# Cell - Fundamental Unit of Life

## Cell and its discovery

**Q.1 Define cell. (1 Mark)**

Cell is the basic structural and functional unit of life. In Latin cell means small compartments.

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**Q.2 Cell is called structural and functional unit of life. justify the statement. (3 Marks)**

Each cell acquires a distinct structure and function due the organisation of the membranes and organelles in a specific way. Therefore each type of cell has a basic structural organisation. This organisation helps different cells to perform certain basic functions like respiration,food intake,excretion of waste material,etc.

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**Q.3 What is the different type of cells on the basis of nuclear material found inside? (2 Marks)**

According to the presence and absence of well defined nucleus, cell is divided into two:

(A) Prokaryotic cell

(B) Eukaryotic cell

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**Q.4 what are eukaryotic cells? (2 Marks)**

The cells which are advanced and possess a well defined nucleus are known as eukaryotic cells. Membrane bound organelles like chloroplast, mitochondria, Golgi bodies, etc are present. These cells are further divided into plant and animal cells.

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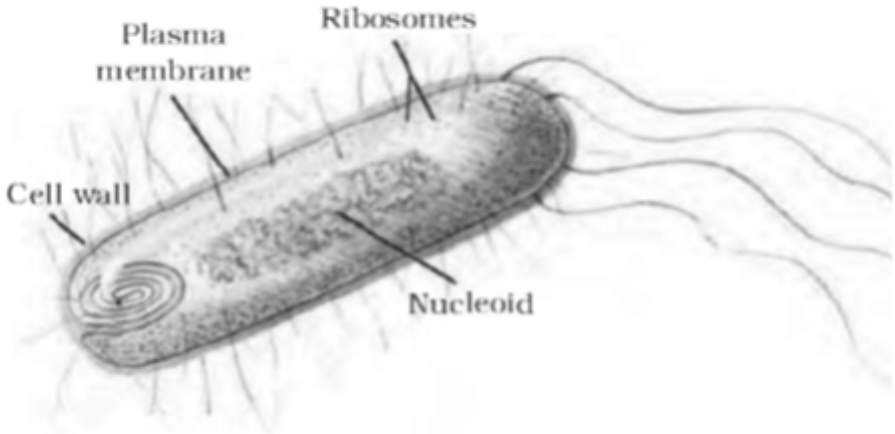
**Q.5 What are prokaryotic cells? (2 Marks)**

The cells which do not possess a well defined nucleus are called prokaryotic cells. These cells are primitive without having membrane bound organelles. Example: bacteria, blue green algae.




A prokaryotic cell

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**Q.6 The cells which do not possess a well defined nucleus. These cells are primitive without having membrane bound organelles. (1 Mark)**

Prokaryotic cells example bacteria.

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**Q.7 Differentiate between unicellular and multicellular organisms. (3 Marks)**

| Characteristics | Unicellular organism | Multicellular organism |
|---|---|---|
| Cell number | Single cell | Large number of cells |
| Function | All functions are performed by single cell | Different cells perform different specific functions. |
| Division of labour | Not performed | Cells specified to perform different functions. |
| Reproduction | Involves the same single cell | Specialised cells,germ cells take part in reproductions |
| Life span | Short | Long |

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**Q.8 Differentiate between prokaryotic and eukaryotic cells (3 Marks)**

| Characteristic | Prokaryotic cell | Eukaryotic cell |
|---|---|---|
| Size | Generally small | Generally large |
| Nucleus | Absent | Present |
| Chromosome | Single | More than one |
| Nucleolus | Absent | Present |
| Membrane bound cell organelles | Absent | Present.<br>Like mitochondria, plastids, endoplasmic reticulum, etc |
| Cell division | By fission or budding | By Mitotic or meiotic |

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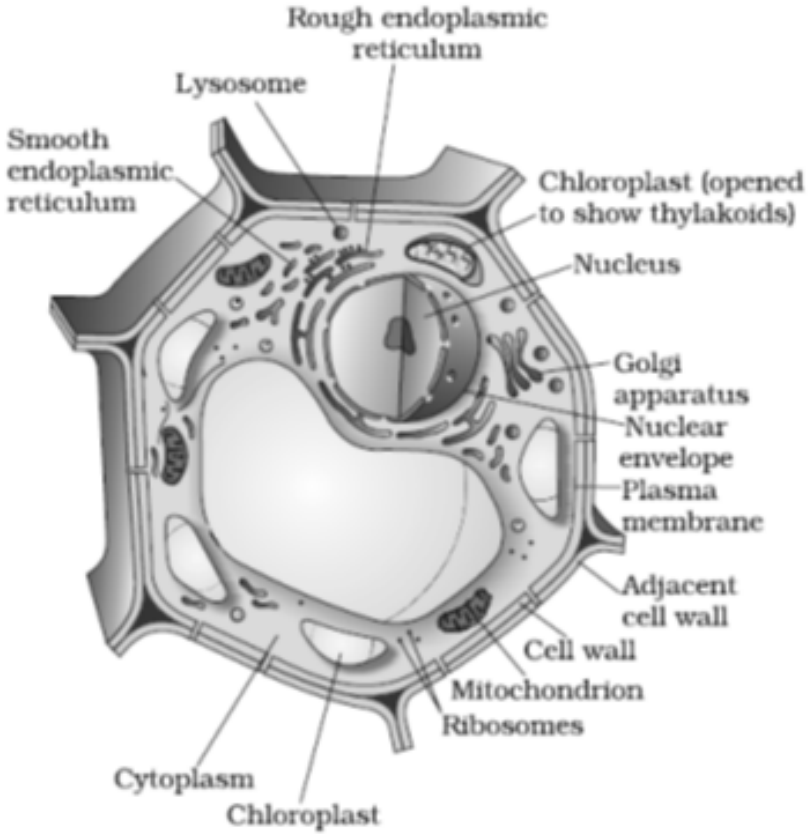
**Q.9 Draw a well labelled diagram of plant cell. (5 Marks)**

