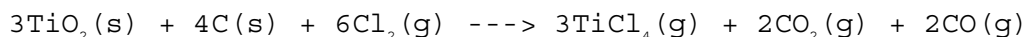


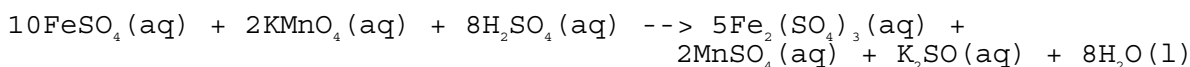
**ON SEPARATE PAPER**, work each of the following problems. SHOW ALL WORK in neat form TO RECEIVE CREDIT!!!! Due: Day/time of final.

- Ethyl alcohol has a density of  $0.789 \text{ g/cm}^3$ . What volume of ethyl alcohol must be poured into a graduated cylinder to give 19.8 g of alcohol?
- Write net ionic equations for the following molecular equations. Careful on **WEAK ACIDS**.
  - $\text{HF(aq)} + \text{KOH(aq)} \rightarrow \text{KF(aq)} + \text{H}_2\text{O(l)}$
  - $\text{AgNO}_3\text{(aq)} + \text{NaBr(aq)} \rightarrow \text{AgBr(s)} + \text{NaNO}_3\text{(aq)}$
  - $\text{CaS(aq)} + 2\text{HBr(aq)} \rightarrow \text{CaBr}_2\text{(aq)} + \text{H}_2\text{S(g)}$
  - $\text{NaOH(aq)} + \text{NH}_4\text{Br(aq)} \rightarrow \text{NaBr(aq)} + \text{NH}_3\text{(g)} + \text{H}_2\text{O(l)}$
  - $\text{H}_2\text{SO}_4\text{(aq)} + \text{NaOH(aq)} \rightarrow$
- Seawater contains 0.00065% (by mass) of bromine. How many grams of bromine are there in 1.00 L of seawater? The density of seawater is  $1.025 \text{ g/cm}^3$ .
- Titanium, which is used to make airplane engines and frames, can be obtained from titanium tetrachloride, which in turn is obtained from titanium dioxide by the following process:

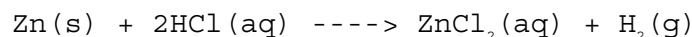


A vessel contains 4.15 g  $\text{TiO}_2$ , 5.67 g C, and 6.78 g  $\text{Cl}_2$ . Suppose the reaction goes to completion as written. How many grams of titanium tetrachloride can be produced.

- How many grams of sodium dichromate,  $\text{Na}_2\text{Cr}_2\text{O}_7$ , should be added to a 50.0-mL volumetric flask to prepare 0.025 M  $\text{Na}_2\text{Cr}_2\text{O}_7$  when the flask is filled to the mark with water? What are the Molarities of the  $\text{Na}^+$  ion and the  $\text{Cr}_2\text{O}_7^{2-}$  ion in the solution?
- How many milliliters of 0.238 M  $\text{KMnO}_4$  are needed to react with 3.36 g of iron(II) sulfate,  $\text{FeSO}_4$ ? The reaction is as follows:



- A 1.28-g sample of a colorless liquid was vaporized in a 250-mL flask at  $121^\circ\text{C}$  and 786 mmHg. What is the molecular weight of this substance?
- Small amounts of hydrogen are conveniently prepared by reacting zinc with hydrochloric acid.



How many grams of zinc are required to prepare 2.50 L  $\text{H}_2$  gas at 765 mmHg and  $22^\circ\text{C}$ ?

- The atmosphere in a sealed diving bell contained oxygen and helium. If the gas mixture has 0.200 atm of oxygen and a total pressure of 3.00 atm, what is the pressure due to He? Calculate the mass of helium in 1.00 L of the gas mixture at  $20^\circ\text{C}$ .
- Determine the amount of heat needed to raise 20.0 g of ice at  $0^\circ\text{C}$  to steam at  $100^\circ\text{C}$ .  
 $(\Delta H_{\text{fusion}} = 334 \text{ J/g}; \text{SpHt}_{\text{(H}_2\text{O)}} = 4.18 \text{ J/gc}; \Delta H_{\text{vap}} = 2.25 \text{ kJ/g})$