

Daily Tutorial Sheet-10

Level-2

116.(D) Mixture of NH_4Cl and NH_3 is buffer solution. Dilution will not effect the pH value.

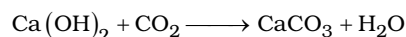
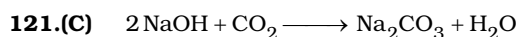
117.(C) CH_3COOH is a weak acid and it ionizes feebly

118.(B) Final conc. of H^+ ions =
$$\frac{30 \times \frac{1}{3} + 20 \times \frac{1}{2} - 40 \times \frac{1}{4}}{1000} = 10^{-2} \text{M}$$

$$\text{pH} = -\log 10^{-2} = 2$$

119.(B) $10^{-5} \text{M NaOH} \longrightarrow 10^{-5} \text{M } [\text{OH}^-] \Rightarrow \text{pOH} = 5 \Rightarrow \text{pH} = 9$

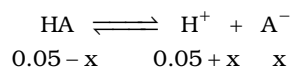
120.(D) $0.001 \text{M NaOH} \longrightarrow 10^{-3} \text{M } \text{OH}^- \text{ ions}$



122.(D) $K_w = 10^{-14}$ only at $T = 298 \text{K}$

123.(A) $[\text{H}^+] = \frac{10 \times 0.3 - 10 \times 0.1}{10 + 10 + 20} = 0.05$

$$[\text{HA}] = \frac{20 \times 0.1}{20 + 20} = 0.05$$



Due to common ion effect neglect x w.r.t. 0.05

$$K_a = \frac{(0.05 + x) \cdot x}{(0.05 - x)} \approx x$$

$$\therefore x = 10^{-5} \quad \therefore \frac{[\text{A}^-]}{[\text{HA}] + [\text{A}^-]} = \frac{x}{x + 0.05} = 2 \times 10^{-4}$$

124.(C) After half neutralization

$$\frac{[\text{Salt}]}{[\text{Acid}]} = \frac{1/2}{1/2} = 1$$

$$\text{pH} = \text{pK}_a + \log \frac{[\text{Salt}]}{[\text{Acid}]} = \text{pK}_a \Rightarrow \text{pK}_a = 5.4$$

125.(A) $\text{pH}(0.1 \text{M } \text{CH}_3\text{COOH}) = \frac{1}{2}(\text{pK}_a - \log C)$

$$\text{pH}(0.1 \text{M } \text{NH}_4\text{Cl}) = 7 - \frac{1}{2}(\text{pK}_a + \log C)$$

CH_3COONa solution is basic

Hence, $\text{pH}(\text{HCl}) < \text{pH}(\text{CH}_3\text{COOH}) < \text{pH}(\text{NH}_4\text{Cl}) < \text{pH}(\text{CH}_3\text{COONa})$