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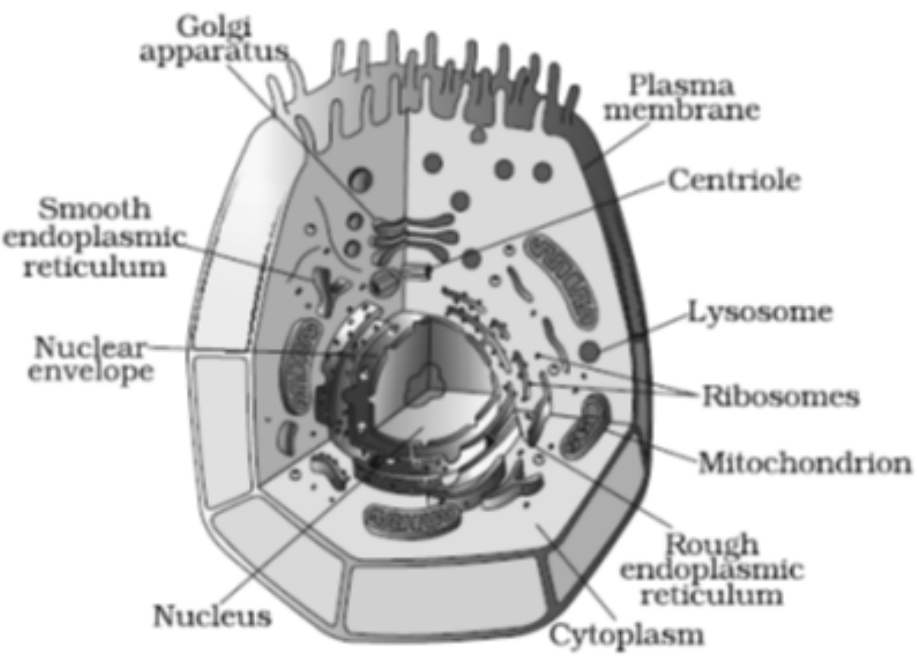
**Q.10 Draw a well labelled diagram of animal cell. (5 Marks)**

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**Q. 11 Write the characteristics of cell. (3 Marks)**

- Cells are the structural and functional unit of life.
- Cells size ranges from 1 to 100 micrometer
- Cells can replicate independently.
- Cells Contain hereditary information due to presence of nucleus or nucleoid.
- Cells perform all the life sustaining activities by themselves.

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**Q.12 Why is virus an exception to cell theory? (2 Marks)**

Virus donot have any membrane and therefore do not show characteristics of life until and unless they enter a living organism and utilizes their cell machinery to increase their number. So cell theory is not true for virus.

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**Q.13 The discovery of cell was done by which scientist? (1 Mark)**

**or**

**Name the scientist who discovered cell for the first time.**

Robert Hooke in 1665 discovered cell in the thin slice of cork under microscope.

Robert Hooke

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**Q.14 Name the scientist who discovered cell in the pond water with advanced microscope. (1 Mark)**

Leeuwenhoek

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**Q.15 Who discovered nucleus in the cell? (1 Mark)**

Robert brown

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**Q.16 Cell theory was proposed by which scientist? (1 Mark)**

Schleiden and Schwann

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**Q.17 Which scientist coined the term protoplasm? (1 Mark)**

Purkinjee

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**Q.18 'Cells arise from the pre-existing cells' this concept was given by which scientist? (1 Mark)**

Virchow

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**Q.19 To which of the substance does Robert Hooke sees the resemblance of slice of the cork from a tree. (1 Mark)**

Honeycomb

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**Q.20 Name the book written by Robert Hooke on his discovery of cell. (1 Mark)**

Micrographia

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**Q.21 Name the largest cell found. (1 Mark)**

Ostrich egg

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**Q.22 Name the cell present in the body which is of greatest length. (1 Mark)**

Nerve cell

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**Q.23 Name the smallest and largest cell in human body. (1 Mark)**

Smallest- sperm

Largest - ovum

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**Q.24 Give an example of**

**(a) Prokaryotic organisms**

**(b) Eukaryotic organisms**

**(c) Unicellular organism**

**(d) multicellular organism (2 Marks)**

(a) Bacteria and blue green algae.

