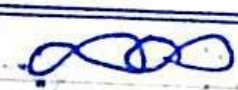


→ 2 types of overlapping

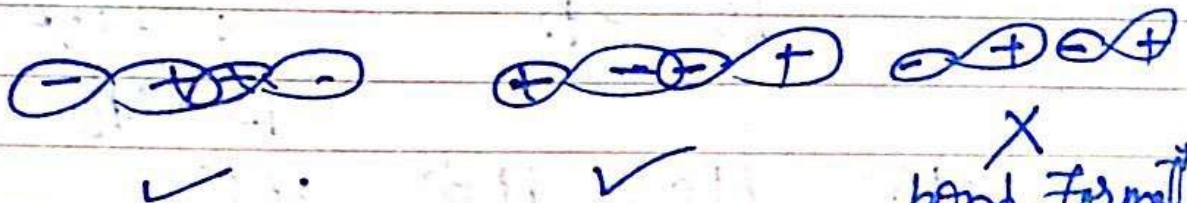
(A) Axial overlapping / Head on overlapping

σ - bond 

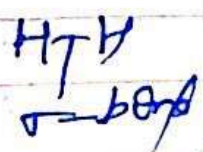
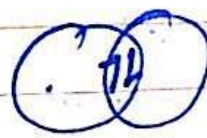
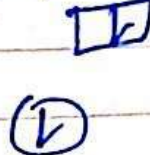
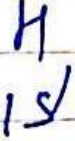
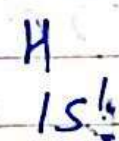
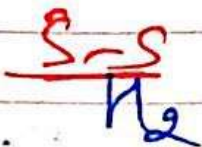
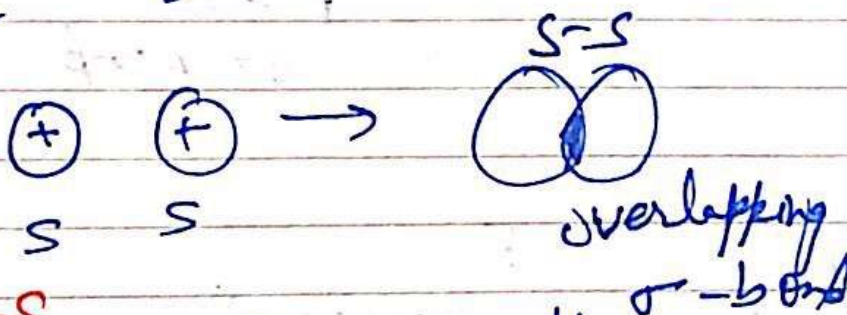
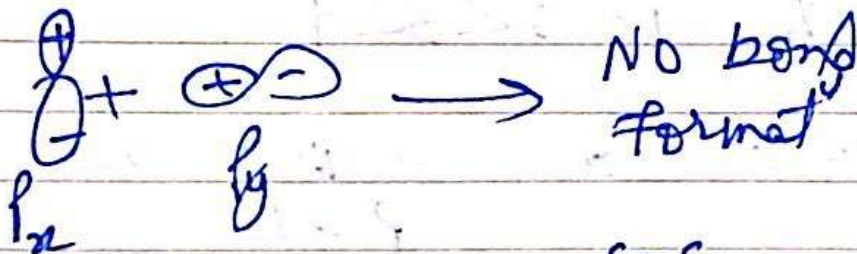
(B) Parallel overlapping / sideways lateral overlapping

 π - bond

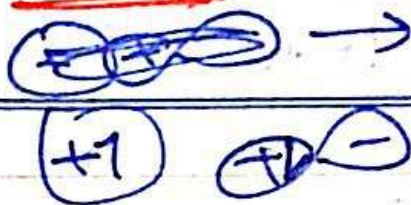
→ overlapping ~~overlap~~ orbital must have same sign → then bond will form



✗
bond formation is not possible

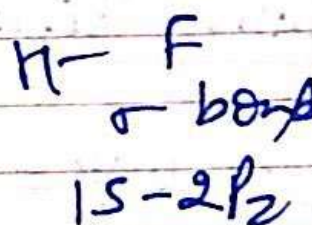
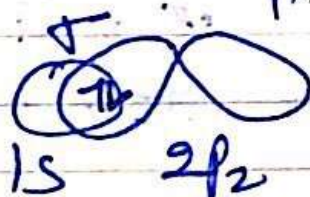
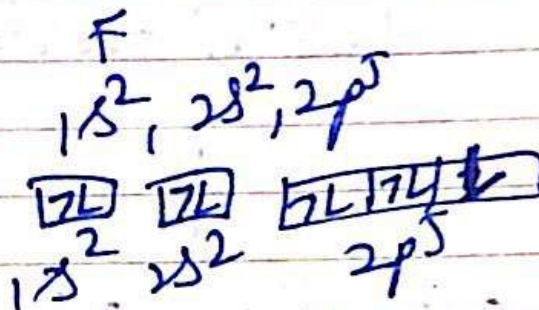


