

## Empirical/Molecular Formulas

- 1) Acrylic acid, used in plastics, has the composition 50.0% C, 5.6% H, and 44.4% O. What is the empirical formula of acrylic acid?
- 2) Adipic acid is used in the manufacture of nylon. The composition of the acid is 49.3% C, 6.9% H, and 43.8% O (by mass), and the molecular weight is 146 amu. What is the molecular formula of adipic acid?
- 3) Cumene is a hydrocarbon, a compound composed of only carbon and hydrogen.. It is 89.94% carbon and has a molecular mass of 120.2 g/mol. What are the empirical and molecular formulas of cumene?
- 4) DDT is an insecticide having the composition 47.5% carbon, 2.54% hydrogen and the remainder chlorine. What is the empirical formula of DDT?
- 5) The action of bacteria of meat and fish creates a poisonous and stinky compound called cadaverine. It is 58.77% C, 13.81% H and 27.42% N. Its molecular mass is 102.2 g/mol. Determine the molecular formula of cadaverine.
- 6) A chemical compound was found to contain only Fe, C and H. When 5.00 grams of this compound is completely burned in O<sub>2</sub>, 11.8 g CO<sub>2</sub> and 2.42 g of H<sub>2</sub>O were produced. Find the empirical formula of this compound.
- 7) A 1.45 gram sample of a compound containing only C, H and O was burned in an excess of oxygen. It yielded 1.56 g of H<sub>2</sub>O and 3.83 g of CO<sub>2</sub>. Find the percentage by mass of each element in the original compound and its empirical formula.
- 8) Combustion analysis of 0.326 g of a compound containing only C, H, and O produces 0.7160 g CO<sub>2</sub> and 0.3909 g H<sub>2</sub>O. The molecular mass of the compound is approximately 120 g/mol. Determine the empirical and molecular formulas of the compound.