
Important Questions for Class 11

Biology

Chapter 8 - Cell The Unit of Life

1 Mark

1. Define totipotency?

Ans. Each vegetative plant cell has the potential to grow into a whole plant. The term totipotency refers to a plant's ability to reproduce itself.

2. Name two cell organelles which contain their own DNA?

Ans. In a cell, two organelles that contain their own DNA are mitochondria and the chloroplast.

3. Which cell organelle functions as "segregation apparatus"?

Ans. Endoplasmic Reticulum (ER) is the one cell organelle present in the cytoplasm that functions as the segregation apparatus.

4. Which structure is called a little nucleus?

And. The nucleolus is a structure within the cell nucleus that is responsible for ribosome production and assembly.

5. What is the function of contractile vacuole?

Ans. The contractile vacuole maintains the osmoregulation aka water balance.

6. Name the enzymes present in peroxisomes?

Ans. Catalase and B- hydroxy oxidase are the enzymes present in the peroxisomes.

7. Who gave the statement “Omnis cellula cellula”?

Ans. Rudolf Virchow gave the statement ‘Omnis cellula cellula’ which means new cells are generated from the pre-existing ones.

8. Which organelle is called the engine of the cell?

Ans. Ribosomes aid in protein synthesis, which is why they are referred to as the cell's engine.

9. What is mycoplasma?

Ans. Mycoplasma is a prokaryote that lives in an aerobic environment. They don't have a cell wall, but they do have a nucleoid.

10. Why is karyotype done at metaphase?

Ans. Because the strands of each double chromosome joined together at the centromere of metaphase chromosomes with two chromatids are clearly visible.

11. Expand PPLO.

Ans. The full form of PPLO is ‘pleuropneumonia-like organisms’.

12. Name the parts of bacterial flagella.

Ans. A filament, a hook, and a basal body make up the bacterial flagellum.

13. What do elaioplasts and aleuroplasts store?

Ans. Oils and fats are stored in the elaioplasts, while proteins are stored in the aleuroplasts.

14. Who first saw and described a live cell?

Ans. Anton Van Leeuwenhoek was the first to notice a live cell.

15. Which is the largest single cell?

Ans. The ostrich egg is the world's largest single cell.

16. Who first explained that cell arose from pre-existing cells?

Ans. Rudolf Virchow was the first person who explained the pre-existence of the cells.

17. What is the composition of the plasma membrane of human erythrocyte?

Ans. 52% proteins and 40% lipids are found in the plasma membrane.

18. Eukaryotic ribosome are 80S. What does 'S' stand for.

Ans. In the 80S eukaryotic ribosome, the S stands for sedimentation coefficient.

19. What is the function of cytoskeleton in a cell?

Ans. The cytoskeleton provides mechanical support, motility, and cell shape maintenance.

2 Marks

1. Give two examples of gram positive bacteria?

Ans. *Clostridium tetani* and *Mycobacterium* are the two gram-positive bacteria.

2. What is the significance of plasma membrane?

Ans. The Plasma Membrane's Importance:

- (i) It defines the cell's outer border, giving it a distinct shape.
- (ii) It safeguards the cell's internal contents.
- (iii) It creates a molecular barrier between the cell and its surroundings.

3. Differentiate between gram positive and gram negative bacteria?

Ans. The difference between gram-positive and gram-negative bacteria are as follows;

GRAM-POSITIVE	GRAM-NEGATIVE
i) Gram stain marks the gram-positive bacteria.	i) These are not marked by the gram stain.
ii) They have a single-layered cell wall that is 100-200 Å thick.	ii) Their cell wall is made up of two layers and measures 70-120 Å thick.

iii) They do not possess pilli.	iii) They possess pilli.
iv) Mesosomes are observed.	iv) Mesosomes are not observed.

4. Why are lysosomes called “suicidal bags”?

Ans. Lysosomes are sac-like structures that contain numerous digesting enzymes and are confined by a single membrane. When these enzymes are released from lysosomes, they cause various cytoplasmic structures to break down. Suicidal sacks of cells aid in the digestion of food particles, other foreign materials, and old worn-out organelles of the cell, often resulting in cell death.

5. Explain the functions of centrosomes?

Ans. Centrosomes have the following functions:

- (a) Centrioles create the basal bodies.
- (b) They arrange the spindle and produce asters during cell division.
- (c) They are the source of cilia and flagella.
- (d) The axial filament or axoneme of the sperm tail is formed by the distal centrioles of sperms.