S-P



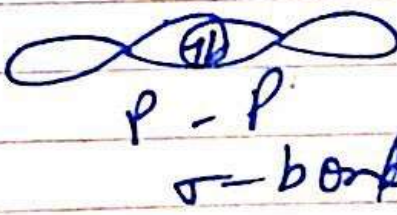
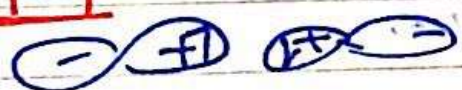
S-P (σ -bond)

H-F

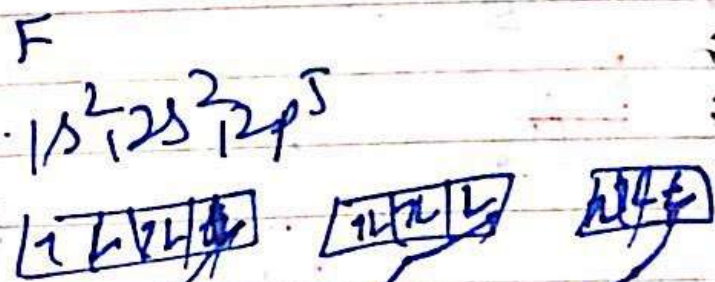
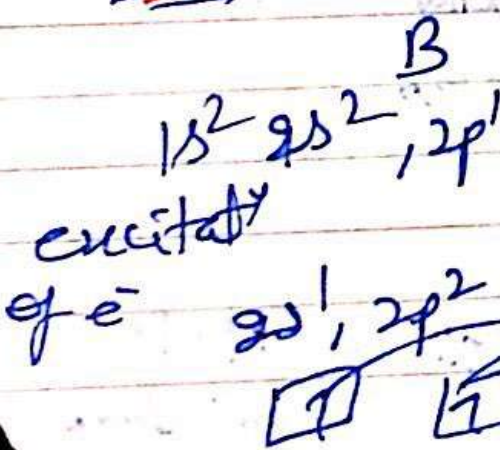


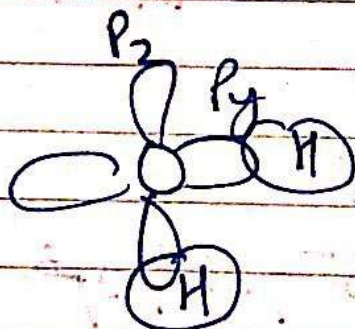
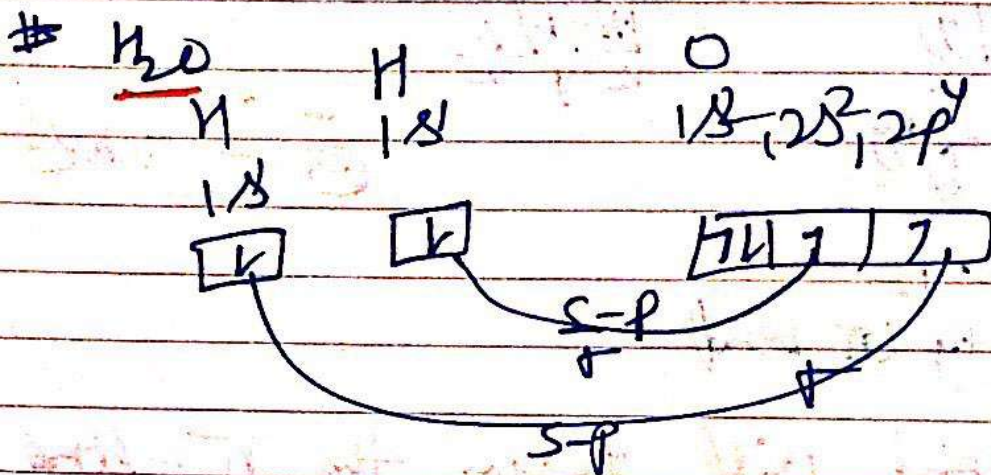
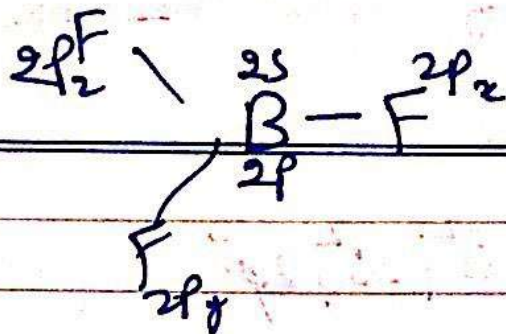
	HF	HCl	HBr	HI
bond strength	1	2	3	4
bond length	1	2	3	4

