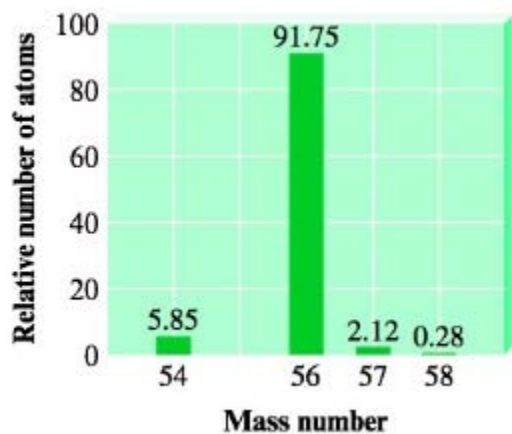


**CHEM 101A – Chapter 3 Stoichiometry Problems**

1. The stable isotopes of iron are  $^{54}\text{Fe}$ ,  $^{56}\text{Fe}$ ,  $^{57}\text{Fe}$ , and  $^{58}\text{Fe}$ . The mass spectrum of iron looks like the following:

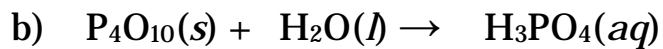
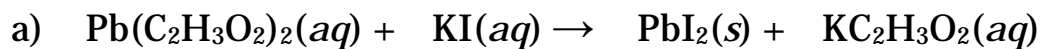


Use the data from the mass spectrum to estimate the atomic mass of iron and compare to the value on the periodic table.

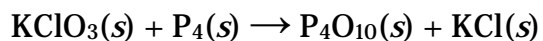
2. What is the percent composition of each element in  $\text{Na}_3\text{N}$ ?

3. A compound contains 47.08%C, 6.59%H, and 46.33%Cl by mass. The molar mass is 153g/mol. What are the empirical and molecular formulas?

4. Balance the following equations:

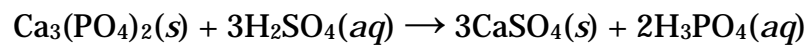


5. If you react 52.9 g potassium chlorate with excess red phosphorus, what mass tetraphosphorus decoxide could be produced? The Unbalanced equation is below:



6. A 0.4230-g sample of impure sodium nitrate was heated, converting all the sodium nitrate to 0.2864 g of sodium nitrite and oxygen gas. Determine the percent sodium nitrate in the original sample.

7. Consider the balanced reaction below:



What masses of calcium sulfate and phosphoric acid can be produced from the reaction of 1.0 kg calcium phosphate with 1.0 kg concentrated sulfuric acid (98% $\text{H}_2\text{SO}_4$  by mass)? State the limiting reactant.