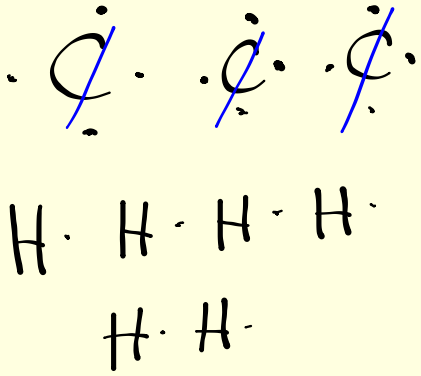
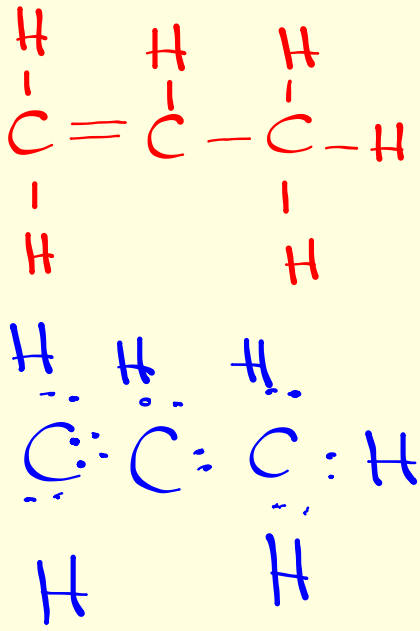
Warm Up

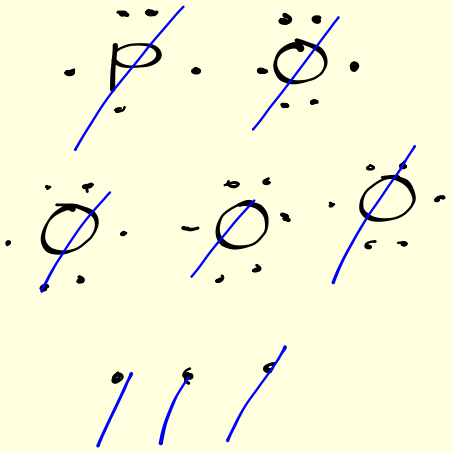
Draw an electron dot structure and structural diagram for the following:

