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Atomic bonds, its types, explanation and comparisons

- **Atomic Bonds:-**

Atomic bond is attractive force between the atoms to form chemical substances.

These attractive forces are between the opposite charges or between electrons and Nuclei of atom.

- **Types of Atomic bonds-**

There are major five types of atomic bondings :-

1. Ionic Bonds
2. Covalent Bonds
3. Co-ordinate Covalent Bond
4. London Dispersion forces
5. Hydrogen Bonds

Explanation of bonds:-

- **Ionic Bonds:-**

Interaction between the atoms due to large difference of electronegativity. If there is a difference of 1.7 between the bonding atoms then it is likely an ionic bond

If ionic bond breaks, then it separates into negative and positive ions. In ionic bonds, the ionic charges are between -3e to +3e ionic.

- **Covalent Bonds:-**

In this type of atomic bonding, the electro-negativity difference is very small or none. In organic compounds, mostly the bonding is covalent bonding.

Electronegativity of these bonds is 0.3 to 1.7. Further two types of covalent bonds are polar and non-polar.

- **Co-ordinate Covalent Bond:-**

This type of atomic bonding is formed between the electrons of atom which is involved in bonding. Co-ordinate covalent bonding helps us to study about Lewis Acid and base.

In co-ordinate covalent bonds, electrons shared equally and roughly i.e (NH_4^+). Electro-negativity of these bonds ranges from 0 to 0.3.

- **London Dispersion Forces:-**

London Dispersion forces also called instantaneous Dipole induced dipole forces and are named after German-American physicist Fritz London.

These are very weak forces and induced due to polarization for instant. They are generally present between atoms and molecules.

- **Hydrogen Bond:-**

Hydrogen bonding is electrostatic attraction between polar molecules. These bonds formed when an hydrogen atoms bounds To highly electronegative elements i.e Oxygen, Nitrogen etc.

These hydrogen-bond attraction can occur between molecules (inter-molecular) or with in molecule (intra-molecule). These bonds are present in water, DNA, proteins etc.

Comparison between bonds:—

	Electronegativity Difference	Strength	Examples
Ionic bond	1.7	Very Strong bond	NaCl, CaCl
Covalent bond	0.3 To 1.7	Strong bond	Carbondioxide
Co-ordinate Covalent bond	0 - 0.3	Weaker than Ionic and Covalent	(NH_4^+) Ammonium
London Dispersion Forces	Instant bonding, No electronegativity difference.	Very weak forces	Between two atoms of Helium.
Hydrogen bonding	High difference between Hydrogen & bonding element.	Very Strong bonds.	Water, DNA, proteins.