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## CBSE 9th : BIOLOGY NOTES

### CELL: The Fundamentaln Unit of Life

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## POINTS TO REMEMBER

1. In 1665, Robert Hooke first discovered and named the cells.
2. Cell is the structural and functional unit of all living organisms.
3. Organisms may be unicellular or multi-cellular. A single cell constitutes the unicellular organism whereas many cells coordinately function in case of multi-cellular organism.
4. The size, shape and volume of the cell are related to the specific function that they perform.
5. A cell generally shows plasma membrane, nucleus and cytoplasm.
6. Plasma membrane is a thin, selectively permeable membrane, covering the cell and is made up of lipids and proteins.
7. Functions of plasma membrane :
  - (i) It separates the contents of a cell from its outside environment.
  - (ii) It regulates the flow of substances to and from the cell through diffusion, facilitated diffusion, active transport and endocytosis.
8. Osmosis is diffusion of water through a selectively permeable membrane.
9. A cell will gain water when placed in hypotonic solution and lose water when placed in hypertonic solution. When placed in isotonic solution, cells will neither lose nor gain water.  
Can be written more specifically as :
  - (i) Hypotonic solution : A cell placed in it will gain water.
  - (ii) Hypertonic solution : A cell placed in it will loose water : Also known as plasmolysis.
  - (iii) Isotonic solution: A cell placed in it will neither gain nor loose water.
10. In addition to plasma membrane, the cells of plants, fungi and bacteria have another rigid, non-living, outer covering called cell wall, composed mainly of cellulose.  
Can be written more specifically as  
Cells of Plants, fungi & bacteria: Contain both plasma membrane & cell wall.  
Cell wall is rigid, non-living & outer most covering, composed mainly of cellulose.
11. When placed in hypertonic solution, a living plant cell shows plasmolysis.
12. Cell wall provides mechanical strength to the cell. It permits the cell to withstand huge changes in the surrounding medium.
13. Nucleus is an important, spherical, usually centrally located constituent of the cell and is bounded by double layered nuclear envelope.
14. The nucleus of a dividing cell shows rod-shaped chromosomes, made up of DNA and proteins. In a non-dividing cell, the chromosomes elongate and take the form of thread-like chromatin.
15. DNA molecules are responsible for transmitting hereditary information from one generation to the next.
16. Nucleus controls all metabolic activities of the cell.
17. Depending on the presence or absence of nucleus, cells may be prokaryotic or eukaryotic.
  - (i) Prokaryotic cells lack a well-defined nucleus and instead show nucleoid, an undefined nuclear region containing the genetic material.
  - (ii) Eukaryotic cells possess a proper nucleus with nuclear membrane.
18. Cytoplasm is the fluid content of the cell, occurring between nucleus and plasma membrane. It stores several vital chemicals and is the site of certain important metabolic pathways.
19. Several specialized cell organelles are present in the cytoplasm. These organelles perform different kinds of metabolic activities and are kept separate from each other.

20. The various cell organelles include endoplasmic reticulum, Golgi apparatus, lysosomes, mitochondria, plastids, vacuoles and centrosome.
21. Endoplasmic reticulum (ER) is an extensive, interconnected, membrane bound network of tubes and sheets.
22. Ribosomes are attached to the surface of Rough Endoplasmic Reticulum (RER) and are absent in Smooth Endoplasmic Reticulum (SER).
23. Functions of ER :
  - (i) It synthesizes important proteins (RER) and lipids (SER).
  - (ii) It provides a pathway for intracellular transport of materials.
  - (iii) SER of liver cells is important for detoxification.
24. Golgi apparatus is a network of stacked, flattened, membrane bound sacs and vesicles.
25. Golgi apparatus carries out the storage, modification and packaging of substances manufactured in the cell and is also involved in lysosome formation.
26. The spherical, sac-like lysosomes contain powerful digestive enzymes and form the waste disposal system of the cell. They are also known as ‘suicide bags’.
27. Mitochondria and plastids are each covered by 2 membranes and possess their own DNA and ribosomes.
28. Mitochondria are the ‘power houses of the cell’, providing energy for various metabolic activities.
29. Chromoplasts and leucoplasts are the 2 types of plastids present in plant cells.
30. Chloroplasts are chromoplasts containing chlorophyll and carry out photosynthesis in plants.
31. Leucoplasts store starch, oil and protein granules.
32. The large central vacuole of mature plant cells provides turgidity to the cell and also stores important substances.
33. In unicellular organisms, vacuoles play important roles in nutrition and osmoregulation.
34. Ribosomes are sites of protein synthesis.
35. Centrosome is found only in animal cells and consists of 2 centrioles. Centrosome helps in cell division.
36. The membrane-bound cell organelles are absent in prokaryotic cells.
37. Differences between plant cell and animal cell.
  
