## Bonding in organic compounds.

The organic compounds are carbon compounds consisting of one or more carbon atoms. Carbon must form only covalent bonds, i.e., it should share its valency electrons with other atoms.
According to the modern concept, a covalent bond is formed between two atoms if there is an overlapping of an atomic orbital of one atom with an atomic orbital of another atom. The overlapping is possible by two ways,

(1) **End to end overlapping:**This type of overlapping is possible between $s-s, s-p_x$ and $p_x - p_x$ atomic orbitals. The molecular bond formed is termed as sigma $(\sigma)$ bond.

(2) **Sidewise or parallel or lateral overlapping:** Such overlapping is possible between $p-p$ atomic orbitals. The molecular bond formed is termed as $pi(\pi)$ bond.

| $\sigma$-Bond | | $\pi$-Bond |
|---|---|---|
| Formed by End to End overlap of AO's. | | Formed by lateral overlap of $p$-orbitals. |
| Has cylindrical charge symmetry about bond axis. | | Has maximum charge density in the cross-sectional plane of the orbitals. |
| Has free rotation | | No free rotation, i.e., frozen rotation |
| Low energy | | Higher energy |
| Only one σ bond can exist between two atoms, | | One or two π bonds can exist between two atoms. |
| Sigma bonds are directional. Thus the geometry of the molecule depends on the σ bonds. | | πBonds are not directional. Geometry of the molecule not depends on π bond. |
| Area of overlapping is higher hence bond is stronger. | | Area of overlapping is small hence bond is weaker. |
| σBond can have independent existence. | | πBond always exist along with a σ bond and π bond is formed after the formation of σ bond. |