Workshop: VSEPR, Hybridization, and Polarity **NAME:**

Los Angeles City College Chemistry 101

1. Draw and label the shapes for each of the following molecules listed below. Determine the hybridization of the central atom(s) in each molecule. Is the molecule polar or nonpolar? How many σ- and π- bonds are present in each?

A.	H_3O^+	F.	ClF_3	K.	NH_4^+
B.	$SOCl_2$	G.	IF_5	L.	BrF_3
C.	AlF_6^{3-}	H.	O_3	M.	XeF_4
D.	ClO_3^-	I.	PCl_3	N.	benzene (C_6H_6)
E.	GaI_3	J.	SO_3		

2. Explain the following: The SO_2 molecule has a dipole moment, whereas the CO_2 molecule has no dipole moment.

3. Explain the following: Molecules of AsF_3 are polar, whereas molecules of AsF_5 are nonpolar.

4. Account for the fact that the carbon-oxygen bond length in carbonate is greater than the carbon-oxygen bond length in carbon dioxide.

5. Account for the fact that the CF_4 molecule is nonpolar, whereas the SF_4 molecule is polar.

6. Use a table of average bond energies to predict whether the following reaction is endothermic or exothermic.

$$\mathbf{H_2O(g) + Cl_2(g) \rightarrow \tfrac{1}{2}O_2(g) + 2HCl(g)}$$