38. The basic structural organization of the cell helps it to perform important functions like respiration, nutrition, excretion and protein synthesis.

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# CONCEPT APPLICATION LEVEL - I

[NCERT Questions]

**Q.1 Who discovered cell and how ?**

**Ans.** Robert Hooke discovered cells with the help of his self-designed microscope. In 1665, Robert Hooke was examining a thin slice of cork and he saw that the cork resembled the structure of a honeycomb consisting of many compartments.

**Q.2 Why is the cells called the structural and functional unit o life?**

**Ans.** Each living cell has the capacity to perform certain basic functions that are characteristic of al living forms. Each living cell has got certain specific components within it known as cell organelles. Each kind of cell organelle performs as special function, such as making new material in the cell, clearing up the waste material from the cell and so on. A cell is able to live and perform all its functions because of these organelles. Theses organelles together constitute the basic unit called the cell.

**Q.3 How do substances like CO<sub>2</sub> and water move in and out of the cell ?**

**Ans.** Sustances like CO<sub>2</sub> (which is cellular waste and requires to be excreted out by the cell) accumulates in high concentrations inside the cell. In the cell's external environment, the concentration of CO<sub>2</sub> is low as compared to that inside the cell. As soon as there is a difference of concentration of CO<sub>2</sub> inside and outside a cell, CO<sub>2</sub> moves out of the cell, from a region of low concentration outside the cell by the process of diffusion.

**Q.4 Why is the plasma membrane called a selectively permeable membrane ?**

**Ans.** The plasma membrane allows or permits the entry and exit of some materials in and out of the cell. It also prevents movement of some other materials. The cell membrane, therefore, is called a selectively permeable membrane.

**Q.5 Fill int the gaps in the following table illustrating differences between prokaryotic and eukaryotic cells.**

Prokaryotic Cell	Eukaryotic Cell
Size : Generally small (1 – 10 $\mu\text{m}$ ) $1\mu\text{m} = 10^{-6}\text{m}$	Size : Generally large (5– 100 $\mu\text{m}$ )
Nuclear region : _____ (a) _____ and known as _____ (b) _____	Nuclear region : well defined and surrounded by a nuclear membrane
Chromosome single	More than one chromosome.
Membrane bound cell organelles absent.	_____ (c) _____ _____ (d) _____

**Q.6 Can you name the two organelles we have studied that contains their own genetic material?**

**Ans.** Mitochondrion and Plastid.

**Q.7 If the organisation of a cell is destroyed due to some physical or chemical influence, what will happen?**

**Ans.** Each living cell has the capacity to perform certain basic functions due to its cell organelles which are responsible for its organisation. If this organisation of a cell is destroyed, then cell will not be able to perform certain basic functions and ultimately it will die soon.

**Q.8 Why are lysosomes known as suicide bags ?**

**Ans.** Lysosomes contain powerful digestive enzymes capable of breaking down all organic material whenever there is disturbance in the cellular metabolism, i.e., when the cell gets damaged, then these lysosomes may burst and the enzymes digest their own cell. Therefore, lysosomes are also known as the ‘suicide bags’ of a cell.

**Q.9 Where are protein synthesised inside the cell ?**

**Ans.** Ribosomes (which are attached to the surface of Rough Endoplasmic Reticulum) are the sites of protein manufacture inside the cell.

**Q.10 Make a comparision and write down ways in which plant cells are different from animal cells.**

<b>S.No.</b>	<b>Plant Cell</b>	<b>Animal Cell</b>
1	A cell wall made up of cellulose, is present outside the plasma membrane.	Cell wall is absent.
2	Plastids (chloroplast, leucoplasts and chromoplasts) are present.	Plastids are absent.
3	Vacuoles are present usually a large cell vacuole lies in the centre.	Vacuoles are either absent or very small.
4	Centriole is absent (except in few lower plants).	Centriole with centrosome is present.
5	They are usually regular in shape.	They are usually irregular in shape.
6	Reserve food occurs in the form of starch.	Food is stored in the form of glycogen.
7	Lysosomes are either absent or very few in number.	Lysosomes are prominent and more in number.

