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Chapter - 5
The Fundamental Unit Of Life

* Cell - It is the structural, functional, smallest, basic or fundamental unit of life

* Cell word is derived from Latin language which means small room or compartment

Q1) Why cell is called structural and fashctional unit of life?

Ans All living organism are made up of cells which perform various functions essential for the survial of the organism. Ex- Respiration, Digestion, Excretion etc. Thus, cell is the functional unit of life.

In unicellular organism a single cell carries out all the function, while in multicellular organisms group of cells carry out different function. Thus, cell is the structural unit of all organism / life.

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- Smallest cell - Mycoplasm
- Longest cell - Nerve cell
- Largest cell - Ostrich egg

* Basic characteristics of cell

i) They have the ability to replicate independently.

ii) They contain heridetary information.

iii) They can perform all life sustaining activities.

iv) They show similar chemical composition

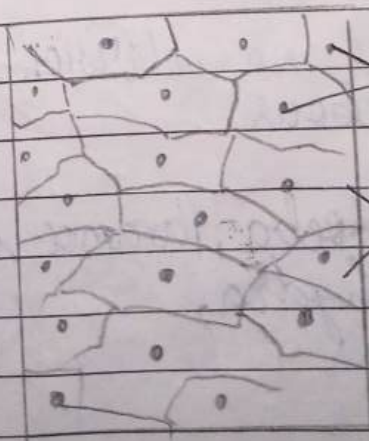
* Discovery of cell

Sr no.	Name of organelle	Scientist Name	Year
1.	Dead cell	Robert Hooke	1665
2.	Live cell	Leeuwenhoek	1674
3.	Nucleus	Robert Brown	1831
4.	Cell Theory	a) Schleiden (plant)	1838
		b) Schwann (animals)	1839
		c) Virchow (pre existing cell)	1855

5.	Protoplasm	Purkinje	1839
6.	Mytochondria	Kolliker	1842
7.	Golgi Apparatus	Camillio Gogi	1898
8.	Antoplasmic recticulum	Porter and Thompson	1945
9.	Ribsome	George Emil Palade	1955
10.	Lysosome	Christian De Deve	1974
11.	Vacuoles	Leeuwenhoek	1676
12.	Plastids	E. Haeckel	1838

Q2 Who discovered cell and how?

Ans Cell was discoverd by Robert hooke in the year 1665. He observed the cell in the cork slice with the help of self designed micro-scope. The cork slice ressembled the structure of honeycomb consisting of small room/compartment like structure. Hooke called this rooms as cell.



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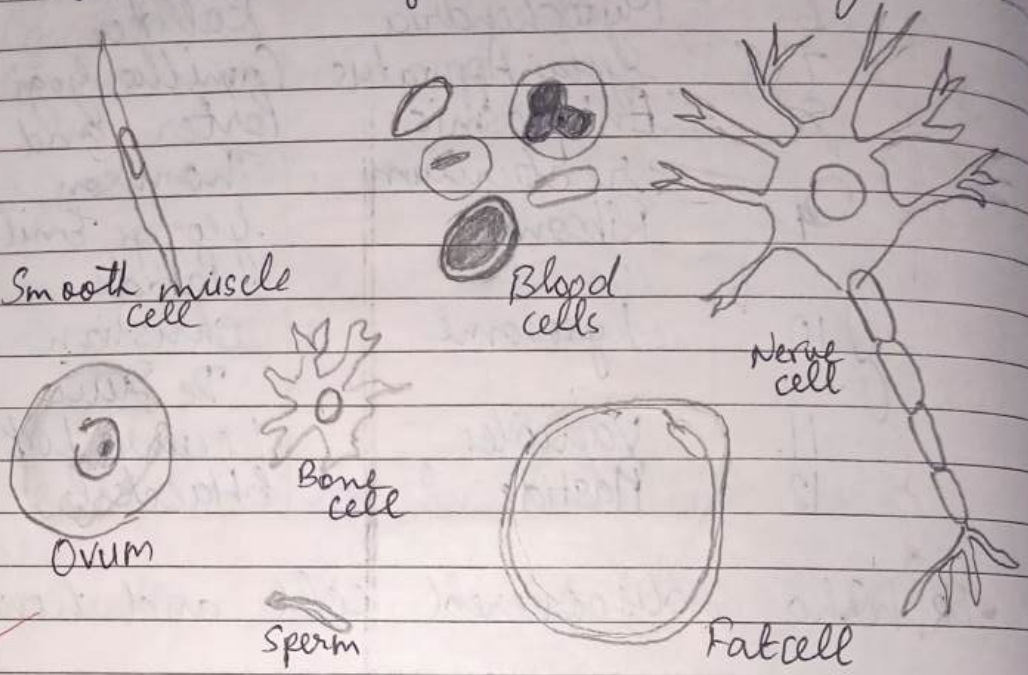
★ Various cells of human body



