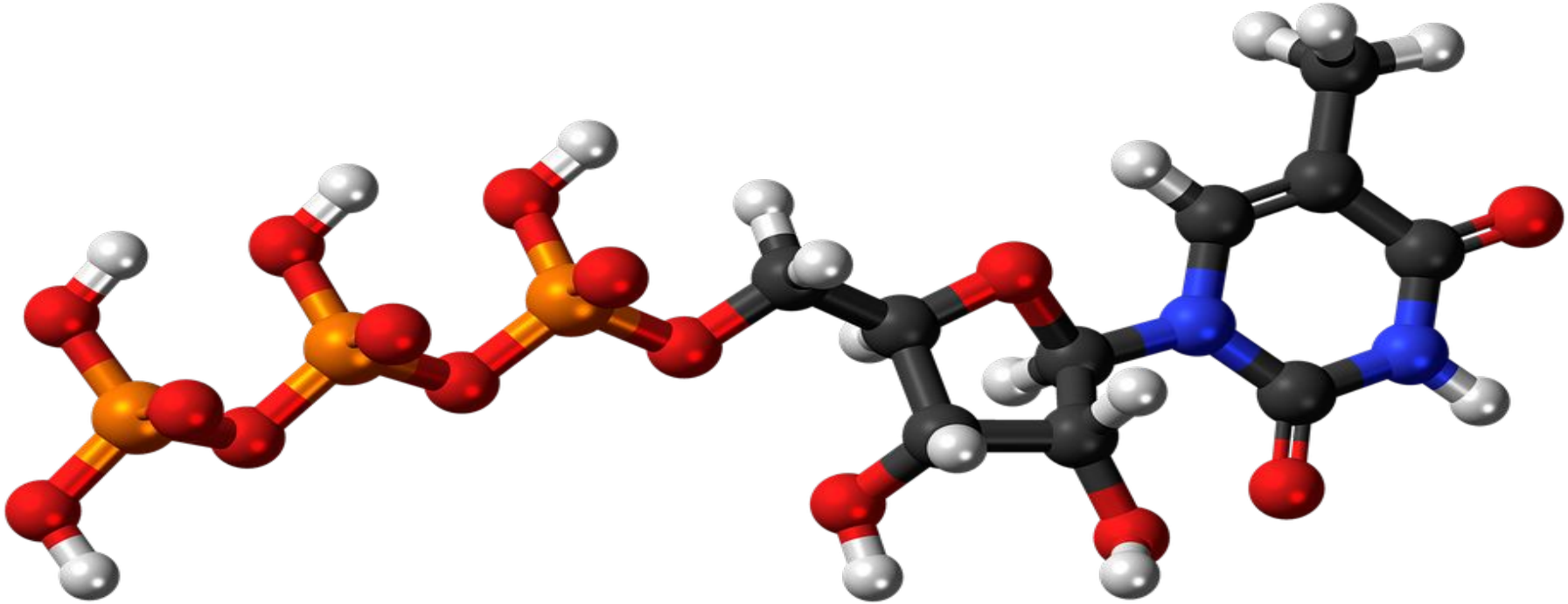
CHEMICAL BONDING



CHEMICAL BONDING-

The attractive force which holds the atoms together in molecules.

