

Chemical Equilibrium -2

1. The pH of 0.01 M solution of acetic acid is 5.0. What are the values of $[H^+]$ and K_a respectively? (E-2010)

- 1) 1×10^{-4} M, 1×10^{-8} 2) 1×10^{-5} M, 1×10^{-9}
3) 1×10^{-5} M, 1×10^{-8} 4) 1×10^{-3} M, 1×10^{-8}

Solution: Ans: 3

$$[H^+] = \sqrt{K_a \cdot C}, \text{ as } P^H = 5, [H^+] = 10^{-5}, C = 0.01$$

$$K_a = [H^+]^2 / C = [10^{-5}]^2 / 0.01 = 10^{-8}.$$

2. What is the P^H of a solution obtained by dissolving 0.0005 mole of the strong electrolyte, calcium hydroxide, $Ca(OH)_2$ to form 100 ml of a saturated solution (aqueous) ? ($K_w = 1.0 \times 10^{-14} \text{ mole}^2 \text{ litre}^{-2}$) (AFMC 1999)

- 1) 9.8 2) 11.7 3) 12.0 4) 3.0

Ans: 3

$$\text{Solution: } [OH^-] = \text{Normality of base} = 0.0005 \times 2 \times 1000 / 100 = 10^{-2}$$

$$P^{OH} = -\log 10^{-2} = 2, \quad P^H = 14 - 2 = 12$$

3. A: According to Bronsted theory, a substance can function as an acid as well as a base.

R: Acid reacts with a base to produce a salt. (M-2010)

- 1) 'A' and 'R' are true, 'R' is correct explanation of 'A'.
2) 'A' and 'R' are true. 'R' is not correct explanation of 'A'.
3) 'A' is true and 'R' are false.
4) Both A and R are false.

4. 50 ml of H_2O is added to 50 ml of 1×10^{-3} M barium hydroxide solution. What is the pH of the resulting solution? (E - 2008)

- 1) 3.0 2) 3.3 3) 11.7 4) 11.0

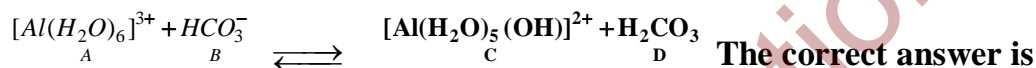
Ans: 4

5. Of the given anions, the strongest Bronsted base is (AFMC 2001)

- 1) ClO^- 2) ClO_3^- 3) ClO_2^- 4) ClO_4^-

Ans: 1

6. Identify Bronsted - Lowry acids in the reaction given below? [M - 2008]



- 1) A, C 2) A, D 3) B, D 4) B, C

Ans: 2

7. Among the following relatively strong base is (AFMC 2004)

- 1) HSO_4^- 2) NO_3^- 3) CH_3COO^- 4) Cl^-

Ans: 3

8. Which of the following is not a conjugate acid - base pair (E - 2007)

- 1) HPO_3^{2-} , PO_3^{3-} 2) H_2PO_4^- , HPO_4^{2-}
 3) H_2PO_4^- , H_3PO_4 4) H_2PO_4^- , PO_3^{3-}

Ans: 4

9. Which of the following is a Lewis acid? [M2005]

- 1) HCOO^- 2) H_2SO_4 3) SiF_4 4) H_2S

Ans: 3

10. Conjugate base of HSO_4^- is (M-2006)

- 1) H_2SO_4 2) $\text{H}_2\text{SO}_4^{2-}$ 3) SO_4^{2-} 4) H^+ Ans: 3