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Difference between

Unicellular	Multicellular
i) A single cell constituted the whole organism	ii) Many cells are grouped together in a single body.
ii) There is no division of labour	ii) There is a division of labour
iii) Eg- Amoeba, Paramoecium, hydra, euglena	iii) Eg:- Humans, plants and animal

Prokaryotic	Eukaryotic
1) They are small (1-10 um)	1) The are large (5-100 um)
2) Single chromosome	2) Many chromosome
3) Poorly developed or no nuclear membrane	3) Well defined nuclear membrane
4) Nucleolus absent	4) Nucleolus Present
5) Centriole absent	5) Centriole present

Plant Cell	Animal Cell
1) They are bigger in size	They are smaller
2) They have regular shape	2) They have irregular shape
3) Cellwall is present	3) Cell wall is absent
4) A large vacuole is present	4) Many small vacuoles are present

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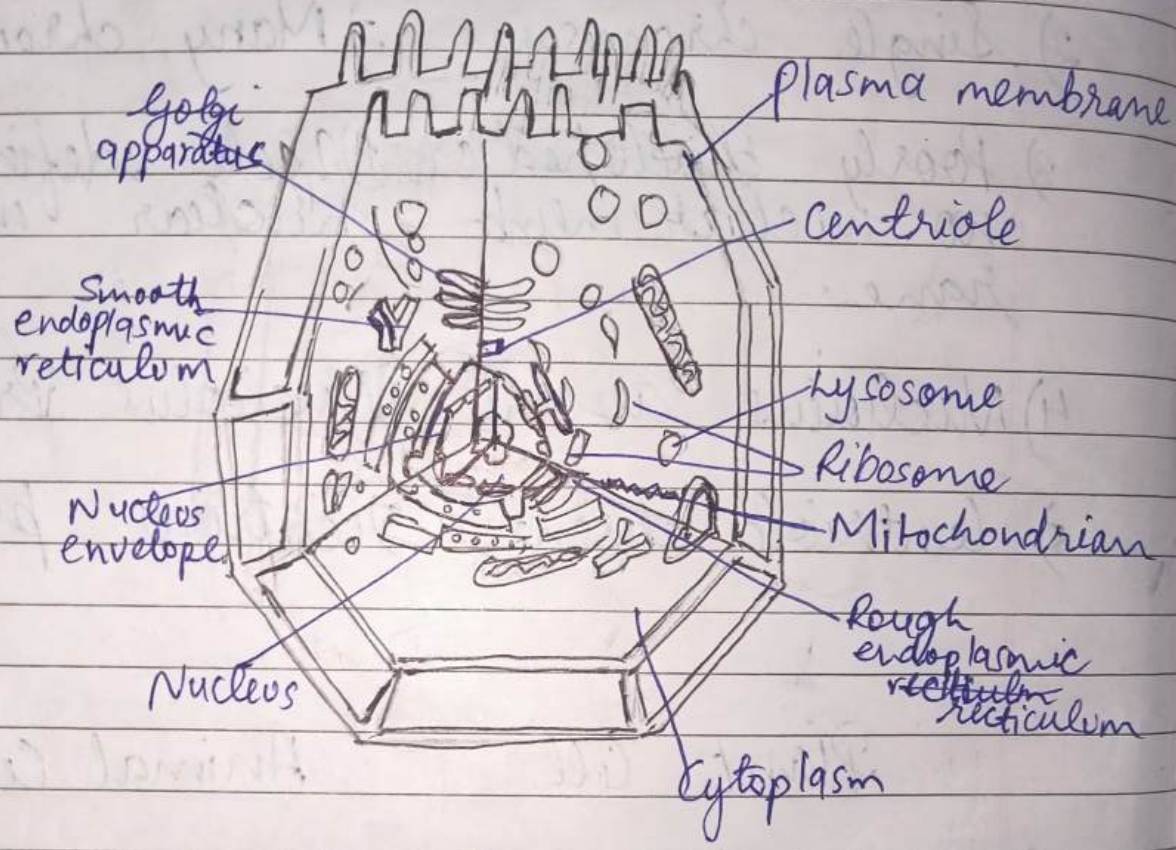

