

Equilibrium/ Acids and Bases- Review Aid

1. A homogeneous equilibrium may involve

- A) a reaction between two gases that produces a gaseous product
- B) a reaction in which the reactants and products are in different phases
- C) a reaction between an aqueous solution of ions that produces a solid precipitate
- D) None of the above

2. Which of the following is not true?

- A) Equilibrium can be approached from either direction of a reaction.
- B) At equilibrium, the concentration of reactants does not have to equal the concentration of products.
- C) At equilibrium, the concentration of reactants must equal the concentration of products.
- D) The rate of the forward and reverse reaction must be equal.

3. When does the rate of the forward reaction of a reversible reaction decrease?

- A) when the temperature is increased
- B) when the initial concentration of the reactants increases
- C) when the rate of the reverse reaction increases
- D) when the rate of the reverse reaction remains constant

4. What is the reaction equation that corresponds to the following equilibrium

expression? $K_c = \frac{[O_2][SO_2]^2}{[SO_3]^2}$

- A) $2SO_{3(g)} \rightleftharpoons 2O_2 + 2SO_{2(g)}$
- B) $2O_2 + 2SO_{2(g)} \rightleftharpoons 2SO_{3(g)}$
- C) $O_2 + 2SO_{2(g)} \rightleftharpoons 2SO_{3(g)}$
- D) $2SO_{3(g)} \rightleftharpoons O_2 + 2SO_{2(g)}$

5. Which of the following equilibrium constant values indicates products are in excess in a reaction mixture at equilibrium?

- A) 1.2×10^{-2}
- B) 1.2×10^{-5}
- C) 0
- D) 1.2×10^5

6. Which of the following is true if the reaction quotient is greater than K_c ?

- A) The system is at equilibrium.
- B) Equilibrium will be achieved by moving to the right.
- C) Products are favoured.
- D) The system must move to the left to achieve equilibrium.

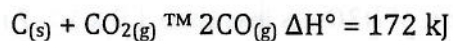
7. What effect will increasing the temperature have on an endothermic reaction?

- A) It will decrease the value of K_c and the equilibrium will shift toward the reactants.
- B) It will increase the value of K_c and the equilibrium will shift toward the products.
- C) It will decrease the value of K_c and the equilibrium will shift toward the products.
- D) It will increase the value of K_c and the equilibrium will shift toward the reactants.

8. What effect will increasing the volume of a container at constant temperature have on an equilibrium system?

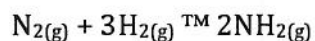
- A) A reaction with more gaseous product molecules than reactant gaseous molecules will shift toward the products.
- B) A reaction with fewer gaseous product molecules than reactant gaseous molecules will shift toward the products.
- C) The value of K_c for a reaction with fewer gaseous product molecules than reactant gaseous molecules will increase.
- D) The value of K_c for a reaction with more gaseous product molecules than reactant gaseous molecules will increase.

9. In the reaction below, which of the following changes will not cause a shift in the equilibrium?



- A) Using a catalyst
- B) Adding $\text{CO}_2(g)$
- C) Removing $\text{CO}(g)$
- D) Decreasing the temperature

10. The synthesis reaction of ammonia shown below is exothermic. What is the function of the catalyst used?



- A) To increase the yield
- B) To decrease the temperature of the reaction
- C) To allow the reaction to occur at a faster rate
- D) To allow the reaction to occur at a slower rate

11. Which of the following statements is correct?

- A) Most acids and bases are strong.
- B) Most acids and bases are weak.
- C) All polyprotic acids are strong.
- D) All metal hydroxides are strong bases.

12. Which of the following statements is true of neutral water at room temperature?

- A) The concentration of H_3O^+ is 18 g/L.
- B) The concentration of H_3O^+ is equal to 1.0×10^{-7} mol/L.
- C) The concentration of H_3O^+ is 55 mol/L.
- D) The concentration of H_3O^+ is greater than the concentration of OH^- .

13. What is true in basic solution?

- A) The concentration of H_3O^+ is greater than $1.0 \times 10^{-7} \text{ mol/L}$.
- B) The concentration of H_3O^+ is equal to $1.0 \times 10^{-7} \text{ mol/L}$.
- C) The concentration of H_3O^+ is less than $1.0 \times 10^{-7} \text{ mol/L}$.
- D) The concentration of H_3O^+ is greater than the concentration of OH^- .

14. Solution A has a pH of 8.2 and solution B has a pH of 10.2. Which statement is true?

- A) Solution A is more basic and its $[\text{H}_3\text{O}^+]$ is 100 times greater than solution B.
- B) Solution B is more basic and its $[\text{H}_3\text{O}^+]$ is 100 times less than solution A.
- C) Solution A is more basic and its $[\text{H}_3\text{O}^+]$ is 100 times less than solution B.
- D) Solution B is more basic and its $[\text{H}_3\text{O}^+]$ is 100 times greater than solution A.

15. Which data describes the most acidic solution?

- A) $[\text{H}_3\text{O}^+] = 10^{-3} \text{ mol/L}$
- B) $[\text{OH}^-] = 10^{-10} \text{ mol/L}$
- C) $\text{pH} = 6$
- D) $\text{pOH} = 12$

16. Which equation shows the concentration of hydronium ions if the pH is 2.5?

- A) $[\text{H}_3\text{O}^+] = 10^{-2.5}$
- B) $[\text{H}_3\text{O}^+] = 2.5$
- C) $[\text{H}_3\text{O}^+] = 14.0 - 2.5$
- D) $[\text{OH}^-] = 2.5$