**Q.11 How is a prokaryotic cell different from a eukaryotic cell.**

<b>S.No.</b>	<b>Prokaryotic Cell</b>	<b>Eukaryotic Cell</b>
1	Size : Generally $(1 - 10\mu\text{m})$ $1 \mu\text{m} = 10^{-6} \text{ m}$	Size : Generally large $(5 - 100 \mu\text{m})$ .
2	Nuclear region : Undefined nuclear region containing only nucleic acids (genetic material) and known as nucleoid	Nuclear region : Well defined and surrounded by a nuclear membrane.
3	Chromosome : single.	More than one chromosomes
4	Membrane bound cell organelles absent.	Membrane bound cell organelles present.

**Q.12 What would happen if the plasma membrane ruptures or breaks down ?**

**Ans.** If the plasma membrane ruptures or breaks down, then following things may happen :

- (i) There will be no difference between the contents of the cell and its external environment.
- (ii) Since plasma membrane is selectively permeable and allows only useful substances to enter inside the cell. When it may get ruptured, then all the useful substances will also move out of the cell.
- (iii) The cell will lose its shape.

Ultimately all the metabolic activities of the cell will get affected and cell may die even.

**Q.13 What would happen to the life of a cell if there was no Golgi apparatus ?**

**Ans.** The following things may happen in the cell if there was no golgi apparatus :

- (i) There will be effect on the packaging and dispatching of different types of proteins to various targets inside and outside the cell.
- (ii) The products of the cell cannot be stored and modified further.
- (iii) The formation of complex sugars from simple sugars cannot take place.

**Q.14 Which organelle is known as the power house of the cell ? Why ?**

**Ans.** Mitochondria are known as the power house of the cell. These organelles contain many oxidative enzymes which oxidise the food and convert it into energy currency of the cell in the form of ATP (Adenosine tri phosphate). This energy (in the form of ATP) is used by body for making new chemical compounds and for doing mechanical work. Due to this reason, mitochondria are generally referred to as ‘power house of the cell’.

**Q.15 Where do the lipids and proteins constituting the cell membrane get synthesised ?**

**Ans.** Lipids are synthesised in Smooth Endoplasmic Reticulum (SER) while proteins are synthesised in the ribosomes which are attached to the Rough Endoplasmic Reticulum (RER).

**Q.16 How does an Amoeba obtain its food ?**

**Ans.** Amoeba acquires its food through the process of endocytosis. This process takes place due to the flexible nature of cell membrane which forms the structure of amoeba. The flexible nature of cell membrane enables the amoeba to engulf in food and other material from its external environment.

**Q.17 What is osmosis ?**

**Ans.** Osmosis is the passage of water or any solvent (diffusion) from a region of its higher concentration to its lower concentration through a semipermeable membrane.

Thus, osmosis is a special type of diffusion through a selectively permeable membrane.

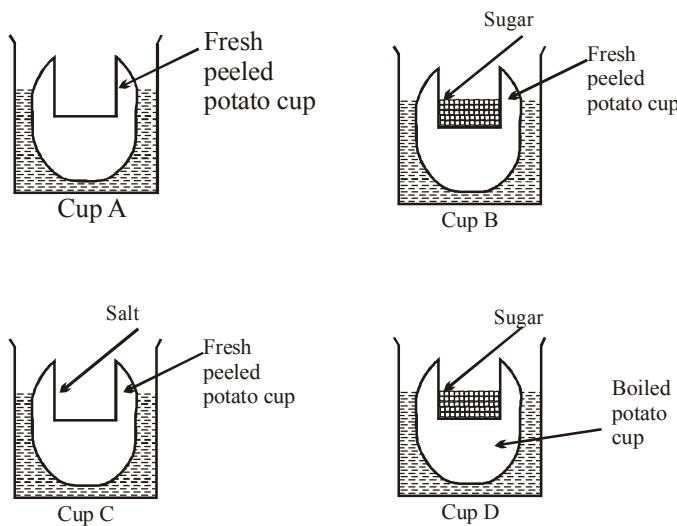
**Q.18 Carry out the following osmosis experiment :**

**Take four peeled potato halves and scoop each one out to make potato cups. One of these potato cups should be made from a boiled potato. Put each potato cup in a trough containing water. Now :**

- (a) Keep cup A empty.
- (b) Put one teaspoon sugar in cup B.
- (c) Put one teaspoon salt in cup C.
- (d) Put one teaspoon sugar in the boiled potato cup D.

