



MORE QUESTIONS SOLVEDS

I. Very Short Answer Type Questions

Question 1. What is meant by equilibrium ?

Answer: Equilibrium is a state at which rate of forward reaction is equal to the rate of backward reaction.

Question 2. State the law of mass action?

Answer: It states that the rate at which a substance reacts is directly proportional to its molar concentration.

Question 3. What is meant by reaction quotient?

Answer: It is defined as the ratio of product of molar concentration of products to the product of molar concentration of reactants at any stage of reaction.

$$\begin{aligned} \text{Cod} + \text{H}_2\text{O} &\rightleftharpoons \text{CodH}^+ + \text{OH}^- \\ \text{pH} &= 9.95 \quad \therefore \text{pOH} = 14 - 9.95 = 4.05, \text{ i.e., } -\log [\text{OH}^-] = 4.05 \\ \text{or } \log [\text{OH}^-] &= -4.05 = 5.95 \quad \text{or } [\text{OH}^-] = 8.913 \times 10^{-5} \text{ M} \\ K_b &= \frac{[\text{CodH}^+][\text{OH}^-]}{[\text{Cod}]} = \frac{[\text{OH}^-]^2}{[\text{Cod}]} = \frac{(8.91 \times 10^{-5})^2}{5 \times 10^{-3}} = 1.588 \times 10^{-6} \\ \text{p}K_b &= -\log (1.588 \times 10^{-6}) = 6 - 0.1987 = 5.8 \end{aligned}$$

Question 4. Define ionic equilibrium.

Answer: The equilibrium between ions and unionised molecules is called ionic equilibrium.

Question 5. What is meant by ionic product of water (K_w)?

Answer:

It is the product of concentration of $[\text{H}_3\text{O}^+]$ and $[\text{OH}^-]$ at a specific temperature.

$$K_w = [\text{H}_3\text{O}^+][\text{OH}^-]$$

$$= 1.0 \times 10^{-14} \text{ at } 298 \text{ K}$$

Question 6. Define solubility product.

Answer: It is product of molar concentration of ion raised to the power of number of ions produced per compound in saturated solution.

Question 7. How does common ion affect the solubility of electrolyte?

Answer: Solubility of electrolyte decreases due to common ion effect.

Question 8. Write conjugate acid and conjugate base of H_2O ?

Answer: Conjugate acid is H_3O^+ and conjugate base is OH^- .

Question 9. Give two characteristics of a buffer solution.

Answer:

- Its pH does not change on the addition of small amount of acid or base.
- Its pH does not change on dilution or standing.

Question 10. How does a catalyst affect the equilibrium constant?

Answer: The equilibrium constant is not affected by a catalyst.

Question 11. State Ostwald's dilution law.

Answer: Ostwald's dilution law states that the degree of dissociation of weak electrolyte is inversely proportional to square root of its concentration.

$$\alpha = \sqrt{\frac{K_a}{C}}, \alpha = \sqrt{\frac{K_b}{C}}$$

Where, K_a and K_b are acid dissociation and base dissociation constants.

Question 12. What is basic buffer?

Answer: Basic buffer is the buffer whose pH is more than 7. It is a mixture containing weak base and its salt with a strong acid, e.g., $\text{NH}_4\text{Cl} + \text{NH}_4\text{OH}$

Question 13. SO_3^{2-} is Bronsted base or acid and why?

Answer: SO_3^{2-} is Bronsted base because it can accept H^+ .

Question 14.



What is the relationship between K_p and K_c ?

Answer: $K_p = K_c$

because $\Delta n = 0$.

Question 15. Define common ion effect.

Answer: The supervision in concentration of one of the ions by adding other ion as common ion is called common ion effect.

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