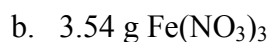


Group Problems

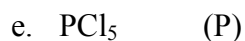
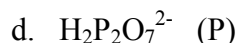
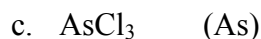
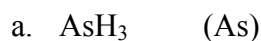
31 August 2009

1. A 25.00 mL sample of 0.132 M HNO_3 is mixed with 10.00 mL of KOH. What is the molarity of the KOH solution if neutralization is achieved?
2. What are the oxidizing and reducing agents in the following reactions?
 - a. $5 \text{SO}_3^{2-}(\text{aq}) + 2 \text{MnO}_4^{-}(\text{aq}) + 6 \text{H}^{+}(\text{aq}) \rightarrow 5 \text{SO}_4^{2-}(\text{aq}) + 2 \text{Mn}^{2+}(\text{aq}) + 3 \text{H}_2\text{O}(\text{l})$
 - b. $2 \text{NO}_2(\text{g}) + 7 \text{H}_2(\text{g}) \rightarrow 2 \text{NH}_3(\text{g}) + 4 \text{H}_2\text{O}(\text{g})$
3. Write a molecular equation and net ionic equation given the following starting materials:
 - a. $\text{NaCl}(\text{aq}) + \text{Pb}(\text{NO}_3)_2(\text{aq}) \rightarrow$
 - b. $\text{Fe}(\text{NO}_3)_3(\text{aq}) + \text{NaOH}(\text{aq}) \rightarrow$

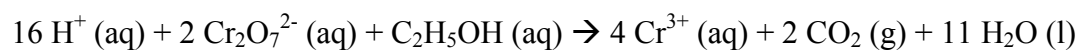
4. Calculate the number of ions observed in an aqueous solution of the following salts:
- 0.37 mol NH_4Cl



5. Provide the oxidation number for the indicated atoms below:



6. A person's blood alcohol content of ($\text{C}_2\text{H}_5\text{OH}$) level can be determined by titrating a sample of blood plasma with a potassium dichromate solution. The balanced equation is shown below. At the equivalence point, the moles of dichromate equal the moles of alcohol ($\text{C}_2\text{H}_5\text{OH}$). If 35.45 mL of 0.05961 M $\text{Cr}_2\text{O}_7^{2-}$ is required to titrate 28.00 grams of plasma, what is the mass percent of alcohol in the blood as calculated from the mass of alcohol divided by the mass of plasma.



Individual Problems

1. An auto mechanic spills 78 mL of 2.6 M HNO_3 (from a battery). How many mL of 1.5 M NaHCO_3 (a base) must be poured onto the spill to completely neutralize the acid?
2. Give the oxidation number of the indicated atom in each of the following:
 - a. MnO_4^{2-} (Mn)
 - b. Mn_2O_3 (Mn)
 - c. KMnO_4 (Mn)
 - d. CrO_3 (Cr)
 - e. $\text{Cr}_2\text{O}_7^{2-}$ (Cr)
3. Given the following salts:



Write all of the precipitation reactions possible between these three compounds. Include the molecular equation, the ionic equation, and the net ionic equation in the answer.

4. How many ions would be observed in 24 mL of 0.188 M $\text{Mg}(\text{NO}_3)_2$?