Keep these for two hours. Then observe the four potato cups and answer the following :

- Explain why water gathers in the hollowed portion of B and C.
- Why is potato A necessary for this experiment ?
- Explain why water does not gather in the hollowed out portions of A and D.



- Ans.**
- The water gathers in the hollowed portion of B and C due to the process of osmosis. Since the concentration of solute (sugar in cup B and salt in cup C) is higher inside the cup as compared to the water which is outside the cup. Therefore, water (solvent) from its higher concentration (outside the cup) will move towards the lower concentration (inside the cup). This process of osmosis (moving in of solvent) is known as endosmosis.
  - Potato A acts as a control for the experiment. This is very necessary for comparing the results of the experiment.
  - Water does not gather in the hollowed out portions of A and D because of the following reasons.
    - The hollowed portion of potato A is empty. Thus, there is no concentration difference and, therefore, no osmosis takes place.
    - The hollowed portion of potato D contains sugar inside it but this potato is boiled one. Therefore, osmosis will not take place as its semipermeable membrane is destroyed by boiling.

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# **CONCEPT APPLICATION LEVEL - II**

## **SECTION-A**

### **Fill in the blanks :**

1. Protoplasm consist of two parts \_\_\_\_\_ and \_\_\_\_\_.  
\_\_\_\_\_ is the basic unit of life.
  2. \_\_\_\_\_ separates the content of a cell from its surrounding medium.
  3. Cell wall is absent in \_\_\_\_\_ cells
  4. Cell wall is made up of \_\_\_\_\_ in plant cell.
  5. \_\_\_\_\_ allows exchange of substances between nucleus and cytoplasm.
  6. \_\_\_\_\_ are units of hereditary material.
  7. RER helps in the synthesis of \_\_\_\_\_.
  8. When lysosomes bring self destruction of a cell, they are called \_\_\_\_\_.
  9. Vacuoles are fluid filled sacs covered by a membrane called \_\_\_\_\_.

## **SECTION-B**

11. Most abundant organelle of the cells are :  
 (A) Mitochondria      (B) Plastids      (C) Ribosomes      (D) Golgi body
12. Golgi apparatus is concerned with :  
 (A) excretion      (B) secretion      (C) ATP synthesis      (D) RNA synthesis
13. Main function of lysosome is :  
 (A) Secretion      (B) Respiration  
 (C) Extracellular digestion      (D) Intra cellular digestion
14. Mitochondrial matrix contains :  
 (A) Enzymes      (B) DNA & RNA      (C) Ribosomes      (D) All of the above
15. Organelle covered by double membrane is :  
 (A) Nucleus      (B) Mitochondria      (C) Plastid      (D) All of the above
16. Structural elements of chloroplasts are :  
 (A) plasto globuli      (B) photosynthetic pigments  
 (C) thylakoids      (D) quantasome
17. Centrioles are found :  
 (A) Singly      (B) In Pairs      (C) In Triplets      (D) In Quadruplets
18. Liquid content of a vacuole is called :  
 (A) cell sap      (B) matrix      (C) nucleoid      (D) core
19. A biomembrane is made up of :  
 (A) protein, lipids and carbohydrate      (B) protein, lipids and RNA  
 (C) protein, lipids and DNA      (D) protein, lipids and hormones
20. Most abundant lipid of cell membrane :  
 (A) cholesterol      (B) phospholipid      (C) glycolipid      (D) none of these

### SECTION-C

#### PREVIOUS YEAR'S QUESTIONS

**Very Short Answer Type Questions : (One Mark)**

Q.1 All activities inside the cell and interaction of the cell with its environment are possible due to some features found in almost every cell. Name any two such features. [SAI 2015]

Ans. (i) Presence of living membrane (Plasma / cell membrane).  
 (ii) Presence of control centre. (Nucleus).  
 (iii) Presence of site for all cellular activities (Cytoplasm).

Q.2 What is protoplasm ? Who coined this term and when ? [SAI 2014]  
 Ans. The living fluid substance of the cell is called as 'protoplasm'. Purkinje in 1839 coined the term protoplasm.

**Q.3** Name the process of building of cell membrane. [SAI 2013, 14]  
**Ans.** Membrane biogenesis.

**Q.4** Who observed the free living cells in pond water for the first time ? [SAI 2011, 14]  
**Ans.** Leeuwenhoek.

**Q.5** What can be seen when cell is placed in a hypertonic solution ? [SAI 2013, 14]  
**Ans.** Most of the water moves out of the cell due to exosmosis. The cell shrinks.

