

Name _____ Date _____ Hr _____

Chapter 8 Review: Equilibrium

1. How would you describe a system that is at equilibrium? Why does it take time to reach equilibrium? When the system is not at equilibrium, what is this called?
2. If a system is at equilibrium, does that mean it has stopped reacting? Explain.
3. Complete the following sentences:
 - a. If K is greater than one, there is a higher concentration of _____ and the reaction lies to the _____.
 - b. If K is less than one, there is a higher concentration of _____ and the reaction lies to the _____.
4. What types of compounds are included in the equilibrium expression? What don't we include?
5. Write the equilibrium constant expression for the following reaction:
$$\text{H}_2 (\text{aq}) + \text{I}_2 (\text{aq}) \leftrightarrow 2 \text{HI} (\text{s})$$
6. For the reaction $\text{NH}_4\text{NO}_3 (\text{s}) \leftrightarrow \text{N}_2\text{O} (\text{g}) + 2\text{H}_2\text{O} (\text{g})$, $K_{\text{eq}} = 8.75 \times 10^{-2}$. Write the equilibrium expression and tell me if the reactant or products are favored and why.
7. Write out the equilibrium constant (K_{eq}) for the following system at equilibrium.
$$\text{H}_2 (\text{g}) + \text{I}_2 (\text{aq}) \leftrightarrow 2 \text{HI} (\text{aq})$$
8. What does it mean when a reaction lies to the left? Is this good from an economic standpoint for a manufacturer or business? Explain.
9. What is the difference between K and Q ?

10. Consider the following reaction at equilibrium: $2 \text{N}_2 (\text{g}) + 3 \text{H}_2 (\text{g}) \rightleftharpoons 2 \text{NH}_3 (\text{g}) + 92.0 \text{kJ}$

a. Suggest three ways you could produce more reactant.

b. Suggest three ways you could produce more product.

11. Respond with "exothermic" or "endothermic" for the following situations:

a. ΔH is positive _____

c. Heat is a reactant _____

b. ΔH is negative _____

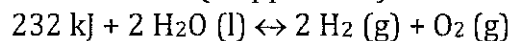
d. Heat is a product _____

12. For an endothermic reaction, adding heat would push the reaction towards the _____.

13. For an exothermic reaction, adding heat would push the reaction towards the _____.

14. After heating a solution that is at chemical equilibrium, you determine that there was a shift in equilibrium concentration towards the products. Is this reaction endothermic or exothermic? Provide an explanation.

15. In the reaction below, determine the shift (if applicable) for the following stresses:



a. Adding He

b. Removing O_2

c. Increasing pressure

d. Increasing volume

e. Decreasing temperature

f. Removing H_2O

g. Adding a catalyst

h. Adding H_2

16. What are the main contributors to acid rain? How does acid rain affect pH?

17. Consider the following reaction at equilibrium: $\text{N}_2(\text{g}) + 2 \text{O}_2(\text{g}) \rightleftharpoons 2 \text{NO}_2(\text{g}) + \text{heat}$

If N_2 is added to the system, how will:

a. The concentration of the reactants change?

b. The concentration of the products change?