

$$\begin{aligned}
 60. \quad M &= \frac{\text{moles}}{\text{Liters}} = \frac{6.73 \text{ g Na}_2\text{CO}_3}{250. \text{ mL}} \times \frac{1000 \text{ mL}}{1 \text{ L}} \times \frac{1 \text{ mol Na}_2\text{CO}_3}{105.99 \text{ g}} \\
 &= 0.253986 \text{ M} \\
 &= \cancel{0.02} \\
 &= \boxed{0.254 \text{ M Na}_2\text{CO}_3}
 \end{aligned}$$

$$\begin{aligned}
 62. \quad 250. \text{ mL} \times \frac{1 \text{ L}}{1000 \text{ mL}} \times \frac{.0125 \text{ mol}}{\text{L}} \times \frac{158.04 \text{ g KMnO}_4}{1 \text{ mol KMnO}_4} &= \\
 &= 0.493875 \\
 &= \boxed{0.494 \text{ g KMnO}_4}
 \end{aligned}$$

$$\begin{aligned}
 64. \quad 25.0 \text{ g NaOH} \times \frac{1 \text{ mol NaOH}}{40.0 \text{ g}} \times \frac{1 \text{ L}}{0.125 \text{ mol}} \times \frac{1000 \text{ mL}}{1 \text{ L}} &= 5000 \text{ mL} \\
 &= \boxed{5.00 \times 10^3 \text{ mL}}
 \end{aligned}$$

$$\begin{aligned}
 66. \quad V \cdot M &= V \cdot M \\
 (4.00 \text{ mL}) (0.0250 \text{ M}) &= (10.0 \text{ mL}) x \\
 x &= \boxed{0.0100 \text{ M}}
 \end{aligned}$$

$$70. \quad \text{a) } [\text{NH}_4^+] = 2 \times 0.25 \text{ M} = \boxed{0.50 \text{ M}}$$

$$[\text{SO}_4^{2-}] = \boxed{0.25 \text{ M}}$$

$$\text{b) } [\text{H}^+] = \boxed{0.056 \text{ M}}$$

$$[\text{NO}_3^-] = \boxed{0.056 \text{ M}}$$

$$\text{c) } [\text{Na}^+] = 2 \times 0.123 \text{ M} = \boxed{0.246 \text{ M}}$$

$$[\text{CO}_3^{2-}] = 0.125 \text{ M}$$

$$\text{d) } [\text{K}^+] = 0.00124 \text{ M}$$

$$[\text{ClO}_4^-] = 0.00124 \text{ M}$$

$$72. \quad 1.30 \text{ g Ba(OH)}_2 \times \frac{1 \text{ mol Ba(OH)}_2}{171.32 \text{ g}} \times \frac{2 \text{ mol HNO}_3}{1 \text{ mol Ba(OH)}_2} \times \frac{1000 \text{ mL}}{0.125 \text{ mol HNO}_3 \text{ M}^{-1}}$$

$$= 121.4 \text{ mL} = \boxed{121 \text{ mL HNO}_3}$$

$$76. \quad 0.250 \text{ g AgBr} \times \frac{1 \text{ mol AgBr}}{187.8 \text{ g}} \times \frac{2 \text{ mol Na}_2\text{S}_2\text{O}_3}{1 \text{ mol AgBr}} \times \frac{1000 \text{ mL}}{0.0138 \text{ M}^{-1}}$$

$$= 192.9 \text{ mL} = \boxed{193 \text{ mL}}$$

$$82. \quad 1.33 \text{ g NaOH} \times \frac{1 \text{ mol NaOH}}{40.0 \text{ g}} \times \frac{1 \text{ mol HCl}}{1 \text{ mol NaOH}} \times \frac{1000 \text{ mL HCl}}{0.812 \text{ mol HCl} \text{ M}^{-1}}$$

$$= 40.948 \text{ mL}$$

$$= \boxed{40.9 \text{ mL}}$$

$$84. \quad 2.152 \text{ g Na}_2\text{CO}_3 \times \frac{1 \text{ mol Na}_2\text{CO}_3}{105.99 \text{ g}} \times \frac{1 \text{ mol HCl}}{1 \text{ mol Na}_2\text{CO}_3} \times \frac{1000 \text{ mL}}{0.955 \text{ mol}}$$

$$= 21.26$$

$$= \boxed{21.3 \text{ mL HCl}}$$