The Fundamental Unit of Life

Multiple Choice Questions

1. Which of the following can be made into crystal?
(a) A Bacterium
(b) An Amoeba
(c) A Virus
(d) A Sperm
Ans. (c) A Virus
Explanation: Virus does not have a cell; like other options. Virus is composed of nuclear material enclosed in a protein coat. Due to this, it can be into crystal.

2. A cell will swell up if
(a) The concentration of water molecules in the cell is higher than the concentration of water molecules in surrounding medium
(b) The concentration of water molecules in surrounding medium is higher than water molecules concentration in the cell
(c) The concentration of water molecules is same in the cell and in the surrounding medium
(d) Concentration of water molecules does not matter
Ans. (b) The concentration of water molecules in surrounding medium is higher than water molecules concentration in the cell
Explanation: If concentration of water molecules in surrounding medium is higher than water molecules concentration in the cell, it will result in movement of water into the cell. This will result in cell getting swelled up.

3. Chromosomes are made up of
(a) DNA
(b) protein
(c) DNA and protein
(d) RNA
Ans. (c) DNA and protein

4. Which of these options are not a function of Ribosomes?
(i) It helps in manufacture of protein molecules
(ii) It helps in manufacture of enzymes
(iii) It helps in manufacture of hormones
(iv) It helps in manufacture of starch molecules
(a) (i) and (ii)
(b) (ii) and (iii)
(c) (iii) and (iv)
(d) (iv) and (i)
Ans. (c) (iii) and (iv)

Explanation: Ribosomes are responsible for protein synthesis. Enzymes are composed of protein. Hence, options (iii) and (iv) are incorrect.

5. Which of these is not related to endoplasmic reticulum?
(a) It behaves as transport channel for proteins between nucleus and cytoplasm
(b) It transports materials between various regions in cytoplasm
(c) It can be the site of energy generation
(d) It can be the site for some biochemical activities of the cell

Ans. (c) It can be the site of energy generation
Explanation: Energy generation is the function of mitochondria.

6. Following are a few definitions of osmosis
Read carefully and select the correct definition
(a) Movement of water molecules from a region of higher concentration to a region of lower concentration through a semipermeable membrane
(b) Movement of solvent molecules from its higher concentration to lower concentration
(c) Movement of solvent molecules from higher concentration to lower concentration of solution through a permeable membrane
(d) Movement of solute molecules from lower concentration to higher concentration of solution through a semipermeable membrane

Ans. (a) Movement of water molecules from a region of higher concentration to a region of lower concentration through a semipermeable membrane

7. Plasmolysis in a plant cell is defined as
(a) break down (lysis) of plasma membrane in hypotonic medium
(b) shrinkage of cytoplasm in hypertonic medium
(c) shrinkage of nucleoplasm
(d) none of them

Ans. (b) shrinkage of cytoplasm in hypertonic medium
Explanation: When a cell is kept in hypertonic solution, it results in exosmosis. Most of the fluid goes out of the cell; resulting in shrinkage of cytoplasm.

8. Which of the following are covered by a single membrane?
(a) Mitochondria
(b) Vacuole
(c) Lysosome
(d) Plastid

Ans. (b) Vacuole
Explanation: Other organelles in the options are double – membrane structures.

9. Find out the false sentences
(a) Golgi apparatus is involved with the formation of lysosomes
(b) Nucleus, mitochondria and plastid have DNA; hence they are able to make their own structural proteins
(c) Mitochondria is said to be the power house of the cell as ATP is generated in them.

(d) Cytoplasm is called as protoplasm

Ans. **(a)** Golgi apparatus is involved with the formation of lysosomes
Explanation: Golgi apparatus is involved in synthesis and storage of certain biomolecules and has no role to play in the formation of lysosomes.

10. Find out the correct sentence
(a) Enzymes packed in Lysosomes are made through RER (rough endoplasmic reticulum)
(b) Rough endoplasmic reticulum and smooth endoplasmic reticulum produce lipid and protein respectively
(c) Endoplasmic reticulum is related with the destruction of plasma membrane
(d) Nucleoid is present inside the nucleoplasm of eukaryotic nucleus

Ans. **(a)** Enzymes packed in Lysosomes are made through RER (rough endoplasmic reticulum)
Explanation: RES has ribosomes on the surface and ribosomes are responsible for protein synthesis and thus for enzymes synthesis as well. Hence, option 'a' is correct and option 'b' is incorrect. ER has no role to play in destruction of plasma membrane. The undefined nuclear region in prokaryotes is called nucleoid.

