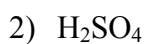


A Simple Rhyme for a Simple Formula, by Joel S. Thompson

Percent to mass
Mass to mole
Divide by small
Multiply 'til whole

Calculate the percent composition of each element in each compound listed.



Empirical Formula Examples

- 1) A compound is found to have (by mass) 48.38% carbon, 8.12% hydrogen and the rest oxygen. What is its empirical formula?

- 2) A compound is found to have 46.67% nitrogen, 6.70% hydrogen, 19.98% carbon and 26.65% oxygen. What is its empirical formula?

- 3) A compound is found to have 1.121 g nitrogen, 0.161 g hydrogen, 0.480 g carbon and 0.640 g oxygen. What is its empirical formula? (Note that masses are given, NOT percentages.)
- 4) A compound containing only carbon, hydrogen and oxygen is found to be 48.38% carbon and 8.12% hydrogen by mass. What is its empirical formula?
- 5) 95.6 mg of menthol (molar mass = 156 g/mol) are burned in oxygen gas to give 269 mg CO_2 and 110 mg H_2O . What is menthol's empirical formula?

- 6) A 0.2500 g sample of a compound known to contain carbon, hydrogen and oxygen undergoes complete combustion to produce 0.3664 g of CO_2 and 0.1500 g of H_2O . What is the empirical formula of this compound?
- 7) Caffeine, a stimulant found in coffee, tea, and certain soft drinks, contains C, H, O, and N. Combustion of 1.000 mg of caffeine produces 1.813 mg CO_2 , 0.4639 mg H_2O , and 0.2885 mg N_2 . Estimate the molar mass of caffeine, which lies between 150 and 200 g/mol.
- 8) A compound is known to have an empirical formula of CH and a molar mass of 78.11 g/mol. What is its molecular formula?
- 9) Another compound, also with an empirical formula of CH is found to have a molar mass of 26.04 g/mol. What is its molecular formula?

- 10) What are the empirical and molecular formulas for a compound with 86.88% carbon and 13.12% hydrogen and a molecular weight of about 345?
- 11) What are the empirical and molecular formulas for a compound with 83.625% carbon and 16.375% hydrogen and a molecular weight of 388.78?
- 12) 0.1005 g of menthol is combusted, producing 0.2829 g of CO_2 and 0.1159 g of H_2O . What is menthol's empirical formula?
- 13) 0.487 grams of quinine (molar mass = 324 g/mol) is combusted and found to produce 1.321 g CO_2 , 0.325 g H_2O and 0.0421 g nitrogen. Determine the empirical and molecular formulas.