

- Mock - 5
- General science & Abilities
- Shingra Shahid, 333

Date 29-8-2023
M T W T F S S

(Section: A) Part - II

Q:2

Ans: a. **Octet Rule in Chemical Bonding:**

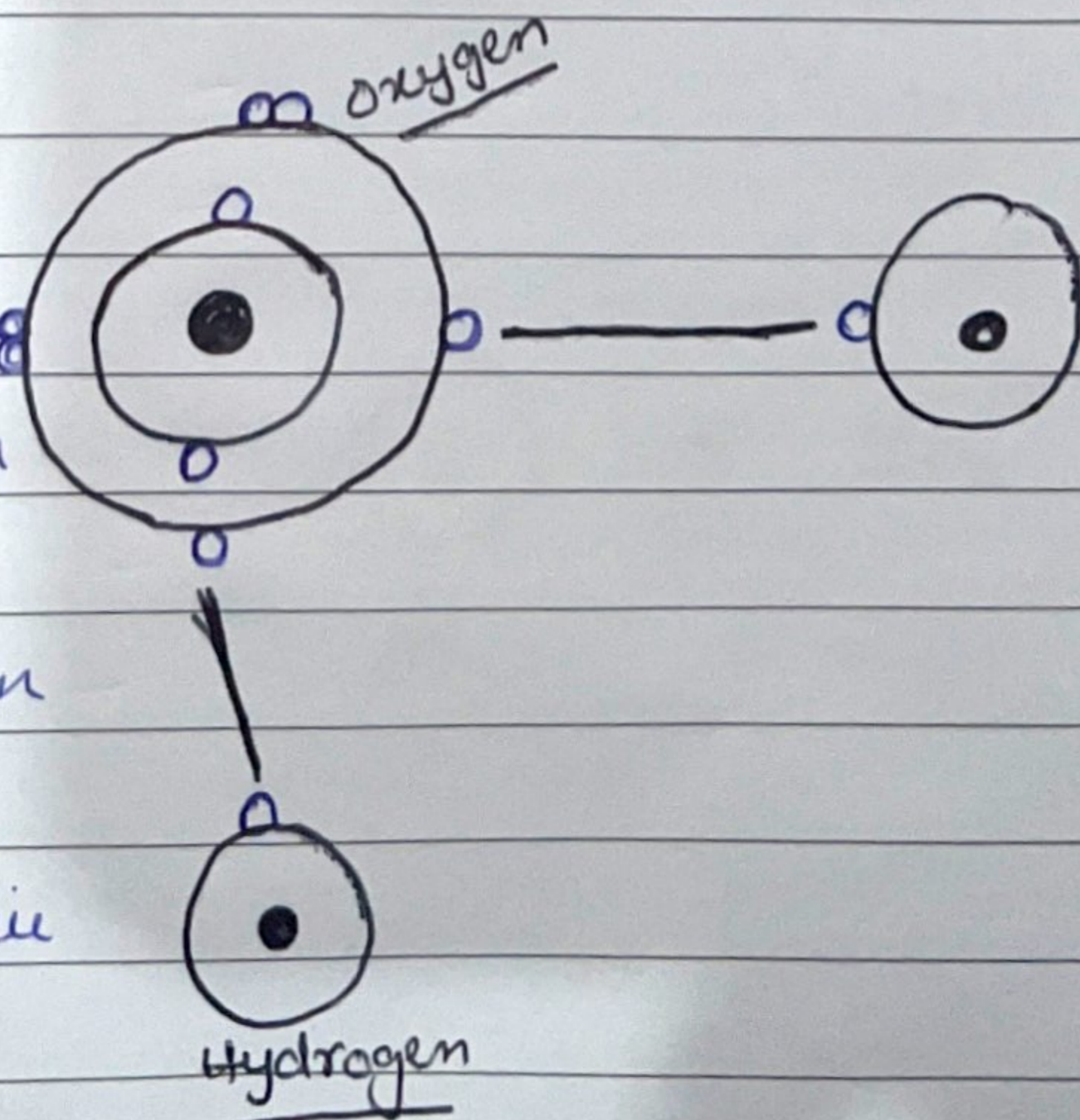
→ Chemical bonding: It is an intra-molecular sharing of electrons between two atoms, mutually or by detaining or attaining, electrons to gain stability.

→ Octet Rule: Octet rule is having eight electrons in the outermost layer of atoms, from the second shell, to have electronic configuration closest to the noble gases.

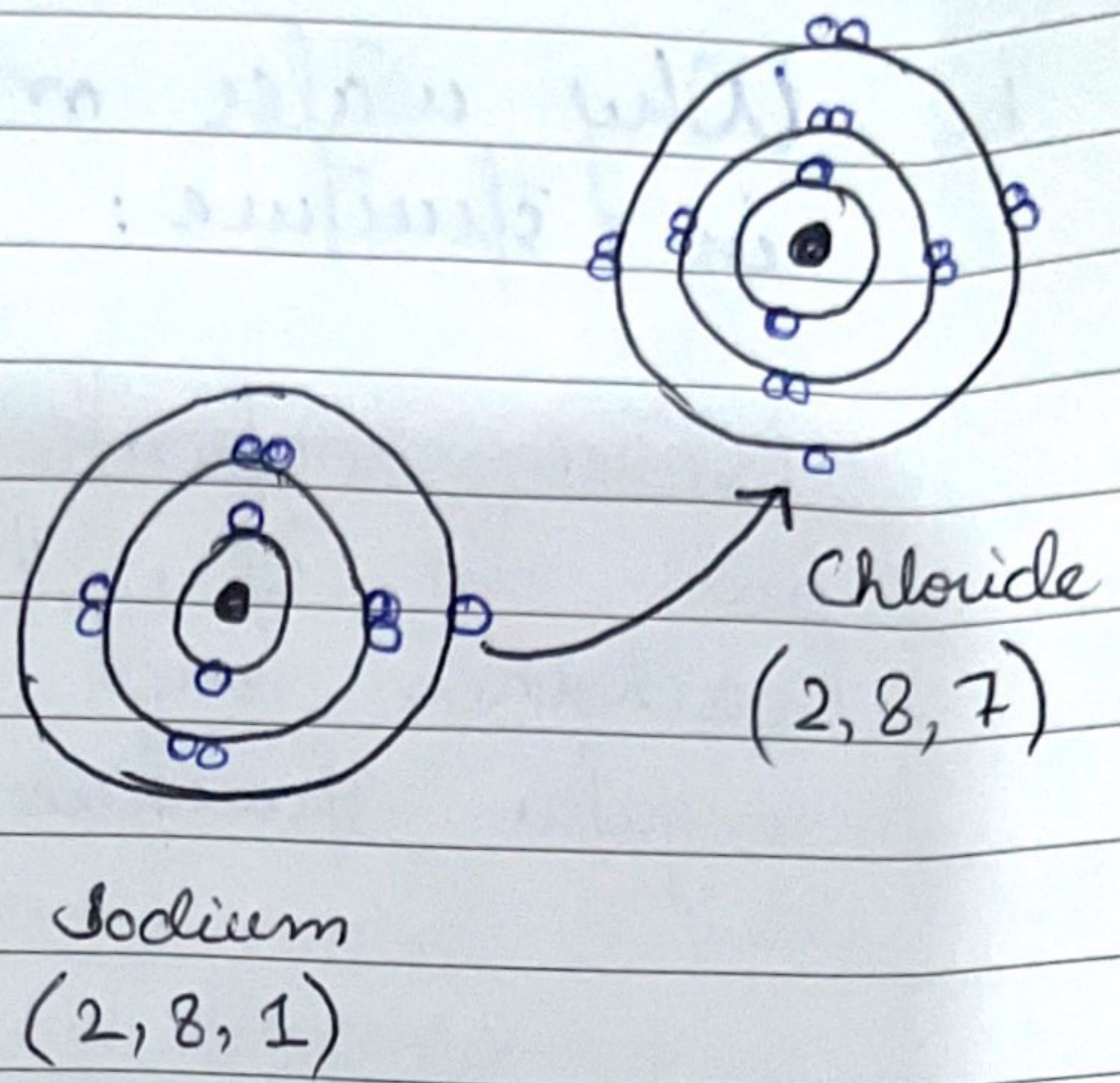
In the first shell, duplet (having two electrons in outer shell) rule is followed.

