

## Competency 6: Assignment 2

1. Read pp 139-144 in old textbook. This will help you with the problems if you still have questions.
2.
  - a. What is the percent of sulfur in  $\text{SO}_3$ ?
  - b. A compound consisting only of phosphorus and oxygen is found to contain 56.34% oxygen. What is the mass of each element in an 18.0 g sample?
  - c. What is the empirical formula of this compound in (b)?
  - d. Given that the molar mass of this compound is 284, what is the molecular formula?
3.
  - a. A substance consisting of carbon, hydrogen, and oxygen is converted, by burning into carbon dioxide and water. A 5.00 g sample produced 9.55 g of carbon dioxide and 1.04 g of water. Calculate the percent of carbon, hydrogen, and oxygen in the sample.
  - b. Calculate the empirical formula of the compound.
4.
  - a. A 1.023 g sample of a compound containing sulfur is converted to 1.509 g of  $\text{BaSO}_4$ . Calculate the percent sulfur in the original compound.
  - b. A metal M forms an oxide  $\text{M}_2\text{O}_3$  containing 68.4% of the metal by mass. Calculate the molar mass of M.
5. Aluminum oxide,  $\text{Al}_2\text{O}_3$ , occurs naturally in nature as a mineral called corundum, which is noted for its hardness and resistance to attack by acids. Its density is  $3.97 \text{ g/cm}^3$ . Calculate the number of atoms of aluminum in  $15.0 \text{ cm}^3$  of corundum.