- **By chemical bonding ,any system can attain stability and lowering energy.**

Types of Chemical Bonding

1. Ionic Bond
2. Covalent Bond
3. Coordinate Bond
4. Hydrogen Bond

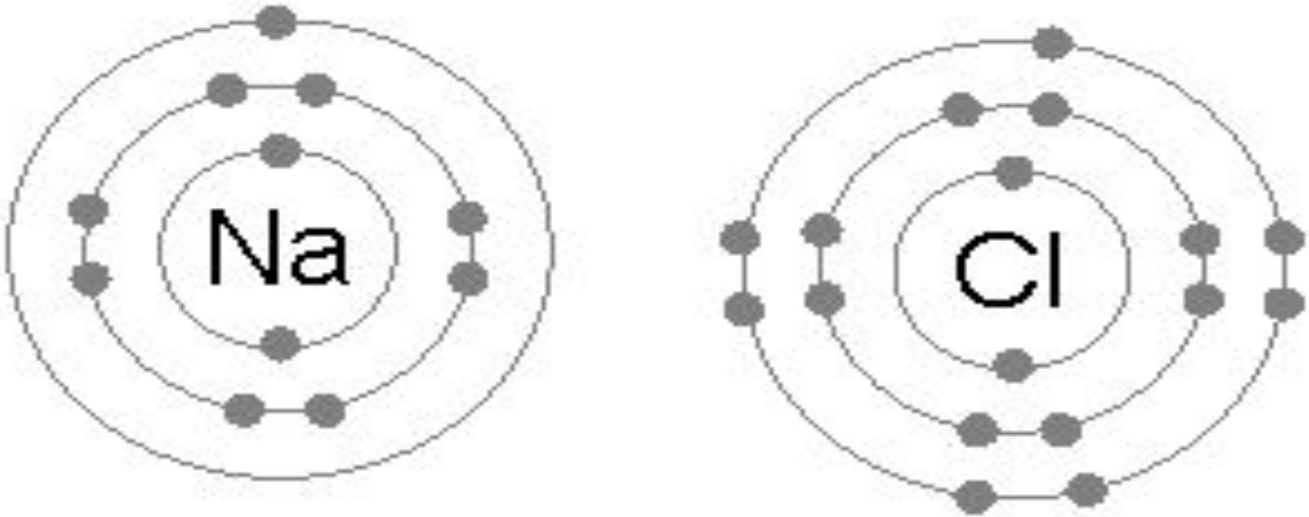
Ionic Bond-/ Electrovalent bond

Complete transfer of one or more electrons from one atoms to another.

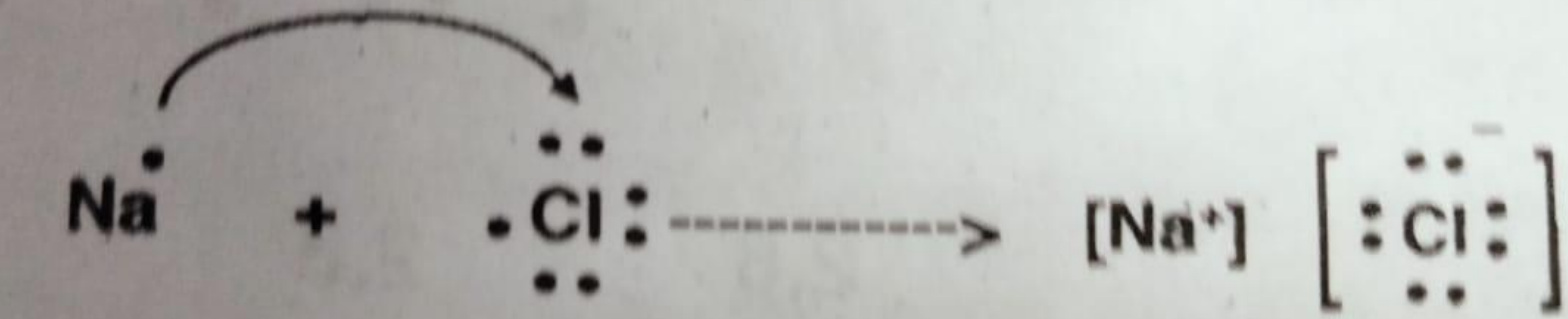
- **The atoms which lose electrons called Cations.**
- **The atoms which accept electrons called anions.**

