Name _____ Date _____ Class _____

CHAPTER 18 REVIEW

Chemical Equilibrium

SECTION 18-1

SHORT ANSWER **Answer the following questions in the space provided.**

1. _____ Silver chromate dissolves in water according to the following equation:

$$Ag_2CrO_4(s) \rightleftarrows 2Ag^+(aq) + CrO_4^{2-}(aq)$$

Which of these correctly represents the equilibrium expression for the above equation?

(a) $\frac{2[Ag^+] + [CrO_4^{2-}]}{Ag_2CrO_4}$ (b) $\frac{[Ag_2CrO_4]}{[Ag^+]^2[CrO_4^{2-}]}$ (c) $\frac{[Ag^+]^2[CrO_4^{2-}]}{1}$ (d) $\frac{[Ag^+]^2[CrO_4^{2-}]}{2[Ag_2CrO_4]}$

2. Are pure solids included in equilibrium expressions? Explain your answer.

3. Write the equilibrium expression for the following hypothetical equation:

$$3A(aq) + B(aq) \rightleftarrows 2C(aq) + 3D(aq)$$

4. **a.** Write the appropriate equilibrium expression for each of the following equations. Include the value of K.

(1) $N_2O_4(g) \rightleftarrows 2NO_2(g)$ $K = 0.1$

(2) $NH_4OH(aq) \rightleftarrows NH_4^+(aq) + OH^-(aq)$ $K = 2 \times 10^{-5}$

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(3) $PbI_2(s) \rightleftarrows Pb^{2+}(aq) + 2I^-(aq)$ $K = 7 \times 10^{-9}$

(4) $H_3O^+(aq) + OH^-(aq) \rightleftarrows 2H_2O(l)$ $K = 1 \times 10^{14}$

_____ **b.** Which of the four systems in part a proceeds farthest to the right when equilibrium is established?

_____ **c.** Which system contains mostly reactants at equilibrium?

PROBLEMS **Write the answer on the line to the left. Show all your work in the space provided.**

5. _____ Consider the following reaction:

$$2NO(g) + O_2(g) \rightleftarrows 2NO_2(g)$$

At equilibrium, $[NO] = 0.80$ M, $[O_2] = 0.50$ M, and $[NO_2] = 0.60$ M. Calculate the value of K for this reaction.

6. Nitrous acid is a weak acid that hydrolyzes according to the following equation:

$$HNO_2(aq) + H_2O(l) \rightleftarrows H_3O^+(aq) + NO_2^-(aq)$$

At 298 K, $K = 4.3 \times 10^{-4}$.

_____ **a.** Which term in the above equation does not appear in the equilibrium expression?

_____ **b.** For the above reaction, $[H_3O^+] = [NO_2^-] = 0.043$ M at equilibrium. Calculate $[HNO_2]$.