

Name \_\_\_\_\_

TA Name \_\_\_\_\_

Lab Section # \_\_\_\_\_

ALL work must be shown to receive full credit. **Due at the end of laboratory.**

ICE3.1. What volume of 0.778 M sodium carbonate solution must be diluted to 150.0 mLs with water to reduce its concentration to 0.0234 M  $\text{Na}_2\text{CO}_3$ ?

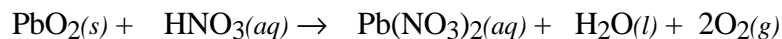
ICE3.2. A 0.0945 g sample of  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$  is dissolved and diluted to the mark in a 500.0 mL volumetric flask. A 2.00 mL sample of this solution is transferred to a second 500.0 mL volumetric flask and diluted.

a) What is the molarity of the  $\text{CuSO}_4$  in the final solution?

b) To prepare the solution directly what mass of  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$  must be weighed out?

ICE3.3. Describe how you would prepare 250.0 mLs of a 0.0100 M solution of  $\text{KMnO}_4$ .

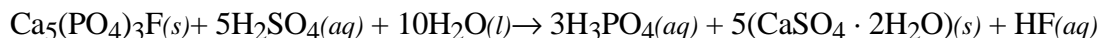
ICE3.4. Given the reaction



a) Balance the chemical equation.

b) What volume of 1.23 M nitric acid is required to react with 15.0 g of lead(IV) oxide according to the equation?

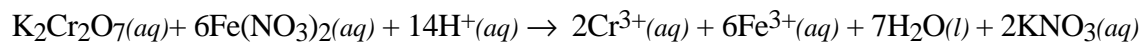
ICE3.5. Phosphoric acid can be produced according to the reaction



a) What volume of 2.50 M phosphoric acid is generated by the reaction of 500. g of  $\text{Ca}_5(\text{PO}_4)_3\text{F}$  with excess sulfuric acid?

b) What volume of 3.00 M sulfuric acid is required to react with amount of  $\text{Ca}_5(\text{PO}_4)_3\text{F}$  in part a)?

ICE3.6. Given the reaction

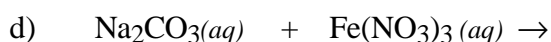
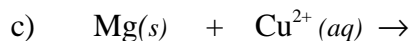
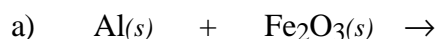


- a) A solution of  $\text{Cr}_2\text{O}_7^{2-}$  is prepared by dissolving 9.34 g of  $\text{K}_2\text{Cr}_2\text{O}_7$  in 400.0 mL of water. (Assume no significant change in volume when the solution is prepared.) A total 14.75 mL of this solution is required to reach the end-point in a titration of a 250.0 mL sample containing Fe(II). Determine the concentration of Fe(II) in the solution.

- b) Calculate the mols of  $\text{H}^+$  required to react with the amount of  $\text{K}_2\text{Cr}_2\text{O}_7(\text{aq})$  and  $6\text{Fe}(\text{NO}_3)_2(\text{aq})$  used in part a.

- c) If this number of mols of  $\text{H}^+$  are dissolved in 300. mLs, calculate the concentration of  $\text{H}^+$ .

ICE3.7. Write the chemical formula(s) of the product(s) and balance the following reactions. Identify all products phases as either (g)as, (l)iquid, (s)olid or (aq)ueous. If no reaction occurs write NR.



ICE3.8. Write the ionic and net ionic chemical equations for 1b) and 1d).

1b)

Ionic equation:

Net Ionic equation:

1d)

Ionic equation:

Net Ionic equation:

ICE3.9. Calculate the mass of manganese(II) sulfate that forms with 0.680 mLs of  $2.44 \times 10^{-3}$  M  $\text{KMnO}_4$  react with 1.25 g of potassium permanganate in excess sulfuric acid. The equation which describes the reaction between oxalic acid, potassium permanganate and sulfuric acid is,