(b) Humans and plants

(c) Amoeba and yeast

(d) Mango tree and tiger

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**Q.25 Write a short note on cell theory. (3 Marks)**

The postulates of cell theory:

(a) All the organisms are made up of cell or group of cells.

(b) Cell is the structural and functional unit of life.

(c) All the cells arise from the pre-existing cells.

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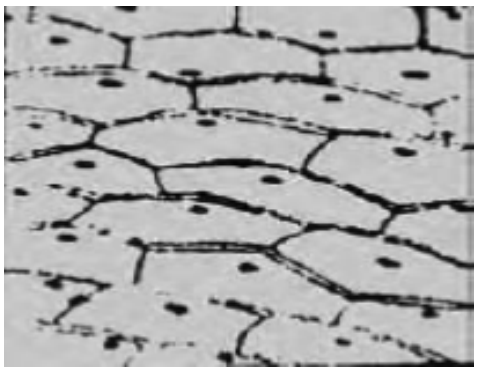
**Q.26 With the help of a diagram show the cells in the onion peel. (1 Mark)**



Cells of onion peel

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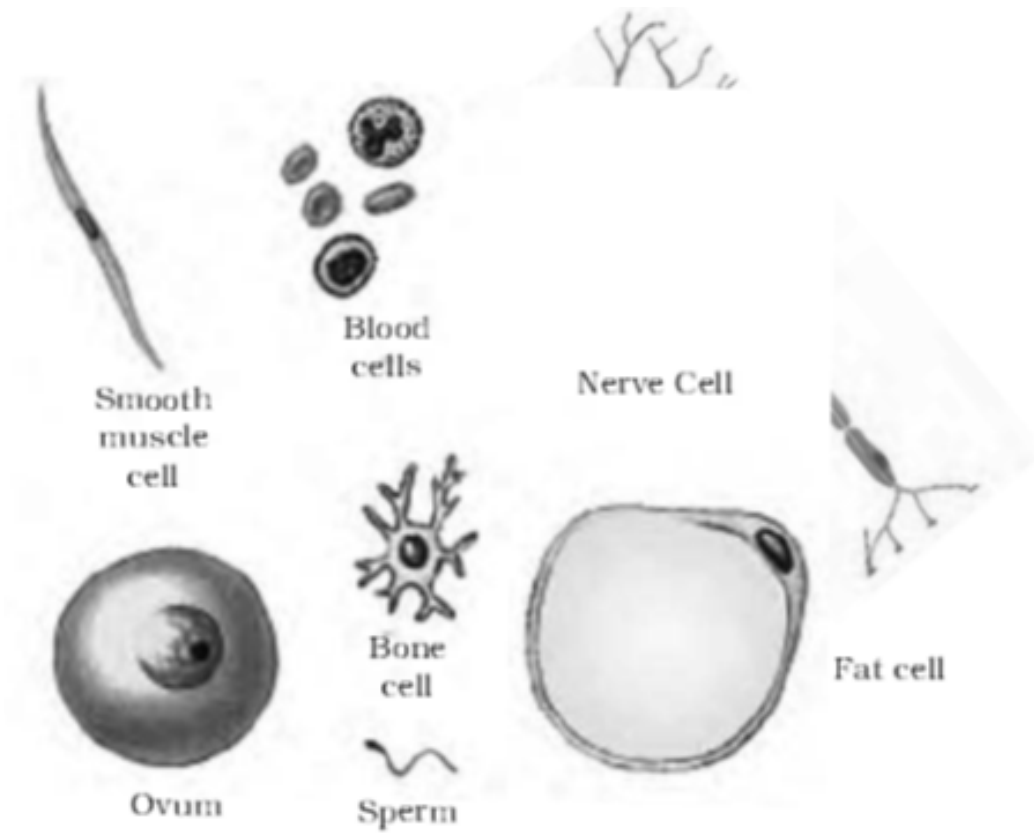
**Q.27 Different types of cells present in human body. Name a few. (2 Marks)**



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**Q.28 What is the basic cell structures present in a eukaryotic cell? (3 Marks)**

- Cell wall
- Cell membrane/ plasma membrane
- Vacuole
- Lysosomes
- Nucleus
- Plastids
- Mitochondria
- Golgi bodies
- Endoplasmic reticulum
- Ribosomes
- Centriole
- Cytoplasm

**Plasma membrane and Cell wall**

**Q.29 (a) What is cell wall and plasma membrane? (3 Marks)**

(b) Is plasma membrane living or dead?

