Revised August 2010

HONORS WORKSHEET 9e: ANSWERS

1. Valence Shell Electron Pair Repulsion

   The fact that electrons are negative, repel one another and therefore want to get as far apart as possible

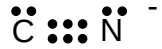
2. It describes the fact that many atoms require their s and p valence orbitals to be filled in covalently bonded species (and therefore Lewis diagrams)

3. Hydrogen only requires a "duet" since its valence shell only consists of s orbitals

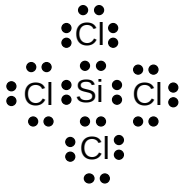
   Atoms in the third period of the periodic table and below, have the ability to expand their valence shells beyond the normal octet by including d orbitals

4.

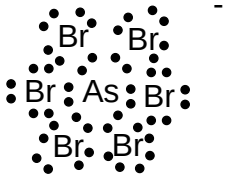
   (a)



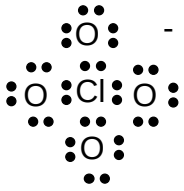
   (b)



   (c)



   (d)



5.
(a) Linear, 180
(b) V-shaped or "bent", 104.5
(c) Trigonal pyramid, 107.5
(d) V-shaped or "bent", 104.5
(e) Tetrahedral, 109.5

6. Oxygen is found in the second period of the periodic table and as such does not have empty d orbitals in its valence shell. Because no d orbitals are present, oxygen cannot expand its octet to form OF_4 and OF_6. Sulfur on the other hand can expand its octet and therefore can form SF_4 and SF_6.