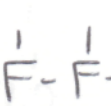
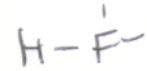
P209 P210 #33, 35, 36, 44, 48, 49

HW #10

33. (a) VSEPR use the number of bonding and lone pairs of electrons on the central atom to predict the geometry of the molecule.

~~35.~~ (b) F_2 $F: 2 \times 7e^- = 14e^-$ 

central atom (Pick one of 2 Fs)
3 nonbonding pairs
1 bonding pair
linear

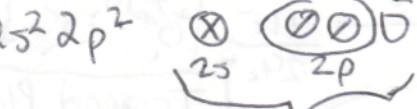
(a) HF $H: 1 \times 1e^- = 1e^-$
$F: 1 \times 7e^- = \underline{7e^-}$
$8e^-$ 
linear

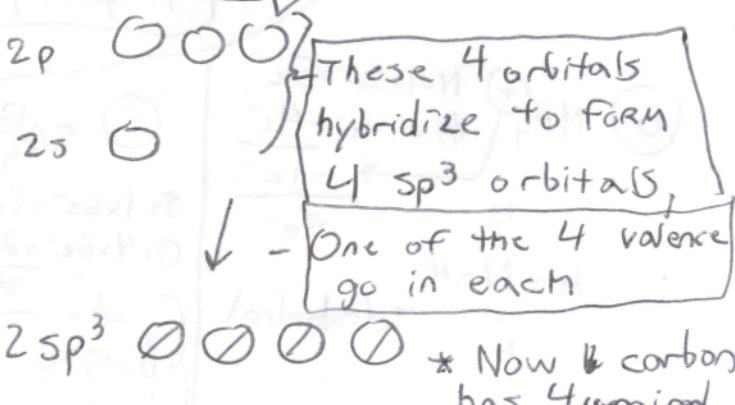
35. (a) Unshared pairs count as electron pairs that will repell bonding pairs of electrons

(b) Double bonds count as single bonds ~~as such~~ (1 bonding area) in determining geometry.

36. (a) Hybrid orbitals are a mixture of 2-6 orbitals to make new orbitals for ~~e~~ electrons.

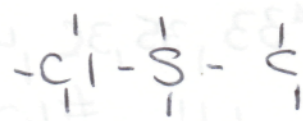
(b) The total number of bonding and nonbonding areas.

44. Cabon only has two unbonded, single electrons in the valence shell $C \rightarrow 2s^2 2p^2$ 



* Now the carbon has 4 unpaired electrons (4 bonds)

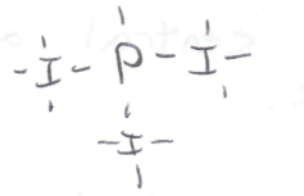
(48) (a) SCl_2 S = 1×6e⁻ = 6e⁻, Cl = 2×7e⁻ = 14e⁻, 20e⁻



2 bonding, 2 nonbonding } central atom

linear

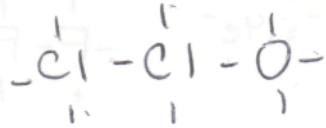
(b) PI_3 P = 1×5e⁻ = 5e⁻, I = 3×7e⁻ = 21e⁻, 26e⁻



3B, 1NB

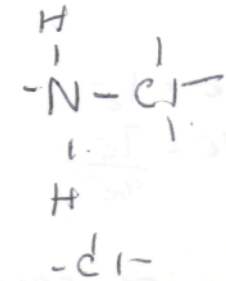
Pyramidal

(c) Cl_2O Cl = 2×7e⁻ = 14e⁻, O = 1×6e⁻ = 6e⁻, 20e⁻



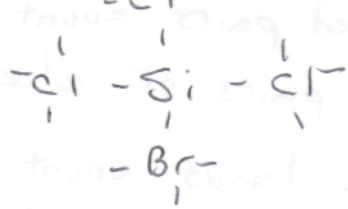
Bent

(D) NH_2Cl N = 1×5e⁻ = 5e⁻, H = 2×1e⁻ = 2e⁻, Cl = 1×7e⁻ = 7e⁻, 14e⁻



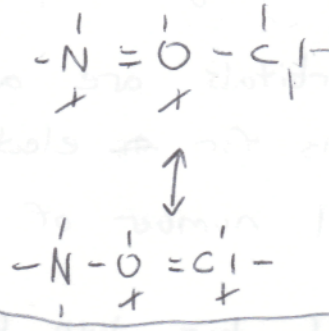
PYRAMIDAL

(E) $SiCl_3Br$ Si = 1×4e⁻ = 4e⁻, Cl = 3×7e⁻ = 21e⁻, Br = 1×7e⁻ = 7e⁻, 32e⁻



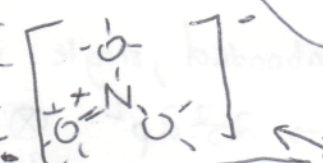
Tetrahedral

(F) ONCl O = 1×6e⁻ = 6e⁻, N = 1×5e⁻ = 5e⁻, Cl = 1×7e⁻ = 7e⁻, 18e⁻

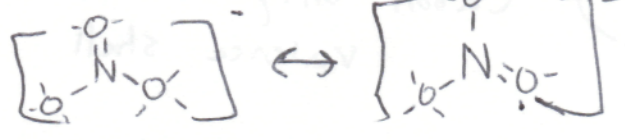


2 Bonding, 1 Nonbonding, V-shaped

(49) (A) NO_3^- N = 1×5e⁻ = 5e⁻, O = 3×6e = 18e⁻, +1e⁻, 24e⁻

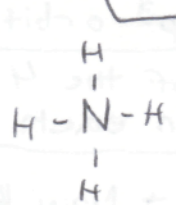


Trigonal Planar



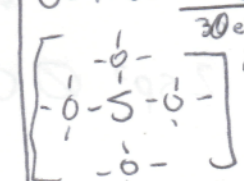
Resonance

(B) NH_4^+ N = 1×5e⁻ = 5e⁻, H = 4×1e⁻ = 4e⁻, −1e⁻, 8e⁻

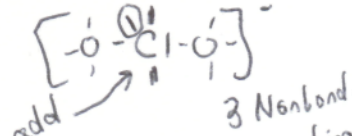


Tetrahedral

(C) SO_4^{2-} S = 1×6e⁻ = 6e⁻, O = 4×6e⁻ = 24e⁻, 30e⁻ + 2e⁻ = 32e⁻



(D) ClO_2^- Cl = 1×7e⁻ = 7e⁻, O = 2×7e⁻ = 14e⁻, +1e⁻, 22e⁻



add 2 lone pairs

3 Nonbonding, 2 Bonding, linear