Example:

i) Hydrogen and Oxygen atom bonding; hydrogen atoms to attain stability, and oxygen atom to attain stability share their electrons.

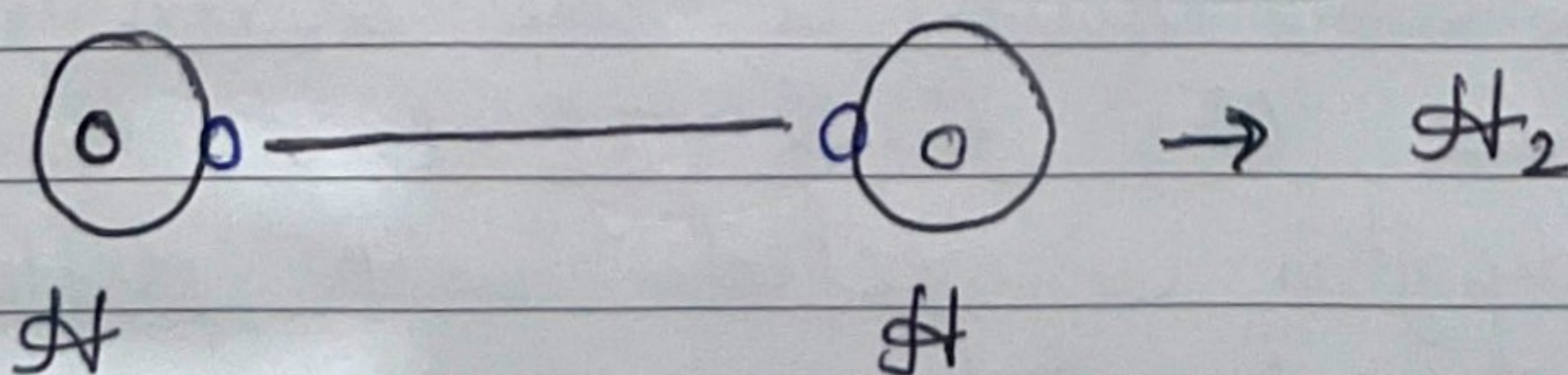


ii) Sodium with atomic number 11 bonds with chloride having atomic number 17; one has 1 electron in the outermost shell while the other has 7, respectively.



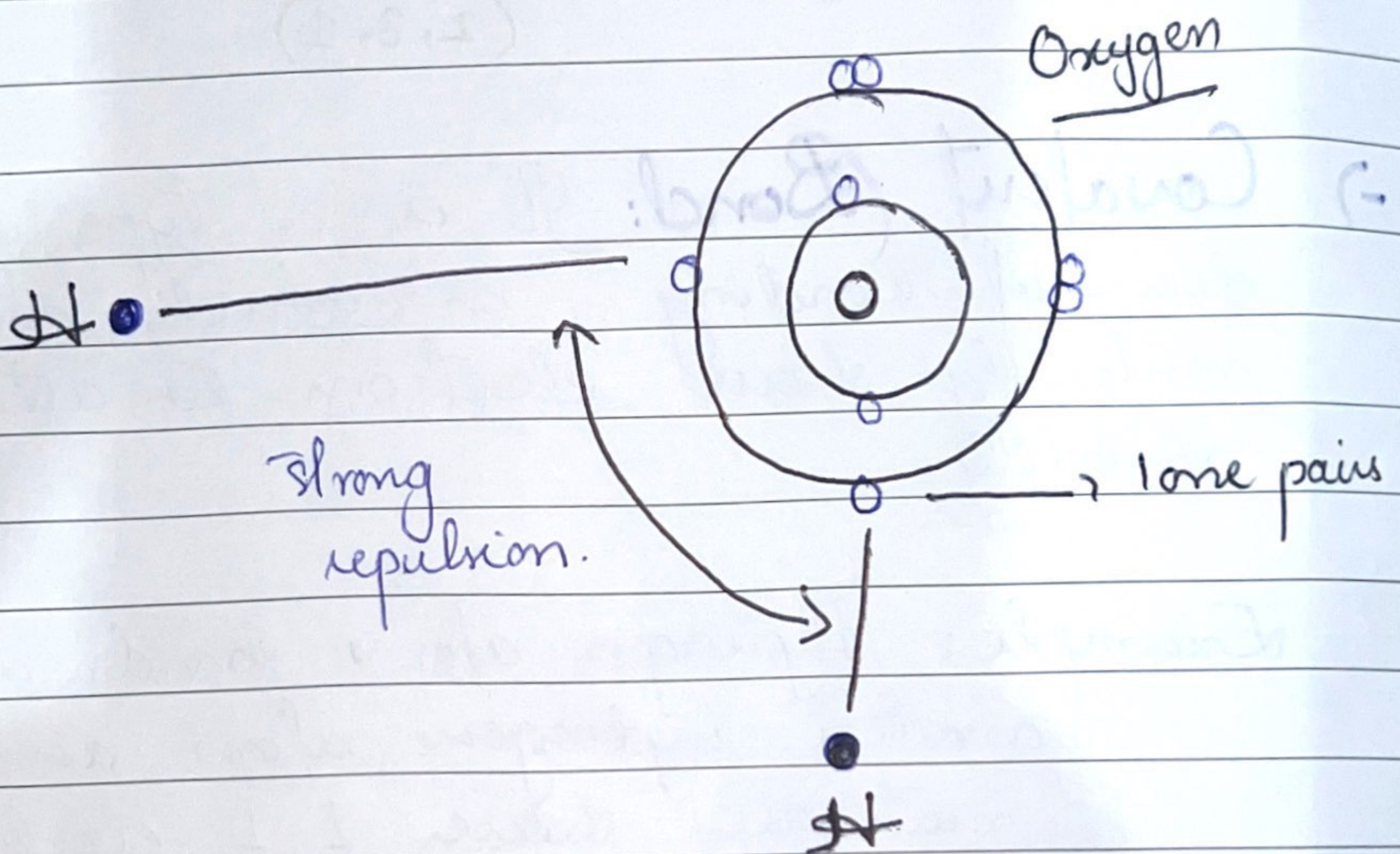
→ **Covalent Bond:** It is a type of chemical bonding, in which atoms mutually share electrons to attain stability.