**Q.6** What is the composition of chromosomes? [SAI 2012, 14]  
**Ans.** Chromosomes are composed of DNA and protein.

**Q.7** Which cell organelle is responsible for making fat molecules or lipids? [SAI 2013]  
**Ans.** Smooth Endoplasmic Reticulum.

**Q.8** Name the cell organelles that help to keep the cell clear by digesting the worn out cell organelles. [SAI 2013]  
**Ans.** Lysosomes.

### **Short Answer Type Questions : (Two Marks)**

**Q.9** (a) Name the different cell organelles which perform functions like protein/lipids make, specific digestion, and energy generation.  
(b) Which ER plays a crucial role in detoxifying many poisons and drugs ? [SAI 2015]

**Ans.** (a) Protein / lipid making-Endoplasmic reticulum (ER).  
Specific digestion – Lysosomes  
Energy generation – Mitochondria  
(b) Smooth endoplasmic reticulum (SER)

**Q.10** State two functions of vacuoles in a plant cell. [SAI 2011, 14]

**Ans.** (i) Vacuoles help in maintaining the osmotic pressure of the cell.  
(ii) They store important substances like amino acids, sugars etc. They also store metabolic wastes of the cell.

**Q.11** What type of enzymes are present in the lysosomes? What is their function? Which cell organelles manufacture these enzymes? [SAI 2011, 13, 14]

**Ans.** (i) Lysosomes contain the powerful digestive enzymes.  
(ii) These enzymes are capable of breaking down all organic material thus, they help to keep the cell clean by digesting any foreign material as well as worn out cell organelles.  
(iii) Rough endoplasmic reticulum manufactures these enzymes.

**Q.12** Write the composition of a chromosome. Name the part of a cell where it is formed. [SAI 2012, 13, 14]

**Ans.** Chromosomes are founded inside the nucleus. Chromosomes are composed of DNA and protein. DNA molecules contain the information necessary for constructing and organising cells. Functional segments of DNA are called genes. In a cell which is not dividing, this DNA is present as part of chromatin material.

**Q.13** What type of information is contained in DNA and in which form it is present? [SAI 2012, 14]

**Ans.** Chromosomes contain information for inheritance of features from parents to next generation in the form of DNA (Deoxyribo Nucleic Acid) molecules.

**Q.14** What is cellular reproduction ? Which organelle plays an important role in it ? [SAI 2013, 14]

**Ans.** (i) The process by which a single cell divides and form two new cells is called cellular reproduction.  
(ii) The nucleus plays a central role in cellular reproduction.

**Q.15** What is nucleoid? Where it can be seen ? [SAI 2014]

**Ans.** It is the poorly defined nuclear region due to the absence of nuclear membrane. This region contains only nucleic acid. It can be seen in bacteria.

**Q.16** What are chloroplasts? What is their function? What other pigments are present in chloroplasts?

[SAI 2014]

**Ans.** Plastids containing the pigment chlorophyll are known as chloroplasts. Chloroplasts are important for photosynthesis in plants. Chloroplasts also contain various yellow or orange pigments in addition to chlorophyll.

### Short Answer Type Questions : (Three Marks)

**Q.17** Name the stain used to prepare slides like that of onion peel and cheek cell. Why is the use of stain necessary ? Do all organelles absorb stain equally? [SAI 2015]

**Ans.** (i) Safranin for onion peel and methylene blue for cheek cells.  
(ii) Stain highlights the cell compartments by making the cell organelles coloured and helps in distinguishing its various components.  
(iii) No, all organelles do not absorb the stain equally. The amount of stain absorbed will depend on surface area and density of the cell organelle.

**Q.18** (a) Where are chromosome present in the cell? What is their chemical composition?

(b) How many pairs of chromosomes are present in humans? [SAI 2015]

**Ans.** (a) Chromosomes are present in the nucleus of cell of all eukaryotes. The chromosomes are made-up of DNA and proteins.  
(b) In normal cells of humans there are 23 pairs (46 is the total number) of chromosomes while in gametes i.e., sperm and egg, there are only 23 chromosomes in each cell.