11. Which cell organelle plays a crucial role in detoxifying many poisons and drugs in a cell?
(a) Golgi apparatus
(b) Lysosomes
(c) Smooth endoplasmic reticulum
(d) Vacuoles

Ans. **(c)** Smooth endoplasmic reticulum
Explanation: In the river cells of vertebrate, SER plays an important role in detoxifying many poisons and drugs.

12. The proteins and lipids, essential for building the cell membrane, are manufactured by
(a) rough endoplasmic reticulum
(b) golgi apparatus
(c) plasma membrane
(d) mitochondria

Ans. **(a)** rough endoplasmic reticulum
Explanation: Endoplasmic reticulum synthesise both lipids and proteins. However, RER mainly synthesise proteins and SER mainly synthesise lipids.

13. The undefined nuclear region of prokaryotes are also known as
(a) nucleus
(b) nucleolus
(c) nucleic acid
(d) nucleoid

Ans. **(d)** nucleoid

14. The cell organelle involved in forming complex sugars from simple sugars are

(a) endoplasmic reticulum
(b) ribosomes
(c) plastids
(d) golgi apparatus

Ans. **(d)** golgi apparatus
Explanation: Golgi apparatus is involved in repackaging of many biomolecules.

15. Which out of the following is not a function of vacuole?
(a) Storage
(b) Providing turgidity and rigidity to the cell
(c) Waste excretion
(d) Locomotion

Ans. **(d)** Locomotion
Explanation: Locomotion is carried out by specialized structures which are outside the cell but vacuoles are inside the cell.

16. Amoeba acquires its food through a process, termed
(a) exocytosis
(b) endocytosis
(c) plasmolysis
(d) exocytosis and endocytosis both

Ans. **(b)** endocytosis
Explanation: The Term endocytosis is composed of two term, i.e. 'endo' means towards inside and 'cytosis' means movement related to cell.

17. Cell wall of which one of these is not made up of cellulose?
(a) Bacteria
(b) Hydrilla
(c) Mango tree
(d) Cactus

Ans. **(a)** Bacteria
Explanation: Other options show plants in which cell wall is made of cellulose. But cell wall of bacteria is made of peptidoglycan.

18. Silver nitrate solution is used to study
(a) endoplasmic reticulum
(b) golgi apparatus
(c) nucleus
(d) mitochondria

Ans. **(b)** golgi apparatus
Explanation: Camillo Golgi carried out 'black reaction' which involved use of silver nitrate. This helped him in staining individual nerve and cell structures.

19. Organelle other than nucleus, containing DNA is
(a) endoplasmic reticulum

(b) golgi apparatus
(c) mitochondria
(d) lysosome

Ans. **(c)** mitochondria
Explanation: Mitochondria and chloroplast contain DNA and hence have capability of replication.

20. Kitchen of the cell is
(a) mitochondria
(b) endoplasmic reticulum
(c) chloroplast
(d) golgi apparatus

Ans. **(c)** chloroplast
Explanation: Food is produced in plants inside chloroplasts. Hence, chloroplast is called the kitchen of the cell.

21. Lipid molecules in the cell are sythesized by
(a) smooth endoplasmic reticulum
(b) rough endoplasmic reticulum
(c) golgi apparatus
(d) plastids

Ans. **(a)** smooth endoplasmic reticulum

22. Cell arises from pre-existing cell was stated by
(a) Haeckel
(b) Virchow
(c) Hooke
(d) Schleiden

Ans. (b) Virchow
Explanation: This postulation of Virchow made an addition to the earlier cell theory.

23. Cell theory was given by
(a) Schleiden and Schwann
(b) Virchow
(c) Hooke
(d) Haeckel

Ans. **(a)** Schleiden and Schwann
Explanation: They were the first to propose the cell theory which stated that all plants and animals are made up of cell and cell is the basic unit of life.

24. The only cell organelle seen in prokaryotic cell is
(a) mitochondria
(b) ribosomes
(c) plastids
(d) lysosomes

Ans. **(b)** ribosomes
Explanation: Other cell organelles are absent in prokaryotic cells.

25. Organelle without a cell membrane is
(a) ribosome
(b) golgi apparatus
(c) chloroplast
(d) nucleus
Ans. **(a)** ribosome
Explanation: Other cell organelles are membrane – bound.

