

### Chapter 3: Worksheet #1 Mass Relationships

1. Calculate the mass percent of carbon, nitrogen and oxygen in acetamide,  $C_2H_5NO$ .

**%C 40.668   %H 8.533   %N 23.713   %O 27.086**

2. A 50.51 g sample of a compound made from phosphorus and chlorine is decomposed. Analysis of the products showed that 11.39 g of phosphorus atoms were produced. What is the empirical formula of the compound?

**$PCl_3$**

3. When 2.5000 g of an oxide of mercury, ( $Hg_xO_y$ ) is decomposed into the elements by heating, 2.405 g of mercury are produced. Calculate the empirical formula.

**$Hg_2O$**

4. The compound benzamide has the following percent composition. What is the empirical formula?

C = 69.40 %   H = 5.825 %   O = 13.21 %   N = 11.57 %

**$C_7H_7NO$**

5. A component of protein called serine has an approximate molar mass of 100 g/mole. If the percent composition is as follows, what is the empirical and molecular formula of serine?

C = 34.95 %   H = 6.844 %   O = 46.56 %   N = 13.59 %

**C<sub>3</sub>H<sub>7</sub>NO<sub>3</sub>**     **empirical formula**

**C<sub>3</sub>H<sub>7</sub>NO<sub>3</sub>**     **molecular formula**

6. Balance the following equations:



