Equilibrium Constant Worksheet

Name: _____ Per:___

Part 1: Write out the expression for the equilibrium constants of these reactions:

1) $N_{2(g)} + 3H_{2(g)} \longrightarrow 2NH_{3\,(g)}$ $K_{eq} =$

2) $COCl_{2\,(g)} \longrightarrow CO_{\,(g)} + Cl_{2\,(g)}$ $K_{eq} =$

3) $Fe^{3+}_{\,(aq)} + SCN^{-}_{\,(aq)} \longrightarrow FeSCN^{2+}_{\,(aq)}$ $K_{eq} =$

4) $2K_{\,(s)} + 2H_2O_{\,(l)} \longrightarrow 2KOH_{\,(aq)} + H_{2\,(g)}$ $K_{eq} =$

5) $2H_{2\,(g)} + O_{2\,(g)} \longrightarrow 2H_2O_{\,(g)}$ $K_{eq} =$

6) $C_{\,(s)} + 2H_{2\,(g)} \longrightarrow CH_{4\,(g)}$ $K_{eq} =$

7) $CH_3COOH_{\,(aq)} + H_2O_{\,(l)} \longrightarrow CH_3COO^{-}_{\,(aq)} + H_3O^{+}_{\,(aq)}$ $K_{eq} =$

8) $AgCl_{\,(s)} + H_2O_{\,(l)} \longrightarrow Ag^{+}_{\,(aq)} + Cl^{-}_{\,(aq)} + H_2O_{\,(l)}$ $K_{eq} =$

Part 2: Use some of the equilibrium expressions you wrote <u>above</u> to calculate the equilibrium constants using the concentrations given.

9) $Fe^{3+}_{\,(aq)} + SCN^{-}_{\,(aq)} \longrightarrow FeSCN^{2+}_{\,(aq)}$

If at equilibrium and 25°C, you have $[FeSCN^{2+}] = 0.25$ M, $[Fe^{3+}] = 0.046$M, and $[SCN^{-}] = 0.046$M, what is the equilibrium constant, K_{eq}?

Using the equilibrium constant you just calculated, calculate the concentration of $FeSCN^{2+}$ ions if the concentrations of Fe^{3+} and SCN^{-} are 0.096M each:

10) Equilibrium constants change with the temperature. If, for the same reaction in #9, at 200°C, $[Fe^{3+}] = 0.076$M, $[SCN^{-}] = 0.056$M, and $[FeSCN^{2+}] = 6.3$M. What is the new K_{eq}?

11) $N_{2\,(g)} + 3H_{2\,(g)} \longrightarrow 2NH_{3\,(g)}$

At 300°C, you have a 2.00L balloon filled, at equilibrium, with 0.0023 moles of N_2, 0.0050 mol of H_2, and 0.00042 mol of NH_3. What is the equilibrium constant?