**Q.19** Where are proteins synthesised inside the cells? How are they transported to various places inside the cells? What is the role of proteins in the functioning of lysosomes? [SAI 2015]

**Ans.** (i) The proteins are synthesised in the cells by ribosomes, i.e., ribosomes are the sites of protein synthesis.  
(ii) Proteins are sent to various places in the cell using endoplasmic reticulum (ER) which serves as channels for transport of proteins between various regions of the cytoplasm or the nucleus.  
(iii) Lysosomes contain powerful digestive enzymes (proteins) which are capable of breaking down all organic material.  
(iv) These lysosomes (proteins) also help in keeping the cell clean by removing its debris.

**Q.20** Name the two cell organelles that contain their own DNA and ribosomes. What is the site of respiration to fulfil energy demands within the cell ? In which form energy is stored in a cell? [SAI 2015]

- Ans. • Mitochondria and plastids.  
 • To fulfil energy demands within the cell, mitochondria is the site of respiration.  
 • Energy cannot be stored in a cell. It is produced as and when required in the form of ATP (Adenosine Triphosphate).

Q.21 Define the following terms :

- (i) Endocytosis      (ii) Phagocytosis      (iii) Exocytosis      [SAI 2012, 14]

Ans. (i) **Endocytosis** : It is the process of ingestion of material by the cells through the plasma membrane.

(ii) **Phagocytosis** : It is a common method of feeding in some organisms such as *Amoeba* and sponges. Biologically it means “cell eating”. The WBCs engulf cell debris and microbes with the help of this process.

(iii) **Exocytosis** : It is the process by which the plasma membrane removes its contents to the surrounding medium.

Q.22 List any six functions of nucleus of a cell.

[SAI 2010, 14]

- Ans. (i) It is the control centre of the cell.  
 (ii) It plays an important role in determining the way the cell will develop.  
 (iii) It also determines what form the cell will exhibit at maturity.  
 (iv) It contains chromosome thus inherits characters.  
 (v) Nucleus plays a central role in cellular reproduction.  
 (vi) Nucleus plays a central activities of the cell.

### Long Answer Type Questions : (Five Marks)

Q.23 On the basis of number of cells, living organisms are classified as unicellular and multicellular.

- (a) Name two unicellular organisms.  
 (b) What is meant by division of labour in multicellular organisms?  
 (c) Name one prokaryotic and one eukaryotic unicellular organism.  
 (d) “Every multicellular organism has come from a single cell.” Justify this humans.  
 (e) Write one common feature between an *Amoeba* and white blood cells of humans. [SAI 2012, 13]

Ans. (a) *Amoeba, Paramecium, Clamydomonas*. (Any two)

(b) The different parts in the body of multicellular organism perform different functions.

(c) Prokaryotic – Bacteria; Eukaryotic – *Amoeba*.

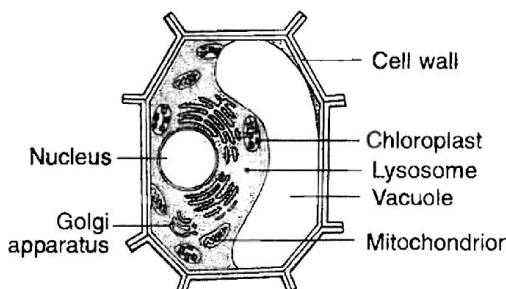
(d) Cell divide again and again to produce the new cells of their own kind. All cells of a multicellular organism come from a pre-existing single cell.

(e) Both have an irregular shape, i.e., their shape keeps on changing continuously.

Q.2 Draw a neat diagram of a plant cell and label the following parts :

[SAI 2012, 13]

- (i) Cell wall      (ii) Nucleus      (iii) Vacuole      (iv) Golgi apparatus  
 (v) Mitochondrion      (vi) Lysosome      (vii) Chloroplast

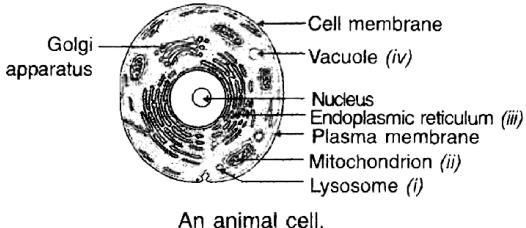


Ans.

Q.3 Draw a neat diagram of animal cell and label only four parts.

[SAI 2013]

Ans.



