Chemical Equilibrium Part 2 Review

1. Write the net ionic reaction for each of the following
   (a) $AgNO_3 + NaCN$ —>
   (b) $KCl + (NH_4)_2SO_4$ —>
   (c) $HgNO_3 + KBr$ —>
   (d) $FeCl_3 + NH_4OH$ —>
   (e) $Ca(NO_3)_2 + Na_2(C_2O_4)$ —>
   (f) $Pb(NO_3)_2 + NH_4I$ —>

2. Calculate the K_{sp} for each of the salts whose solubility is listed below.
   (a) $CaSO_4 = 5.0 \times 10^{-3}$ mol/L
   (b) $MgF_2 = 2.7 \times 10^{-3}$ mol/L
   (c) $AgC_2H_3O_2 = 6.1 \times 10^{-2}$ mol/L
   (d) $SrF_2 = 9.71 \times 10^{-4}$ mol/L

3. Calculate the solubility in mol/L of each of the following salts.
   (a) $AgCN$ $K_{sp} = 2.0 \times 10^{-12}$
   (b) $BaSO_4$ $K_{sp} = 1.5 \times 10^{-9}$
   (c) FeS $K_{sp} = 3.7 \times 10^{-19}$
   (d) $Mg(OH)_2$ $K_{sp} = 9.0 \times 10^{-12}$
   (e) Ag_2S $K_{sp} = 1.6 \times 10^{-49}$
   (f) CaF_2 $K_{sp} = 4.9 \times 10^{-11}$

4. Which of the following slightly soluble salts is the most soluble?
   (a) PbS $K_{sp} = 8.4 \times 10^{-28}$
   (b) $PbSO_4$ $K_{sp} = 1.8 \times 10^{-8}$
   (c) $Pb(IO_3)_2$ $K_{sp} = 2.6 \times 10^{-13}$

5. For each of these substances, calculate the concentration of the metallic ion that can remain at equilibrium in a solution containing 1.0×10^{-4} mol/L of NaOH.
   (a) $Cu(OH)_2$ $K_{sp} = 1.6 \times 10^{-9}$
   (b) $Fe(OH)_3$ $K_{sp} = 6.0 \times 10^{-38}$
   (c) $Mg(OH)_2$ $K_{sp} = 6.0 \times 10^{-12}$

6. It is found that 1.892×10^{-13} grams of the compound cadmium (II) sulphide (CdS) will dissolve in 350.0 mL of water to form a saturated solution. Using this data, calculate the value for the K_{sp} of CdS.