

AP Chem - Unit 6 - NMSI Chemical Bonding & Molecular Structure

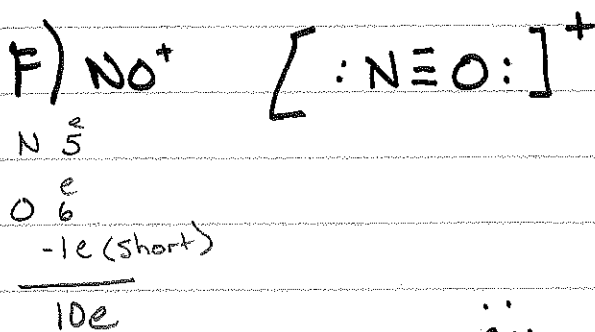
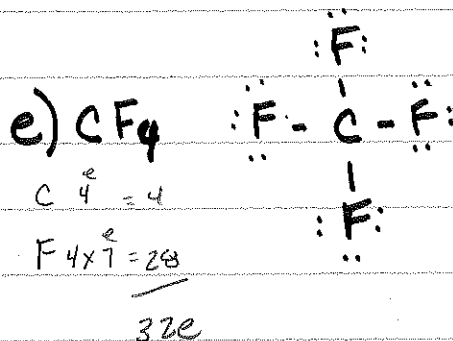
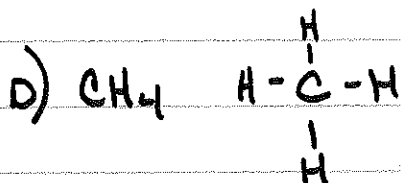
3.5-2.1 3-2.1 2.5-2.1 4.0-2.1

- 1) H-H, O-H, Cl-H, S-H, F-H
 EN Δ 1.4 .9 .4 1.9

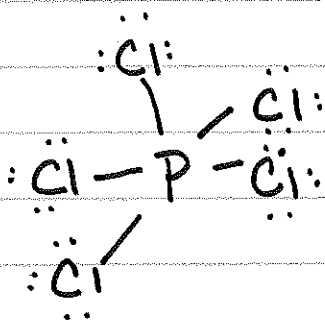


→
Polarity

- 6) a) H-F H- $\ddot{\text{F}}:$
 H 1
 F 7/8 Valence
 Electrons
- b) N₂ :N≡N:
 2x6 = 10e
- c) NH₃ H- $\overset{\text{H}}{\underset{\cdot\cdot}{\text{N}}}$ -H
 N 5
 H 3x1 = 3
 8e

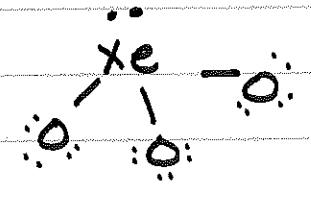
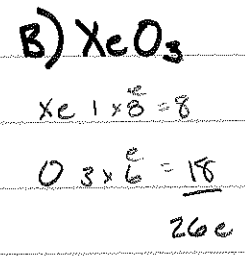
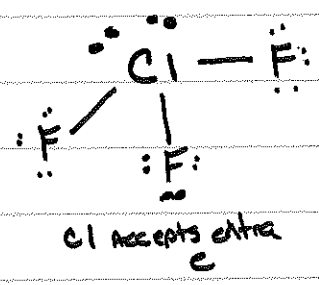
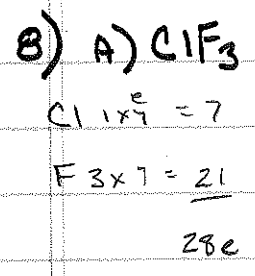


- 7) PCl₅
 P 5 = 5
 Cl 5x7 = 35
 40e

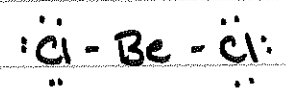
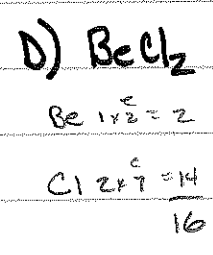
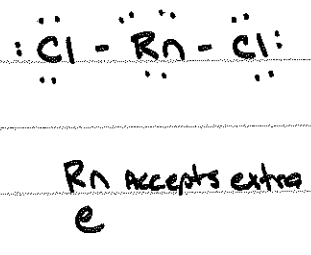
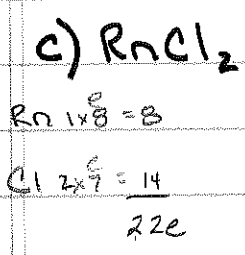