P-P

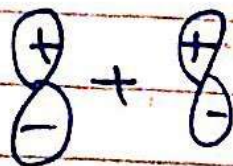


BF₃





Sidewise / lateral / Parallel overlapping

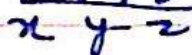
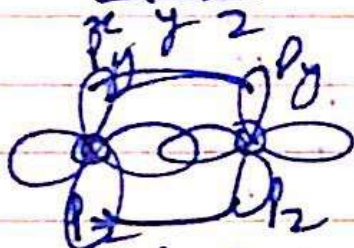
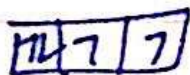
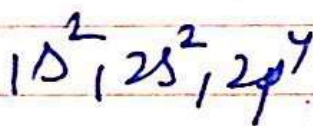
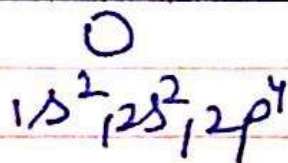


$p\pi - p\pi$ bond

180 Kcal/mol

more overlapping
 (extent ")
 bond strong
 bond energy

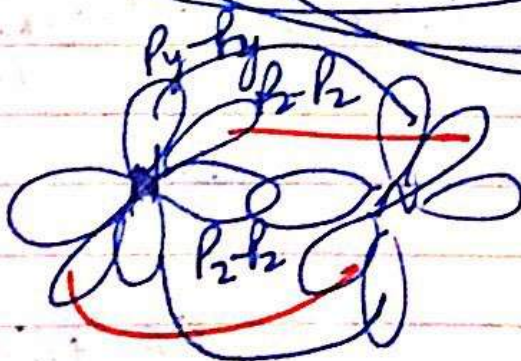
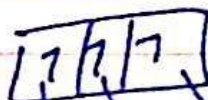
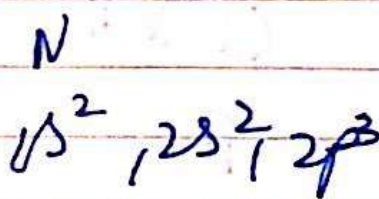
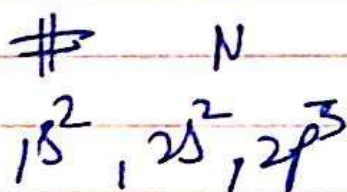
π 165 Kcal/mol



π bond

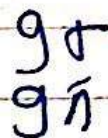
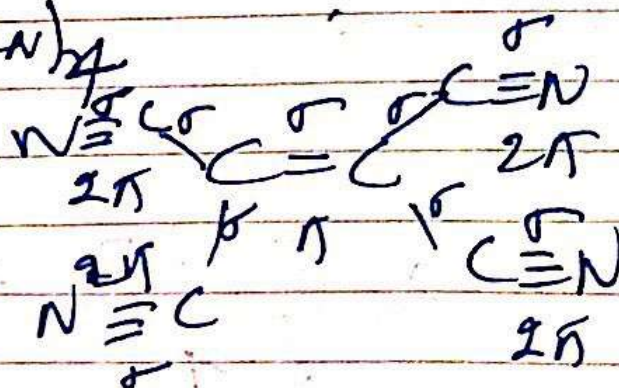
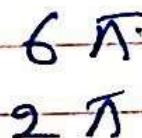
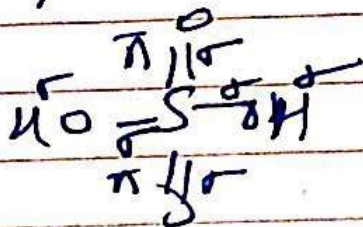
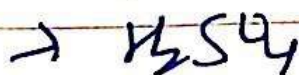
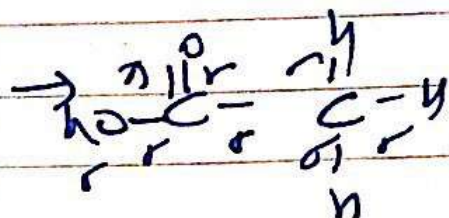
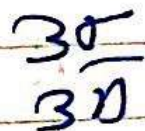
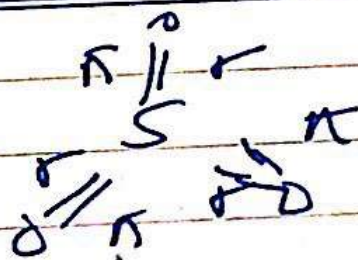
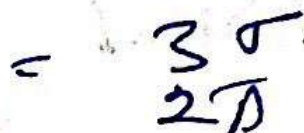
π-π* (π bond)