26. 1 μm is
(a) 10^{-6} m
(b) 10^{-9} m
(c) 10^{-10} m
(d) 10^{-3} m
Ans. **(a)** 10^{-6} m

27. Lysosome arises from
(a) endoplasmic reticulum
(b) golgi apparatus
(c) nucleus
(d) mitochondria
Ans. **(b)** golgi apparatus

28. Living cells were discovered by
(a) Robert Hooke
(b) Purkinje
(c) Leeuwenhoek
(d) Robert Brown
Ans. **(c)** Leeuwenhoek
Explanation: Robert Hooke was the first to observe cells but he observed dead cells of cork. It was Leeuwenhoek who was the first to observe living cells.

29. Select the odd one out
(a) The movement of water across a semipermeable membrane is affected by the amount of substances dissolved in it.
(b) Membranes are made of organic molecules like proteins and lipids
(c) Molecules soluble in organic solvents can easily pass through the membrane.
(d) Plasma membranes contain chitin sugar in plants
Ans. **(d)** Plasma membranes contain chitin sugar in plants
Explanation: This is a wrong statement, while others are correct.

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Short Answer Questions

30. Why are lysosomes known as 'suicide-bags' of a cell?

Ans. Lysosomes are known as 'suicide-bags' because when cell gets damaged during the disturbance in cellular metabolism, lysosomes may burst and the digestive enzymes thus released digest their own cell.

31. Do you agree that "A cell is a building unit of an organism". If yes, explain why?

Ans. I agree with the statement that "A cell is a building block of an organism". This is true because all living beings are made up of cells and cell is the smallest independent unit of living beings.

32. Why does the skin of your finger shrink when you wash clothes for a long time?

Ans. Soap solution is very concentrated - Hypertonic solution, so water moves out of your finger cells by osmosis.

33. Why is endocytosis found in animals only?

Ans. Cell wall is absent in animals. Due to this, movement of substances inside the cells is easier in animals than in plants. Due to this, endocytosis is found in animals only.

34. A person takes concentrated solution of salt, after sometime, he starts vomiting. What is the phenomenon responsible for such situation? Explain.

Ans. Swallowing a concentration solution of salt results in exosmosis from cells of the alimentary canal. Due to this, dehydration occurs in the person. As a result, the person starts vomiting.

35. Name any cell organelle which is non membranous.

Ans. Ribosome

36. We eat food composed of all the nutrients like carbohydrates, proteins, fats, vitamins, minerals and water. After digestion, these are absorbed in the form of glucose, aminoacids, fatty acids, glycerol etc. What mechanisms are involved in absorption of digested food and water?

Ans. Diffusion and osmosis respectively

37. If you are provided with some vegetables to cook. You generally add salt into the vegetables during cooking process. After adding salt, vegetables release water. What mechanism is responsible for this?

Ans. Exosmosis

38. If cells of onion peel and RBC are separately kept in hypotonic solution, what among the following will take place? Explain the reason for your answer.

(a) Both the cells will swell.

(b) RBC will burst easily while cells of onion peel will resist the bursting to some extent.
(c) a and b both are correct.
(d) RBC and onion peel cells will behave similarly.

Ans. **(c)** a and b both are correct. When surrounding medium is hypotonic, water moves into the cells. This will result in swelling of cells. RBCs do not have cell wall and hence they will easily burst. Presence of cell wall in the cells of onion peel will prevent their bursting.

39. Bacteria do not have chloroplast but some bacteria are photoautorophic in nature and perform photosynthesis. Which part of bacterial cell performs this?

Ans. Small vesicles which are associated with plasma membrane are present in such bacteria. These vesicles contain pigments which can trap solar energy to produce food.

40. Match the following A and B

Column A	Column B
(a) Smooth endoplasmic reticulum	(i) Amoeba
(b) Lysosome	(ii) Nucleus
(c) Nucleoid	(iii) Bacteria
(d) Food vacuoles	(iv) Detoxification
(e) Chromatin material and nucleolus	(v) Suicidal bag

Ans. a—(iv); b—(v); c—(iii); d—(i); e—(ii).

