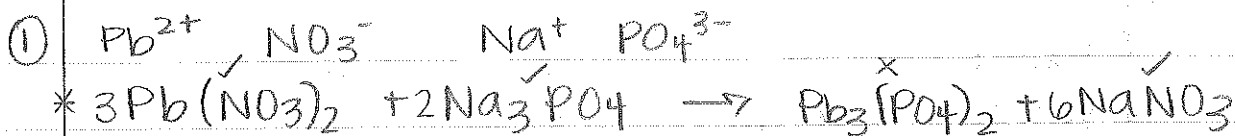


Honors Chem - Final Review Key

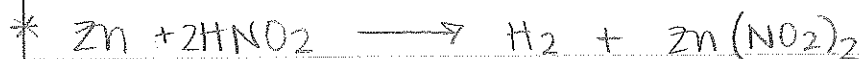
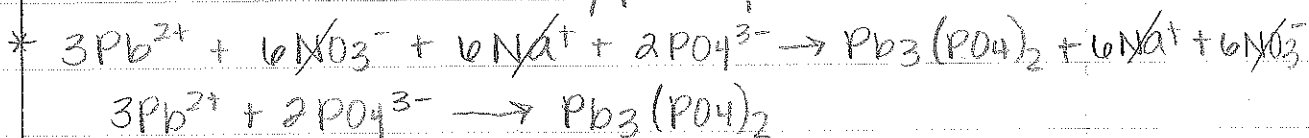
Part I:



* Lead (II) phosphate + sodium nitrate

* Dbl. Replacement Rxn

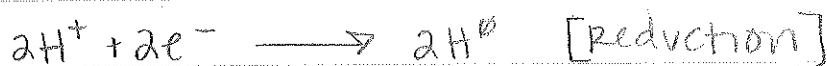
* DF: Formation of solid/precipitate



* Hydrogen gas + zinc (II) nitrite

RIG
OIL
* Single Replacement Rxn

* DF: Formation of a gas



* Aluminum oxide

* Synthesis Rxn

* DF: Transfer of e^-

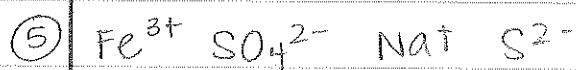




* Water + Lithium sulfate

* Dbl. Replacement Rxn

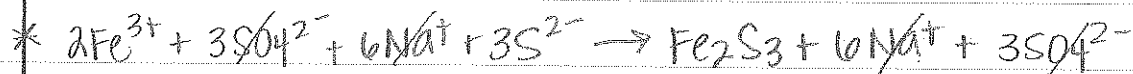
* DF: Formation of water



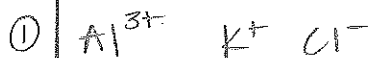
* Iron (III) sulfide + sodium sulfate

* Dbl. Replacement Rxn

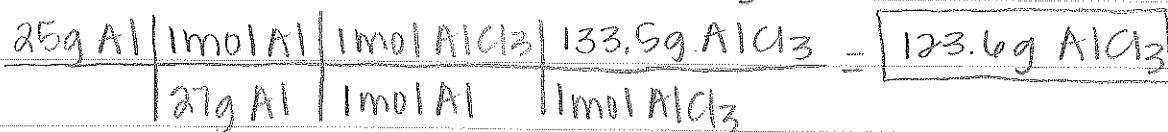
* DF: Formation of a solid

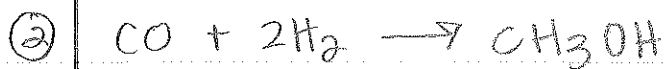


Part II:



Al 27
Cl 106.5
133.5





Ⓐ $\frac{1.2\text{g H}_2}{2\text{g H}_2} \times \frac{1\text{mol H}_2}{2\text{mol H}_2} \times \frac{1\text{mol CH}_3\text{OH}}{1\text{mol CH}_3\text{OH}} \times \frac{32\text{g CH}_3\text{OH}}{1\text{mol CH}_3\text{OH}} = 9.6\text{g CH}_3\text{OH}$

$\frac{7.45\text{g CO}}{28\text{g CO}} \times \frac{1\text{mol CO}}{1\text{mol CO}} \times \frac{1\text{mol CH}_3\text{OH}}{1\text{mol CH}_3\text{OH}} \times \frac{32\text{g CH}_3\text{OH}}{1\text{mol CH}_3\text{OH}} = 8.5\text{g CH}_3\text{OH}$

CO Limiting

Ⓑ $\frac{8.5\text{g CH}_3\text{OH}}{32\text{g CH}_3\text{OH}} \times \frac{1\text{mol CH}_3\text{OH}}{1\text{mol CH}_3\text{OH}} \times \frac{2\text{mol H}_2}{1\text{mol CH}_3\text{OH}} \times \frac{2\text{g H}_2}{1\text{mol H}_2} = 1.06\text{g H}_2$

$1.2\text{g} - 1.06\text{g} = 0.14\text{g H}_2 \text{ excess}$

Part III:

① $P = \frac{nRT}{V} = \frac{0.5\text{mol} \times 0.0821 \times 298.15}{1\text{L}} = 12.24\text{atm}$