- **Ionic bond between positive and negative charge ions**

Formation of sodium chloride:-

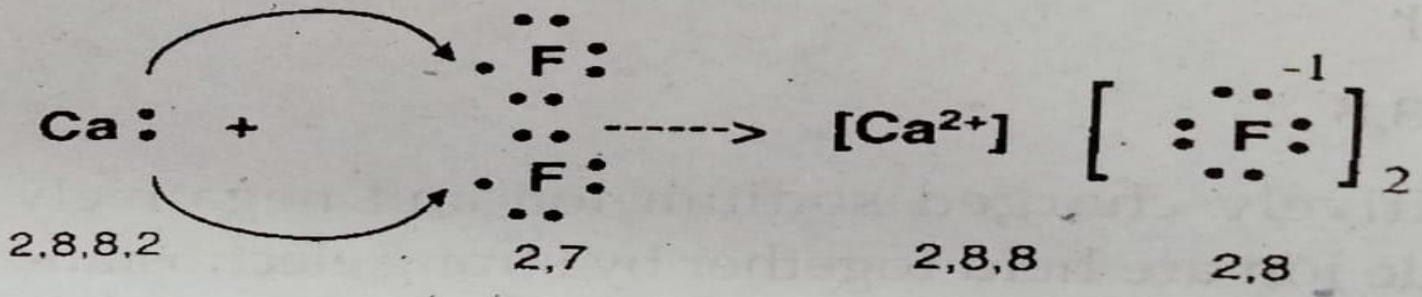


Formation of NaCl



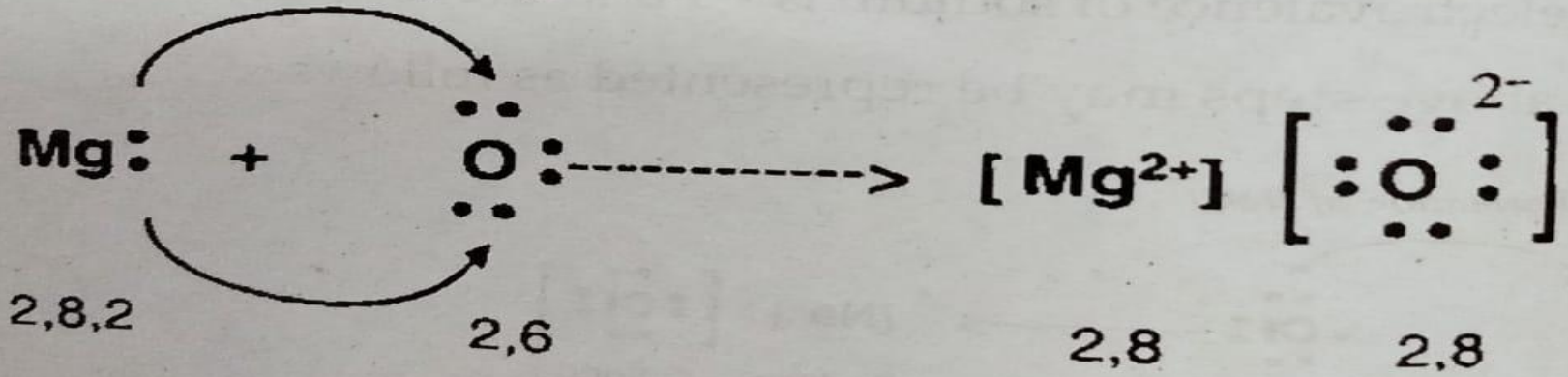
Sodium atom	Chlorine atom	Sodium ion	Chloride ion
2,8,1	2,8,7	2,8	2,8,8

Formation of Ca F_2



3. Formation of Magnesium Oxide

Formation of MgO



The number of electrons liberated or accepted by the atom during the ionic bonding called electrovalency.

