

NCERT Exemplar Solutions of Class 11 Biology – Chapter 8: Cell: The Unit of Life

MULTIPLE CHOICE QUESTIONS

1. A common characteristic feature of plant sieve tube cells and most of the mammalian erythrocytes is

- a) Absence of mitochondria
- b) Presence of cell wall
- c) Presence of haemoglobin
- d) Absence of nucleus

Solution:

Answer: (d) Absence of nucleus

Enhanced Explanation:

Plant sieve tube cells are specialized cells in the phloem that transport nutrients. During their maturation, they lose their nucleus to maximize space for transport. Similarly, mammalian erythrocytes (red blood cells) also lack a nucleus in their mature form, which allows them to be flexible and carry more hemoglobin. This enucleated condition is essential for their specialized transport functions.

2. Select one which is not true for ribosome

- a) Made of two sub-units
- b) Form polysome
- c) May attach to mRNA
- d) Have no role in protein synthesis

Solution:

Answer: (d) Have no role in protein synthesis

Enhanced Explanation:

Ribosomes are the primary sites of protein synthesis in cells. They are indeed made of two subunits (large and small), can form polysomes (multiple ribosomes on a single mRNA), and attach to mRNA during translation. Option (d) is incorrect because protein synthesis is the main function of ribosomes - they translate mRNA into polypeptide chains.

3. Which one of these is not a eukaryote?

- a) Euglena
- b) Anabaena
- c) Spirogyra
- d) Agaricus

Solution:

Answer: (b) Anabaena

Enhanced Explanation:

Anabaena is a cyanobacterium (blue-green algae), which is a prokaryote. It lacks a membrane-bound nucleus and organelles. The other options are eukaryotes: Euglena is a

protist, Spirogyra is a green algae, and Agaricus is a fungus (mushroom). All these have membrane-bound nuclei and organelles.

4. Which of the following stains is not used for staining chromosomes?

- a) Basic Fuchsin
- b) Safranin
- c) Methylene green
- d) Carmine

Solution:

Answer: (b) Safranin

Enhanced Explanation:

Safranin is primarily used for staining plant cell walls and bacterial cells in Gram staining, not specifically for chromosomes. Basic Fuchsin, Methylene green, and Carmine are all used for chromosome staining due to their affinity for DNA and chromatin material.

5. Different cells have different sizes. Arrange the following cells in an ascending order of their size. Choose the correct option among the following:

- i. Mycoplasma
- ii. Ostrich eggs
- iii. Human RBC
- iv. Bacteria

Options:

- a) i, iv, iii & ii
- b) i, iii, iv & ii
- c) ii, i, iii & iv
- d) iii, ii, i & iv

Solution:

Answer: (a) i, iv, iii & ii

Enhanced Explanation:

Size order from smallest to largest:

- **Mycoplasma** (~0.1-0.3 μm) - smallest known free-living cells
 - **Bacteria** (~1-5 μm) - typical bacterial size
 - **Human RBC** (~7-8 μm diameter) - small among animal cells due to lack of nucleus
 - **Ostrich eggs** (~15 cm) - largest single cell known
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6. Which of the following features is common to prokaryotes and many eukaryotes?

- a) Chromatin material
- b) Cell wall present
- c) Nuclear membrane present
- d) Membrane-bound sub-cellular organelles present

Solution:**Answer: (b) Cell wall present****Enhanced Explanation:**

Cell walls are present in prokaryotes (bacteria) and many eukaryotes (plants, fungi). Chromatin material, nuclear membrane, and membrane-bound organelles are exclusive to eukaryotes. The cell wall provides structural support and protection in both prokaryotic and eukaryotic cells that possess it.

7. Who proposed the fluid mosaic model of the plasma membrane?

- a) Benda
- b) Schleiden and Schwann
- c) Singer and Nicolson
- d) Robert Brown

Solution:**Answer: (c) Singer and Nicolson****Enhanced Explanation:**

Singer and Nicolson proposed the fluid mosaic model in 1972. This model describes the plasma membrane as a fluid lipid bilayer with proteins embedded like a mosaic. The model explains membrane fluidity and the dynamic nature of membrane proteins.