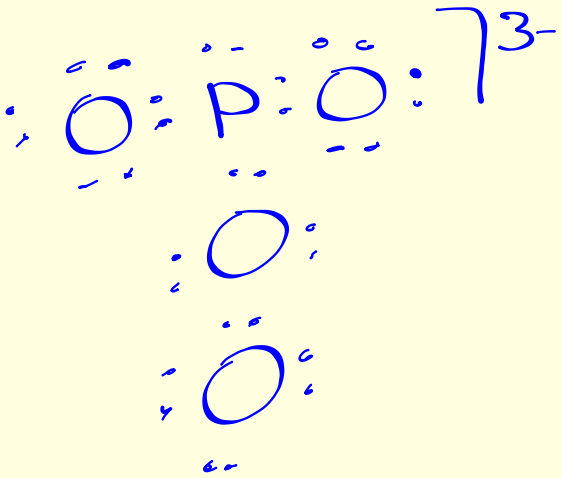
a) C_3H_6





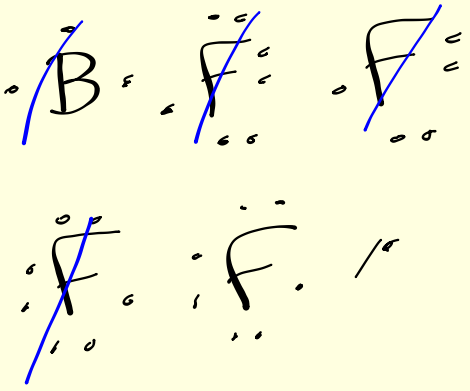
b) PO_4^{3-}

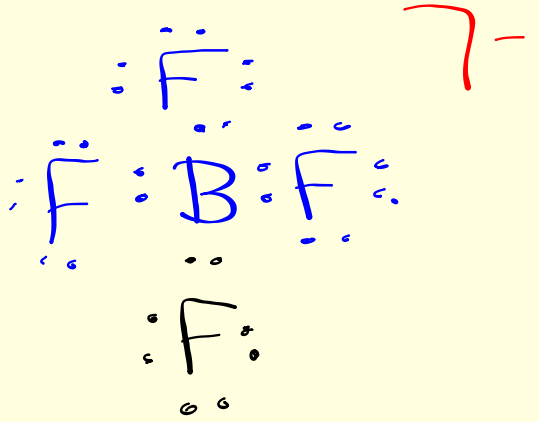


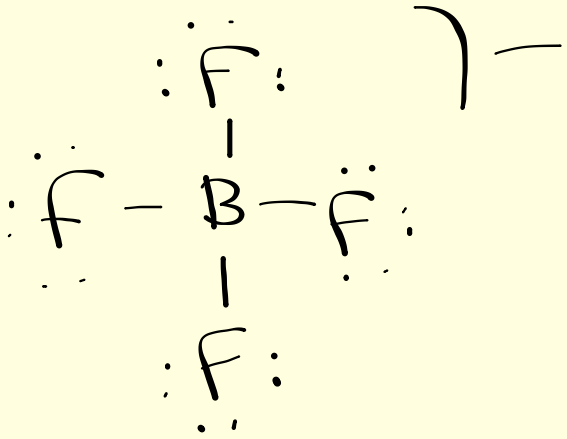


p. 225 #9-12

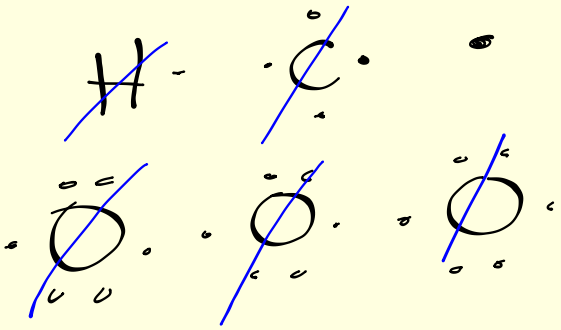
(10) BF_4^-

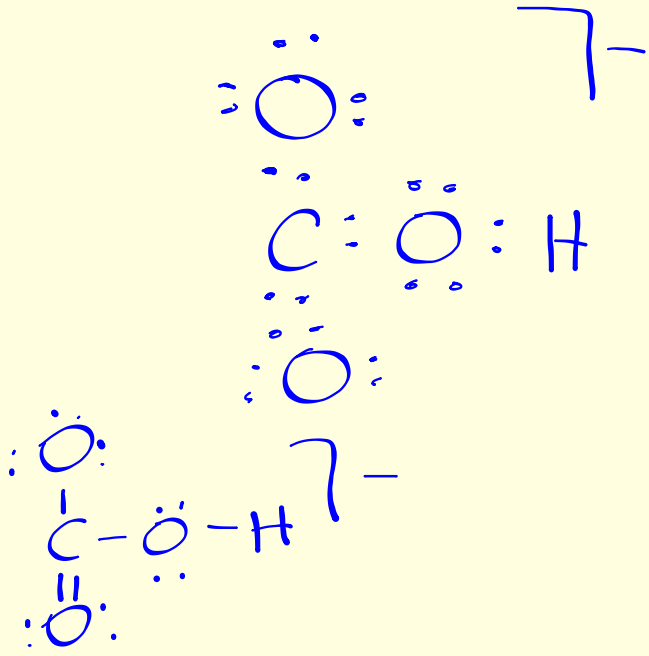


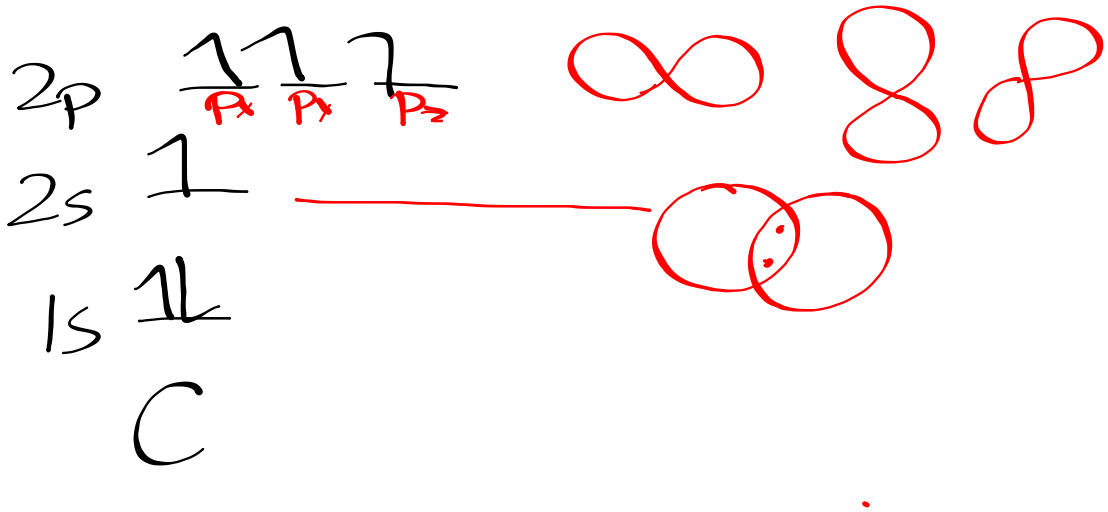




(12) HCO_3^-






2p
2s
1s
C

Molecular Orbitals

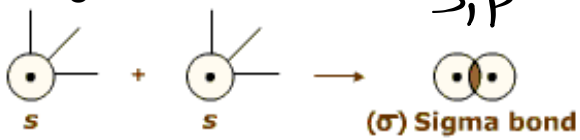
When two atoms share electrons to form a molecule, their atomic orbitals combine to produce molecular orbitals.

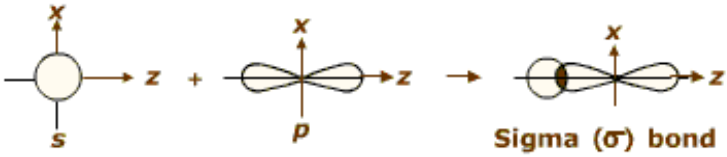
When the orbital is filled with two electrons, it is called a **bonding orbital**.

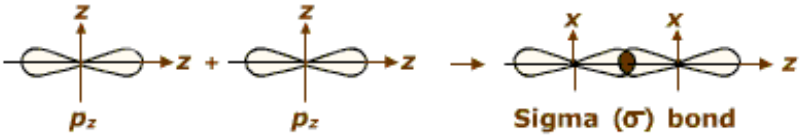
Sigma bond (σ)

Bond that forms when two atomic orbitals overlap head-on.