(a) Cell wall is the outermost rigid covering of plant cell providing protection to plasma membrane and cytoplasm. It is dead part of plant and absent in animal cell.

(b) Unlike cell wall plasma membrane is a living part of the cell.

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**Q.30 Give a brief account of structure of plasma membrane (5 Marks)**

Plasma membrane is a living, flexible, selectively permeable membrane. The structure is made up of phospholipids, proteins, cholesterol, and polysaccharides.

*Fluid mosaic model for plasma membrane*

Model suggested by Singer and Nicolson.

Highlights of model:

(a) Plasma membrane is a bilayer of phospholipids. The phospholipid bilayer is arranged with their hydrophilic heads protruding to the outside and the hydrophobic tails inside.

(b) Two types of proteins are present in the structure:

Intrinsic proteins-these proteins float in the fluid phospholipid forming a channel between inside and outside environment of the cells.

Extrinsic proteins- these proteins float either of the surfaces.

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**Q.31 What do you mean by selectively permeable membrane? Which of the two cell wall or plasma membrane have this feature? (2 Marks)**

A selectively permeable membrane is a membrane which allows the entry and exit of some selected materials. Since plasma membrane permits the in and out through the cell of some substances and not all it is selective permeable membrane. On the other hand, cell wall is permeable.

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**Q.32 What is the name given to the model proposed of plasma membrane by singer and Nicolson? (1 Mark)**

Fluid mosaic model

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**Q.33 If the plasma membrane of an cell is ruptured what will happen to the cell? (1 Mark)**

Plasma membrane makes a boundary around the cell content. If it is ruptured the entire cell content (cytoplasm, cell organelles)will be lost and cell will die.

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**Q 34 State the function of plasma membrane. (2 Marks)**

- Holds the cell content
- Control the movement of selected substances in and out of the cell.
- Maintains shape of the cell
- Provides protection to cell from microbes and foreign substance.

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**Q.35 What is the constituents of cell wall in eukaryotes? (1 Mark)**

Cellulose, Xylan and lignin are the constituents of cell wall.

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**Q.36 Differentiate between cell wall and plasma membrane. (5 Mark)**

| Characteristic | Cell wall | Plasma membrane |
|---|---|---|
| Occurrence | In Plant cells | In both plants and animals |
| Position | Outside the cells | In animal, outermost covering<br><br>In plants, second outermost covering after cell wall |
| Living/non living | Non living | Living |
| Flexibility | Not flexible | Flexible |
| Permeability | Permeable | Selectively permeable |
| Composition | Cellulose, hemicellulose, and pectin | Lipids proteins and small amount of carbohydrates. |
| Function | Provides protection and strength to cell | Hold cellular contents and controls transportation of materials through it. |

**Transportation across plasma membrane**

**Q.37 What happens to RBC when it is placed in hypotonic solution. (1 Mark)**

It will burst due to endosmosis.

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Q.38 Give reasons. (3 Marks)

(a) Skin of our finger shrinks when we wash clothes for a long time.

(b) Person taking concentrated solution of salt vomits after some time.

(c) After adding salt to the vegetables during cooking vegetable releases water.

(a) The detergent which is used in washing our clothes is hypertonic solution in comparison to the skin cells. When our skin cells come in contact with the detergent due to differences in osmotic concentration, our skin cells shrink because of exosmosis.

(b) When a concentrated salt solution (hypertonic solution)is taken in, due to exosmosis excessisive dehydration of the cells of alimentary canal happens. These causes stretching which causes reverse movements and hence vomit out.

(c) When salt is added to the vegetable it releases water through exosmosis as the inside cell is hypotonic then the outer solution.

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**Q.39 Name the different type of transport system across the cell membrane. (2 Marks)**

Type of transport system

(a) Passive transport

(b) Active transport

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**Q.40 What is active transport? (3 Marks)**

In active transport molecules move from low concentration to high concentrations with an assistance of energy as materials are pumped against the concentration gradient.

In animals, active transport of potassium is done within a body for protein synthesis.

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**Q.41 Define:**

**(a) Diffusion**

**(b) Osmosis (3 Marks)**

(a) Diffusion is the self generated movement of molecules from high concentration to low concentration until uniformity is achieved.

Example:

Diffusion of carbon dioxide across plasma membrane.

(b) Osmosis

The movement of water across a semi permeable membrane from its high concentration to low concentration is known as osmosis.

Example:

Swelling of plant cell when placed in a hypotonic solution due to movement of water from solution to cell.

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**Q.42 What is the two different types of osmosis? (1 Mark)**

(a) Exosmosis

(b) endosmosis

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**Q.43 Define endosmosis and exosmosis? (3 Marks)**

Endosmosis-the movement of water into a cell(low concentration)from the hypotonic solution(high concentration)in which cell is placed through a selectively permeable membrane.

Exosmosis-the movement of water from the cell (high concentration)to the hypertonic solution(low concentration)in which it is placed through selectively permeable membrane.