For sodium-1

Chlorine-1

Mg-2

Oxygen-2

calcium-2

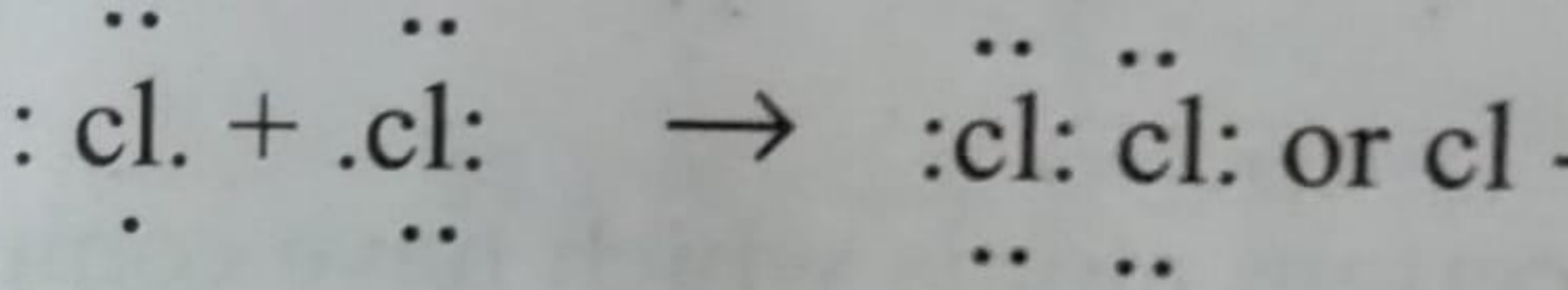
Covalent Bond

1.This bond formed by the sharing of electrons between the atoms .

2.Equal number of electrons are shared by the atoms.

If one electrons are shared the atoms -single bond

- If two electrons are shared by the atoms -double bond
- If three electrons are shared by atoms-triple bond.

