- **Alkanes*, Alkenes* and Conjugated dienes***

  SP^3 hybridization in alkanes, Halogenation of alkanes, uses of paraffins.

  Stabilities of alkenes, SP^2 hybridization in alkenes

  E_1 and E_2 reactions – kinetics, order of reactivity of alkyl halides, rearrangement of carbocations, Saytzeffs orientation and evidences. E_1 verses E_2 reactions, Factors affecting E_1 and E_2 reactions. Ozonolysis, electrophilic addition reactions of alkenes, Markownikoff's orientation, free radical addition reactions of alkenes, Anti Markownikoff's orientation.

  Stability of conjugated dienes, Diel-Alder, electrophilic addition, free radical addition reactions of conjugated dienes, allylic rearrangement

Unit-2

Alkanes, Alkenes and conjugated dienes

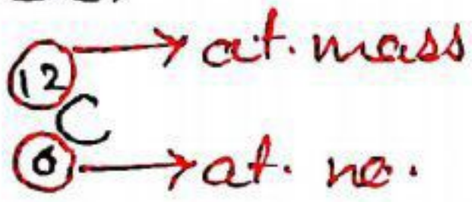
- sp^3 hybridization in Alkanes
- sp^2 hybridization in Alkenes
- Stability of Alkenes.

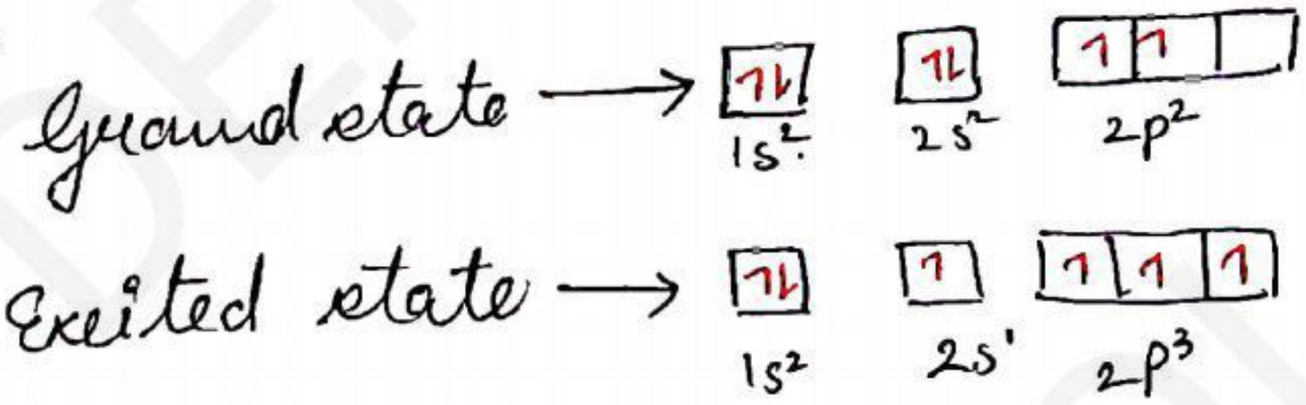
Hybridization :-

- concept of mixing atomic orbitals into new hybrid orbital on the basis of energy.

OR

- Process of mixing of atomic orbitals of different energy level to form hybrid orbital having same energy level.

Eg: → 

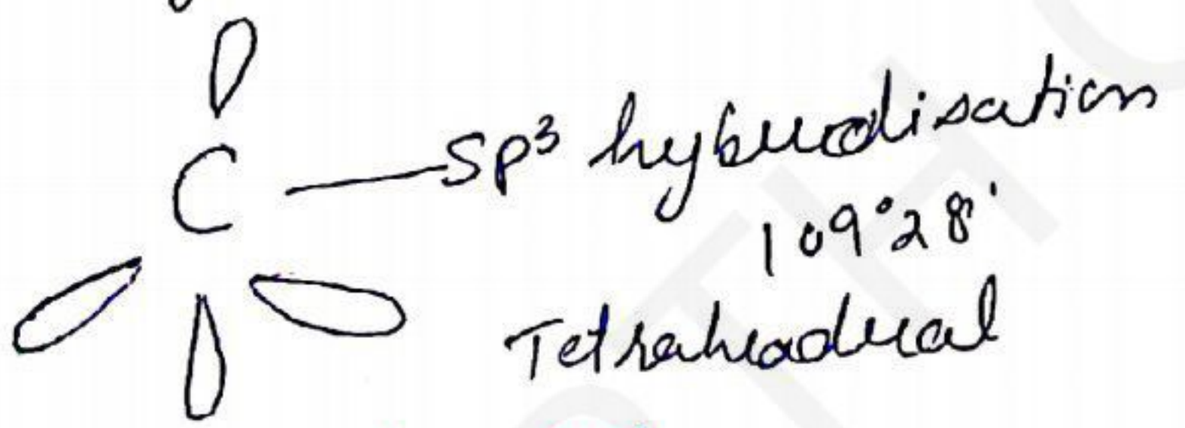


In excited state

6 valence shell has 4 free orbitals to bind for form hybrid orbital.

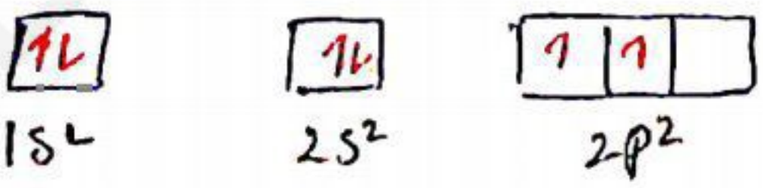
- sp^3 hybridization in Alkanes.

Alkanes always shows sp^3 hybridization (low reactive)



- sp^2 hybridization in Alkenes

Carbon in

Ground state → 

Excited state → $1s^2$ $2s^1$ $2p^3$

Trigonal planer
Bondangle 120°

This reduce electron repulsion.

3 Sp^2 orbital
1 p orbital

Stability of Alkenes

- Alkene add on hydrogen in presence of finely divided metal such as platinum, Palladium or Raney (ground) Nickle to form Alkanes.

$$>C=C< + H_2 \xrightarrow[\Delta]{Pt\ or\ Pd} -\underset{H}{\overset{|}{C}}-\underset{H}{\overset{|}{C}}- + \Delta T \text{ exothermic}$$

Reaction → Hydrogenation.

This reaction is exothermic reaction. the amount of heat evolved when one mole of an alkene is hydrogenated is called its heat of hydrogenation.

$C \rightleftarrows C$

① $H_2C=CH_2$ → stab. ↑

② An Unsubstitute alkene is less stable due to high heat of hydrogenation.

③ Greater the no. of alkyl group attaches to double bonded carbon, More stable is the alkene

$H_2C=CH_2 < R_2C=CH_2$

④ Trans isomers are more stable than Cis.