6. What is meant by active transport across a cell membrane?

Ans. Active transport occurs when molecules move from an area of lower concentration to a region of greater concentration, i.e., against a concentration gradient. The energy is necessary for molecules or ions to travel in the opposite direction. The pump is an enzyme that is thought to be a component of the membrane and is responsible for pumping chemicals into or out of the cell.

7. "Both lysosomes & vacuoles are endomembrane structures yet they differ in terms of their functions" comment.

Ans. Although both lysosomes and vacuoles are endomembranous structures, their roles are distinct: -

i) Hydrolytic enzymes, such as lipase and protease, are found in lysosomes and may digest lipids, proteins, nucleic acids, and carbohydrates.

(ii) Vacuoles are membrane-bound gaps that allow numerous ions and other materials to travel against a concentration gradient.

8. Who proposed cell theory? Give its postulates?

Ans. The prominent cell concept was postulated by M. J. Schleiden and Theodore Schwann, which states:

i) Cells and cell products make up all living things.

(ii) All living creatures have a structural and functional unit called the cell.

(iii) In living organisms, all metabolic processes occur within the cell.

Rudolf Virchow later amended the cell hypothesis, stating that "all new cells emerge from pre-existing cells."

9. Which cell organelle is known as a powerhouse of cell & why?

Ans. Aerobic respiration and the release of energy for cellular activity are closely linked in double-membrane mitochondria. The biological oxidation of lipids and carbohydrates releases a large quantity of energy, which mitochondria use to synthesize ATP. When ATP molecules release the energy necessary for numerous cell activities, they are referred to as the "Power House of the Cell."

10. What are the main functions of a cell wall?

Ans. Cell wall functions are as follows:-

- (i) It gives the cell a distinct form.
- (ii) It safeguards the contents of cells' interiors.
- (iii) It safeguards the fragile plasma membrane underneath it.
- (iv) It enables the movement of different substances into and out of the cell.
- (v) It keeps the contents of the cells from drying out.

11. State differences between SER & RER?

Ans. The major differences between SER and RER are as follows;

SER	RER
i) SER is made up of vesicles and tubules and lacks ribosomes.	i) RER has ribosomes on its outer surface and is made up of cisternal cells.
ii) It produces hormones and lipids, such as fat cells and liver lipid secretory cells.	ii) Due to the presence of ribosomes, its primary function is protein synthesis.
iii) It yields sphaerosomes. Golgi bodies, as well as vacuoles and lysosomes.	iii) It yields Golgi bodies, as well as vacuoles and lysosomes.
iv) Ribosomes are absent.	iv) Ribosomes are present.

12. What are nuclear pores? State their functions? both directions between nucleus & cytoplasm.

Ans. The nuclear envelope is made up of two parallel membranes that are 10-50 nm thick. The nuclear pores are tiny pores generated by the fusing of two membranes in the outer membrane. These pores are the conduits via which RNA and protein molecules travel between the nucleus and the cytoplasm in both directions.

13. Give differences between cell wall & cell membrane?

Ans. The difference between cell wall and cell membrane are as follows;

CELL WALL	CELL MEMBRANE
i) Exclusively found in plant cells.	i) Predominantly found in animal cells
ii) It is made up of cellulose.	ii) It is made up of proteins, lipids, and water.
iii) The cell wall is tough and thick.	iii) Extremely light and flexible.
iv) Various thickenings are observed.	iv) No thickenings are observed.
v) It is not permeable on a selective basis.	v) a membrane that can be permeated selectively

14. Which organelle is responsible for increasing the surface area of absorption in a cell? How?

Ans. The endoplasmic reticulum is in charge of expanding the surface area available for absorption. It persists in the cytoplasm in the form of a network of convoluted tubules. This increases the surface area of absorption while also providing more space for chemical reactions.

15. What is mesosome in a prokaryotic cell? Mention the function that it performs?

Ans. Mesosomes in prokaryotic cells are produced by plasma membrane extensions into the cell, which might take the shape of vesicles, tubules, or lamellae. They aid in the development of cell walls. They assist in DNA replication and delivery to daughter cells. They aid in secretion respiration and enhance the surface area of the plasma membrane.

16. "Plasma membrane is described as" protein iceberg in sea of lipids". Why?