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**Q.44 What is endocytosis ? (2 Marks)**

Endocytosis is a process of ingestion of substances by the cells through plasma membrane. It acts as a nutritive and defensive process. It is a type of active transport in which energy is required.

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**Q.45 What is the different type of endocytosis? (3 Marks)**

These are of three types

(a) Phagocytosis(cell eating)- in this process plasma membrane binds to a large particle and engulfs it through extending their pseudopodias.

(b) Potocytosis(cell drinking)-in this process small areas of plasma membrane invigilate small molecules and ions.

(c) Receptor-mediated endocytosis-in this process large macromolecules are selectively taken up by receptors present on the plasma membrane.

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**Q.46 What is exocytosis ? (2 Mark)**

Exocytosis or cell vomiting is a process of in which the waste materials from the cell are extruded through plasma membrane by diffusing the vesicles containing materials needs to be taken out of the body. This process occurs in cells to remove undigested substances, secrete hormones, enzymes, and transport various substances.

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**Q.47 How is active transport different from facilitated transport? (3 Marks)**

| Active transport | Facilitated transport |
|---|---|
| Rapid process | Slow process |
| Movement of substances is through biological membrane against concentration gradient. | Movement of substances is through biological membrane down the concentration gradient. |
| Unidirectional | Bidirectional |
| Uses ATP for energy requirements | Don't use energy |
| Selective transport of materials | All molecules could pass |

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**Q.48 Write any 4 differences between diffusion and osmosis. (2 Marks)**

| Characters | Diffusion | osmosis |
|---|---|---|
| Medium | Any medium | Liquid medium |
| Diffusing molecules | Solid,liquid or gases | Solvent only |
| Semi permeable membrane | Not necessary | Necessary |
| Equilibrium | Achieved | Not achieved |

**Q.49 What is plasmolysis? (1 Mark)**

When there is a loss of water from the cell through osmosis which causes shrinkage of protoplasm. this process is known as plasmolysis.

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**Q.50 What happens to the resins when they are placed ?**

**(a) In water ?**

**(b) In salt water ? (3 Marks)**

(a) Water being a hypotonic solution,when resins are placed in it the raisins swell due to the inward movement of water. This process through which water moves inside the resin from high concentration of water to low is known as endosmosis.

(b) Water will flow out of the cell as salt water would have less concentration of water in comparison to the cell. Therefore due to exosmosis resin shrinks.

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**Q.51 What is hypotonic , isotonic and hypertonic solutions? (3 Marks)**

Hypotonic solution: a solution outside the cell having higher concentration of water than the cell cytoplasm is known as hypotonic solution.

Isotonic solution: a solution outside the cell having exactly the same water concentration as that of cell cytoplasm is known as isotonic solutions

Hypertonic solution: a solution outside the cell having lower concentration of water than the cell cytoplasm is known as hypertonic solution.

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**Q.52 What happens to the cell when it is placed in hypotonic, hypertonic and isotonic solutions. (5 Marks)**

(a) When a cell is placed in *hypotonic solution* as the solution outside the cell contain more of water concentration so water will move from solution towards the cell. (From high concentration of water to low)

Result: Cell will swell up and ultimately burst due to excessive amount of water in it.

(b) When a cell is placed in *hypertonic solution* as the solution outside the cell contain less of water concentration so water will move from cell towards the solution.

Result: Cell will shrink due to loss of water from the cell.

(c) When a cell is placed in *isotonic solution* as the solution outside the cell contain water of exactly the same concentration so water will move from cell towards the

solution and vice verse in equal amount.

Result: Cell will maintain its size.

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**Q.53 How does amoeba have its food? (3 Marks)**

Amoeba being a unicellular organism has to perform all the functions by itself. For obtaining food amoeba makes its intrusions directed towards the prey in the form of pseudopodias. These pseudopodias make a layer around the prey forming vacuole and engulfs the particle in the cell. this particle is then attacked by the lysosome containing certain digestive juices which digests the ingested particle. Similarly the waste material is taken out of the cell. This whole process is known as phagocytosis.

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**Q.54 How do the different substances like $CO_2$ and water move in and out of the cells? (2 Marks)**

Substances like $CO_2$ and water are transported through diffusion across plasma membrane. The substances being very small in size can readily get transported from an area of high concentration to low.

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**Q.55 Give the Cell wall function in plant cell. (2 Marks)**

Cell wall is present only in plants and is outer covering to plasma membrane. It is non-living and freely permeable membrane. It is made up of cellulose,microfibrils,etc. it provides turgidity ,shape and prevention from desiccation to the cell. It provides mechanical strength to support cell.

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**Q.56 An egg after removing its shell by putting it in dilute hydrochloric acid solution is placed in two different solutions. What will happen when egg is placed in ?**

**(a) In pure water**

**(b) In concentrated salt solution (3 Marks)**

The shell of egg is made up of  calcium bicarbonate which is dissolved in HCl solution and now only a thin skin encloses the egg.