Example: Hydrogen atoms bond with another hydrogen atom and mutually share 1, 1 electrons with each other to gain stability.



Why water molecule is angular in structure:

Water molecule H_2O has two lone pairs in it, these strongly repulse each other and create a V shaped angular structure.



Human Brain:

Human brain is the organ located inside the skull of the human body. It is connected with different parts of itself and body via nerves and complete monitor, regulate, and perform all the functions of the body.

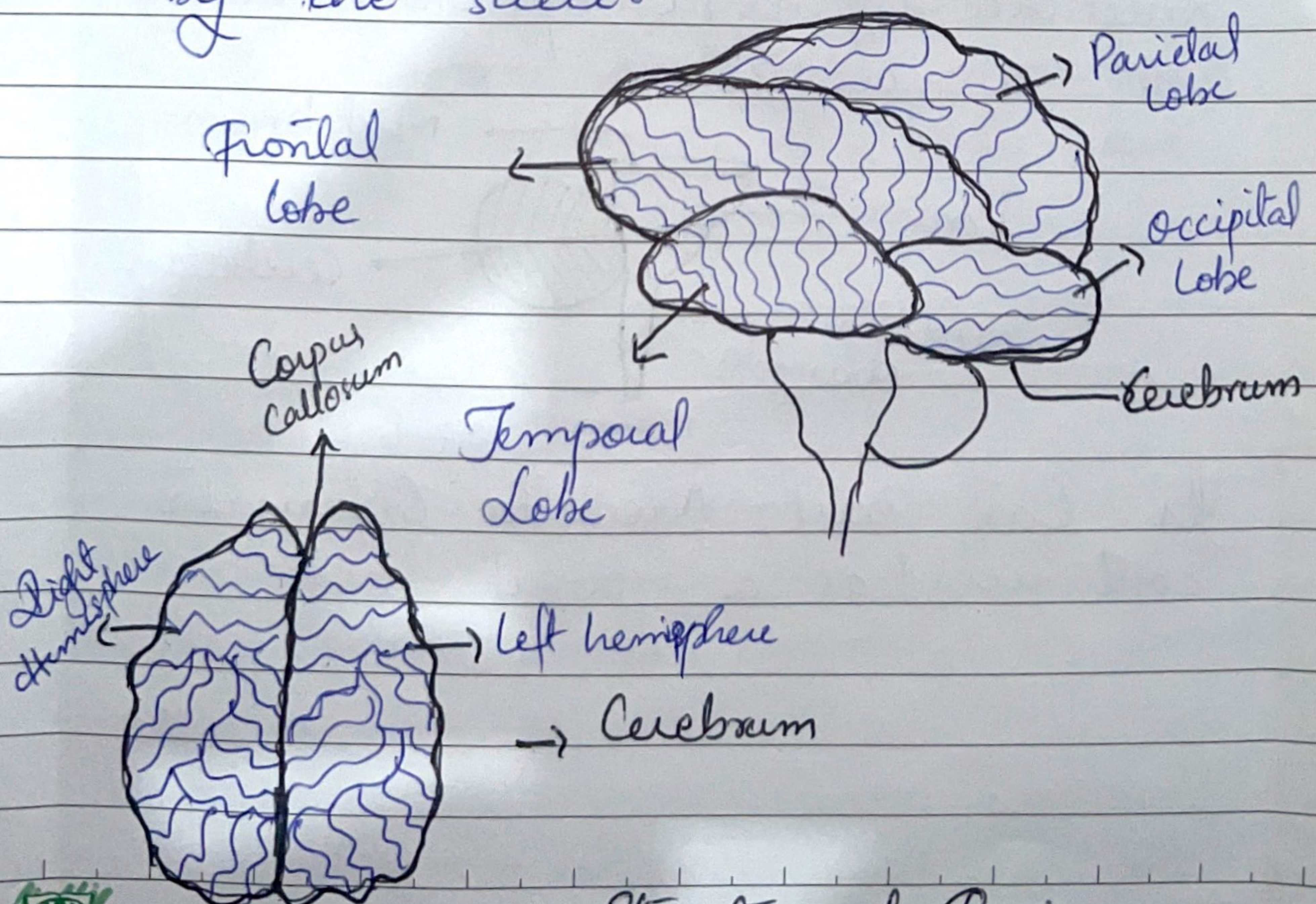
→ Structure of Human Brain:

Human brain is divided into three parts: Forebrain, Midbrain, and hind-brain structurally.

i) **Forebrain:** It consists of cerebrum (2 Cerebral hemispheres) and Limbic System (Thalamus, Hippocampus, Amygdala, and Hypothalamus)

