) Vacuoles
(h) Chromatin fibres
(i) Nucleus
(j) Centrosome

**Question 2**

Give two examples of each:
(a) Unicellular animals
(b) Unicellular plants
(c) Cell organelles
(d) Cell inclusions
(e) Stains which make the nucleus distinct.

Answer
(a) Unicellular animals — Amoeba, Paramecium
(b) Unicellular plants — Chlamydomonas, Diatoms
(c) Cell organelles — Mitochondria, Nucleus
(d) Cell inclusions — Pigments, Granules
(e) Stains which make the nucleus distinct — Iodine, Eosin.

**Question 3**

Name the following:
(a) A plastid without pigment.
(b) A pigment which is not found in plastids.
(c) The orange-red pigment found in the chromoplast.
(d) Scattered Golgi complex, found in plant cells.
(e) Amoeboid blood cells of human body.
(f) The smallest cell of human body.
(g) Bean-shaped cells of stomata.
(h) The part of cytoplasm which is devoid of the organelles.
(i) The folds/finger-like projections from the inner wall of the mitochondria.
(j) The tubules of Golgi complex.

Answer
(a) Leucoplast
(b) Anthocyanin
(c) Carotene
(d) Dictyosomes
(e) White blood cells (WBCs)
(f) Red blood cells (RBCs)
(g) Guard cells
(h) Cytosol
(i) Cristae
(j) Cisternae

## Descriptive Type Question

**Question 1**

Define the following terms:
(a) Cell
(b) Organelles
(c) Cytoplasm
(d) Protoplasm
(e) Nucleus
Answer
(a) Cell — Cell is the structural and functional unit of life capable of independent existence. All cells are basically alike in chemical composition and metabolic processes and arise from a pre-existing cell.
(b) Organelles — Organelles are specialized and membrane-bound, living structures in a cell concerned with definite functions.
(c) Cytoplasm — Cytoplasm is the part of the cell which is inside the cell membrane and outside the nucleus. It is a semi-liquid substance and contains several organelles, each concerned with a specific function.
(d) Protoplasm — The living parts of the cell which consist of cytoplasm, nucleus and other living bodies collectively constitute protoplasm or protoplast.
(e) Nucleus — Nucleus is a large spherical body lying nearly in the centre of the cytoplasm. It is surrounded by a double layered nuclear membrane with nuclear pores.

**Question 2**

Distinguish between the following pairs:
(a) Plant cell and animal cell
(b) Cell wall and cell membrane
(c) Centrosome and chromosome
(d) Chloroplast and chromoplast
Answer

(a) Plant Cell and Animal Cell

| Features | Plant cell | Animal cell |
|---|---|---|
| Size | It is usually larger in size. | It is usually smaller in size. |
| Cell wall | It consists of a definite cell wall made up of cellulose. | It lacks a cell wall. |
| Vacuoles | It consists of large and prominent vacuoles. | It consists of small and temporary vacuoles. |
| Cytoplasm | It consists of less dense cytoplasm. | It consists of denser and more granular cytoplasm. |

(b) Cell Wall and Cell Membrane

| Cell Wall | Cell Membrane |
|---|---|
| It is the outermost covering in plant cells. | It is the outermost covering in animal cells. |
| It is non-living and rigid layer. | It is thin, flexible and living membrane. |
| It is freely permeable. | It is semi-permeable. |
| It is made up of cellulose. | It is made up of lipoproteins. |

(c) Centrosome and Chromosome

| Centrosome | Chromosome |
|---|---|
| It is a clear space of cytoplasm located close to the nucleus. | It is a highly coiled structure contained within the nucleus. |
| Usually one centrosome is present per cell. | Several chromosomes can be present per cell. |
| It consists of two rod-like structures made of protein tubulin. | It consists of DNA coiled around histone protein core. |
| It initiates and regulates cell division. | It transfers hereditary characters from parents to offspring. |

(d) Chloroplast and Chromoplast

| Chloroplast | Chromoplast |
|---|---|
| It is green in colour. | It is variously coloured. |
| It contains the pigment chlorophyll. | It contains pigments such as xanthophyll and carotene. |
| It traps solar energy for photosynthesis. | It imparts colour to flowers and fruits. |