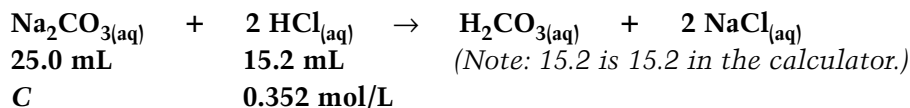


8.5B

Solutions for 8.5A Extra Practice Questions: Acid-Base Titration

1. Analysis



$$n_{\text{HCl}} = 15.2 \text{ mL} \times \frac{0.352 \text{ mol}}{1 \text{ L}} = 5.36 \text{ mmol}$$

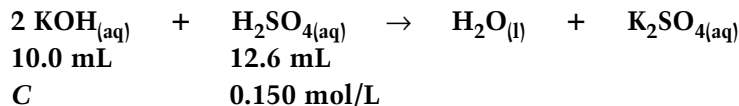
$$n_{\text{Na}_2\text{CO}_3} = 5.36 \text{ mmol} \times \frac{1}{2} = 2.68 \text{ mmol}$$

$$C_{\text{Na}_2\text{CO}_3} = \frac{2.68 \text{ mmol}}{25.0 \text{ mL}} = 0.107 \text{ mol/L}$$

$$\begin{aligned} \text{or } C_{\text{Na}_2\text{CO}_3} &= 15.2 \text{ mL HCl} \times \frac{0.352 \text{ mol HCl}}{1 \text{ L HCl}} \times \frac{1 \text{ mol Na}_2\text{CO}_3}{2 \text{ mol HCl}} \times \frac{1}{25.0 \text{ mL}} \\ &= 0.107 \text{ mol/L} \end{aligned}$$

According to the evidence gathered and the stoichiometric method, the molar concentration of the sodium carbonate solution is 0.107 mol/L.

2. Analysis



$$n_{\text{H}_2\text{SO}_4} = 12.6 \text{ mL} \times \frac{0.150 \text{ mol}}{1 \text{ L}} = 1.88 \text{ mmol}$$

$$n_{\text{KOH}} = 1.88 \text{ mmol} \times \frac{2}{1} = 3.77 \text{ mmol}$$

$$C_{\text{KOH}} = \frac{3.77 \text{ mmol}}{10.0 \text{ mL}} = 0.377 \text{ mol/L}$$

$$\text{or } C_{\text{KOH}} = 12.6 \text{ mL H}_2\text{SO}_4 \times \frac{0.150 \text{ mol H}_2\text{SO}_4}{1 \text{ L H}_2\text{SO}_4} \times \frac{2 \text{ mol KOH}}{1 \text{ mol H}_2\text{SO}_4} \times \frac{1}{10.0 \text{ mL}} = 0.377 \text{ mol/L}$$

Based on the evidence gathered and the stoichiometric method, the molar concentration of the potassium hydroxide solution is 0.377 mol/L.