## **SECTION-D**

### **UNDERSTANDING BASED QUESTIONS**

**Q.1** State the significance of two membrane coverings instead of just one, in mitochondria. **[SAI 2015]**

Ans. The deep folds of inner membrane create a large surface area for ATP generating chemical reactions while the outer membrane which is very porous acts as the protective covering and also helps in the easier diffusion of gases.

**Q.2** List two similarities between mitochondria and plastids.

[SAI 2010, 13, 14]

Ans. (i) Both have two membrane coverings.

(ii) Both have their own DNA and ribosomes and therefore, they are able to make some of their own proteins.

(iii) The inner membrane of both contains numerous folds which increases their surface area for biochemical processes.

**Q.3** Do all cells in our body look alike in terms of shape, size and structure ? Explain with the help of examples. What similarities do they have? [SAI 2015]

Ans. (i) No, all cells in our body do not look alike in terms of shape, size and structure.  
(ii) The shape, size and structure of cell is determined by the function which it performs.  
(iii) The eggs of many animals are spherical in shape, some are oval in shape, smooth muscle fibres are spindle-shaped, nerve cells are elongated and RBCs are discoidal in shape.  
(iv) The size and number of cells also vary from organism to organism.  
(v) All cells have the same organelles.

**Q.4** Identify a cell organelles which is present in prokaryotes as well as eukaryotes. Discuss their shape and location. **[SAI 2015]**

Ans. (a) Ribosomes are present in both prokaryotes as well as eukaryotes.  
(b) **Shape** : Ribosomes are small globular, granular structures.  
(c) **Location** : Ribosome are situated either on the wall of endoplasmic reticulum or present as free ribosomes in cytoplasm.

**Q.5** Classify the following processes as osmosis or diffusion :

(i) Aquatic animals using oxygen dissolved in water during respiration.

(ii) Swelling up of raisins on keeping in water.

(iii) Spreading of virus on sneezing.

[SAI 2011, 12, 14]

#### Q.6 What will happen if:

- (i) Ribosomes are removed from the cell,
  - (ii) Golgi apparatus is removed from the cell,
  - (iii) Plasma membrane ruptures ?

[SAI 2015]

Ans. (i) If ribosomes are removed from the cell, protein will not be synthesised.

- (ii) Packaging of materials, synthesis of complex sugar and formation of lysosome will be adversely affected, if golgi apparatus is removed.
  - (iii) If the plasma membrane ruptures, the inside materials will come out of the cell.

**Q.7** Discuss the role of:

- (a) cellulose in cell wall.
  - (b) presence of deeply folded membrane in mitochondria.
  - (c) digestive enzymes in lysosomes.

[SAI 2015]

Ans. (a) Cellulose is a complex substance that provides structural strength to plants.

- (b) Inner membrane of mitochondria is deeply folded to create a large surface area for ATP-generating chemical reactions.
  - (c) Powerful digestive enzymes present in the lysosomes help in breaking down all the foreign materials, entering into the cell such as bacteria etc., as well as old cell organelles into small species.

Q.8 (a) What are the consequences of the following conditions?

- (i) A cell having higher water concentration than the surrounding medium.
  - (ii) A cell having lower water concentration than the surrounding medium.
  - (iii) A cell having equal water concentration to its surrounding medium.

(b) Name the materials of, which the cell membrane and cell wall are composed of. [SAI 2015]

Ans. (a) (i) If a cell has higher water concentration than the surrounding solution, it will gain water by osmosis. Therefore, the cell will swell up.

- (ii) If a cell having lower water concentration than the surrounding medium, then the cell will lose water by osmosis and the cell is likely to shrink.
  - (iii) A cell having equal water concentration to its surrounding medium, then there will be no net movement of water across the cell membrane and the cell will stay in the same size.

(b) Cell membrane is made-up of organic molecules called lipids and proteins. Plant cell wall is mainly composed of cellulose.



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# **CONCEPT APPLICATION LEVEL - III**

## **SECTION-A**

## **SECTION-B**

### **Assertion & Reason :**

Instructions: In the following questions as Assertion (A) is given followed by a Reason (R). Mark your responses from the following options.

- (A) Both Assertion and Reason are true and Reason is the correct explanation of ‘Assertion’
  - (B) Both Assertion and Reason are true and Reason is not the correct explanation of ‘Assertion’
  - (C) Assertion is true but Reason is false
  - (D) Assertion is false but Reason is true

1. **Assertion:** Cell place in a hypertonic solution shows plasmolysis  
**Reason:** Not all cell shows plasmolysis.
  2. **Assertion:** Plant cell remain cover by dead, rigid cell wall.  
**Reason:** Due to cell wall, plant cells couldn't change its shape.

