

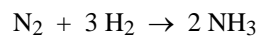
CHM 151
Recitation #10, 5 November 2008

1. Complete the following table.

	SO ₂	H ₃ O ⁺	PCl ₅
Total number of valence electrons in the molecule			
Lewis Structure(s)			
e⁻ pair arrangement			
molecular geometry (SHAPE)			
bond angle(s)			

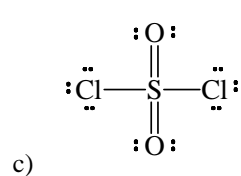
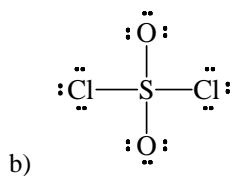
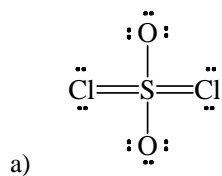
2. In which molecule is the C–O bond *shorter*, CO or CO₂? Why? **Hint:** What are the structures of CO and CO₂?

3. Use bond energy values to estimate ΔH for the following reaction in the gas phase. (**Hint:** You might want to draw correct Lewis structures for each of the molecules.)

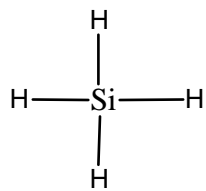


Bond	Bond Energy (kJ/mol)
N-N	193
N=N	418
N≡N	941.4
H-H	436.4
N-P	209
N-H	393
H-O	460

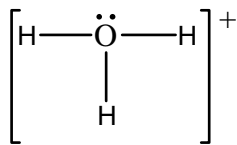
4. Assign *all* formal charges to the molecules below. Which is the "best" Lewis structure based on formal charges?



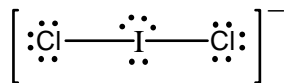
Answer Key



1) SiH_4 , 8 valence electrons, , tetrahedral, tetrahedral, 109°



H_3O^+ , 8 valence electrons, , tetrahedral, trigonal pyramid, 109°



ICl_2^- , 22 valence electrons, , trigonal bipyramid, linear, 180°

2) CO

3) $\Delta H = -107 \text{ kJ}$

- 4) a) S = 0, Cl = +1, O = -1
b) S = +2, Cl = 0, O = -1
c) S = 0, Cl = 0, O = 0

(c) is the best structure based on formal charges.