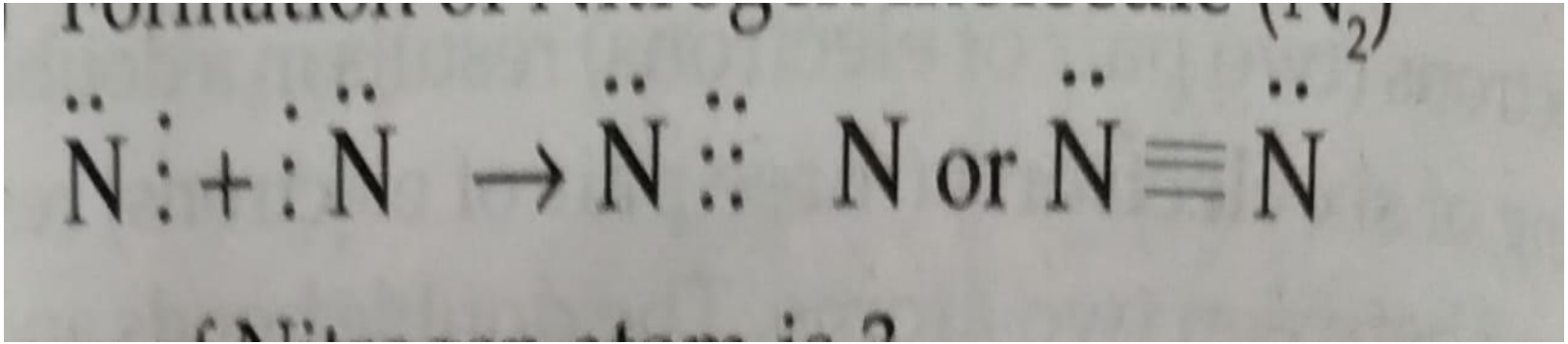


2) Formation of hydrogen molecul

$$H. + H. \rightarrow H : H \text{ or } H - H$$

3) Formation of hydrogen Chloride

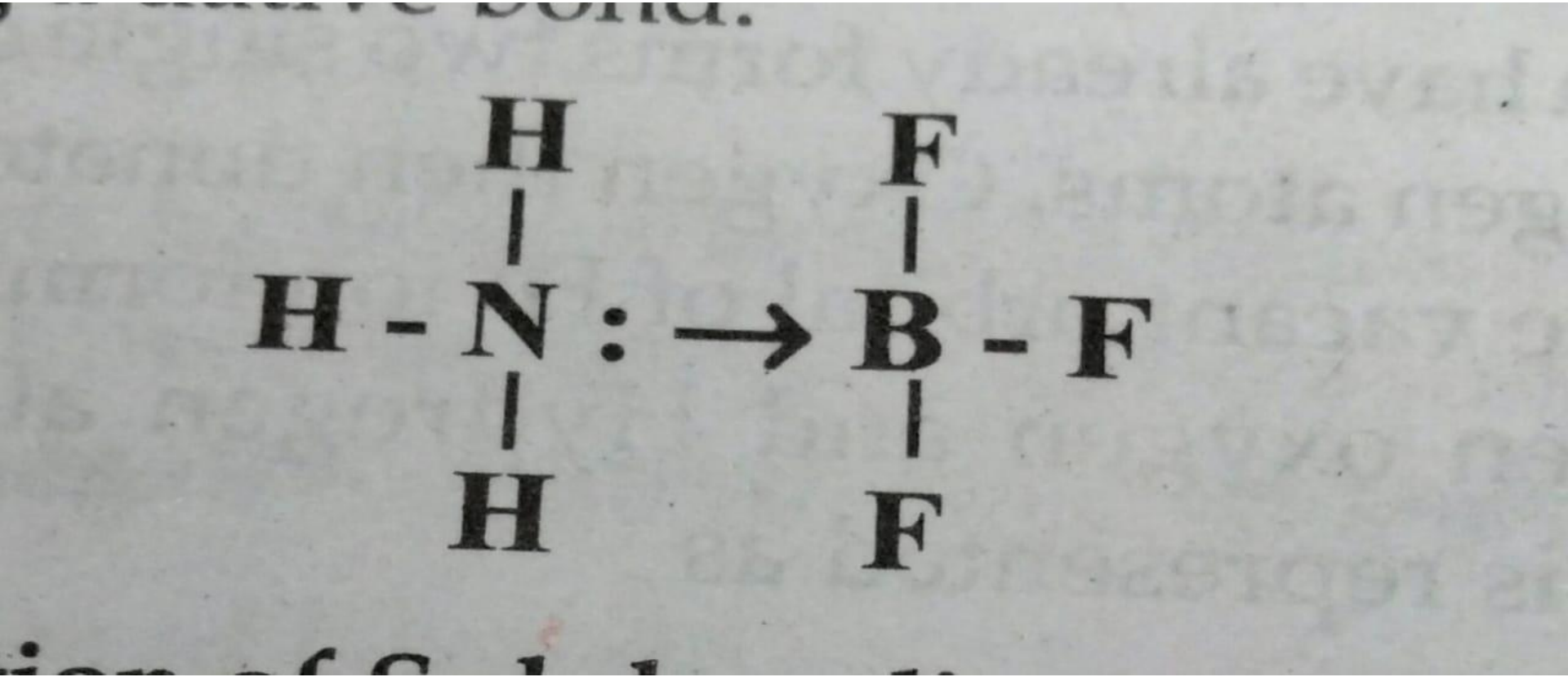
Formation of Nitrogen molecule (N_2)