Ans. Singer and Nicolson explain the plasma membrane as a fluid mosaic model. The proteins and lipids are organized in a mosaic pattern. The matrix is a viscous fluid composed of two layers of phospholipid molecules that contain two types of globular proteins: peripheral or extrinsic proteins and integral or intrinsic proteins. Enzymatic proteins that are located on the surface or close to the membrane can migrate across the matrix and aid in the active and passive transport of ions across the membrane.

17. What are nuclear pores? State their function.

Ans. The nuclear membrane has minute holes that are known as nuclear pores. They allow RNA and proteins to flow between the nucleus and the cytoplasm.

18. Differentiate between the electron microscopic structure of cell/flagella and centriole.

Ans. The difference between an electron microscopic structure of cell flagella and a centriole are;

FLAGELLA	CENTRIOLE
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i) They consist of a (9+2) pattern of axoneme microtubules covered by a membrane.	i) They consist of a (9+0) pattern and an organelle that is membrane-less.
ii) Each tubule has two tubules.	ii) Each tubule is made up of three tubules.

19. Give the specific terms for the following

(a) Cluster of ribosomes found in cytoplasm

(b) Extensive in folding to the inner membrane of mitochondria.

(c) Stacks of closely packed thylakoids

(d) Stalked particles on the inner membrane of mitochondria.

Ans. (a) The clumped ribosomes in the cytoplasm are called polyribosomes or polysomes.

(b) The folding of the inner membrane of mitochondria is called cristae.

(c) The stacks of thylakoids that are closely packed to each other are known as grana.

(d) The stalked particles of mitochondria on the inner membrane are Fe F particles.

20. (a) What is the function of inclusion bodies in prokaryotic cells?

(b) Where are they present?

(c) Give two examples of inclusion bodies.

Ans. (a) Reserve supplies are kept in a safe place.

(b) They're floating about in the cytoplasm.

(c) Phosphate granules, cyanophycean granules, and glycogen granules, for example.

3 Marks

1. Describe the ultrastructure of a cilium or flagellum?

Ans. The structures of cilia and flagella are basically the same. Eleven microtubules make up each cilium or flagellum. There are two radii in which these microtubules are organized. Nine of them are doublets. The remaining two are solitary microtubules in the center and are located on the perimeter. To create an axial filament, microtubules are encased in a cytoplasmic matrix. Two subunits make up the outer tubules, which are 360A^0 in diameter. The smaller of these is the A- tubule, which has two arms, and the smaller is the B- tubule.

2. Distinguish between prokaryotic & eukaryotic cell?

Ans. The differences between prokaryotic and eukaryotic cells are;

PROKARYOTIC CELL	EUKARYOTIC CELL
i) The nucleus is poorly structured. The genetic material is present in the form of nucleoids.	i) A well-developed nucleus is present.
ii) DNA is not packed into chromosomes and is in a circular shape.	ii) Chromosomes contain linear DNA.
iii) A defect in the nuclear membrane.	iii) There is an intact nuclear membrane.
iv) Mitochondria is missing.	iv) Mitochondria are intact.

v) Chloroplast is missing.	v) Chloroplast is exclusively found in plant cells.
vi) Organelles that are attached to the membrane are missing.	vi) The presence of a membrane-bound organelle.
vii) Ribosomes present are the 70s.	vii) Ribosomes present are in 80s.
viii) Mucopolysaccharides make up the cell wall.	viii) In plant cells, the cell wall is composed of cellulose and hemicellulose, as well as lignin which is lacking in animal cells.
ix) The flagella in prokaryotes are basic.	ix) The flagella in eukaryotes are advanced.

3. Explain the fluid mosaic model of plasma membrane.

Ans. G. Nicholson and S. Singer suggested the fluid mosaic model. Each phospholipid layer is bimolecular, with the hydrophilic ends pointing to the top and bottom, respectively. Proteins are divided into two categories: peripheral (extrinsic) and integral (intrinsic). Strong hydrophilic or hydrophobic interactions, or both, hold the integral proteins in place, making them difficult to remove from membranes. This concept explains that the cell membrane is quasi fluid and made up of "protein icebergs in a sea of lipids," as two peripheral proteins are superficially organized on either side membrane selectively permeable.