8. Which of the following statements is true for a secretory cell?

- a) Golgi apparatus is absent
- b) Rough Endoplasmic Reticulum (RER) is easily observed in the cell
- c) Only Smooth Endoplasmic Reticulum (SER) is present
- d) Secretory granules are formed in the nucleus

Solution:**Answer: (b) Rough Endoplasmic Reticulum (RER) is easily observed in the cell****Enhanced Explanation:**

Secretory cells have extensive RER because they produce large amounts of proteins for secretion. The ribosomes on RER synthesize proteins that are processed and packaged for export. Both RER and Golgi apparatus are abundant in secretory cells, and secretory granules are formed in the Golgi apparatus, not the nucleus.

9. What is a tonoplast?

- a) The outer membrane of mitochondria
- b) The inner membrane of chloroplast
- c) Membrane boundary of the vacuole of plant cells
- d) The cell membrane of a plant cell

Solution:**Answer: (c) Membrane boundary of the vacuole of plant cells**

Enhanced Explanation:

The tonoplast is the membrane that surrounds the central vacuole in plant cells. It regulates the movement of molecules into and out of the vacuole and helps maintain turgor pressure in plant cells.

10. Which of the following is not true of a eukaryotic cell?

- a) The cell wall is made up of peptidoglycans
- b) 80S type of ribosomes is present in the cytoplasm
- c) Mitochondria contain circular DNA
- d) Membrane-bound organelles are present

Solution:

Answer: (a) The cell wall is made up of peptidoglycans

Enhanced Explanation:

Peptidoglycan cell walls are found in prokaryotes (bacteria), not eukaryotes. Eukaryotic cell walls are made of cellulose (plants) or chitin (fungi). Eukaryotes do have 80S ribosomes, mitochondria with circular DNA, and membrane-bound organelles.

11. Which of the following statements is not true for plasma membrane?

- a) It is present in both plant and animal cell
- b) Lipid is present as a bilayer in it
- c) Proteins are presently integrated as well as loosely associated with the lipid bilayer
- d) Carbohydrate is never found in it

Solution:

Answer: (d) Carbohydrate is never found in it

Enhanced Explanation:

Carbohydrates are indeed found in plasma membranes as glycoproteins and glycolipids, particularly on the outer surface. These carbohydrates play crucial roles in cell recognition, adhesion, and signaling.

12. Plastid differs from mitochondria based on one of the following features. Mark the right answer.

- a) Presence of two layers of membrane
- b) Presence of ribosome
- c) Presence of thylakoids
- d) Presence of DNA

Solution:

Answer: (c) Presence of thylakoids

Enhanced Explanation:

Thylakoids are unique to plastids (especially chloroplasts) and are absent in mitochondria.

Both organelles have double membranes, ribosomes, and DNA. Thylakoids are the sites of light reactions in photosynthesis.

13. Which of the following is not a function of cytoskeleton in a cell?

- a) Intracellular transport
- b) Maintenance of cell shape and structure
- c) Support of the organelle
- d) Cell motility

Solution:

Answer: (a) Intracellular transport

Enhanced Explanation:

While the cytoskeleton provides tracks for intracellular transport, it doesn't directly perform transport. Motor proteins like kinesin and dynein move along cytoskeletal filaments to transport materials. The cytoskeleton's main functions are maintaining cell shape, supporting organelles, and enabling cell motility.

14. The stain used to visualise mitochondria is

- a) Fast green
- b) Safranin
- c) Acetocarmine
- d) Janus green

Solution:

Answer: (d) Janus green

Enhanced Explanation:

Janus green B is a vital stain specifically used to visualize mitochondria in living cells. It selectively stains mitochondria blue-green due to their high metabolic activity and unique membrane properties.