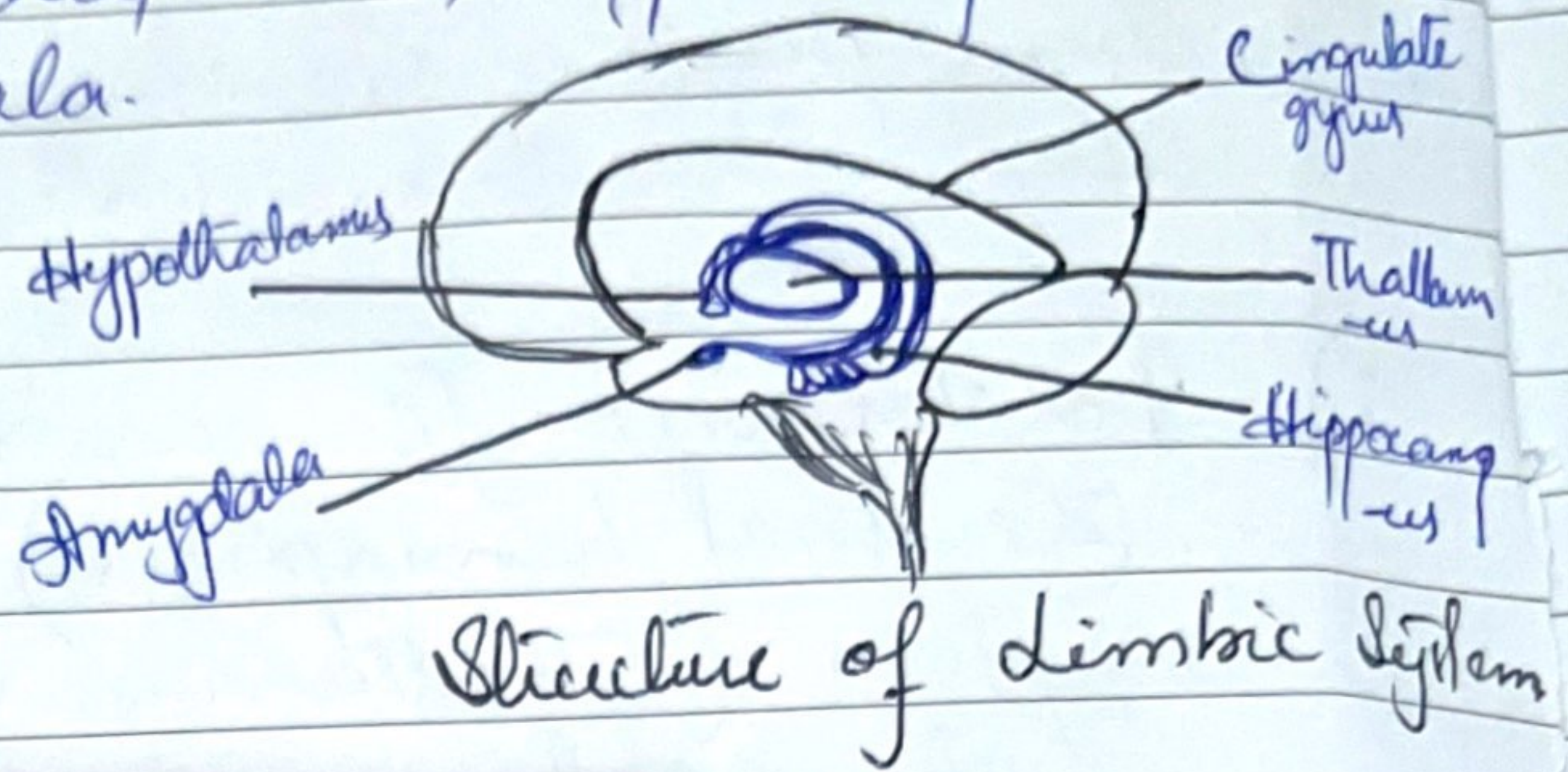
o **Cerebrum:** It is divided by corpus callosum into two hemispheres, right and left.

It is further divided into ~~Forebr.~~ Parietal, Frontal, Temporal, and occipital lobes by the sulci.



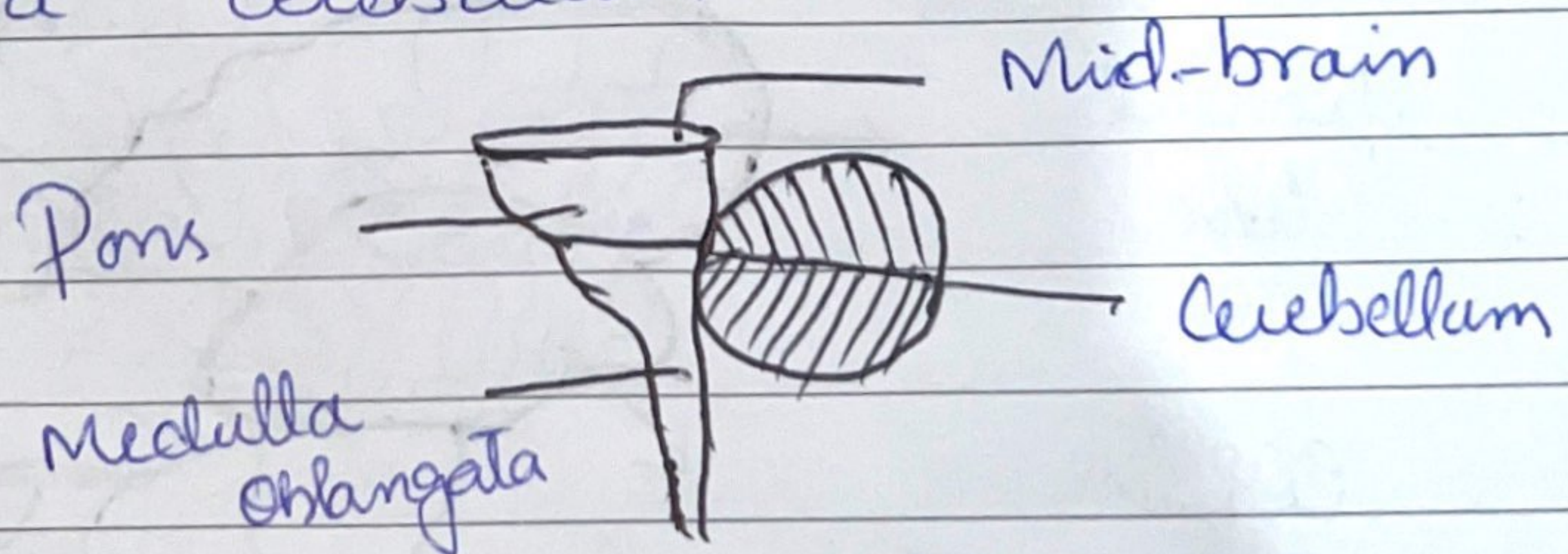
Structure of Brain

- **Limbic System:** It consists of thalamus, hypothalamus, hippocampus and amygdala.



- ii) **Midbrain:** It is a connecting structure located above the pons, and connecting the hind brain with the cerebrum.

- iii) **Hindbrain:** It consists of pons and medulla oblongata of brain stem, and a cerebellum.



Its last part; Medulla oblongata continues as a spinal cord.

→ Functions of Human Brain:

- Forebrain: Movement, Speaking, Thinking initiation, Behaviour, Memory (Body orientation and discrimination, Interpretation of language, Hearing, Vision, all these major body functions are run by different parts of forebrain.
- Brain stem (Midbrain, Pons, Medulla Oblongata):
Consciousness, Alertness, (Breathing, Body Temperature, Respiration, Blood pressure, Swallowing are all under the control of Brainstem.
- Cerebellum (Part of Hindbrain):
Rate, Range, Force of movements and the balance of body are controlled by Cerebellum.

d. Ans: Cell Structure:

→ Cell: Cell is the basic ^{structural and functional} unit of life / human, plants, animals or microbes.

