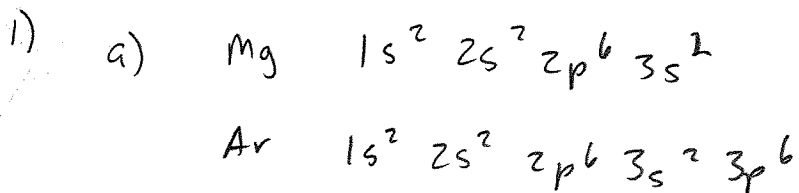


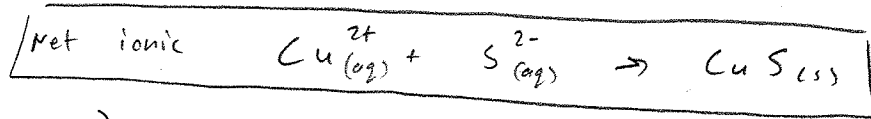
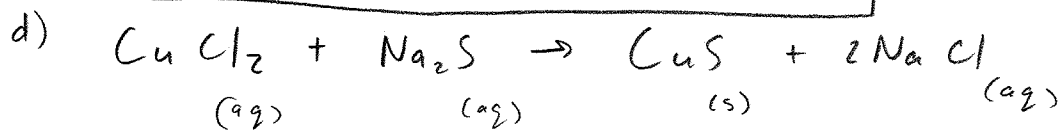
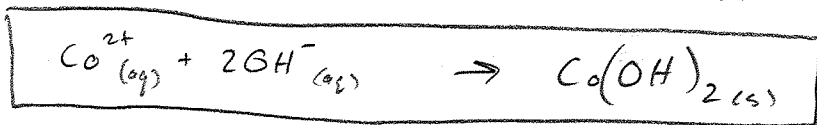
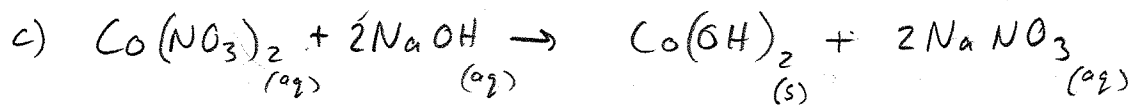
## AP PROBLEM SET #2



b) Valence for Mg and Ar are in same principle energy level, but Ar is smaller + has greater nuclear charge.  $\therefore$  Ionization energies are less for Mg. Removal of 3<sup>rd</sup>  $e^-$  from Mg is from  $n=2$  level,  $\therefore e^-$  in this level experience a greater  $Z_{\text{eff}}$ .

c) Only  $\text{MgCl}_2$  forms. Mg readily lose 2  $e^-$ . Ionization of  $\text{Mg}^{3+}$  is very high.  $E^-$ -affinity for Ar is low, and ionization of Ar is high.

d) QCl Very high 2<sup>nd</sup> ionization energy means only 1 valence  $e^-$



3).

$$a) M_1 V_1 = M_2 V_2$$

$$18.4 M (V_1) = 5.20 M \text{ 1L}$$

$$V_1 = \frac{5.20 M \text{ 1L}}{18.4 M}$$

$$V_1 = \boxed{0.2826 \text{ L or } 282.6 \text{ mL}}$$

b) Assume 1 L.

$$\text{density of conc.} = \frac{1.84 \text{ g}}{\text{mL}}$$

( $\text{H}_2\text{SO}_4 + \text{H}_2\text{O}$ )

$$D = \frac{m}{V}$$

$$1.84 \text{ g} = \frac{m}{1000 \text{ mL}}$$

$$= \boxed{1840 \text{ g } \text{H}_2\text{SO}_4 \text{ and water}}$$

g total ↗

$$18.4 M = \frac{\text{mol}}{\text{L}} = \frac{18.4 \text{ mol } \text{H}_2\text{SO}_4}{1 \text{ L}} \left| \frac{98.1 \text{ g}}{1 \text{ mol}} \right. = \boxed{1805 \text{ g } \text{H}_2\text{SO}_4}$$

$$\text{Mass \%} = \frac{\text{part}}{\text{total}} \times 100\%$$

$$\frac{\text{g } \text{H}_2\text{SO}_4}{\text{g } \text{H}_2\text{SO}_4 + \text{water}}$$

$$\boxed{98.1\% \text{H}_2\text{SO}_4}$$



10.5 g $\text{NaHCO}_3$	1 mol $\text{NaHCO}_3$	1 mol $\text{H}_2\text{SO}_4$	1 L
	84.0 g $\text{NaHCO}_3$	2 mol $\text{NaHCO}_3$	5.20 mol $\text{H}_2\text{SO}_4$

$$\boxed{0.0120 \text{ L of } 5.2 M \text{H}_2\text{SO}_4}$$

