CHM 1045 CH 4 Homework

1. Review example 4.01. Use the solubility rules to determine which of the following ionic compounds are soluble in water: $(NH_4)_2CO_3$, K_2S, BaI_2, and $CaCO_3$.
   Some of these compounds have two rules each that apply to them. Describe ALL of the applicable rules and applicable exceptions for each ion in the compound. (2 pts)

   $(NH_4)_2CO_3$ has two applicable rules and an applicable exception.

   K_2S has two applicable rules and an applicable exception.

   BaI_2 has one applicable rule. Also, describe if an exception is applicable.

   $CaCO_3$ has one applicable rule. Also, describe if an exception is applicable.

2. Review examples 4.02 and 4.03. Use the solubility rules to determine which product is insoluble for the aqueous reaction between BaI_2 and $Hg(NO_3)_2$. Refer to these tables, if necessary, to determine formulas and charges for the monatomic and polyatomic ions. Then, write the balanced molecular (formulas only), complete ionic (split aq into ions), and net ionic equations (eliminate spectators). Include the phase subscripts and coefficients on all substances and ions, as well as the ionic charge on all of the ions. (2 pts)

3. Review example 4.06 and these tables. Write the balanced molecular, complete ionic and net ionic equations for the aqueous reaction between HI and K_2CO_3. Note that a gas is formed, and that the reaction is very similar to the stomach antacid example. Include the phase subscripts and coefficients on all substances and ions, as well as the ionic charge on all of the ions. (2 pts)

4. Review example 4.08 and red-ox reactions in the chapter 4 notes.
Use half-cells to balance the following red-ox reaction.
The bromide is a spectator ion. Eliminate it from your equations first.
Show the charges where applicable on each metal species.
Then, add e^{-1}'s to balance charges.
Use factors to add the two half-reactions together
so that the e^{-1}'s cancel out of the overall reaction.
Label each half-reaction as oxidation or reduction. (2 pts)

$$FeBr_{3(aq)} + Mg_{(s)} \rightarrow Fe_{(s)} + MgBr_{2(aq)}$$

5. Review examples 4.09, 4.10, and 4.11. Use the equation $M_iV_i = M_fV_f$ to determine the final solution volume needed to dilute 25.0 ml of 1.00 M NaOH to a final concentration of 0.200 M. Next, find the volume of water which needs to be added to the original volume of solution. Then, use the equation moles = (mol/L)(L) to determine the moles of NaOH in the solution. Finally, convert the moles of NaOH into the mass in grams. Show all of the equations and include all of the applicable units, conversion factors, and significant figures. (2 pts)