CHM 1045 Ch 9 Homework

1. Review Examples 9.01 and 9.02. Write Lewis (electron-dot) symbols for P, P^{-3}, Ga, Ga^{+3}, GaP, and $GaCl_3$. Both of the two compounds are ionic (not covalent). Include all dots and charges on all of the ions. Place all anions in brackets, as in the two examples. (2 pts)

2. Review Example 9.01 and these chemical reactions. Use Lewis symbols to depict the chemical reaction between two H atoms and one O atom to form water molecule, which is covalently bonded. Then, use Lewis symbols to depict the chemical reaction between H_2O and H^{+1} to form H_3O^{+1}. Include Lewis structures for all of the reactants and products, along with the arrow between them, for both reactions. (2 pts)

3. Refer to the electronegativity chart and review Example 9.05. Also, review "Polar Covalent Bonds and Electronegativity" from the chapter 9 class notes. Use electronegativity differences to determine relative polarities of C-H, C-Br, N-H, and O-H bonds. Show the subtraction equation for each bond. Also, state which bonds are nonpolar, and indicate the $\delta+$ and $\delta-$ atoms for the bonds that are polar. Do not include $\delta+$ and $\delta-$ for bonds that are nonpolar. (2 pts)

4. Review Examples 9.07 and 9.11. Also, review this image for H_2SO_4. Write Lewis structures for CH_2O (formaldehyde) and H_2SO_3 (sulfurous acid, with both H's on O's). Show the steps from page 4 of the chapter 9 notes. Include the total valence e^{-1} count and the skeleton structure. Then, follow the rules from page 6 of the chapter 9 notes to eliminate all formal charges, as there are none for either molecule. (2 pts)

5. Review Example 9.04 and "Ionic Radius" from the chapter 9 class notes.
Define isoelectronic series and describe the size trend for an isoelectronic series.
Then, count the total number of protons and electrons for K^{+}, Ca^{+2}, Cl^{-1}, and S^{-2}.
Show the ions in order of increasing size (A < B).
Also, explain the (column) size trend for Mg^{+2} versus Ca^{+2} ions. (2 pts)