-strong bond

S, P

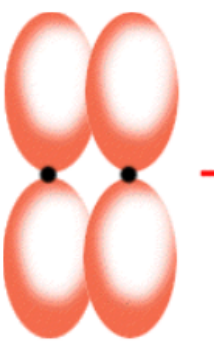


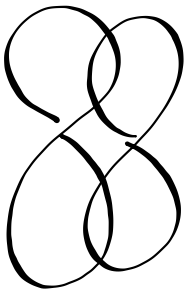




Pi bond (π)

Bond that forms when two atomic orbitals overlap side-by-side.
-orbitals overlap less than in sigma bonds, thus the bonds are weaker than sigma bonds.

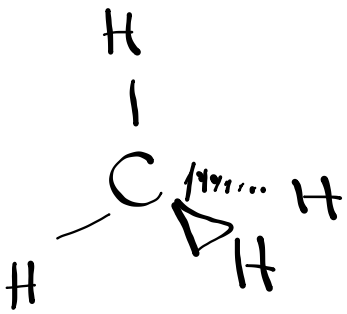


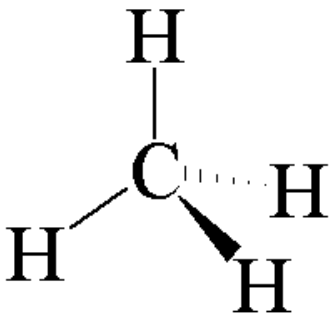


VSEPR Theory

Valence-Shell Electron-Pair Repulsion Theory
Repulsion between electron pairs causes molecular shapes to adjust so that the valence-electron pairs are as far apart as possible.

Ex. CH_4

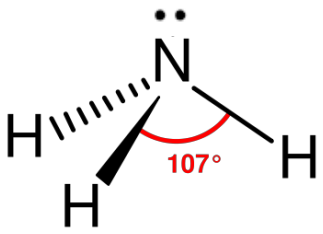




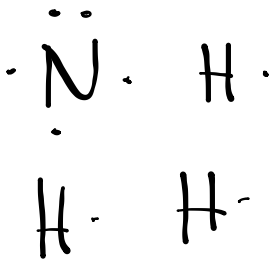
tetrahedral angle (109.5°)

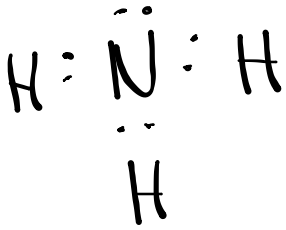
Ex. NH_3

Lone pairs (unshared pairs) also affect the shapes of molecules.



NH_3





CH_4