Note: P does exceed octet rule

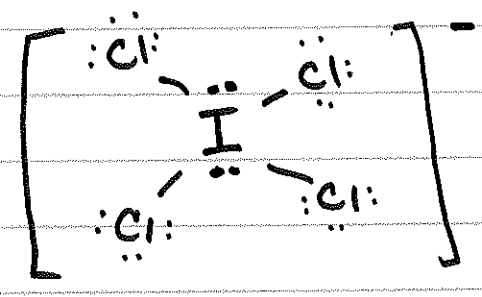
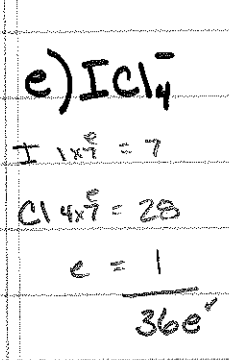
AP Chem - Unit 6 - MMSI - CB + MS



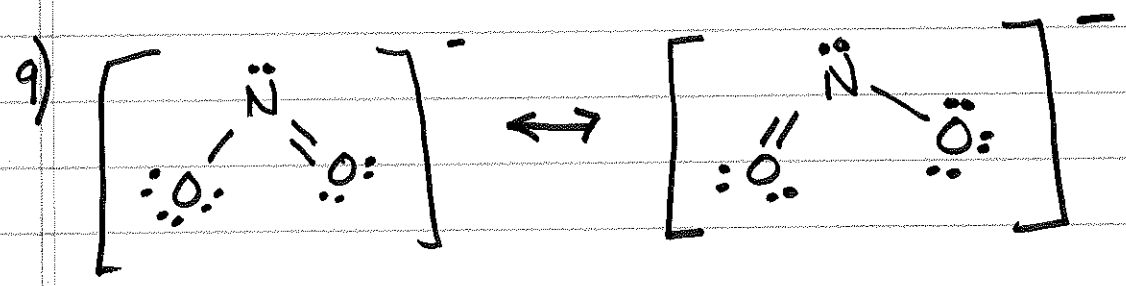
All obey octet Rule



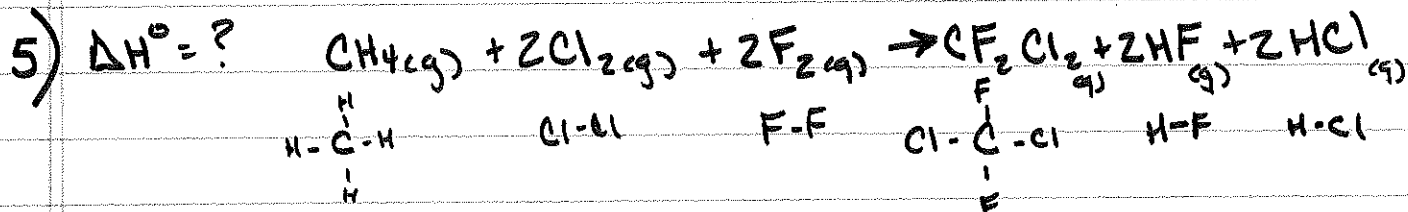
Be is also deficient



Iodine exceeds octet Rule



3/5



$$\Delta H^\circ_{\text{rxn}} = \sum n D_R - \sum n D_P$$

$$= \sum (4(\text{C-H}) + 2(\text{Cl-Cl}) + 2(\text{F-F})) - \sum (2(\text{C-F}) + 2(\text{Cl-Cl}) + 2(\text{H-F}) + 2(\text{H-Cl}))$$

$$[4(413) + 2(239) + 2(164)] - [2(485) + 2(339) + 2(565) + 2(427)]$$

2

units = kJ/mol

$$= 2438 \text{ kJ/mol} - 3632 \text{ kJ/mol}$$

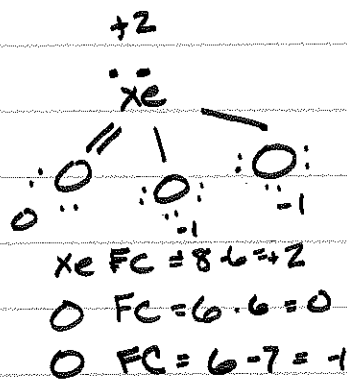
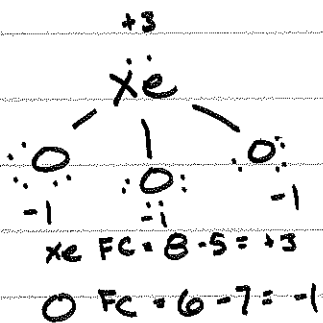
$$\Delta H^\circ_{\text{rxn}} = -1194 \text{ kJ/mol}$$