② $V = \frac{nRT}{P} = \frac{1.35\text{mol} \times 0.0821 \times 373.15\text{K}}{2.58\text{atm}} = 16.02\text{L}$

③ $P = \frac{nRT}{V} = \frac{0.01\text{mol} \times 0.0821 \times 10273.15\text{K}}{4.5\text{L}} = 1.87\text{atm}$

④ $V = \frac{nRT}{P} = \frac{0.435\text{mol} \times 0.0821 \times 23\text{K}}{100\text{atm}} = 0.0082\text{L}$

Part IV:

$$\textcircled{1} \quad M = \frac{\text{moles}}{L} \quad M = \frac{1.2 \text{ mol}}{1.22 \text{ L}} = \boxed{0.98 \text{ M}}$$

$$\textcircled{2} \quad \frac{12 \text{ mL}}{1000} = 0.012 \text{ L} \quad M = \frac{0.09 \text{ mol}}{0.012 \text{ L}} = \boxed{7.5 \text{ M}}$$

$$\textcircled{3} \quad \frac{65 \text{ mL}}{1000} = 0.065 \text{ L} \quad M = \frac{0.75 \text{ mol}}{0.065 \text{ L}} = \boxed{11.5 \text{ M}}$$

$\begin{array}{r} \text{Ca } 40.1 \\ \text{N } 28 \\ \hline 0.64 \\ \hline 132 \end{array}$	$\textcircled{4} \quad \frac{120 \text{ g Ca(NO}_2)_2}{132 \text{ g Ca(NO}_2)_2} \left \frac{1 \text{ mol Ca(NO}_2)_2}{1} \right. = 0.91 \text{ mol Ca(NO}_2)_2$
	$M = \frac{0.91 \text{ mol}}{0.24 \text{ L}} = \boxed{3.8 \text{ M}}$

$$\textcircled{5} \quad \frac{98 \text{ g NaOH}}{40 \text{ g NaOH}} \left| \frac{1 \text{ mol NaOH}}{1} \right. = 2.45 \text{ mol} \quad M = \frac{2.45 \text{ mol}}{2.2 \text{ L}} = \boxed{1.1 \text{ M}}$$

$$\textcircled{6} \quad \frac{1.2 \text{ g HCl}}{36.5 \text{ g HCl}} \left| \frac{1 \text{ mol HCl}}{1} \right. = 0.03 \text{ mol} \quad \frac{25 \text{ mL}}{1000} = 0.025 \text{ L}$$
$$M = \frac{0.03 \text{ mol}}{0.025 \text{ L}} = \boxed{1.2 \text{ M}}$$

Part V:

① $M_1V_1 = M_2V_2$

$$0.15M \times 125mL = 150mL \times XM$$

$$18.75 = 150X$$

$$X = 0.125M$$

② $0.15M \times 100mL = 150mL \times XM$

$$15 = 150X$$

$$X = 0.1M$$

③ $250mL \times 10M = 0.05M \times XmL$

$$2500 = 0.05X$$

$$X = 50,000mL$$

④ $345mL \times 1.5M = 250mL \times XM$

$$517.5 = 250X$$

$$X = 2.1M$$

⑤ $500mL \times 2.4M = 1M \times XmL$

$$1200 = 1X$$

$$X = 1200mL \text{ total}$$

$$1200 - 500 = 700mL \text{ water}$$

Part VI:

① $\frac{25g HCl}{36.5g HCl} \times 1 \text{ mol HCl} = 0.68 \text{ mol}$ $M = \frac{0.68 \text{ mol}}{1.5L} = 0.45M$

$$pH = -\log[0.45]$$

$$pH = 0.35$$

H 1
N 14
O 48
63

$$\textcircled{2} \frac{1.32 \text{g HNO}_3}{63 \text{g HNO}_3} \times \frac{1 \text{mol HNO}_3}{63 \text{g HNO}_3} = 0.02 \text{mol HNO}_3 \quad M = \frac{0.02 \text{mol}}{0.75 \text{L}} = 0.027 \text{M}$$

$$\text{pH} = -\log[0.027] \quad \boxed{\text{pH} = 1.57}$$

$$\textcircled{3} \frac{1.7 \text{mol}}{1000 \text{L}} = 0.0017 \text{M} \quad \text{pH} = -\log[0.0017] = 2.77$$

$$\text{pOH} = 14 - 2.77$$

$$\boxed{\text{pOH} = 11.23}$$

$$\textcircled{4} \text{pH} = -\log 4.5 \times 10^{-7} \quad \boxed{\text{pH} = 6.35 \text{ Acidic}}$$

$$\textcircled{5} [\text{H}^+] = 10^{-4} \quad [\text{H}^+] = 0.0001 \text{M}$$
$$10 \text{mL} \times 0.0001 \text{M} = 1000 \text{mL} \times X \text{M}$$
$$0.001 = 1000X$$
$$X = 0.000001$$

$$\text{pH} = -\log[0.000001]$$

$$\boxed{\text{pH} = 6}$$

$$\textcircled{6} \text{pH} = 3.2 \quad \text{pOH} = 14 - 3.2 = 10.8$$

$$[\text{OH}^-] = 10^{-10.8}$$

$$\boxed{[\text{OH}^-] = 1.6 \times 10^{-11}}$$