σ bond will form the π-bond
will form



Find no. of σ & π bond





σ -bond

Antal / Head on overlapping

S-S, S-P, P-P

→ overlapping $\rightarrow$ strong

1. B-E-

Stable bond
80 Kcal/mol

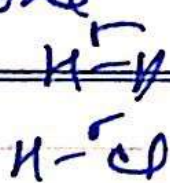
π -bond

side wise / parallel overlap

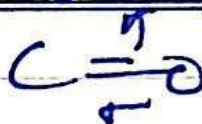
P-P, P-d, d-A

$$\beta \cdot G \approx 65 \text{ Kcal/mol}$$

σ can be formed alone



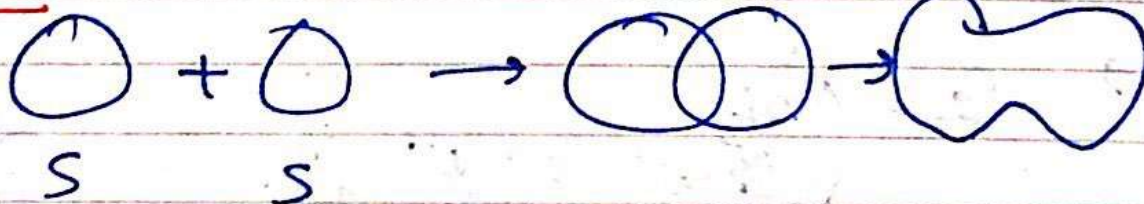
π is formed with σ (after σ)



Overlapping



S-S



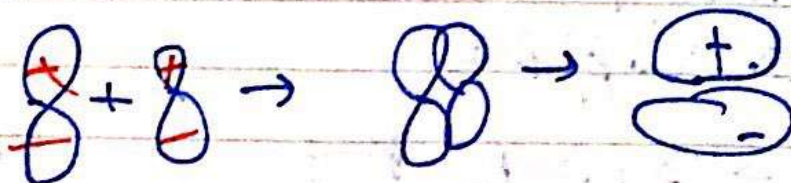
S-P



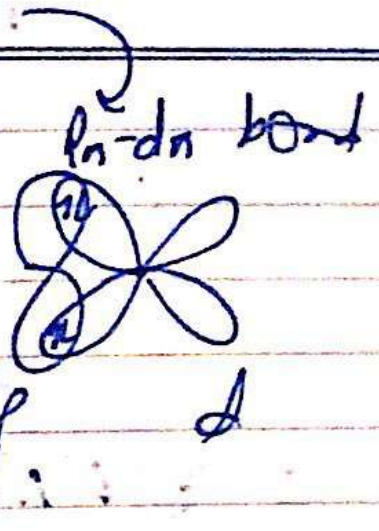
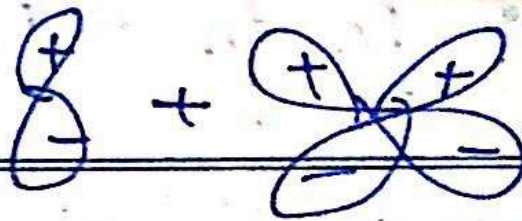
P-P