41. Write the name of different plant parts in which chromoplast, chloroplast and leucoplast are present.

Ans. Flower and Fruit— Chromoplast
Leaves of the plant— Chloroplast
Root of the plant— Leucoplast

42. Name the organelles which show the analogy written as under

(a) Transporting channels of the cell _____
Ans. Endoplasmic reticulum
(b) Power house of the cell _____
Ans. Mitochondria
(c) Packaging and dispatching unit of the cell _____
Ans. Golgi body
(d) Digestive bag of the cell _____
Ans. Lysosome
(e) Storage sacs of the cell _____
Ans. Vacuole
(f) Kitchen of the cell _____
Ans. Chloroplast
(g) Control room of the cell _____
Ans. Nucleus

43. How is a bacterial cell different from an onion peel cell?

Ans.

Bacteria Cell	Onion peel cell
(i) Cell wall is made peptidoglycan.	(i) Cell wall is made of cellulose.
(ii) Nucleus is absent	(ii) Nucleus is present.
(iii) Vacuole is absent	(iii) Vacuole is present.
(iv) These are prokaryotes.	(iv) These are eukaryotes.

44. How do substances like carbon dioxide (CO_2) and water (H_2O) move in and out of the cell?

Ans. Carbon dioxide moves through diffusion, while water moves through osmosis.

45. How does amoeba obtain its food?

Ans. Amoeba makes pseudopodia to surround a food particle. It then ingest the food particles; along with a drop of water and then forms food vacuole. This process of obtaining food by Amoeba is called endocytosis.

46. Name the two organelles in a plant cell that contain their own genetic material and ribosomes.

Ans. Mitochondria and plastids

47. Why are lysosomes also known as "scavengers of the cells"?

Ans. Lysosomes contain enzymes which are used for destroying worn out parts of the cell. Lysosomes also destroys waste materials. Due to this, lysosomes are also known as 'scavengers of the cells'.

48. Which cell organelle controls most of the activities of the cell?

Ans. Nucleus

49. Which kind of plastid is more common in

(a) roots of the plant

Ans. Leucoplast

(b) leaves of the plant

Ans. Chloroplast

(c) flowers and fruits

Ans. Chromoplast

50. Why do plant cells possess large sized vacuole?

Ans. Vacuoles not only store many important substances, they also contain cell sap that give turgidity to cell.

51. How are chromatin, chromatid and chromosomes related to each other?

Ans. Chromosomes are made up of chromatids and chromatids are made up of chromatin.

52. What are the consequences of the following conditions?

(a) A cell containing higher water concentration than the surrounding medium

Ans. Exosmosis

(b) A cell having low water concentration than the surrounding medium.

Ans. Endosmosis

(c) A cell having equal water concentration to its surrounding medium.

Ans. No effect

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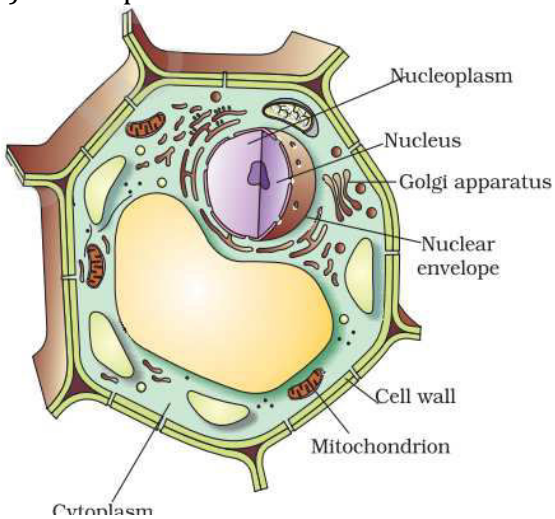
Long Answer Questions

53. Draw a plant cell and label the parts which
(a) determines the function and development of the cell
(b) packages materials coming from the endoplasmic reticulum
(c) provides resistance to microbes to withstand hypotonic external media without bursting
(d) is site for many biochemical reactions necessary to sustain life.
(e) is a fluid contained inside the nucleus

Ans. (a) Nucleus
(b) Golgi apparatus
(c) Cell wall
(d) Cytoplasm
(e) Nucleoplasm.