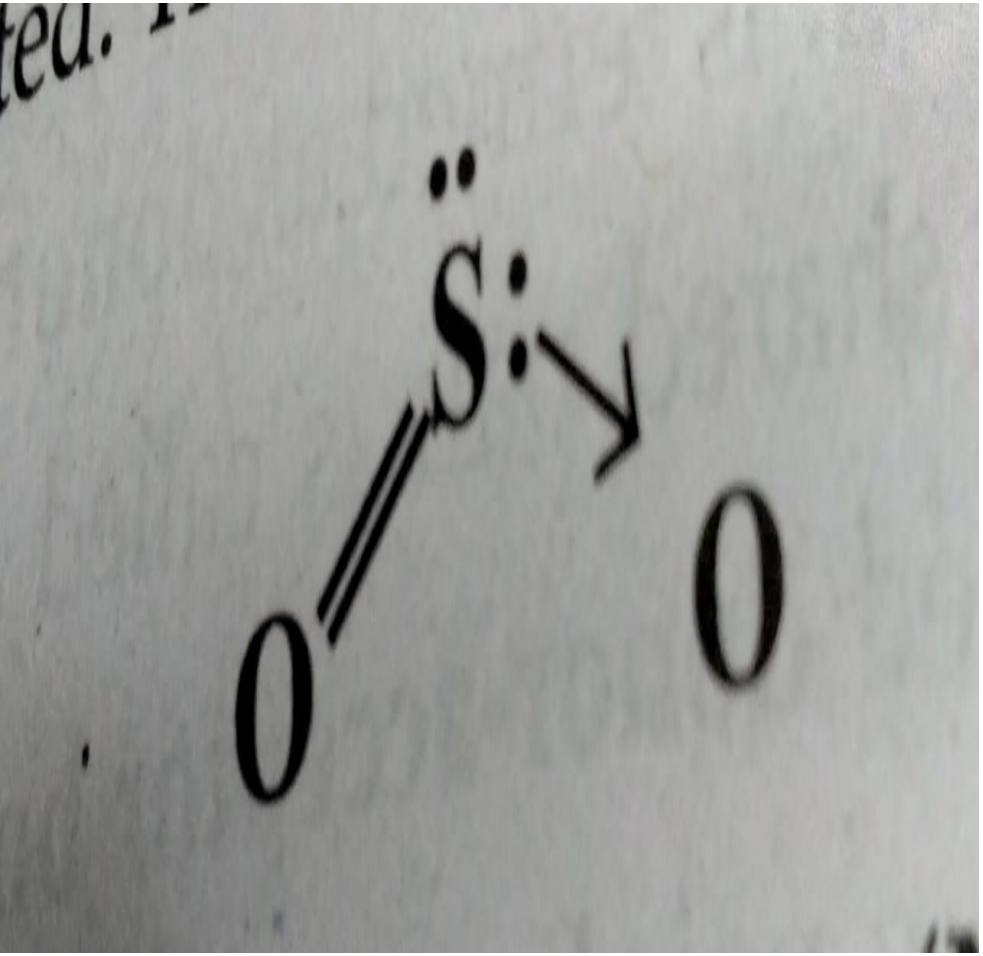


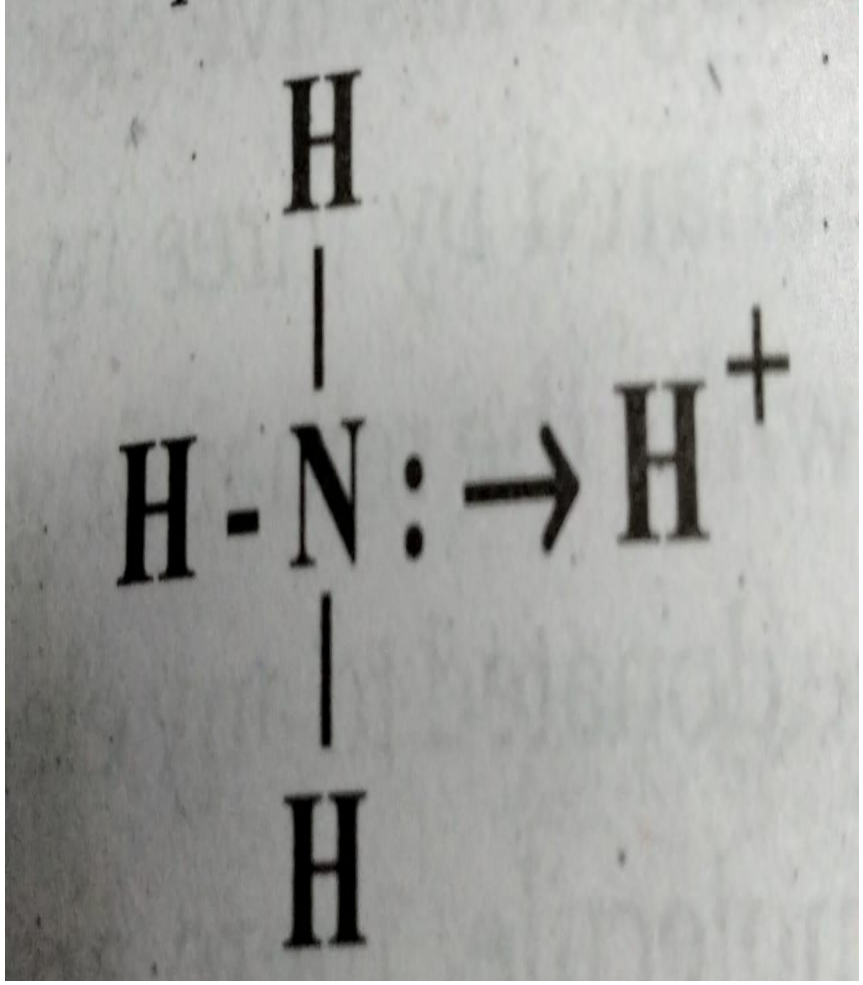
3. CO-ORDINATE OR DATIVE BOND

- Electron pair is donated by only one atom but shared by both atoms , the bond formed is called coordinate bond.
- The electron giving atom is called Donor and other atom is called acceptor.
- Bond is represented by arrow pointing donor to acceptor.