**SECTION-C****Match the following (one to one) :**

**Column-I** and **column-II** contains **four** entries each. Entries of column-I are to be matched with some entries of column-II. Only One entries of column-I may have the matching with the same entries of column-II and one entry of column-II Only one matching with entries of column-I

- |           |                   |                    |
|-----------|-------------------|--------------------|
| <b>1.</b> | <b>Column I</b>   | <b>Column II</b>   |
|           | (A) Mitochondria  | (P) Secretion      |
|           | (B) Golgi complex | (Q) Digestive bags |
|           | (C) Lysosomes     | (R) ATP            |
|           | (D) Centrosome    | (S) Cell division  |

**Match the following (one to many) :**

**Column-I** and **column-II** contains **four** entries each. Entries of column-I are to be matched with some entries of column-II. One or more than one entries of column-I may have the matching with the same entries of column-II and one entry of column-II may have one or more than one matching with entries of column-I.

- |           |                           |                       |
|-----------|---------------------------|-----------------------|
| <b>2.</b> | <b>Column I</b>           | <b>Column II</b>      |
|           | (A) Cell membrane         | (P) Biocatalyst       |
|           | (B) Enzyme                | (Q) Entry and exit    |
|           | (C) Polymer of amino acid | (R) Protein and lipid |
|           | (D) Ribosome              | (S) Protein           |

**SECTION-D****Comprehension**

Continuity of living organism depends upon the process of cell division. For a cell to divide normally instruction comes from Nuclues.

Nucleus contain DNA, RNA and protein. DNA together with a nucleoprotein form chromosome. These chromosomes are in a thread like structure in a resting cell.

1. The nucleoprotein present in nucleus is :  
 (A) Rhizome                    (B) Histone                    (C) Insulin                    (D) None of these
  
2. DNA is :  
 (A) Deoxyribose acid                    (B) Deoxyribose sugar  
 (C) Deoxyribo nucleic acid                    (D) Deoxynucleic acid
  
3. Protein are the polymer of:  
 (A) Fatty acid                    (B) Nucleic acid                    (C) Amino acid                    (D) Citric acid

\*\*\*\*\*

**ANSWER KEY****Try yourself:**

- |       |       |       |       |       |
|-------|-------|-------|-------|-------|
| 1. D  | 2. B  | 3. B  | 4. D  | 5. B  |
| 6. D  | 7. A  | 8. A  | 9. D  | 10. D |
| 11. B | 12. B | 13. A | 14. A | 15. C |
| 16. A | 17. B | 18. B | 19. C | 20. D |
| 21. C | 22. B | 23. A | 24. D | 25. A |
| 26. B | 27. C | 28. D | 29. D | 30. A |
| 31. C | 32. C | 33. A | 34. C |       |

**CONCEPT APPLICATION LEVEL - II****SECTION-A**

- |                       |              |                    |
|-----------------------|--------------|--------------------|
| 1. Cytoplasm, nucleus | 2. Cell      | 3. Plasma membrane |
| 4. Animal             | 5. Cellulose | 6. Nuclear pore    |
| 7. Genes              | 8. Proteins  | 9. Suicidal bags   |
| 10. Tonoplast         |              |                    |

**SECTION-B**

- |       |       |       |       |       |
|-------|-------|-------|-------|-------|
| 1. C  | 2. A  | 3. A  | 4. D  | 5. D  |
| 6. A  | 7. D  | 8. B  | 9. A  | 10. B |
| 11. C | 12. B | 13. D | 14. D | 15. D |
| 16. C | 17. B | 18. A | 19. A | 20. B |

**CONCEPT APPLICATION LEVEL - III****SECTION-A**

- |       |       |       |       |       |
|-------|-------|-------|-------|-------|
| 1. D  | 2. C  | 3. D  | 4. A  | 5. B  |
| 6. A  | 7. C  | 8. C  | 9. B  | 10. D |
| 11. B | 12. D | 13. A | 14. B | 15. D |
| 16. A | 17. C | 18. B | 19. C | 20. B |

**SECTION-B**

1. B                  2. A

**SECTION-C**

1. (A)-(R), (B)-(P), (C)-(Q), (D)-(S)      2. (A)-(Q,R), (B)-(P,S), (C)-(S), (D)-(S)

**SECTION-D**

1. B                  2. C                  3. C



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