



PARISHRAM ACADEMY

NAME of Student : _____

Subject : Chemistry

Class : XII

Topic: Ionic Equilibria

Total Marks :- 35

SECTION – A

Q. 1. Select the write the correct answer: (4 Marks)

- (i) The pH of 10^{-8} M of HCl is
(a) 8 (b) 7 (c) less than 7 (d) greater than 7
- (ii) Which of the following is a buffer solution?
(a) $\text{CH}_3\text{COONa} + \text{NaCl}$ in water (b) $\text{CH}_3\text{COOH} + \text{HCl}$ in water
(c) $\text{CH}_3\text{COOH} + \text{CH}_3\text{COONa}$ in water (d) $\text{HCl} + \text{NH}_4\text{Cl}$ in water
- (iii) Blood in human body is highly buffered at pH of
(a) 7.4 (b) 7.0 (c) 6.9 (d) 8.1
- (iv) For $\text{pH} > 7$ the hydronium ion concentration would be
(a) 10^{-7} M (b) $< 10^{-7}$ M (c) $> 10^{-7}$ M (d) $\geq 10^{-7}$ M

Q.2. Answer the following: (3 Marks)

- (i) Write one property of a buffer solution.
- (ii) The pH of a solution is 6.06. Calculate its H^{\oplus} ion concentration.
- (iii) Why it is necessary to add H_2SO_4 while preparing the solution of CuSO_4 .

SECTION – B

Attempt any Four (8 Marks)

- Q. 3. Label the conjugate acid-base pair in the following reaction
a. $\text{HCl} + \text{H}_2\text{O} \rightleftharpoons \text{H}_3\text{O}^{\oplus} + \text{Cl}^{\ominus}$
b. $\text{CO}_3^{2\ominus} + \text{H}_2\text{O} \rightleftharpoons \text{OH}^{\ominus} + \text{HCO}_3^{\ominus}$
- Q. 4. Aqueous solution of sodium carbonate is alkaline whereas aqueous solution of ammonium chloride is acidic. Explain.
- Q. 5. In NaOH solution $[\text{OH}^{\ominus}]$ is 2.87×10^{-4} . Calculate the pH of solution.
- Q. 6. Calculate the pH of buffer solution containing 0.05 mol NaF per litre and 0.015 mol HF per litre. $[\text{K}_a = 7.2 \times 10^{-4}$ for HF]
- Q. 7. Explain auto-ionisation of water. Derive a relation of ionic product of water.
- Q. 8. Explain common ion effect with suitable example.

SECTION – C

Attempt any Four (12 Marks)

- Q. 9. Define degree of dissociation. Derive Ostwald's dilution law for the CH_3COOH .
- Q. 10. What is meant by hydrolysis? A solution of $\text{CH}_3\text{COONH}_4$ is neutral. Why?
- Q. 11. The pH of rain water collected in a certain region of Maharashtra on particular day was 5.1. Calculate the H^{\oplus} ion concentration of the rain water and its percent dissociation. Explain the relation between ionic product and solubility product to predict whether a precipitate will form when two solutions are mixed?
- Q. 12. The solubility product of AgBr is 5.2×10^{-13} . Calculate its solubility in mol dm^{-3} and g dm^{-3} (Molar mass of AgBr = 187.8 g mol^{-1})

- Q. 13. If 20.0 cm^3 of $0.050 \text{ M Ba(NO}_3)_2$ are mixed with 20.0 cm^3 of 0.020 M NaF , will BaF_2 precipitate ?
 K_{sp} of BaF_2 is 1.7×10^{-6} at 298 K .
- Q. 14. NH_4OH is 4.3% ionised at 298 K in 0.01 M solution. Calculate the ionisation constant and pH of NH_4OH .

SECTION – D

Attempt Any Two:

(8 Marks)

- Q. 15. Write expression for solubility and solubility product of following sparingly soluble salts:
(i) AgBr (ii) PbI_2 (iii) Al(OH)_3
- Q. 16. Explain the hydrolysis of the salt of weak acid and weak base.
- Q. 17. Explain the relation between ionic product and solubility product to predict whether a precipitate will form when two solution are mixed?