EX:-NH_3 and BF_3







Hydrogen Bond

- **When the electronegative atoms like N,F,O etc attached to hydrogen atom by a covalent bond, the electrons of the covalent bond are shifted to electronegative atom.**

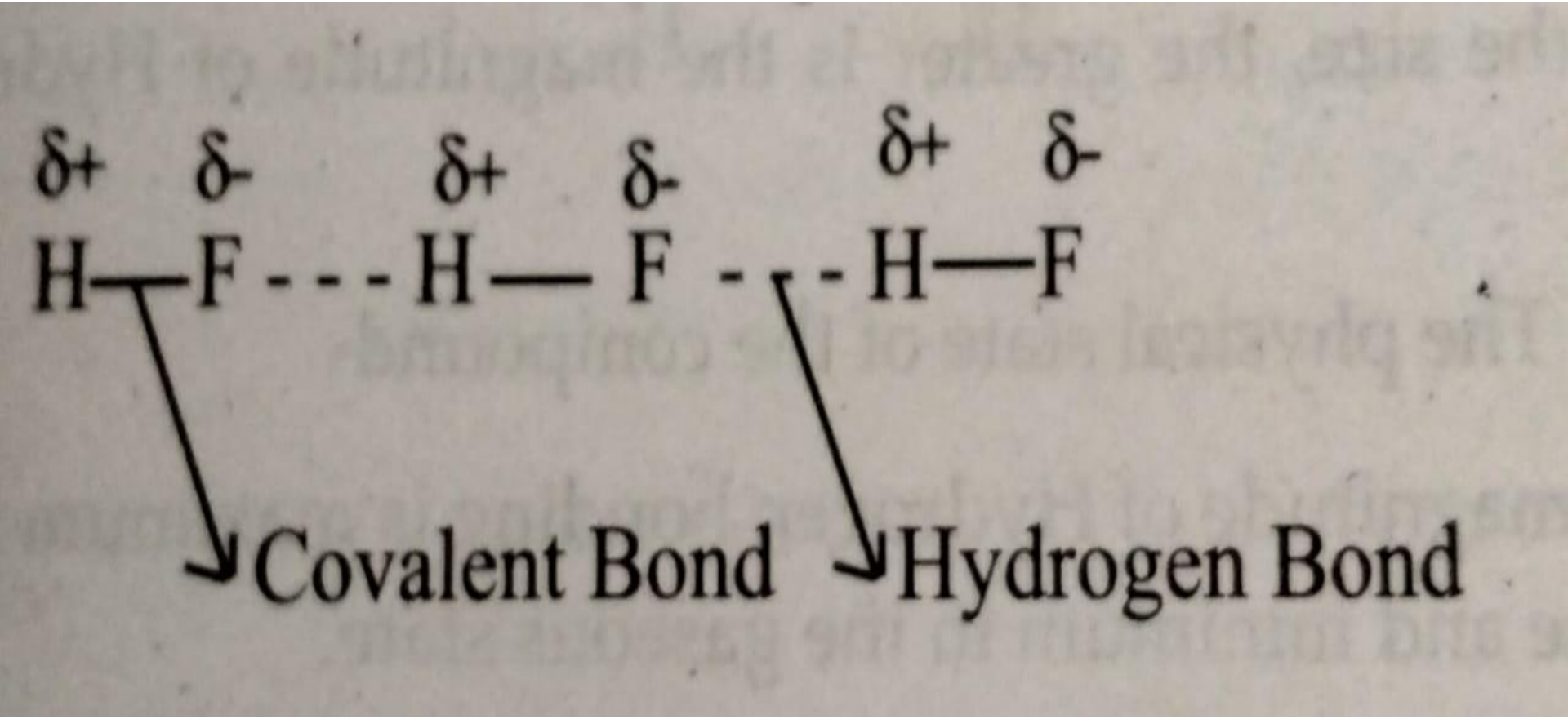
- **Then the electronegative atom becomes slightly negative and hydrogen atom becomes Slightly positive.**