Fig Animal Cell

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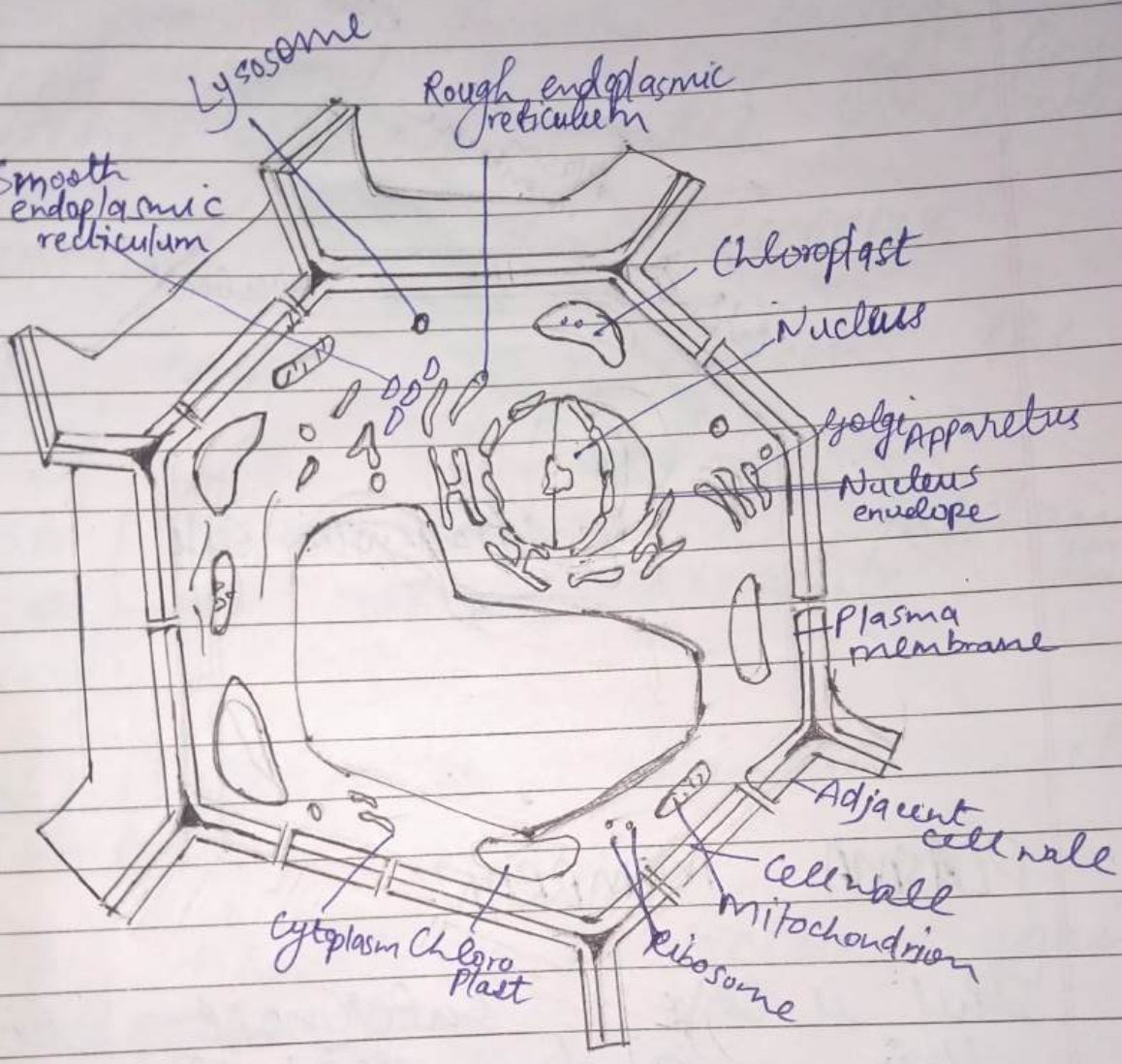