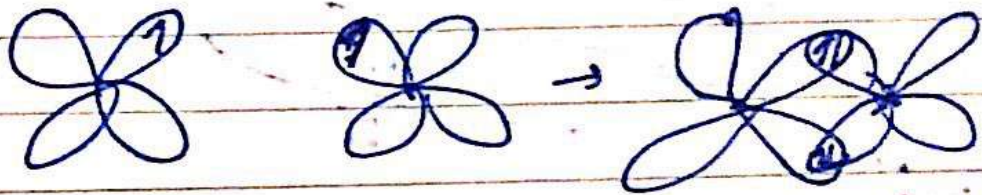
P_x-P_x



$p\pi - d\pi$

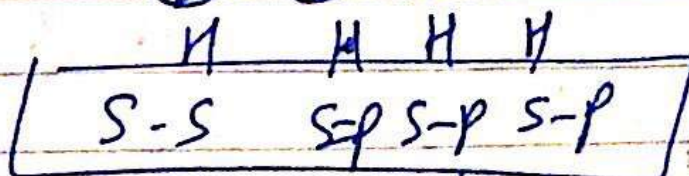
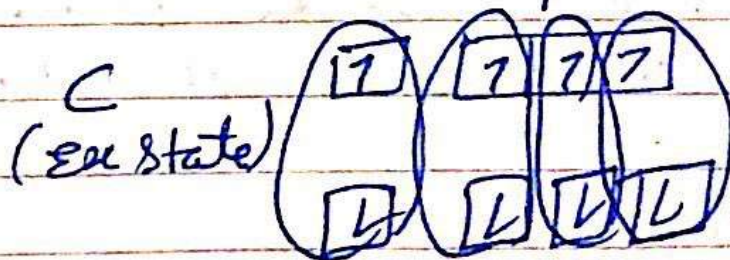
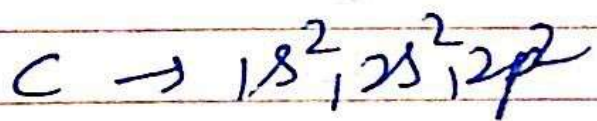
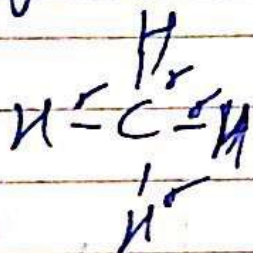


$dn - dn$



$dn-dn$ bond

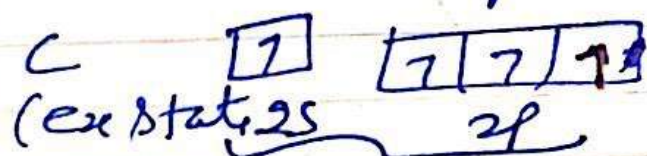
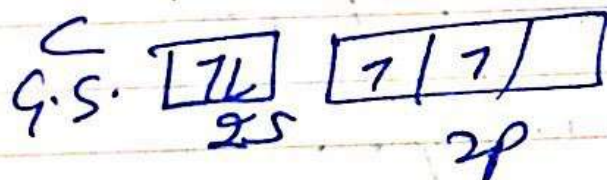
Hybridisation :- ^{Pauling} ACC. to VBT



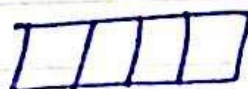
ACC. to VBT 4-bonds are diff type
 ① S-S, ② S-p

All four bonds of $C-H_4$ are equivalent in all respects

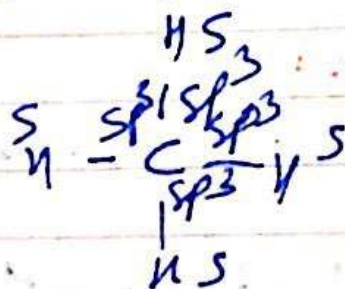
{ B.E., B.L same }



energy nearly same s & p

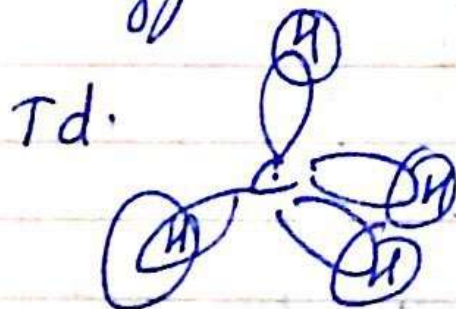


4 sp^3 energy same



④ $s-sp^3$ hyp. orbital
all 4-bonds are same

Atomic orbital of same or nearly same energy orbital intermix to give new orbital of exactly same energy



all 4-hyp. bonds
repel to each other
& take a geometry

where repulsion is min

Points of hyp.

- ① Intermixing of Atomic orbitals of same or nearly same energy to give new orbitals of exactly same energy
- ② Half filled orbital } all can undergo
empty orbital } hybridization
i.e. fully filled "
- ③ no. of Hyp orbital = no. of intermixing orbital
- ④ concept of Hybridization is for σ b.p. (single) bond
π-bond is not related to hyp.
(σ bond making orbital involves in hyp.)
- ⑤ Hyp. orbitals are named after the parent orbitals.