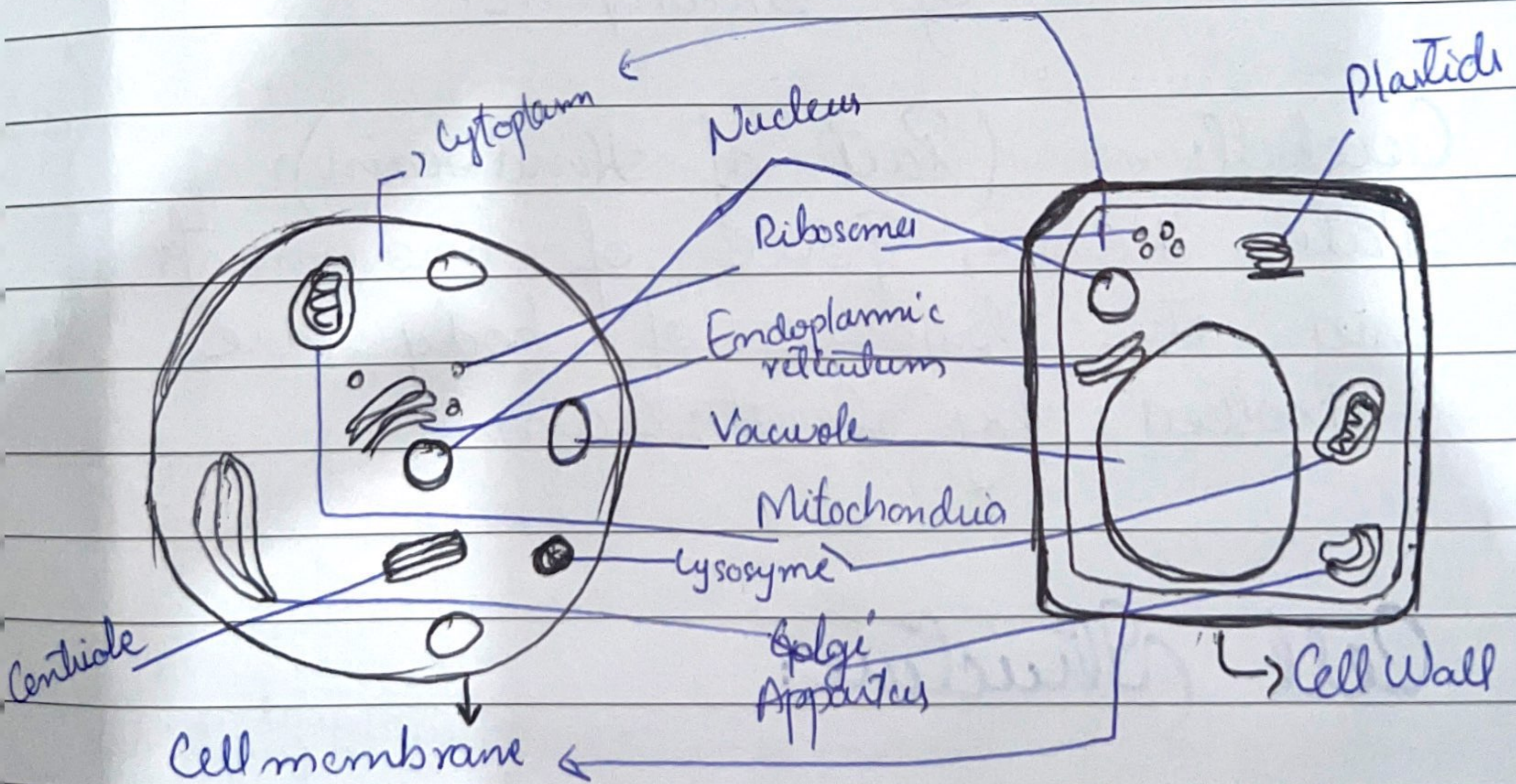


→ Structure of Cell:

Structure of Plant cell and Animal cell have similar characteristics with few differences.

- Plant Cell: It is surrounded by a cell wall, have plastids, and a single large vacuole, that distinguish it from animal cell.

- Animal Cell: It is surrounded by cell-membrane, have centrioles and multiple small vacuoles as distinguishing features.



Except aforementioned different features. All the cells have almost similar structure and composition, and consist of following structures.

- i) **Cell Wall:** Cells (Plant) are surrounded by a thick rigid outermost covering, called cell wall.
- ii) **Cell Membrane:** Cell membrane is semi-permeable membrane, that surrounds the cell and provides it a shape.

The diagram illustrates a cross-section of a cell membrane. It shows two layers of phospholipids. Each phospholipid has a circular 'Hydrophilic head' and two wavy 'Hydrophobic tail' groups. The heads of one layer face the heads of the other layer, with tails pointing towards each other. On the left side, there are small gaps labeled 'transport channels'.
- iii) **Mitochondria:** Also known as power house of cell.
- iv) **Nucleus:** Functioning unit of cell, contains DNA material.
- v) **Endoplasmic reticulum:** It is either smooth, or rough (having ribosomes attached to it).
- vi) **Golgi Apparatus:** It is an other sub-cellular organelle present in cytoplasm.
- vii) **Vacuoles:** Digesting machines of cells.
- viii) **Plastids:** Only present in plant cell.
- ix) **Centrioles:** Only present in animal cell.
- x) **Cytoplasm:** Liquid composition that contains all the cellular organelles.

→ Cell Membrane Function:

It is a semi-permeable outermost covering in animal cell, and is further surrounded by cell-wall in plant cell.



- It provides,
- Structural support.
 - Transportation channels.
 - Provides binding site for enzymes.
 - Protection of Cell.

-> **Function of Cytoplasm:** It is a fluid present inside the cell.

It helps with:

- Structural support.
- Provides shape to the cell.
- Intra-cellular transport of molecules required.
- Contains all the cellular organelles.

-> **Function of Mitochondria:**

It is known as power house of the cell. It helps with:

- Provision / Generation of ATP.
- Regulation of immunity.
- Stem cell regulation.
- Autophagy.

Q no 31

Ans a) **Polio:** Polio is the paralytic viral disease affecting humans.

Cause: It is caused by the Polio-virus (any of its type);

- Polio-virus Type-I
- Polio-virus Type-II
- Polio-virus Type-III

Symptoms of Polio: It is a progressive disease, and have different symptoms at different stages.