(a) When this treated egg is placed in pure water egg swells because water enters the egg by osmosis.(concentration of water in cell < in solution) . This process is known as endosmosis.

(b) When placed in a concentrated salt solution the egg shrinks as water passes out of the egg into the solution by osmosis. (Concentration of water in cell> in solution). This process is known as exosmosis.

**Q.57 Give an example of osmosis. (1 Mark)**

Absorption of water by plant roots

**Cell organelles**

**Q.58 Name two cell organelles having their own genetic material. (1 Mark)**

Mitochondria and plastids

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**Q.59 name the cell organelle which is known as post office of the cell. (1 Mark)**

Golgi bodies

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**Q.60 Name the process by which transport of CO2 and water occurs in and out of the cell. (2 Marks)**

$CO_2$ by diffusion

$H_2O$ by osmosis

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**Q.61 What is the main content which a nucleolus contains? (1 Mark)**

Ribonucleic acid

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**Q.62 Name the site for photosynthesis. (1 Mark)**

Chloroplast

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**Q.63 What is membrane biogenesis? (2 Marks)**

The smooth endoplasmic reticulum synthesizes certain proteins and lipids which help in building of cell membrane of the cell. This process of building up of cell membrane is known as membrane biogenesis.

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**Q.64 Name the organelles which are present only in plant cells. (1 Mark)**

Cell wall, Plastids, polar caps , dictyosomes, polar caps

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**Q.65 Name the organelles which are only present in animal cells (1 Mark)**

Centrosome, lysosome, golgi apparatus

**Q.66 Name the cell organelle which is known as Internal transport system. (1 Mark)**

Endoplasmic reticulum

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**Q.67 Name the organelle which is called**

**(a) kitchen of the cell**

**(b) power house of the cell (2 Marks)**

(a) Chloroplast

(b) Mitochondria

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**Q.68 Match the following: (2 Marks)**

| Structrue | Organelles |
|---|---|
| Strom | Mitochondria |
| Chromosome | Chloroplast |
| Cistae | centrosome |
| Centriole | nucleus |
| Strom | chloroplast |
| Chromosome | nucleus |
| Cistae | mitochondria |
| Centriole | centrosome |

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**Q.69 What is ATP? (1 Mark)**

Adenosine triphosphate is the energy currency of plant.

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**Q.70 Write the full form for DNA and RNA. (2 Marks)**

DNA Deoxyribonucleic acid

RNA ribonucleic acid

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**Q.71 If nucleus is removed from the cell what happens to the cell? (2 Marks)**

All the metabolic activities of cell are performed by nucleus. If nucleus is removed from the cell which makes protoplasm of the cell to dry up and cell eventually dies.

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**Q.72 What provides different colours to spinach, papaya, etc? (2 Marks)**

The different colour to papaya and other colourful fruits is due to the presence of chromoplast in the cells and green colour of spinach is due to chloroplast in the cells of the plant.

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**Q.73 Give reason, why lysosomes are called (3 Marks)**

**(a) digestive bags**

**(b) Demolition squad**

**(c) suicidal bags**

(a) Lysosomes are spherical tiny structures containing powerful digestive enzymes enclosed in a layer. These serve as digestive bags which destroy the foreign material entering the cell and protect the cell from bacterial infections.

(b) Lysosomes work in removing the worn out material, the dysfunction organelles by digesting them for making place for the new to work. Therefore removes cell debris and is called demolition squad, scavengers.

(c) Lysosomes at the time of cellular breakdown or when cell gets damaged may burst and its enzyme then eats up their own cell content therefore giving it a name of suicidal bags.

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**Q.74 what are genes? (1 Mark)**

Genes are the segment of DNA which acts as hereditary units which carries information from one generation to other.

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**Q.75 What is protoplasm and nucleoplasm? (2 Marks)**

Protoplasm: the cell content in a living cell within the plasma membrane.

*Protoplasm= Nucleus+ Cytoplasm*

Nucleoplasm: it is the liquid content present in the nucleus and bounded by nuclear membrane.

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**Q.76 What is dictyosome? (1 Mark)**

In plant cells, there are many freely distributed subunits of golgi apparatus known as dictyosomes.

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**Q.77 Write any two differences between rough and smooth endoplasmic reticulum. (2 Marks).**

| Characteristics | Rough endoplasmic reticulum | Smooth endoplasmic reticulum |
|---|---|---|
| Ribosomes | Present at the surface | Absent |
| Function | Synthesisis proteins | Synthesises lipids and proteins |

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**Q.78 What is nucleoid? (1 Mark)**

The undefined nuclear region in the cytoplasm of prokaryotic cell is called nucleoid.

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**Q.79 What are plastids? (2 Marks)**

Plastids are present in most of the plant cells. These organelles have their own DNA or genetic material and can divide into new cells. There are three types of plastids:

- Chromoplast: plastids with different colours except green colour.

