**Quiz: 14.2–14.3 (A)**

**Name**_____

**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**

1) Which of the following statements is FALSE?
   A) K >> 1 implies that the reaction is very fast at producing products.
   B) When K << 1, the reverse reaction is favored and the forward reaction does not proceed to a great extent.
   C) When K ≈ 1, neither the forward or reverse reaction is strongly favored, and about the same amount of reactants and products exist at equilibrium.
   D) When K >> 1, the forward reaction is favored and essentially goes to completion.
   E) None of the above.

2) Express the equilibrium constant for the following reaction.

$$16\ CH_3Cl(g) + 8\ Cl_2(g) \rightleftharpoons 16\ CH_2Cl_2(g) + 8\ H_{2(g)}$$

A) $K = \dfrac{[CH_2Cl_2]^{16}[H_2]^8}{[CH_3Cl]^{16}[Cl_2]^8}$

B) $K = \dfrac{[CH_3Cl]^{16}[Cl_2]^8}{[CH_2Cl_2]^{16}[H_2]^8}$

C) $K = \dfrac{[CH_2Cl_2][H_2]}{[CH_3Cl][Cl_2]}$

D) $K = \dfrac{[CH_3Cl][Cl_2]}{[CH_2Cl_2][H_2]}$

E) $K = \dfrac{[CH_3Cl]^{1/2}[Cl_2]}{[CH_2Cl_2]^{1/2}[H_2]}$

3) Express the equilibrium constant for the following reaction.

$$P(g) + 3/2\ Cl_2(g) \rightleftharpoons PCl_3(g)$$

A) $K = \dfrac{[PCl_3]}{[P][Cl_2]^{3/2}}$

B) $K = \dfrac{[PCl_3]^1}{[P]^1[Cl_2]^1}$

C) $K = \dfrac{[P]^{1/2}[Cl_2]^{1/3}}{[PCl_3]^{1/2}}$

D) $K = \dfrac{[P][Cl_2]^{3/2}}{[PCl_3]}$

E) $K = \dfrac{[PCl_3]^2}{[P]^2[Cl_2]^3}$

4) The equilibrium constant is given for one of the reactions below. Determine the value of the missing equilibrium constant.

$H_2(g) + Br_2(g) \rightleftharpoons 2\ HBr(g)$ $K_c = 3.8 \times 10^4$

$2\ HBr(g) \rightleftharpoons H_2(g) + Br_2(g)$ $K_c = ?$

A) $6.4 \times 10^{-4}$ B) $1.9 \times 10^4$ C) $5.3 \times 10^{-5}$ D) $2.6 \times 10^{-5}$ E) $1.6 \times 10^3$

5) The equilibrium constant is given for one of the reactions below. Determine the value of the missing equilibrium constant.

$N_2O_4(g) \rightleftharpoons 2\ NO_2(g)$ $K_c = 1.46$

$0.5\ N_2O_4(g) \rightleftharpoons 1\ NO_2(g)$ $K_c = ?$

A) 2.13 B) 0.730 C) 1.46 D) 2.92 E) 1.21

6) Explain dynamic equilibrium. **Use the generic reaction A(g) ⇌ B(g) to explain.**

7) Why is an equilibrium constant unitless?

1) A
2) A
3) A
4) D
5) E
6) In this reaction, dynamic equilibrium means that the ratio of [B]/[A] is constant. Even though the ratio of their concentrations is constant, the forward and reverse reactions continue to occur. The rates of the forward and reverse reactions are equal in order to keep the ratio of [B]/[A] constant.
7) Each concentration or pressure for a reactant or product, when used to calculate the equilibrium expression is actually a ratio to a reference concentration or pressure. Each ratio is therefore unitless before it is used to calculate into the equilibrium expression.