CHEM-01A

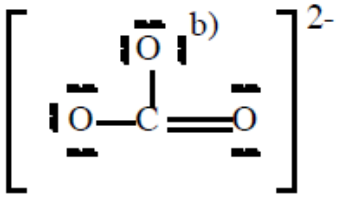
Work Session 9: Theories of Bonding

Name _____ **Date** _____ **Grade** _____

Work Session 9: Theories of Bonding

1. For each of the following molecules, give the hybridization of the central atom(s). Also give the VSEPR type and shape, the bond angles, and identify polar and non-polar molecules.

a) b)



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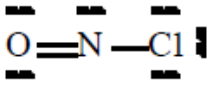

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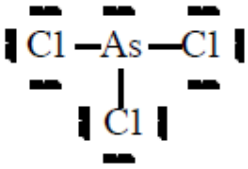

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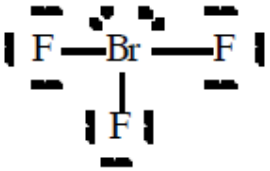

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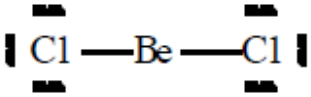

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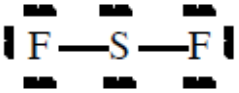

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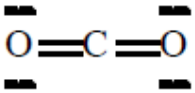
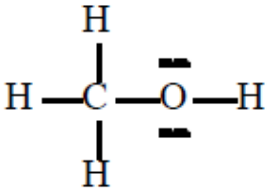
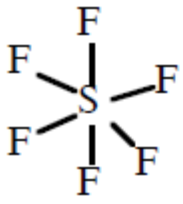
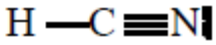


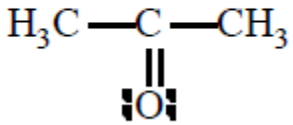
h)

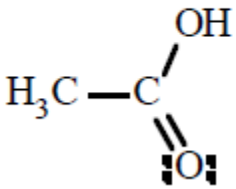


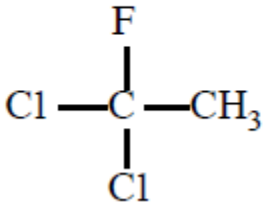
i) 

j) 

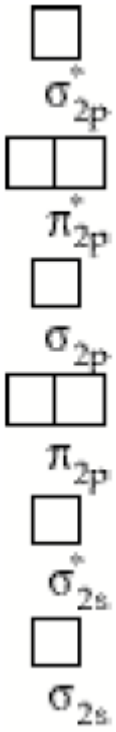
2. For each of the molecules below, redraw with full Lewis structures. Indicate which hybrid orbitals are used on each central atom. Indicate which orbitals are overlapping in each bond. For each molecule, point out and add up the σ and π bonds.

a. 

b. 

c. 

3. Use MO diagrams to show the placement of electrons in O_2, CN^-, C_2, and BC. Give the bond order and magnetic characteristics of each substance. Use an MO diagram such as the one shown at right, one for each species.



4. What is required for a polar bond? For a polar molecule?

5. Explain how double bonds consist of σ and π bonds.