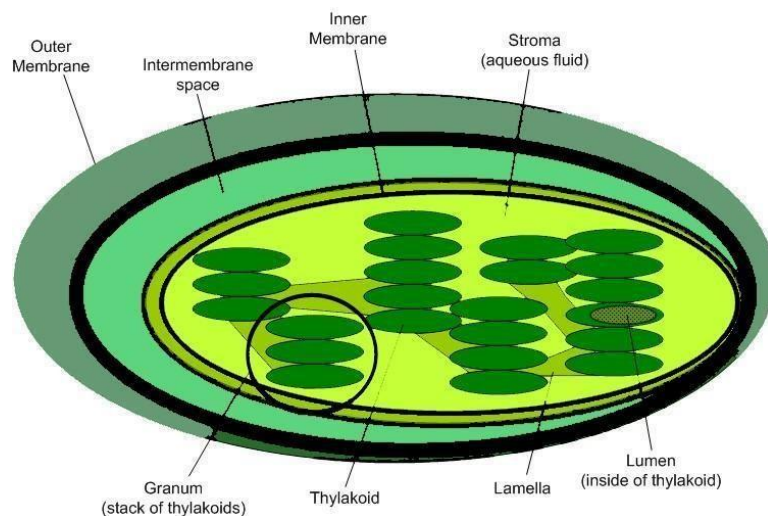
4. Describe the structure of a typical eukaryotic chloroplast.

Ans. Two membranes, approximately 3000 \AA in total thickness, surround chloroplasts. Every layer is $40 - 60 \text{ \AA}$ wide. The inner membrane is highly detailed to produce a lamellar structure. Internally, the chloroplasts are divided into two sections:

(a) the stroma, which is a colorless, granular material; and

(b) the membrane system, which is made up of closed flattened sacs known as thylakoids.

These thylakoids are clumped together and resemble heaps of coins. Grana is the name given to these buildings. The arrangement can take the shape of simple parallel sacs running longitudinally, or it can take the form of a complicated interconnected network of sacs. In algae, starch granules in the chloroplasts usually congregate around a specific area known as the pyrenoid.



5. Mention three similarities & three differences between mitochondria & chloroplasts?

Ans. Mitochondria and chloroplast similarities;

(i) Mitochondria as well as the chloroplasts are semiautonomous organelles with their own DNA, RNA, and ribosomes.

(ii) They both develop and originate in the same way, as pre-existing 4.1. organelles are divided to produce them.

(iii) A circular DNA is present in both mitochondria and chloroplast.

The differences between mitochondria and chloroplast are as follows;

MITOCHONDRIA	CHLOROPLAST
i) Mitochondria is found in all eukaryotic cells.	i) Chloroplast is only found in plant cells.
ii) Pigments are not found in mitochondria but are always found in chloroplasts.	ii) Pigments are always found in chloroplasts.
iii) In mitochondria, the inner membrane is folded into cristae.	iii) In chloroplast, cristae are missing.

6. "multicellular organisms have better survival than their cellular counterpart" why? Ans. In unicellular organisms, there is no division of labour. The single cell of the organism is capable of performing all the vital activities of life respiration, movement, digestion & reproduction etc. Respiration, nutrition & excretion generally occur through the general body surface no special organs for these are present in them because they are too small to need them.

Ans. In multicellular organisms, all body cells do not execute all of life's essential functions; instead, these cells specialize in certain areas, such as locomotion, digesting, breathing, and waste disposal. Except for the purpose for which they are specialized, these cells would do nothing else. Tissues are collections of comparable cells that perform similar functions.

7. Differentiate between a prokaryotic and eukaryotic cell.

Ans. The divide between prokaryotes and eukaryotes is regarded as the most important among organism types. The existence of mitochondria and chloroplasts, the cell wall, and the organization of chromosomal DNA are all differences in cellular structure between prokaryotes and eukaryotes. For many years, prokaryotes were the sole form of life on Earth, until more complex eukaryotic cells evolved through evolution.

The differences are as follows;

PROKARYOTIC CELL	EUKARYOTIC CELL
i) The nucleus is absent.	i) The nucleus is present.
ii) Membrane-bound organelles are not observed in the cell.	ii) Membrane-bound organelles are observed in the cell.
iii) No true nucleus is present. Instead, a nucleoid is present.	iii) A true nucleus is present with nucleoli and nuclear membrane.
iv) The size is smaller than a eukaryotic cell.	iv) The size is larger than the prokaryotic cell.