Chemistry 231 Week 7 Review Sheet

Empirical Formulas, Elemental Composition, VSEPR Theory

Determine the empirical and molecular formula for chrysotile asbestos. Chrysotile has the following percent composition: 28.03% Mg, 21.60% Si, 1.16% H, and 49.21% O. The molar mass for chrysotile is 520.8 g/mol.

Determine empirical formula for Saran; 24.8% C, 2.0% H, 73.1% Cl

Calculate the mola

r mass of a metal that forms an oxide having the empirical formula M_2O_3 and contains 68.04% of the metal by mass. Identify the metal.

To find the formula of a compound composed of iron and carbon monoxide, $Fe_x(CO)_y$, the compound is burned in pure oxygen, an reaction that proceeds according to the following unbalanced equation.

$Fe_x(CO)_y + O_2 \rightarrow Fe_2O_3 + CO_2$

If you burn 1.959 g of $Fe_x(CO)_y$ and obtain 0.799 g of Fe_2O_3 and 2.200 g of CO_2, what is the empirical formula of $Fe_x(CO)_y$?

Pure oxygen can be made by heating a compound containing potassium, chlorine and oxygen. What is the empirical formula of this compound, if a 3.22 g sample decomposes to give gaseous oxygen (O_2) and 1.96 g KCl?

Chemistry 231 Week 7 Review Sheet

Fill out the table. For each box where possible, provide the electron geometry, molecular geometry, bond angle(s), and hybridization.

Regions of Electron Densities	0 lone pairs	1 lone pair	2 lone pairs	3 lone pairs	4 lone pairs
2					
3					
4					
5					
6					

For each of the following, provide the Lewis Structure, with formal charges, resonance (if applicable) the electron and molecular geometry, the bond angle(s), hybridization, net dipole, and state whether it is polar or non-polar.

ClF_4^+ BeF_2 N_2O C_2H_6O

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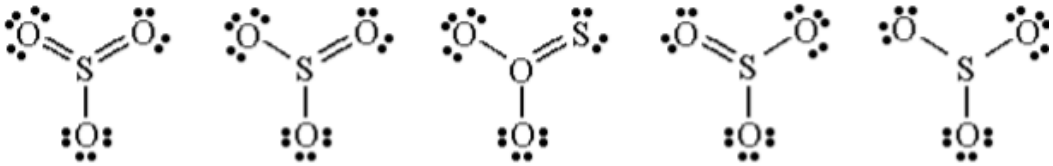
Concept questions:

Which of the following are correct resonance structures for SO_3?



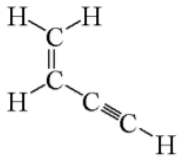
(1) (2) (3) (4) (5)

What is the formal charge on each atom in dichloromethane, CH_2Cl_2?

Draw the most stable Lewis Structure of OCN^-

Use VSEPR theory to predict the molecular geometry of BH_3 and ICl_3

What is the hybridization of the carbon atoms in benzene, C_6H_6?



How many sigma and pi bonds are present in the following molecule:

Which of the following molecules is polar? BF_3 H_2Se N_2 GeF_4

According to molecular orbital theory, which of the following species is the most likely to exist?

H_2^{2-} He_2 Li_2 Li_2^{2-} Be_2

For N_2^+, determine the bond order, number of antibonding, its magnetic properties, and its likelihood of existing.