Molarity & Dilutions

① $\frac{4.5\ g\ Sr(NO_3)_2}{} \left| \frac{1\ mol\ Sr(NO_3)_2}{211.64\ g\ Sr(NO_3)_2} \right. = 0.02126\ mol\ Sr(NO_3)_2$

a) $[Sr(NO_3)_2] = \frac{0.02126\ mol\ Sr(NO_3)_2}{0.2\ L} = \boxed{0.11\ M\ Sr(NO_3)_2}$

b) $[Sr^{2+}] = \frac{0.11\ Mol\ Sr(NO_3)_2}{1\ L} \left| \frac{1\ mol\ Sr^{2+}}{1\ mol\ Sr(NO_3)_2} \right. = \boxed{0.11\ M\ Sr^{2+}}$

c) $[NO_3^-] = \frac{0.11\ mol\ Sr(NO_3)_2}{1\ L} \left| \frac{2\ mol\ NO_3^-}{1\ mol\ Sr(NO_3)_2} \right. = \boxed{0.22\ M\ NO_3^-}$

② $2.33\ M\ NaC_2H_3O_2 = \frac{x}{0.55\ L}$

$x = 1.2815\ mol\ NaC_2H_3O_2$

$\frac{1.2815\ mol\ NaC_2H_3O_2}{} \left| \frac{82.04\ g\ NaC_2H_3O_2}{1\ mol\ NaC_2H_3O_2} \right. = \boxed{105\ g\ NaC_2H_3O_2}$

③ $M_1V_1 = M_2V_2$

$(12\ M)(V_1) = (5\ M)(200\ mL)$

$\boxed{V_1 = 83\ mL}$

④ $V_2 = 400\ mL + 25\ mL = 425\ mL$

$M_1V_1 = M_2V_2$

$(2.97\ M)(25\ mL) = (M_2)(425\ mL)$

$\boxed{M_2 = 0.17\ M}$

Net Ionic Equations

① $2NaOH_{(aq)} + CuCl_{2(aq)} \rightarrow Cu(OH)_{2(s)} + 2NaCl_{(aq)}$

$\cancel{Na^+}_{(aq)} + OH^-_{(aq)} + Cu^{2+}_{(aq)} + \cancel{Cl^-}_{(aq)} \rightarrow Cu(OH)_{2(s)} + \cancel{Na^+}_{(aq)} + \cancel{Cl^-}_{(aq)}$

$$\boxed{Cu^{2+}_{(aq)} + 2OH^-_{(aq)} \rightarrow Cu(OH)_{2(s)}}$$

② $Pb(NO_3)_{2(aq)} + KI_{(aq)} \rightarrow PbI_{2(s)} + KNO_{3(aq)}$

$Pb^{2+}_{(aq)} + \cancel{NO_3^-}_{(aq)} + \cancel{K^+}_{(aq)} + I^-_{(aq)} \rightarrow PbI_{2(s)} + \cancel{K^+}_{(aq)} + \cancel{NO_3^-}_{(aq)}$

$$\boxed{Pb^{2+}_{(aq)} + 2I^-_{(aq)} \rightarrow PbI_{2(s)}}$$

③ $K_2CrO_{4(aq)} + Fe(C_2H_3O_2)_{3(aq)} \rightarrow Fe_2(CrO_4)_{3(s)} + KC_2H_3O_{2(aq)}$

$\cancel{K^+}_{(aq)} + CrO_4^{2-}_{(aq)} + Fe^{3+}_{(aq)} + \cancel{C_2H_3O_2^-}_{(aq)} \rightarrow Fe_2(CrO_4)_{3(s)} + \cancel{K^+}_{(aq)} + \cancel{C_2H_3O_2^-}_{(aq)}$

$$\boxed{2Fe^{3+}_{(aq)} + 3CrO_4^{2-}_{(aq)} \rightarrow Fe_2(CrO_4)_{3(s)}}$$

Solution Stoichiometry

① $Pb(NO_3)_2(aq) + (NH_4)_2SO_4(aq) \rightarrow PbSO_4(s) + 2NH_4NO_3(aq)$

55 mL	Excess	? g
1.05 M		
0.05775 mol		

$$\left(1.05 \frac{mol}{L}\right)(0.055\ L) = 0.05775\ mol\ Pb(NO_3)_2$$

$$\frac{0.05775\ mol\ Pb(NO_3)_2 \mid 1\ mol\ PbSO_4}{1\ mol\ Pb(NO_3)_2} \mid \frac{303.26\ g\ PbSO_4}{1\ mol\ PbSO_4}$$

$$= \boxed{18\ g\ PbSO_4}$$

② $2Li_3PO_4(aq) + 3SrCl_2(aq) \rightarrow 6LiCl(aq) + Sr_3(PO_4)_2(s)$

2.17 M	30 mL
V = ?	0.395 M
	0.01185 mol

$$\left(0.395 \frac{mol}{L}\right)(0.03\ L) = 0.01185\ mol\ SrCl_2$$

$$\frac{0.01185\ mol\ SrCl_2 \mid 2\ mol\ Li_3PO_4}{3\ mol\ SrCl_2} = 0.0079\ mol\ Li_3PO_4$$

$$\frac{0.0079\ mol\ Li_3PO_4 \mid 1\ L}{2.17\ mol\ Li_3PO_4} = 0.00364 = \boxed{3.64 \times 10^{-3}\ L\ Li_3PO_4}$$

③ $Fe^{3+}(aq) + 3OH^-(aq) \rightarrow Fe(OH)_3(s)$

4.22 g

V of $Ba(OH)_2$ = ?

$[Ba(OH)_2] = 0.381\ M$

$$\frac{4.22\ g\ Fe(OH)_3}{} \left| \frac{1\ mol\ Fe(OH)_3}{106.88\ g\ Fe(OH)_3} \right. = 0.03948\ mol\ Fe(OH)_3$$

$$\frac{0.03948\ mol\ Fe(OH)_3}{} \left| \frac{3\ mol\ OH^-}{1\ mol\ Fe(OH)_3} \right. = 0.11845\ mol\ OH^-$$

$$\frac{0.11845\ mol\ OH^-}{} \left| \frac{1\ mol\ Ba(OH)_2}{2\ mol\ OH^-} \right. = 0.059225\ mol\ Ba(OH)_2$$

$$\frac{0.059225\ mol\ Ba(OH)_2}{} \left| \frac{1\ L}{0.381\ mol\ Ba(OH)_2} \right. = \boxed{0.155\ L\ Ba(OH)_2(aq)}$$