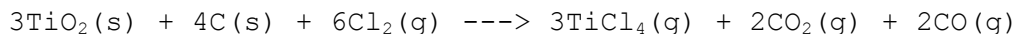


ON SEPARATE PAPER, work each of the following problems. SHOW ALL WORK in **neat** form TO RECEIVE CREDIT! Due: Day/Time of final (Mon. Dec. 13^h).

- Ethyl alcohol has a density of 0.789 g/cm³. 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. Be Careful on **WEAK ACIDS**.

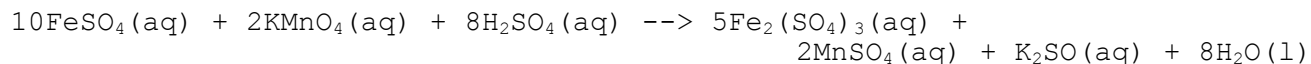
- $\text{HF}(\text{aq}) + \text{KOH}(\text{aq}) \rightarrow \text{KF}(\text{aq}) + \text{H}_2\text{O}(\text{l})$
- $\text{AgNO}_3(\text{aq}) + \text{NaBr}(\text{aq}) \rightarrow \text{AgBr}(\text{s}) + \text{NaNO}_3(\text{aq})$
- $\text{CaS}(\text{s}) + 2\text{HBr}(\text{aq}) \rightarrow \text{CaBr}_2(\text{aq}) + \text{H}_2\text{S}(\text{g})$
- $\text{NaOH}(\text{aq}) + \text{NH}_4\text{Br}(\text{aq}) \rightarrow \text{NaBr}(\text{aq}) + \text{NH}_3(\text{g}) + \text{H}_2\text{O}(\text{l})$
- $\text{H}_2\text{SO}_4(\text{aq}) + \text{NaOH}(\text{aq}) \rightarrow$

- 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 g/cm³.
- 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 TiO₂, 5.67 g C, and 6.78 g Cl₂. Suppose the reaction goes to completion as written. How many grams of titanium tetrachloride can be produced.

- How many grams of sodium dichromate, Na₂Cr₂O₇, should be added to a 50.0-mL volumetric flask to prepare 0.025 M Na₂Cr₂O₇ when the flask is filled to the mark with water? What are the Molarities of the Na⁺ ion and the Cr₂O₇²⁻ ion in the solution?
- How many milliliters of 0.238 M KMnO₄ are needed to react with 3.36 g of iron(II) sulfate, FeSO₄? The reaction is as follows:



- A 1.28-g sample of a colorless liquid was vaporized in a 250-mL flask at 121°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.

$$\text{Zn}(\text{s}) + 2\text{HCl}(\text{aq}) \rightarrow \text{ZnCl}_2(\text{aq}) + \text{H}_2(\text{g})$$
 How many grams of zinc are required to prepare 2.50 L H₂ gas at 765 mmHg and 22°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°C.
- Determine the amount of heat needed to raise 20.0 g of ice at 0°C to steam at 100°C.
 $(\Delta H_{\text{fusion}} = 334 \text{ J/g}; \text{SpHt}_{(\text{H}_2\text{O})} = 4.18 \text{ J/gc}; \Delta H_{\text{vap}} = 2.25 \text{ kJ/g})$