Fig Plant Cell

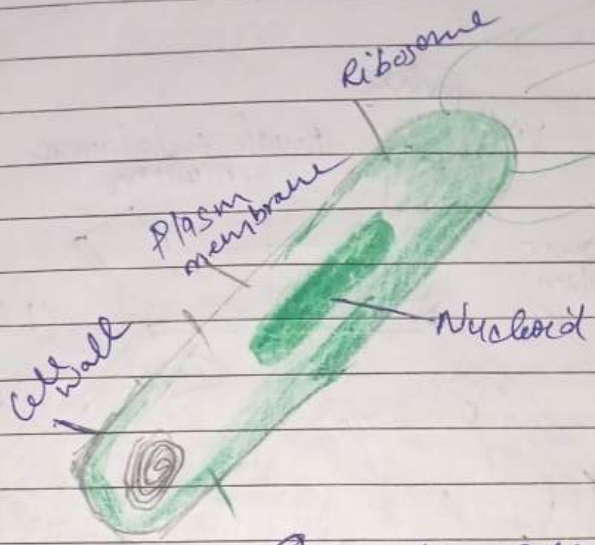

Fig Prokaryotic Cell

PLASMA MEMBRANE

This is the outermost living thin and delicate, covery cell. It seperate the contents of cell from external surrounding. It is made up of phospholids.

Endocytosis

It enables the cell to engulf the food and other material from its external environment ~~to~~ ~~proce~~. This

process is called endocytosis
Ex- Amoeba taking the food with the help of finger like projection called Pseudopodia

FUNCTION OF PLASMA MEMBRANE

1) It helps to maintain the shape of cell
2) It acts as a mechanical barrier which prevents the leaking out.
3) It helps to maintain cellular homeostasis
4) It provide protection against pathogens
5) It allows entry and exist of certain molecules with the help of plasma membrane which acts as a semi-permeable and selective permeable membrane

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Holiday Homework

1) Who discovered cells and how?

Ans Robert Hooke found the cell in year in 1665. He observed the cell in the cork of tree with the help of his self made microscope. The cells were arranged in a honey-comb structure the were like little rooms so Robert named them cell which means small room/ compartment in Latin.

2) Why the cell is called the structural and functional unit of life?

Ans All the organism are made up of cells which perform various functions like Digestion, Respiration etc. thus are called functional unit of life.
In multicellular organism multiple cells perform

different functions while in unicellular organism single cell perform all the function and thus the cell is called structured unit of life

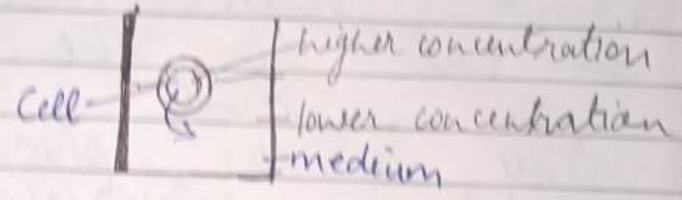
3) How do substances like CO_2 and water move in and out of the cell? Discuss and

4) Why is the plasma membrane called a selectively permeable membrane?