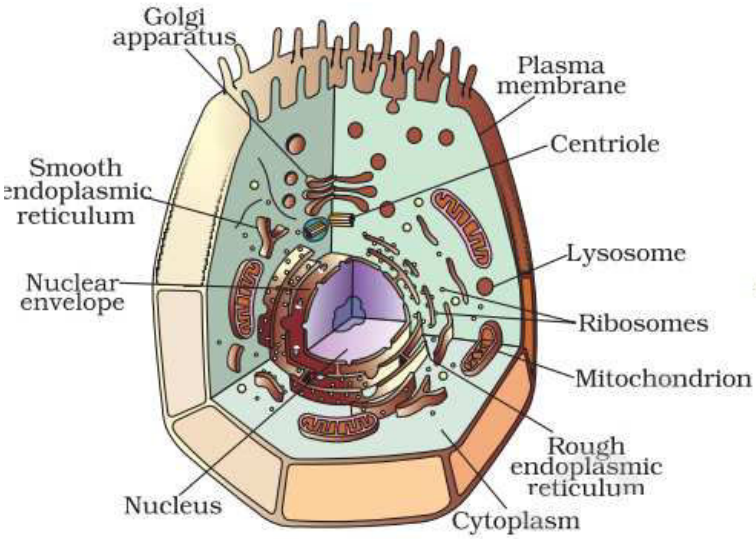
54. Illustrate only a plant cell as seen under electron microscope. How is it different from animal cell?

Ans.

Animal cell	Plant cell
1. cell wall absent	1. Cell wall present
2. Plastids are absent	2. Plastids are present
3. It has a small vacuole	3. It has a large vacuole
4. Centriole present	4. Centriole absent

55. Draw a neat labelled diagram of an animal cell.

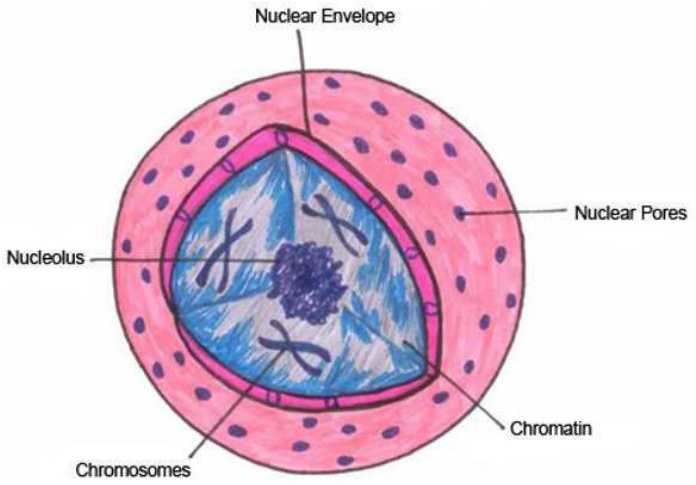
Ans.



Animal cell

56. Draw a well labelled diagram of an eukaryotic nucleus. How is it different from nucleoid?

Ans.



Nucleus	Nucleoid
(i) Nuclear membrane is present.	(i) Nuclear membrane absent.
(ii) Nucleolus present.	(ii) Nucleolus absent.
(iii) Genetic materials are enclosed in nucleus.	(iii) Genetic materials are not contained in any closed structure.
(iv) Found in eukaryotes.	(iv) Found in prokaryotes.

57. Differentiate between rough and smooth endoplasmic reticulum. How is endoplasmic reticulum important for membrane biogenesis?

Ans. The ribosomes, which are present in all active cells, are the sites of protein synthesis. Endoplasmic reticulum helps in transporting these proteins to various places. The

smooth endoplasmic reticulum help in manufacture of fat and lipids which along with proteins help in building the cell membrane.

Smooth Endoplasmic Reticulum (SER)	Rough Endoplasmic Reticulum (RER)
SER has no ribosomal particles on the surface, hence look smooth SER helps in the manufacture of lipids and fat molecules.	RER has particles of ribosome on the surface. Ribosomes are the sites of protein synthesis.

58. In brief state what happens when

(a) dry apricots are left for sometime in pure water and later transferred to sugar solution?

Ans. First it swells due to endosmosis and then exosmosis occurs and it shrinks.

(b) a Red Blood Cell is kept in concentrated saline solution?

Ans. It will lose water and shrink.

(c) the Plasma-membrane of a cell breaks down?

Ans. The cell will die.

(d) rheo leaves are boiled in water first and then a drop of sugar syrup is put on it?

Ans. The cell gets killed on boiling so no plasmolysis.

(e) golgi apparatus is removed from the cell?

Ans. All sorts of vesicle formation stop.

59. Draw a neat diagram of plant cell and label any three parts which differentiate it from animal cell.

Ans.