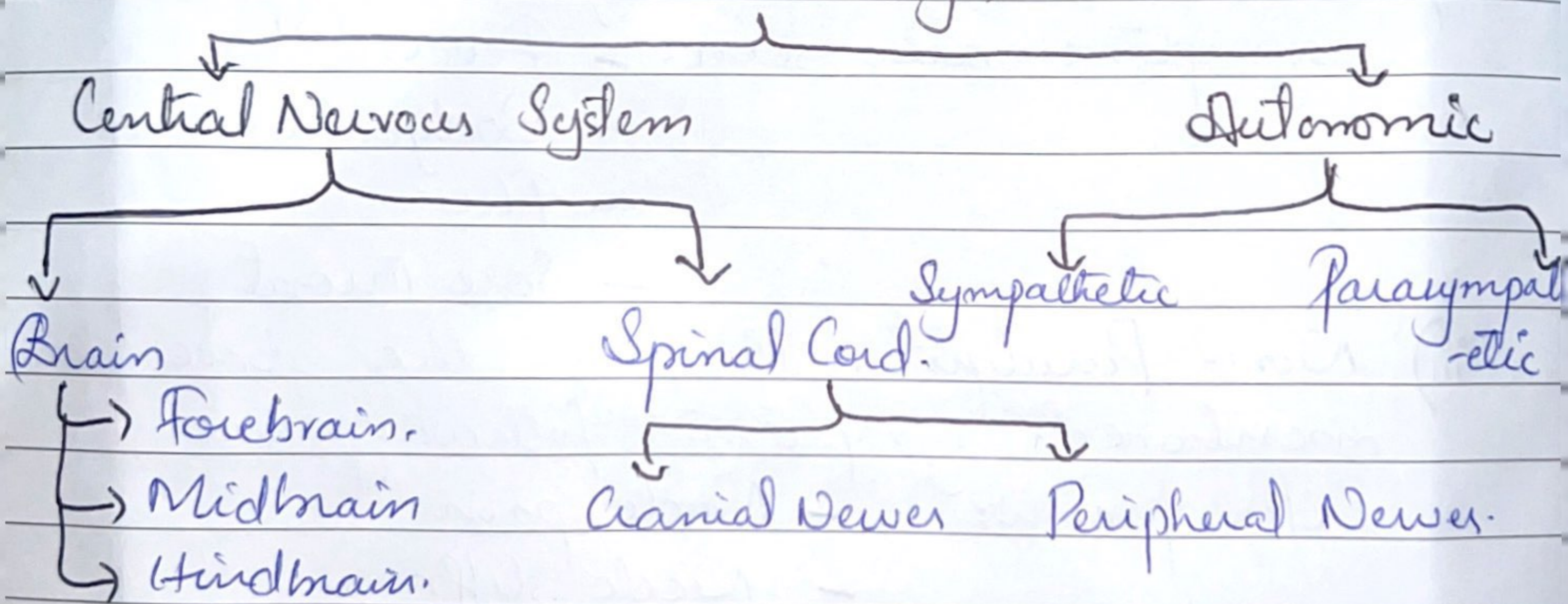
- i) **Abortive:** In this stage following symptoms are seen:
 - Fever.
 - Bodyache.
 - Flu
 - Sore throat.
- ii) **Non-Paralytic:** Along with the above mentioned symptoms, following are also present:
 - Neck pain,
 - Neck stiffness.
- iii) **Paralytic:** It affects the muscles of different regions and causes paralysis.
 - Paralysis in limbs.
 - Paralysis (if occurs in respiratory muscles) can stop breathing and cause death.
- iv) **Bulbar:** Brain gets affected in this stage, cause encephalopathy, and mostly followed by death.

→ Difference between OPV & IPV.

OPV	IPV
i) Oral polio vaccine	i) Injectable polio vaccine.
ii) First dose is given at birth.	ii) First dose after few weeks of birth.
iii) It is a type of (killed) vaccine.	iii) It is a type of live attenuated vaccine.

b Parts of Nervous System:

Following are the two parts of ~~Auto~~ Nervous System



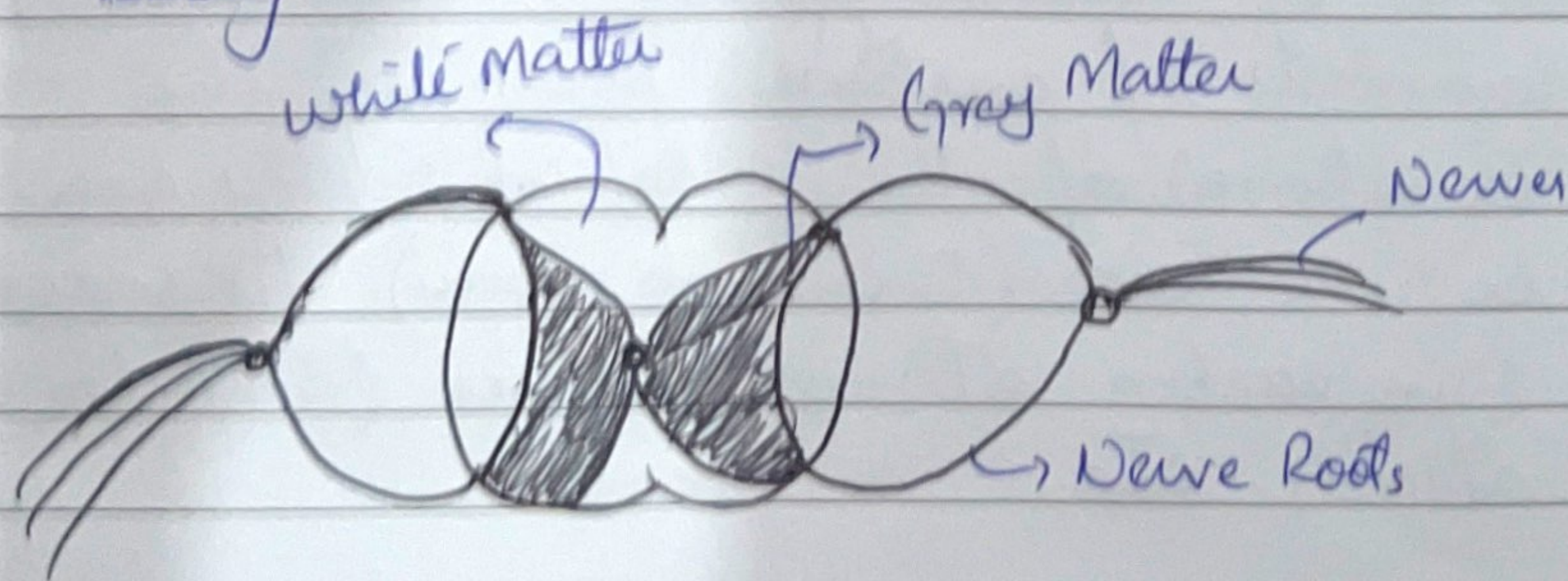
Central Nervous System It consists of brain and spinal cord.

→ **Brain:** Brain is the main cognitive organ that controls, and regulates all the functions carried out by human body. It is sub-divided into different parts; Forebrain, Midbrain, and Hindbrain that monitor different functions, and run entire human body.

→ **Spinal Cord:** It is the continuation of brain in the vertebral column. It has different sets of peripheral nerves and cranial nerves that transmit the impulses and initiate a response.

• **Peripheral Nerves:** There are eight cervical, twelve thoracic, five lumbar, five sacral, and one four coccygeal peripheral nerves, leaving the vertebral column from respective regions.

• **Cranial Nerves:** There are twelve pair of cranial nerves that carry different functions in the body.



Structure of Spinal Cord.