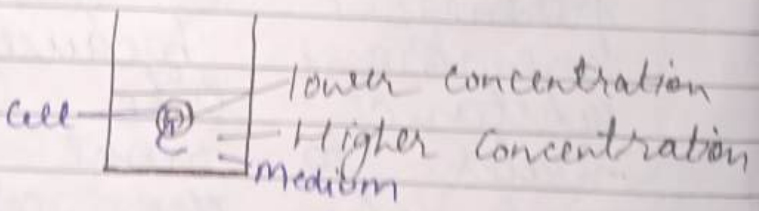
Ans Cell membrane or Plasma membrane is called a selectively permeable or semi-permeable membrane because it allows substance like CO_2, O_2 and water to move in and out of the cell By moving this substances from high concentration to low concentration

★ Three types of solution

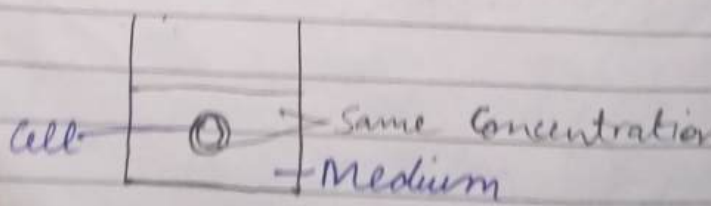
i) Hypertonic solution - If the medium has lower concentration of water than the cell. cell shrink in such solution



ii) Hyptonic solution - If the medium has higher concentration of water than the cell. Cell ~~shrink~~ in such solution



iii) Isotonic Solution - When the medium has exactly same concentration as the cell. Cell ~~wholesize~~ remain same.



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CELL ORGANELLES

1) Lysosome (Sucidal bags)
They are called sucidal bags as they burst and ~~digest~~ enzymes are present/released which digest their own cells in case of damage.

Function - Distruction of damaged cell and digestion of cellular material

2) Vacuoles (Storge sac)
They are storing different molecules like food, water and air and other molecules. They provide turgidity and rigidity to the cell. They are smaller in animal cell and ~~plant~~ larger in plant cells.

3) Mitochondria (Power house of the cell)
It releases the energy in the form of ATP
ATP - Adenosine tri phosphate

→ They store energy and supply it to others organelles

→ They have their own own DNA (Deoxyribonucleic acid)

→ They also synthesize their own protein.

4) Endoplasmic ~~Reti~~ reticulum (ER)
→ They are of two types -
RER (Rough Endoplasmic Reticulum)
SER (Smooth Endoplasmic reticulum)

→ They produce ribosome which manufacture protein.

SER (⊘) - They do not contain ribosome

RER (⊜) - The contain ribosome on their surface

5) Golgi Apparatus :-
They package and dispatching the chemical substance or material is produced in the cell.

6) Ribosome -
They help in manufactoring of proteins.

7) Chr

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DNA

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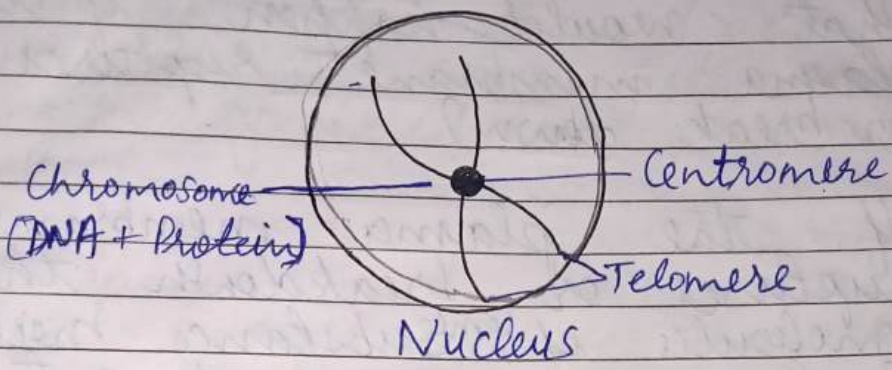
7) Chromosome -



They are chromatid made up of DNA and protein which transmit/ transfer genetic information from one generation to next generation.

8) Nucleus (Brain or controller of cell)
It controls the activities of all other cell organelles.

9) Cytoplasm
It is a jelly like substance or fluid present inside the cell which keeps the cell organelles safe inside the cell.

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3. Question

3) What would happen if the plasma membrane ruptures or break down?

Ans If the plasma membrane ruptures or breakdown the molecules of some substance will freely move in and out.

