

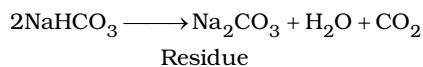
Daily Tutorial Sheet-8

Level - 2

96.(B) In $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$

$$\% \text{ by mass of } \text{H}_2\text{O} = \frac{180}{286} \times 100 = 63\% \text{ (approx)}$$

97.(A) Na_2CO_3 is not affected by heating.



98.(C) $\chi_2 = \frac{n_2}{n_1 + n_2} = 0.25$ (ethanol) (solute) ($M_{w2} = 46 \text{ g}$)

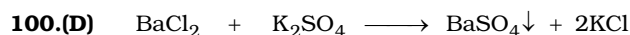
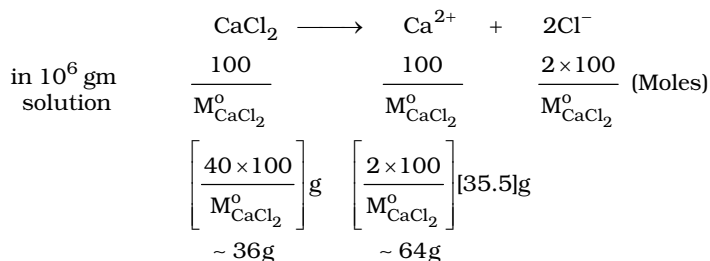
$$\chi_1 = \frac{n_1}{n_1 + n_2} = 0.75 \text{ (water) (solvent) } (M_{w1} = 18 \text{ g})$$

$$\frac{\chi_1}{\chi_2} = \frac{n_1}{n_2} = \frac{3}{2} \Rightarrow \frac{W_1 \times M_{w2}}{M_{w1} \times W_2} = \frac{3}{1}$$

$$\frac{W_1 \times 46}{18 \times W_2} = 3$$

$$\frac{W_1}{W_2} = 1.17 \quad \therefore \quad \frac{W_2}{W_1 + W_2} = 0.46$$

99.(D)



$$10 \times 1 \quad 5 \times 0.5$$

$$= 10 \text{ mmol} \quad = 2.5 \text{ mmol}$$

Here, K_2SO_4 is the limiting reagent

$$1 \text{ mmol } \text{K}_2\text{SO}_4 \equiv 1 \text{ mmol } \text{BaSO}_4$$

$$2.5 \text{ mmol } \text{K}_2\text{SO}_4 \equiv 2.5 \text{ mmol } \text{BaSO}_4 = \frac{2.5}{1000} = 0.0025 \text{ mol } \text{BaSO}_4$$

101.(A) Dibasic acid $\equiv \text{NaOH}$

$$12.5 \text{ mL} \quad 10 \text{ mL} \times 0.1 \text{ N} = 1 \text{ mEq}$$

$$\text{Strength of dibasic acid} = 6 \text{ g L}^{-1}$$

$$\text{mEq of acid} = \text{mEq of NaOH}$$

$$12.5 \times \text{N} = 1 \text{ mEq}$$

$$\frac{12.5 \times 6 \times 100}{\frac{M_w}{2} \times 1000} = 1 \quad \therefore \quad M_w(\text{acid}) = 150$$

102.(C) 10 mL of 0.2 N HCl + 30 mL of 0.1 N HCl $\equiv$ 40 mL of NaOH ($\equiv$ 0.61 g organic acid)

mEq of HCl $\equiv$ mEq of NaOH $\equiv$ mEq of organic acid

$$10 \times 0.2 + 30 \times 0.1 = \frac{0.61}{E} \times 1000$$

$$5 = \frac{0.61 \times 1000}{E} \Rightarrow E = \frac{610}{5} = 122$$

103.(C) $Z_2O_3 + 3H_2 \longrightarrow 2Z + 3H_2O$

$$\begin{array}{ccc} [2g=200\text{ mg}] & & \frac{12\text{ mg}}{2\text{ mg}} \\ & & = 6\text{ mmol} \end{array}$$

Since H_2 used is 6 mmol, Z_2O_3 used should be 2 mmol.

$$\text{Mol of } Z_2O_3 = \frac{\text{Weight}}{\text{Mw}} = \frac{200\text{ mg} \times 10^{-3}\text{ g}}{\text{Mw}} = 2 \times 10^{-3}\text{ moles}$$

$$\therefore \text{Mw}(Z_2O_3) = 100$$

$$\therefore 2Z + 16 \times 3 = 100 \Rightarrow Z = \frac{100 - 48}{2} = 26$$

104.(B) as $M = \frac{10 \times d}{M^\circ}$

$$0.9 = \frac{10 \times x \times 1.025}{60}$$

$$x = 5.27$$

$\Rightarrow$ 5.27 gm of salt in 100 g solution.

$$\Rightarrow 60\text{ gm of salt in } \left(\frac{100}{5.27} \right) 60 = 1138\text{ g solution.}$$

105.(B) Molar mass = $2 \times$ vapour density = $2 \times 39.5 = 79$

Let x be valency of element $\Rightarrow$ Formula of chloride is MCl_x

$$\Rightarrow (3.82 \times x) + 35.5 x = 79 \Rightarrow x = 2 \Rightarrow \text{Atomic weight of element} = 3.82 \times 2 = 7.64$$