4.95 $\text{mol } MnO_4^- \quad (0.0100\text{M})(0.0240\text{L}) = 2.40\times10^{-4}\text{ mol}$

$$2.40\times10^{-4}\text{ mol } MnO_4^- \times \frac{5\text{ mol } C_2O_4^{2-}}{2\text{ mol } MnO_4^-} \times \frac{90.04\text{g}}{1\text{ mol}} = 0.05402\text{g } H_2C_2O_4$$

$$\frac{0.05402\text{g}}{1.00\text{g}} \times 100\% = 5.40\%\ H_2C_2O_4$$

4.108 $Zn^0 + 2Ag^+ \longrightarrow Zn^{2+} + 2Ag^0$ $\quad 3.37\text{g Ag} + \text{Zn}$ (xs)

x = g Ag produced

$$x\text{ g Ag} \times \frac{1\text{ mol}}{107.9\text{g}} \times \frac{1\text{ mol Zn}}{2\text{ mol Ag}} \times \frac{65.39\text{g}}{1\text{ mol}} = 0.303x\text{ g Zn consumed}$$

$2.50\text{g Zn}_{\text{start}} - 0.303x\text{ g}_{\text{consumed}} =$ g Zn remaining

$3.87\text{g}_{\text{Zn+Ag}} =$ x g Ag + [2.50g − 0.303x] g Zn

$x = 1.25\text{g Ag}$

$3.37\text{g} - 1.25\text{g Ag} = 2.12\text{g Zn}$

4.95 mol MnO_4^- $(0.0100M)(0.0240L) = 2.40\times10^{-4}$ mol

$$2.40\times10^{-4}\text{ mol } MnO_4^- \times \frac{5\text{ mol } C_2O_4^{2-}}{2\text{ mol } MnO_4^-} \times \frac{90.04\text{ g}}{1\text{ mol}} = 0.0540\text{ g } H_2C_2O_4$$

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4.108

$$Zn^0 + 2Ag^+ \longrightarrow Zn^{2+} + 2Ag^0$$

3.37 g Ag + Zn (x5)

x = # g Ag produced

$$x\text{ g Ag} \times \frac{1\text{ mol}}{107.9\text{ g}} \times \frac{1\text{ mol Zn}}{2\text{ mol Ag}} \times \frac{65.39\text{ g}}{1\text{ mol}} = 0.303x\text{ g Zn consumed}$$

$$2.50\text{ g Zn (start)} - 0.303x\text{ g (consumed)} = \#\text{ g Zn remaining}$$

$$3.37\text{ g (Zn + Ag)} = x\text{ g Ag} + [2.50\text{ g} - 0.303x]\text{ g Zn}$$

$$x = 1.25\text{ g Ag}$$

$$3.37\text{ g} - 1.25\text{ g Ag} = 2.12\text{ g Zn}$$

4.30 $X = Na, K$

$$XCl + AgNO_3 \longrightarrow AgCl + XNO_3$$

1 : 1 — 1.913 g

$$1.913\,g\ AgCl \times \frac{1\ mol}{143.4\,g} \times \frac{1\ mol\ XCl}{1\ mol\ AgCl} = 0.01334\ mol\ "XCl"$$

let x = mol NaCl ∴ $0.01334 - x$ = mol KCl

#g NaCl + #g KCl = 0.8870 g

$$\left[x\ mol\ NaCl \times \frac{58.44\,g}{1\ mol}\right] + \left[(0.01334 - x) \times \frac{74.55\,g}{1\ mol}\right] = 0.8870\,g$$

$x = 6.673 \times 10^{-3}\ mol\ NaCl \times \frac{58.44\,g}{1\ mol} = 0.39\,g\ NaCl$

$0.497\,g\ KCl$

$\frac{0.39\,g}{0.8870\,g}$ % NaCl = 44% NaCl

56% KCl

65.6 g ≈ 1.032 mol

4.151

(1) $Cu(s) + 4HNO_3(aq) \longrightarrow Cu(NO_3)_2 + 2NO_2 + 2H_2O$ REDOX

(2) $Cu(NO_3)_{2(aq)} + 2NaOH_{(aq)} \longrightarrow Cu(OH)_{2(s)} + 2NaNO_{3(aq)}$ PRECIP. DOUBLE REP

(3) $Cu(OH)_{2(s)} \xrightarrow[\Delta]{heat} CuO + H_2O$ DECOMPOSITION

(4) $CuO_{(s)} + H_2SO_4 \longrightarrow CuSO_4 + H_2O$ NEUTRALIZATION

(5) $CuSO_4 + Zn \longrightarrow Cu^0 + ZnSO_4$ Redox M displacement

(6) $Zn(s) + 2HCl \longrightarrow ZnCl_2 + H_2$ H displacement

19.1 c)

$$\overset{+2\ -3}{CN^-} + \overset{+7\ -2}{MnO_4^-} \longrightarrow \overset{+4\ -3\ -2}{CNO^-} + \overset{+4\ -2}{MnO_2} \qquad \text{BASIC}$$

$$3\left(2OH^- + H_2O + \overset{+2}{C}N^- \longrightarrow \overset{+4}{C}NO^- + 2e^- + 2H^+ + 2OH^-\right)$$

$$2\left(4OH^- + 4H^+ + 3e^- + \overset{+7}{Mn}O_4^- \longrightarrow \overset{+4}{Mn}O_2 + 2H_2O + 4OH^-\right)$$

$$\cancel{6OH^-} + \cancel{3H_2O} + 3CN^- \longrightarrow 3CNO^- + 6H_2O$$

$$\cancel{8}\,(H_2O) + 2MnO_4^- \longrightarrow 2MnO_2 + \cancel{4H_2O} + \cancel{8}^{\,2}\,OH^-$$

$$H_2O + 3CN^- + 2MnO_4^- \longrightarrow 3CNO^- + 2MnO_2 + 2OH^-$$