4) What would happen to the life of a cell if there was no Golgi apparatus.

Ans Golgi apparatus has the function of storage and packaging of the products in vesicles. If there where no golgi bodies packaging and dispatching of materials synthesis by the cell will will be blocked

5) Which organell is known as the power-house of cell.

Ans Mitochondria is known as the power house of cell because it releases the energy required for different

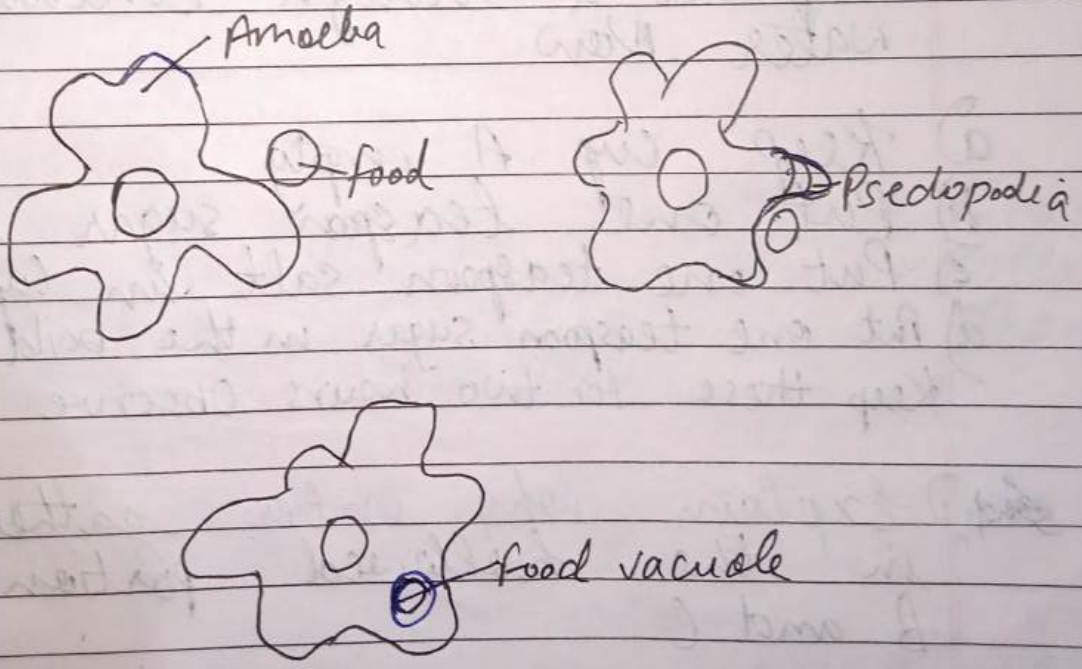
activities of life.

5) Where do the lipids and proteins constituting the cell membrane get synthesid

Ans lipids and proteins are synthesid in endoplasmic reticulum (ER).

6) How does an Amoeba obtain its food?

Ans Amoeba takes its food by the cell membrane which form the food vacuole



Endocytosis in Ameeba

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1) What is Osmosis?

Ans Osmosis is the process of movement of water molecule from a higher concentration to lower water concentration through a semi-permiable membrane.

2) Carry out the following osmosis experiment

Take four peeled potato halves and scoos 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 cups
c) Put one teaspoon salt in cup C
d) Put one teaspoon sugar in the boild potato cup
Keep these for two hours. Observe

Ans 1) Explain why water gathers in the hollowed portion of B and C.

Ans Water gather in B and C because of osmosis. as there is a difference in the wate

concentration it will move from high concentration to low concentration

ii) Why is potato A necessary for this experiment?

Ans Potato A, is necessary for control

iii) Explain why water does not gather in the hollowed out portions of A and D.

Ans Water does not gather in A and D as there is no change in water concentration

10) Plastids

Plastids is a membrane-bound organelle found in the cells of plants, algae, and some other eukaryotic organisms

→ Present in plant cell
→ Two types - 1) Chromoplasts (colured)
2) Leucoplasts (colourless)
→ Plastids containing green pigment chlorophyll are called Chloroplast
→ Leucoplast stores materials as starch, oils and protein granules.