Class — B.Sc. Part I (Honours)
Subject - chemistry
Paper - IC
Topic — Hybridisation
Name — Dr. Rashmi Sinha
Department of chemistry
H.D. Jain college, Ara

Hybridisation

Hybridization is the merger of orbital an atom having nearly equal energy to produce entirely a new orbital having same energy contain identical shape and Symetrycally disposed in a space.

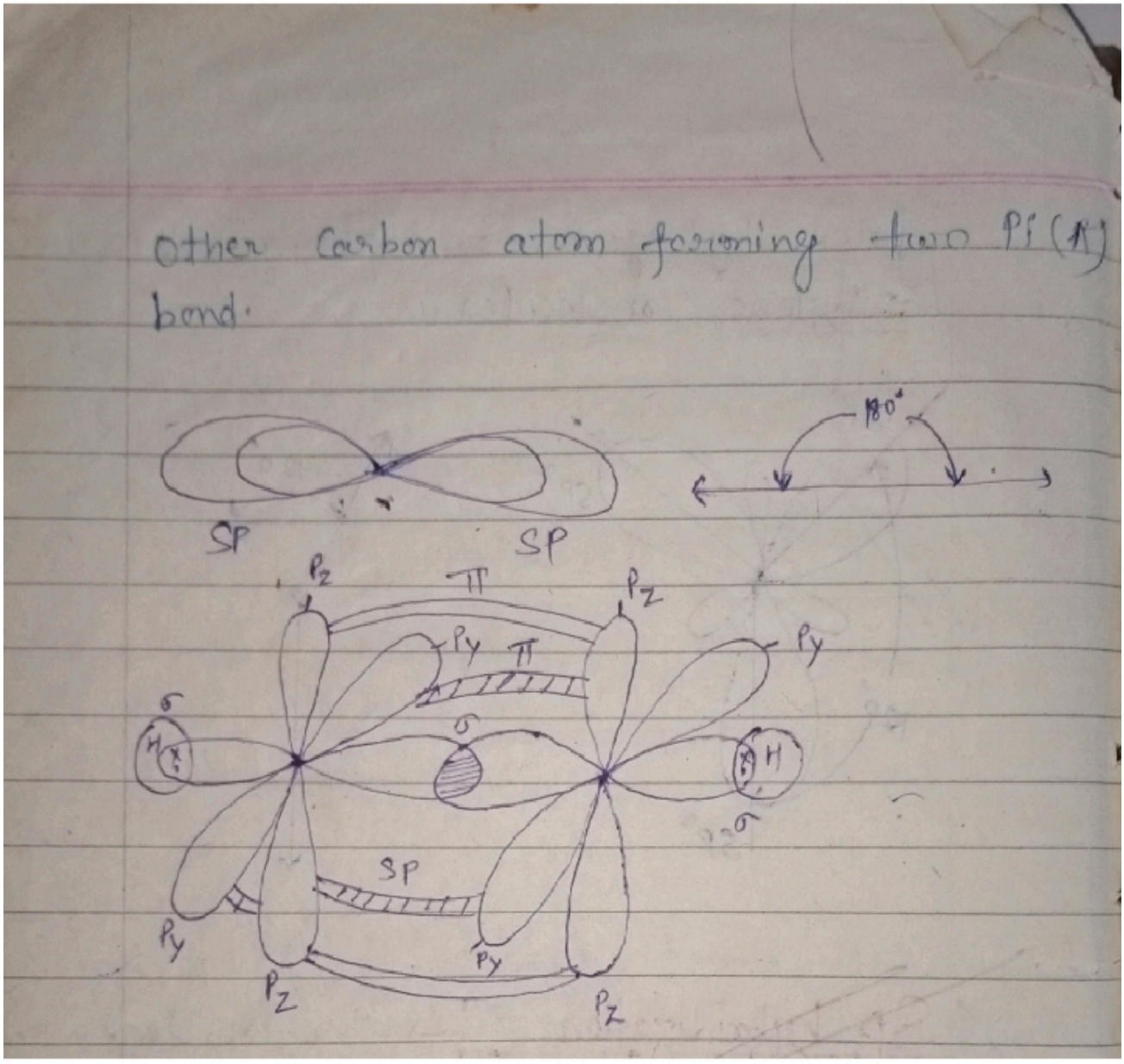
In the case of Carbon their are three types of hybridization. Discuss as bellow:-