→ **Alzheimer Disease:** It is the neuro-degenerative disease caused by deposition of amyloid within the brain. It is the most common cause of dementia. It mainly affects the

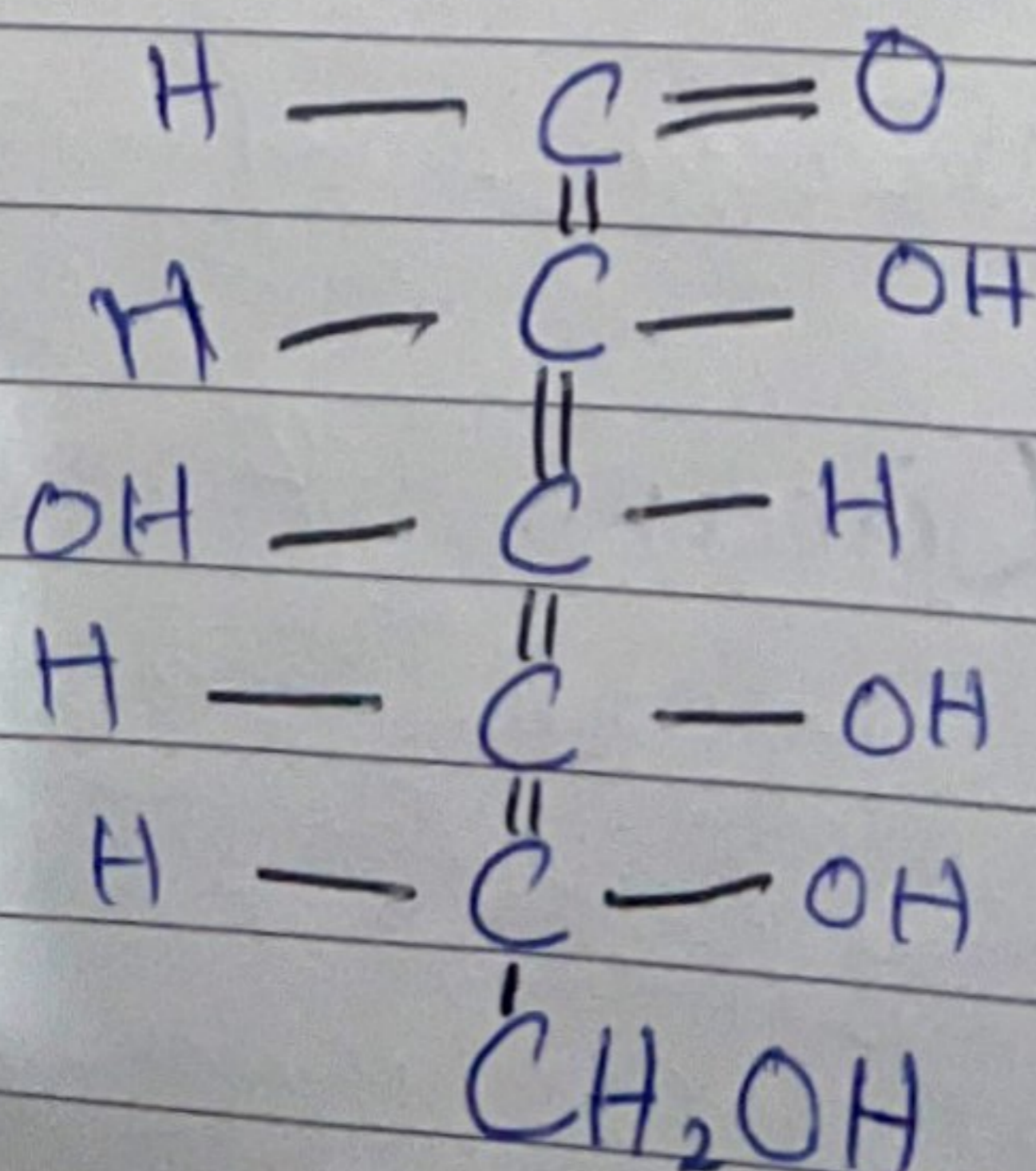
old age people. It is highly progressive, patients begin forgetting minor things to even forgetting the talkative ability skills.

c. Carbohydrates

Carbohydrates are macromolecules that provide nutrition and energy to the body.

→ Structure: Carbohydrate, as the name suggest has Carbon & hydrogen atoms in the structure. It is one hydroxyl and one carbonyl group attached to it.

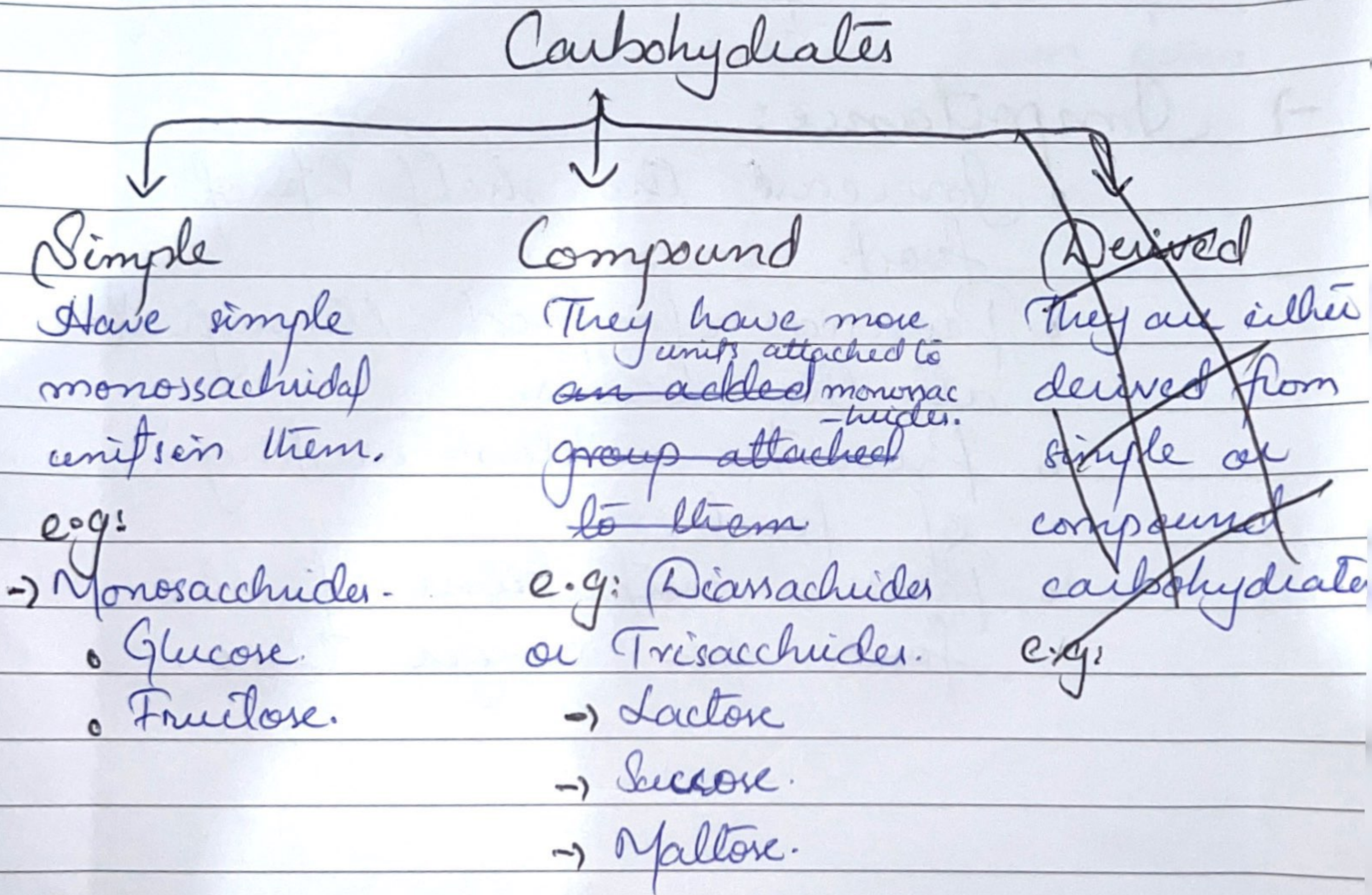
The monosaccharides are structural unit of carbohydrate, with different number of carbons forming the backbone of the molecule; they can be pentose (5 Carbon atoms), hexose (six carbon atoms, triose (3 carbon atoms) etc.



