

DETERMINING EMPIRICAL FORMULAS

Name _____

What is the empirical formula (lowest whole number ratio) of the compounds below?

1. 75% carbon, 25% hydrogen

2. 52.7% potassium, 47.3% chlorine

3. 22.1% aluminum, 25.4% phosphorus, 52.5% oxygen

4. 13% magnesium, 87% bromine

5. 32.4% sodium, 22.5% sulfur, 45.1% oxygen

6. 25.3% copper, 12.9% sulfur, 25.7% oxygen, 36.1% water

DETERMINING MOLECULAR FORMULAS (TRUE FORMULAS)

Name _____

Solve the problems below.

1. The empirical formula of a compound is NO_2 . Its molecular mass is 92 g/mol. What is its molecular formula?

2. The empirical formula of a compound is CH_2 . Its molecular mass is 70 g/mol. What is its molecular formula?

3. A compound is found to be 40.0% carbon, 6.7% hydrogen and 53.5% oxygen. Its molecular mass is 60. g/mol. What is its molecular formula?

4. A compound is 64.9% carbon, 13.5% hydrogen and 21.6% oxygen. Its molecular mass is 74 g/mol. What is its molecular formula?

5. A compound is 54.5% carbon, 9.1% hydrogen and 36.4% oxygen. Its molecular mass is 88 g/mol. What is its molecular formula?

COMPOSITION OF HYDRATES

Name _____

A hydrate is an ionic compound with water molecules loosely bonded to its crystal structure. The water is in a specific ratio to each formula unit of the salt. For example, the formula $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ indicates that there are five water molecules for every one formula unit of CuSO_4 . Answer the questions below.

1. What percentage of water is found in $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$?

2. What percentage of water is found in $\text{Na}_2\text{S} \cdot 9\text{H}_2\text{O}$?

3. A 5.0 g sample of a hydrate of BaCl_2 was heated, and only 4.3 g of the anhydrous salt remained. What percentage of water was in the hydrate?

4. A 2.5 g sample of a hydrate of $\text{Ca}(\text{NO}_3)_2$ was heated, and only 1.7 g of the anhydrous salt remained. What percentage of water was in the hydrate?

5. A 3.0 g sample of $\text{Na}_2\text{CO}_3 \cdot \text{H}_2\text{O}$ is heated to constant mass. How much anhydrous salt remains?

6. A 5.0 g sample of $\text{Cu}(\text{NO}_3)_2 \cdot n\text{H}_2\text{O}$ is heated, and 3.9 g of the anhydrous salt remains. What is the value of n ?
