

Empirical and Molecular Formulas- Accel.

Name/Period: _____

Show set up and answer with units to solve each of these problems. Put a box around the answer.

1. Determine the empirical formula of a compound that contains 30.5% nitrogen and 69.5% oxygen.
2. Analysis of a sample of a pure compound reveals it contains 50.1g sulfur and 49.9g oxygen by mass. What is the empirical formula?
3. Rust occurs when iron metal reacts with the oxygen in air. Chemical analysis shows that dry rust is 69.9% iron and 30.1% oxygen by mass. Determine the empirical formula for rust.
4. Calculate the molecular formula for a compound with an empirical formula of C_2H_5 . The molar mass of this compound is 58.1 g/mol.
5. Chemical analysis shows that ethylene dichloride is 24.7% carbon, 4.07% hydrogen and 71.65% chlorine by mass. Given that the molecular mass of ethylene dichloride is 98.95 g/mol, determine its molecular formula.
6. A compound has a molecular formula of $C_6H_{12}O_6$. What is the empirical formula? _____

Extension problems: Complete the following problems on another sheet of paper for more practice solving empirical & molecular formulas.

7. Determine the empirical formula for a compound that is 46.45% Li and 53.55% O.
8. Glucose is 40.0% carbon, 6.72% hydrogen, and 53.3% oxygen. The molar mass of glucose is 180 grams. What is the molecular formula?
9. There are many compounds, called hydrocarbons that consist of only carbon and hydrogen. Gasoline typically is a mixture of over 100 different hydrocarbons. Chemical analysis of one of the constituents of gasoline yields 92.3g carbon and 7.7g hydrogen by mass. Determine the empirical formula.
10. Using the data from problem 9 and that the molecular mass is 78 g/mol, determine the molecular formula.
11. Acetone is an important chemical solvent; a familiar home use is as a nail polish remover. Chemical analysis shows that acetone is 62.0% carbon, 10.4% hydrogen and 27.5% oxygen by mass. Determine the empirical formula of acetone.
12. In a separate experiment, the molecular mass is found to be 58.1 g/mol for acetone. What is the molecular formula of acetone? Use the data from problem 11.