→ Functions of carbohydrates:

- i) Basic source of energy.
- ii) Source of Vitam B-12.
- iii) Functioning of Body.
- iv) Promote lipid metabolism.
- v) Provide bulk fibre.

→ Classification of Carbohydrates,



d. Importance of Preservatives & Anti-oxidants.

Preservatives: They are added compounds in the food.

Anti-oxidants: They are the compounds that inhibit oxidative reactions in the body and hence stop the formation of free radicals.

→ Importance:

- Increase the shelf life of food.
- Provision of food throughout all the seasons.
- Prevents sudden wastage of food.
- Preserve nutrients of the food for longer time.

(Section - B)

Q. 181

Ans. b.

- ROSE is code for 6821.
- CHAIR is code for 73456.
- PREACH is the code for 961473
- SEARCH — ??

If we assign the numbers in code to the letters from given examples:

2 is for R.

1 is for E.

4 is for A.

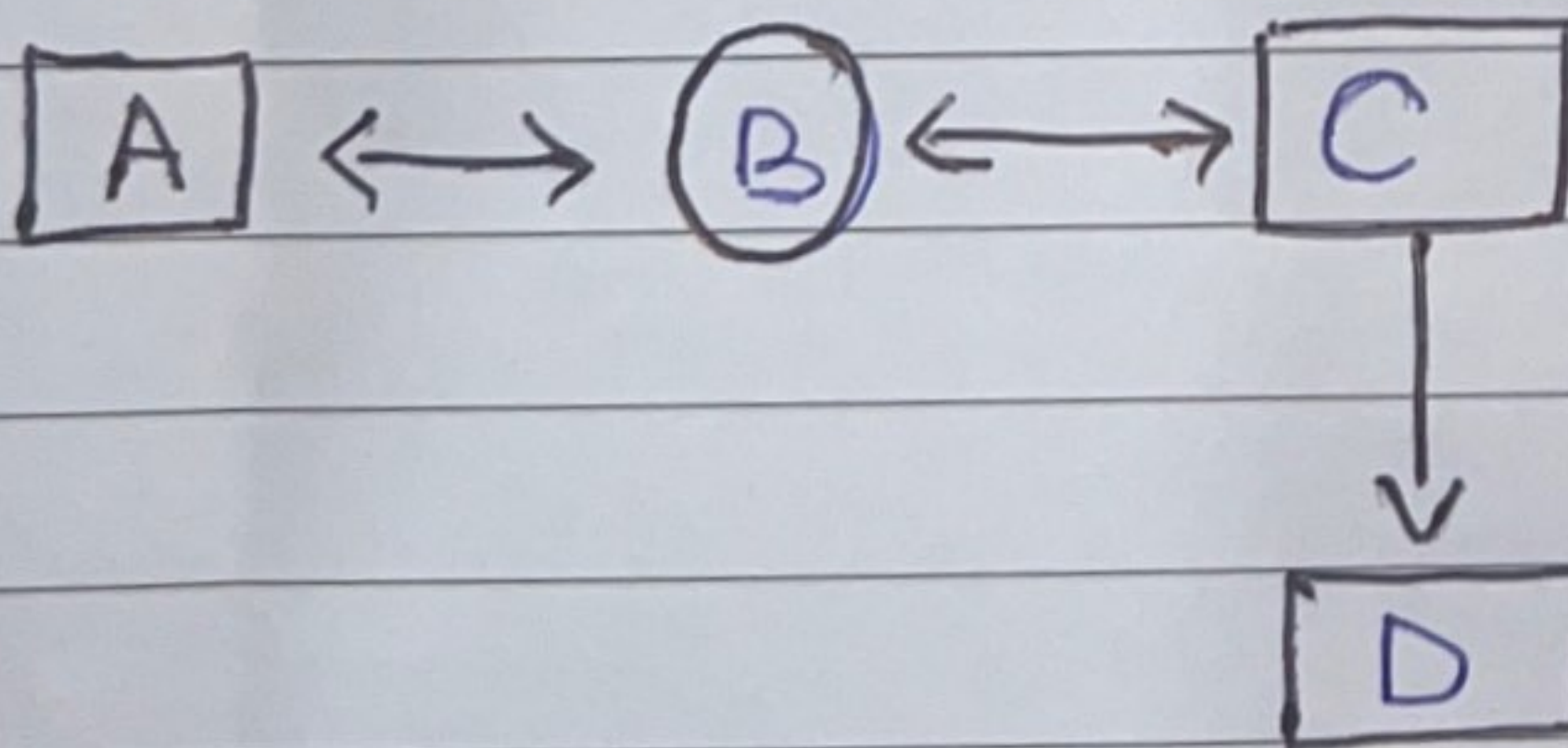
6 is for R.

7 is for C.

3 is for H.

Hence, the code for SEARCH will be 214673.

c



A and B are C's sister ^{et} brother, C is D's father; D son of C is the Nephew of D.

Q. 6.

Ans. b.

Karif requires 800

200 is in his bank.

20% → borrowed from brother.

30% → borrowed from mother.

Total Cash:

$$\rightarrow 20\% \text{ of } 800 = \frac{20}{100} (800)$$

Money Borrowed from brother = 160

$$\rightarrow 30\% \text{ of } 800 = \frac{30}{100} (800)$$

Money borrowed from mother = 240

$$200 + 240 + 160 = 380.$$

Hence, Total Money in numbers is 380.

c. Three bags contains; 3 red, 7 black.
4 red, 6 black,
8 red, two black

If the ball drawn from 1 bag is red what is the probability?

Probability = $\frac{\text{no of occurrence of events}}{\text{total possible outcomes}}$

$$P = \frac{18}{36} = \frac{1}{2}$$

