Percent Composition and Molecular Formula Worksheet #3

1. What’s the empirical formula of a molecule containing 65.5% carbon, 5.5% hydrogen, and 29.0% oxygen?

2. If the molar mass of the compound in problem 1 is 110 grams/mole, what’s the molecular formula?

3. What’s the empirical formula of a molecule containing 18.7% lithium, 16.3% carbon, and 65.0% oxygen?

4. If the molar mass of the compound in problem 3 is 73.8 grams/mole, what’s the molecular formula?

Write the molecular formulas of the following compounds:

5. A compound with an empirical formula of C₂OH₄ and a molar mass of 88 grams per mole.

6. A compound with an empirical formula of C₄H₄O and a molar mass of 136 grams per mole.

7. A compound with an empirical formula of CFBrO and a molar mass of 254.7 grams per mole.

8. A compound with an empirical formula of C₂H₈N and a molar mass of 46 grams per mole.

Answer the following questions:

9. The percentage composition of acetic acid is found to be 39.9% C, 6.7% H, and 53.4% O. Determine the empirical formula of acetic acid.

10. The molar mass for question #9 was determined by experiment to be 60.0 g/mol. What is the molecular formula?

11. 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?
   \[ \text{C} = 34.95\% \quad \text{H} = 6.844\% \quad \text{O} = 46.56\% \quad \text{N} = 13.59\% \]

12. Determine the number of atoms that are in 1.39 mol of Se.

13. How many moles of CaNO₃ contain 1.28 x 10^{24} molecules?

14. How many grams are there in #13?

15. Determine the number of molecules that are in 2.1 moles of ammonia gas, NH₃.

16. How many grams are there in #15

17. How many moles of calcium sulfate are in 2.7 x 10^{24} molecules?