- Chloroplast: green coloured plastids

- Leucoplast: colourless plastids

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**Q.80 What is the structure of chloroplast? (3 Marks)**

Chloroplast is a double membrane bounded structure with following constituents:

Grana,functional unit of chloroplast,are stack of membrane bounded flattened discoid sacs called thylakoids which contains chlorophyll.

Stroma,homogeneous matrix containing photosynthetic enzymes,DNA,ribosomes,and starch grains. Grana is embedded in this stroma.

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**Q.81 Discuss the functions of plastids. (3 Marks)**

Chromoplast: impart colours to flowers to attract insects for pollination.

Chloroplast: contains chlorophyll which is necessary for photosynthesis to manufacture food for plants.

Leucoplast: store food in the form of carbohydrates,fats,and protein.

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**Q.82 What is the structure and function of vacuole? (5 Marks)**

Vacuole are membrane bound spaces forms sac which stores water,glycogen and protein.

In plants, vacuole are large occupying almost all of the volume of the cell. It acquires central position in the cell pushing other cell organelles towards the boundry.

In animals, vacuoles are small and temporary.

The vacuole is filled with a watery solution rich in sugars ,amino acids,protein, and metabolic waste.

Function:

- helps in maintaining osmotic pressure in a cell.

- Store toxic metabolic by products and products in plants.

- Provides turgidity to plant cell

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**Q.83 Write a short note on centrosome. (2 Marks)**

It is a non bounded structure with two granules like centrioles which are made up of microtubules. Found only in the animal cells. It helps in cell division in animals by forming spindles during cell division. In plants polar cap is involved in spindle formation.

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**Q.84 Write a short note on nucleus structure. (5 Marks)**

Nucleus is a large ,spherical ,centrally placed cell component which is bounded by two nuclear membrane forming nuclear envelope.

Nuclear envelope- This nuclear envelope is connected to a system of membranes called endoplasmic reticulum. Nuclear envelope separates nucleus from cytoplasm.

Nuclear pore- nuclear envelope contains many pores called nuclear pore which encloses nucleoplasm(a liquid ground substance) inside. It allows transport of substances between nucleoplasm and cytoplasm.

Nucleoplasm- it consist of two types of nuclear structures embedded.

(a) Nucleolus,

(b) Chromatin

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**Q.85 Write the characteristics of nucleolus. (3 Marks)**

- may be more than one,

- not bounded by any membrane.

- rich in protein and RNA molecules, act as the site for ribosome formation.

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**Q.86 Which cellular content is named as factory of ribosome and why? (1 Mark)**

Nucleolus, as it is the site where ribosomes are formed.

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**Q.87 what is chromatin? (2 Marks)**

Chromatin is an uncoiled thread like material of chromosome. It contains a DNA molecules and histone proteins.

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**Q.88 What is DNA? (1 Mark)**

DNA,deoxyribonucleic acid stores information which is necessary for cellular functions, to grow and reproduce new cells of next generation.

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Q.89 What is nucleosome? (1 Mark)

DNA molecule coiled around a disc of histones is known as nucleosome.

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**Q.90 State the functions of nucleus. (3 Marks)**

- Controls all the metabolic activities performed by the cell.

- Regulates cell cycle

- Transmits genetic material from parent to offspring's.

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**Q.91 Name a structure responsible for transmission of hereditary information which becomes visible only at the time of cell division. (1 Mark)**

Chromosomes

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**Q.92 What are chromosomes? (2 Marks)**

These are thread like structures visible at times of cell division. It contains hereditary information of cell in forms of distinct segments called genes. The component of chromosome is DNA and proteins.

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**Q.93 Name a human cell which do not have nucleus. (1 Mark)**

RBC

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**Q.94 In humans, what is the number of chromosome present in each body cell? (1 Mark)**

There are 46 chromosomes present in each body cell. From which 44 are autosomes and 2 are sex chromosomes.

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**Q.95 Name the organelles which are doubly membrane bound structure. (1 Mark)**

Nucleus ,mitochondria,plastids

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**Q.96 Name the cell organelles without any membrane present. (1 Mark)**

Ribosomes,centrioles,nucleolus

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**Q.97 Write the chemical composition of cytoplasm. (2 Marks)**

| Chemicals | Percentage |
|---|---|
| Oxygen | 64 |
| Carbon | 18 |
| Hydrogen | 10 |
| Nitrogen | 0.3 |
| Trace elements | 0.5 |

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**Q.98 State the function of cytoplasm. (1 Mark)**

- Acts as a store house for chemicals like amino acids,vitamins,etc.

- Site for some metabolic reactions

**Q.99 Write a short note on organelle of cells which is responsible for production of energy in the form of ATP.**

**or**

**Mitochondria are called the power house of the cell. justify (3 Marks)**

Stricture: it is a double membrane bound structure. The outer membrane is porous whereas inner membrane has many a folds increasing surface area and is known as cristae. These are dotted by small round bodies known as F1 particles. The cavity is filled by proteinaceous gelly like matrix with ribosomes, DNA and phosphate granules.

