## Chapter 18 Take-Home Quiz

**Multiple Choice**
*Identify the choice that best completes the statement or answers the question.*

_____ 1. Consider the reaction $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$. What is the effect of decreasing the volume on the contained gases?
   a. The reaction shifts toward the product gas.
   b. The system reacts by increasing the number of gas molecules.
   c. The pressure on the gases decreases momentarily.
   d. Ammonia is consumed in the reaction.

_____ 2. In an endothermic reaction at equilibrium, what is the effect of raising the temperature?
   a. The reaction makes more products.       c. The reaction is unchanged.
   b. The reaction makes more reactants.       d. The answer cannot be determined.

_____ 3. If a reaction has an equilibrium constant just greater than 1, what type of reaction is it?
   a. irreversible                              c. reversible, favoring products
   b. spontaneous                               d. reversible, favoring reactants

_____ 4. Entropy measures _____.
   a. energy                                    c. disorder
   b. heat transferred                          d. force

_____ 5. Which one of the following systems has the highest entropy?
   a. 10 mL of water at 10°C                    c. 10 mL of water at 100°C
   b. 10 mL of water at 50°C                    d. All have the same entropy because all
                                                   are water.

_____ 6. The melting of ice at temperatures above 0°C _____.
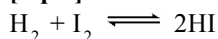   a. liberates heat                            c. is not favorable
   b. is not spontaneous                        d. is endothermic

**Short Answer**

7. **[2 pts]** What is the equilibrium constant for the following reaction?
$4A + B \rightleftharpoons 2C$
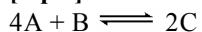
   **answer:**

8. **[2 pts]** A mixture of hydrogen and iodine are in equilibrium with hydrogen iodide, as shown in the following equation.
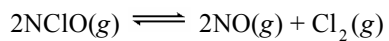$H_2 + I_2 \rightleftharpoons 2HI$

   Calculate the concentration of HI when the equilibrium constant is $1 \times 10^5$, the equilibrium concentration of $H_2$ is 0.08$M$, and the equilibrium concentration of $I_2$ is 0.006$M$.

   **Show work:**

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9. **[2 pts]** Calculate the value of $K_{eq}$ for the following reaction at equilibrium.

$$2NClO(g) \rightleftharpoons 2NO(g) + Cl_2(g)$$

An analysis of the equilibrium mixture in a 1-L flask gives the following results: NClO, 1.6 mol; NO, 6.4 mol; $Cl_2$, 0.49 mol

**Show work:**

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10. **[2 pts]** Calculate the concentration of a silver ion when the solubility product constant of AgI is $10^{-16}$.
**Show work:**

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**Essay**

11. **[2 pts]** Explain the effects of these factors on the rate of reaction:
(1) reactant concentration

(2) particle size on the rate of a reaction.

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12. **[2 pts]** What is entropy? Give examples.