Sp hybridization :→ In this hybridization S and p orbitals take part in hybridization to form two co-linear orbitals while. The two p orbital of excited carbon atom remain unhybrized and these lie perpendicular to the plane of hybrid orbital.

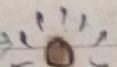
for e.g :— In the formation of acetylene (C_2H_2) :—

One hybrid orbitals to two orbitals each overlap linearly forming σ bond and rest of one hybrid orbital overlap with two orbital of two hydrogen atom forming two Sigma (σ) bond and two unhybridized that is Py and Pz overlap Sidewise with the unhybride orbital Py and Pz with

other Carbon atom forming two Pi (π) bond.

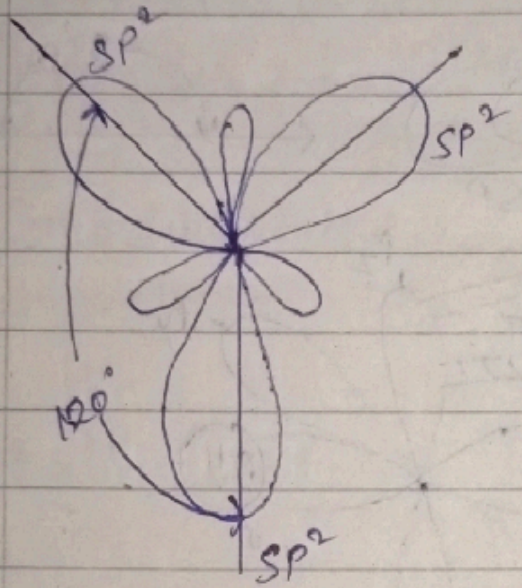


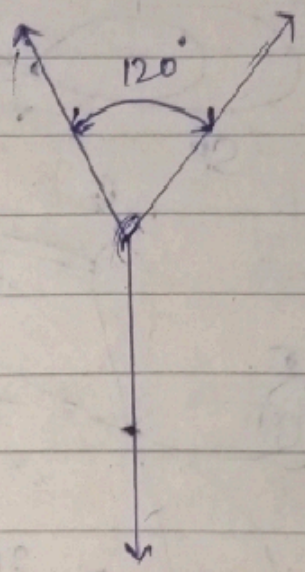
Sp^2 hybridization :→ In this hybridization 2s, 2px and 2Py orbitals is take part to form three Sp^2 hybrid orbitals which are planner and have Contituent and an angle of 120°. They are directed towards the equilateral. It has following Charactics → It takes place in a Compound C=C, Bond length 134 Pm and Bond angle = 120°.

for eg :→ In the formation of ethylene (C_2H_4) :→ 

One hybrid orbitals of two carbon atom which overlap linearly forming σ (sigma) bond between them. Now rest of the two rest hybrid Orbital of two carbon atom Overlap Oxidizely to form four S orbital to

four hydrogen atom giving rise to ethylene molecules.





(1) **Sp^3 hybridization :** — In this hybridization 2s, 2px, 2Py and 2Pz Orbitals takes part to form four Sp^3 hybrid Orbital which are identical and have equal energy angle of 109°, 28". They Contain One electron each further. They are represented by the Carbon of the tetra hydral.

It has following characteristics, They Contain in a Compound C-C (Carbon Single bond Carbon), Bond length — 154 A°. and Bond angle 109°.28' It shape is twine bounded in which One lobe is much larger than the other.