Function: mitochondria are the site for cellular respiration. These oxidises carbohydrates and fats present in the cell to form carbondioxide, water and energy. This energy is used to make ATP(adenosine triphosphate). The energy stored in ATP is used up by the cell.

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**Q.100 ATP is the energy currency of the cell. Justify the statement. (3 Marks)**

The energy stored in ATP is used up in:

(a) Synthesis of chemical compounds like proteins, carbohydrates, lipids,etc.

(b) Mechanical work by cell like, locomotion, peristaltic motion, conduction of nerve impulse.

(c) Production of heat, electricity and light.

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**Q.101 Synthesis of proteins is associated with which cell organelle? (1 Mark)**

Ribosome

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**Q.102 Write the characteristics of ribosomes. (2 Marks)**

- Dense,spherical, granular particles without bounded by a membrane.

- Occur both freely (cytoplasm) and attached to endoplasmic reticulum.

- Consist of ribonucleic acid and protein.

- Present in both eukaryote (except mammalian RBC) and prokaryotes.

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**Q.103 What function is provided to the cell by Golgi apparatus? (3 Marks)**

- Packages synthesised material in cell and dispatches to the targeted sites.

- Produces vacuoles, vesicles containing cellular secretions like enzymes, proteins.

- Involved in the synthesis of cell wall, plasma membrane and lysosomes.

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**Q.104 Give a brief account of structure of Golgi body. (2 Marks)**

Golgi apparatus is a set of membrane bounded, fluid filled vesicles, vacuoles, flattened cisternae. Cisternae are usually stacked together in parallel rows. It is present near the nucleus. In plants they are called dictyosomes.

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**Q.105 Endoplasmic reticulum has a big number of functions to perform within a cell. Justify. (3 Marks)**

- Helps in detoxification by metabolizing various toxics like aspirin, insecticides, etc.

- Helps in biosynthesis of glycolipids, phospholipid and cholesterol.

- Digestive enzymes of lysosome are produced by rough ER.

- The lipids and proteins from which cell membrane is made are synthesized by endoplasmic reticulum.

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**Q.106 Write the structure and function of endoplasmic reticulum. (5 Marks)**

A membranous network of enclosing a fluid filled lumen filling the cavity. This is called endoplasmic reticulum. ER is connected to nucleus at one end and to plasma membrane to the other side.

There are two types of ER:

(a) Rough endoplasmic reticulum- ER with ribosomes attached on its surface are rough endoplasmic reticulum.

(b) Smooth endoplasmic reticulum- SER without ribosomes

Function:

- It supports skeletal frame work of cell.

- Provides a pathway for distribution of nuclear material from one cell to another.

- Enzymes present synthesizes fats,steroids and cholesterol.

- Transport of proteins synthesised by ribosomes on surface of Rough ER.

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**Q.107 Name the organelles which are named :**

**(a) Control room of the cell**

**(b) Packaging and dispatching unit of the cell.**

**(c) Storage sac of the cell (3 Marks)**

(a) Nucleus

(b) Golgi apparatus

(c) Vacuole

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**Q.108 Plants have large vacuoles. why? (2 Marks)**

Vacuole of plant cell is large sized as it had to perform a lot of functions like:

(a) Plant stores salt, sugar, amino acids, etc.

(b) Metabolic wastes of cell is also dumped in the vacuole

(c) lysosomal enzyme is produced in vacuoles.

(d) Maintain turgidity of the cell by containing cell sap.

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**Q.109 Where does the ATP is synthesised in mitochondria? (1 Mark)**

ATP synthesis occurs in the inner membrane of mitochondria known as cristae.

**Value based Questions:**

**Q.1 Shreyansh was taken to the biology lab where his teacher told the features and differences of plant and animal cells. They were told that plant cells were almost had dead cells whereas animal cells have most of the component living in the cell. Shreyansh want to know if these characters show any advantage.**

**Answer the following:**

**(a) Does this character show any advantage to the plants and animals? If yes, what are they?**

**(b) What character of shreyansh is reflected here? (3 Marks)**

(a) Yes, plants do not have to locomote in search of food as they are autotrophs and so do not need much energy. But the dead cells present in plants provide rigidity to the structure. On the other hand animals need energy for locomotion and other cellular functions.

(b) Shreyansh wants to acquire more knowledge and is very curious to know new things.

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**Q.2 There was a quiz organized by a school. Aditya and Anil participated in it. A question was asked that which organelle is responsible for the content which transfers genetic material from one generation to other. Aditya answered the question correctly while Anil didn't.**

**Answer the following question based on the above passage.**

**(a) What would be the answer given by Aditya?**

**(b) What values were shown by both Aditya and Anil? (3 Marks)**

(a) Nucleus

(b) Anil have knowledge about the topic fundamental unit of life and was well prepared for the quiz on the hand Anil was not ready so could not answer the question.