AP Chem - Unit 6 - NMST CB + MS

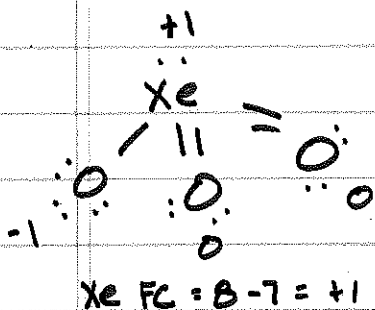


Xe 8x1 = 8

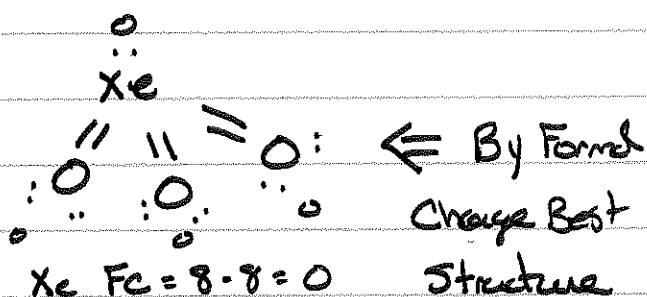
O 6x3 = 18
26 V.E.



Note
 ← missing = Bond same for all FC



Note:
 missing = same FC

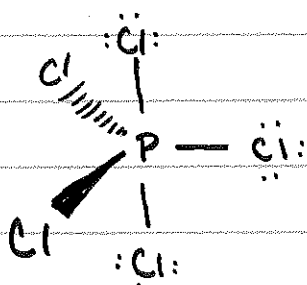
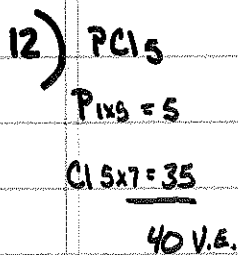


← By Formal Charge Best Structure

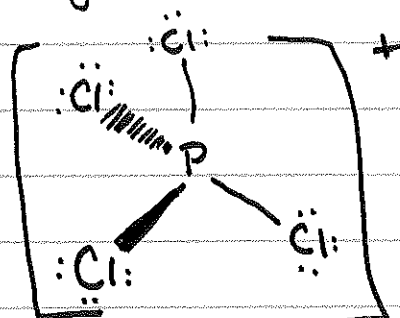
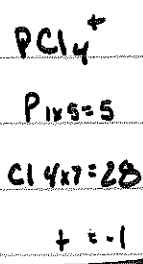
11) Describe the molecular structure of the water molecule



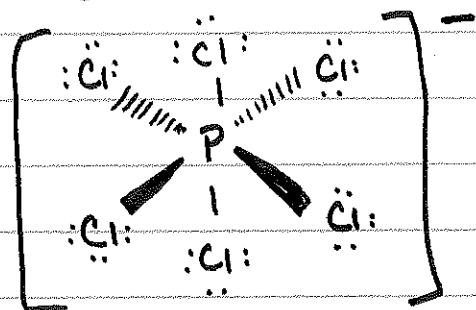
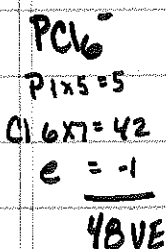
Two Bonded Hydrogen Atoms + Two Non-bonding Pairs of electrons. Forming a V shape molecule



Trigonal Bipyramidal



Tetrahedral



Octahedral

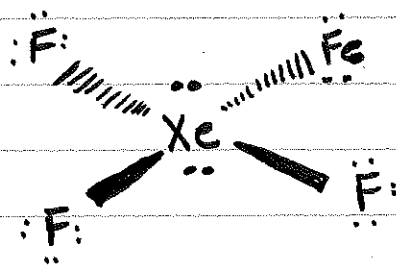
AP Chem - Unit 6 - NMS2 CB & MS

13)



$\text{Xe } 1 \times 8 = 8$

$$\begin{array}{r} \text{F } 4 \times 7 = 28 \\ \hline 36 \text{ VE} \end{array}$$



Square planar

Note: Lone pairs require more room

 \therefore want to be as far apart as possible

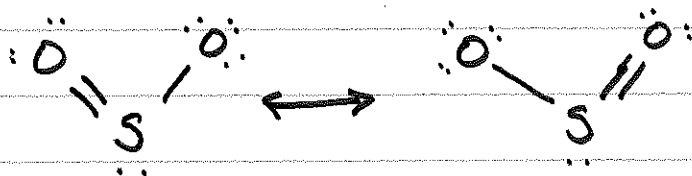
14)



dipole movement?

$\text{S } 1 \times 6 = 6$

$$\begin{array}{r} \text{O } 2 \times 6 = 12 \\ \hline 18 \text{ VE} \end{array}$$



Trigonal Planar

 \therefore V shaped

Dipole movement