- This partially positive charge hydrogen atom of one molecule form a bond with electronegative atom of other molecule.

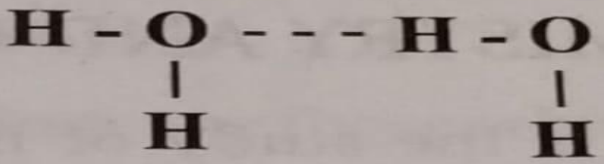
- This bond is called hydrogen bond.

Hydrogen bond is attractive force between hydrogen atom of one molecule with electronegative atom of another molecule.
https://www.youtube.com/watch?v=3N8aCwu4RbA

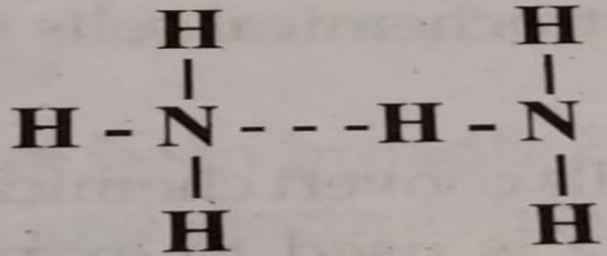
EX-



Water (H_2O) molecules: H_2O molecule contains hydrogen bonds.



Ammonia (NH_3) molecule: NH_3 molecule contains hydrogen bonds



The magnitude of hydrogen bond depends on:-

1. The electronegativity of linked atom-higher the electronegativity greater the hydrogen bond.
2. Size of electronegative atom-the smaller the size greater the hydrogen bond
3. Physical state of the compound -hydrogen bond is maximum in solid state and minimum in gaseous state.

Q. **Hydrogen bond in HF is greater than HI why?**
A. F have smaller size than I, F have greater electronegativity than I ,so F have greater hydrogen bond than I

Q. H_2O is in liquid state while H_2S is gas why?
A; O have higher electronegativity and smaller size compared to S. so oxygen form strong bond with H ,ie it is in liquid state.