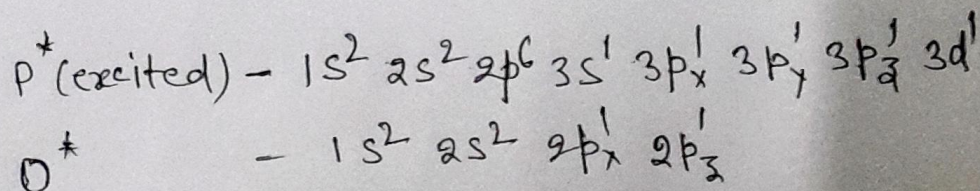
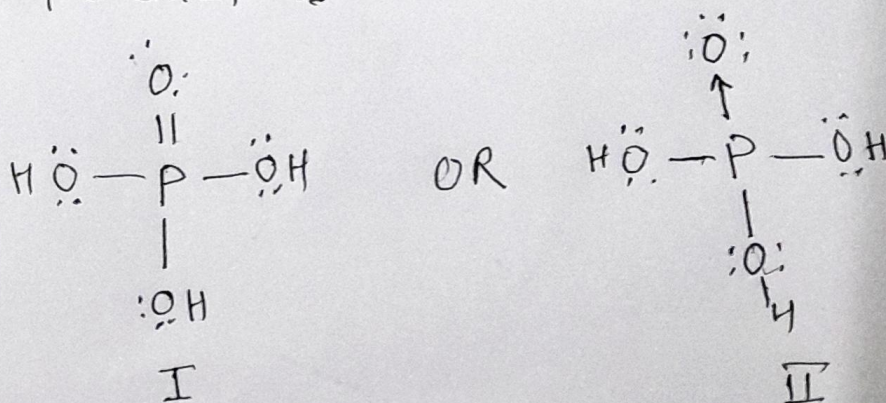


$d\pi - p\pi$ Bonds:

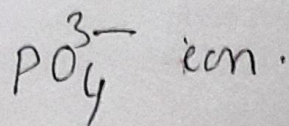
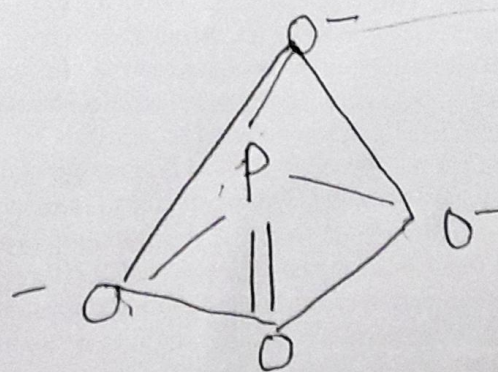
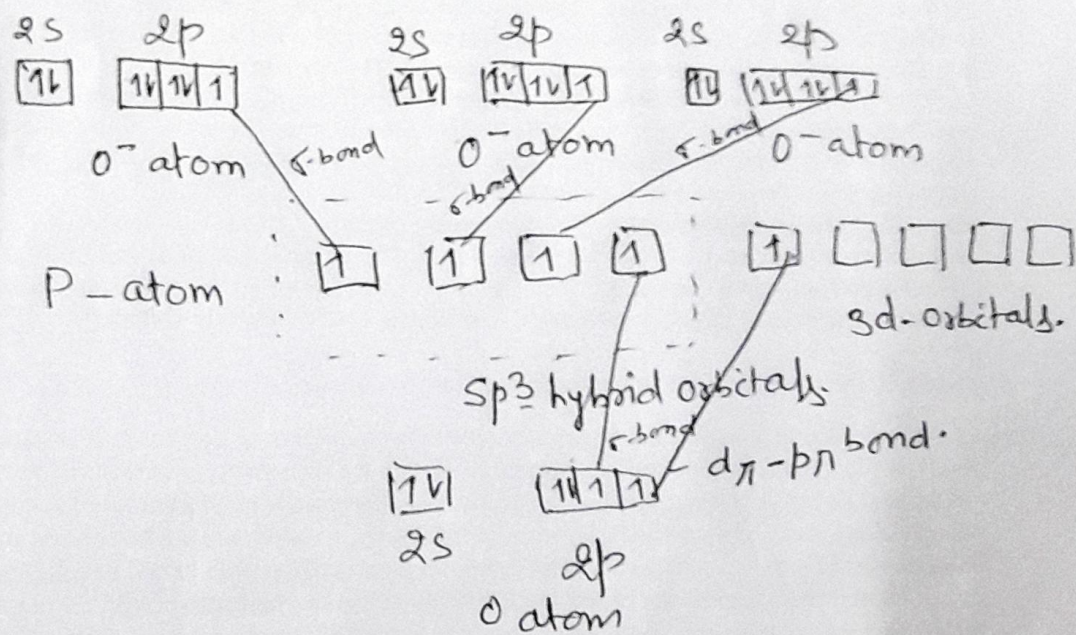
This type of bond is formed by number of molecules and ions. In such species the central atom has half-filled d-orbitals which forms π -bonds with the surrounding atom having half filled p-orbitals. First they form σ -bond later on π -bond is formed. Such bonds are present in H_3PO_3 , H_3PO_4 , POX_3 , H_2SO_3 , H_2SO_4 , SO_2OF_2 etc. Structure of ^{H_3PO_4} some such molecules are given below:

f. H_3PO_4 molecule: - Phosphoric acid (H_3PO_4) is a tribasic acid, it contains three -OH group attached directly with central phosphorus atom thus its dot structure may be represented as

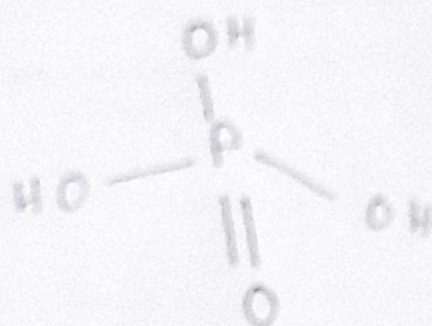


one 3s and three 3p orbitals of P atom undergo hybridization to yield four sp^3 hybrid orbitals. one 3d orbital is unhybridized and able to form π -bonds.

The PO_4^{3-} ion is having three negative charges hence three of the oxygen atom may be having one extra electron each.



(3)



H_3PO_4 , sp^3 hybridization

Three of the four sp^3 hybrid orbitals of phosphorus atom are able to overlap with sp orbitals of three oxygen atoms having sp^3 -p σ bonds. Remaining one sp^3 hybrid orbital of phosphorus atom are able to overlap with sp orbital of one oxygen atom forming sp^3 -p sigma bond. The one with unhybridized d-orbital of phosphorus atom are able to overlap with sp orbital of one oxygen atom making $\text{d}-\text{p}$ bond. Hence PO_4^{3-} ion have tetrahedral structure and three H-atom is bonded with three oxygen atom having negative charged oxygen atom.

Thus when a bond is formed between the p-orbital of the one element and the d-orbital of the another element

(4)

Such type of bonding is known as $d\pi - p\pi$ bonding. The heavier non-transition element have a little tendency to form π -bond among themselves. But they can form π -bond with lighter element like oxygen, nitrogen by using outer d-orbital, such type of bonding is called $d\pi - p\pi$ bond.