Ionic Bonding -

- Positive & negative ions, by virtue of their net electrical charge, attract one another.
- Attractive bonding forces are coulombic
- Non directional bonding, ie., magnitude of the bond is equal in all directions around an ion.
- Predominant bonding in ceramic material
- found in compounds that are composed of both metallic & non-metallic elements.
- ex:- NaCl, MgO, ~~Si, Diamond~~,
- Bonding energies: 600 - 1500 kJ/mol (3 - 8 eV/atom)
- Reflected in high melting temperature material
- Ionic materials are characteristically hard & brittle
- electrically & thermally insulative

Covalent Bonding

- Sharing of electrons between adjacent atoms
- Directional bonding: it is between specific atoms and may exist only in the direction between one atom and another that participates in the electron sharing.
- Ex - non metallic elemental molecules (H_2, Cl_2, F_2, etc)
  Ex - CH_4, H_2O, HNO_3, HF
- Found in elemental solids, such as diamond (Carbon), Silicon & germanium & other solid compounds GaAs, InSb, SiC
- No. of covalent bond $8-N'$. N' - Valence electrons
- Very strong bonding in Diamond, (Hard & very high M.P.)
- Very weak in Bismuth (melts at 270°C)