Empirical and molecular formulae.

1) An unknown hydrocarbon is found to contain 85.7% carbon and an atomic mass of 84.0 g/mol. What is its molecular formula?

2) A 1.50 g sample of a hydrocarbon gas undergoes complete combustion to produce 4.40 g of CO_2 and 1.80 g of H_2O.
   a) What is the empirical formula of this compound?

   b) If its molecular weight has been determined to be 56 g/mol. What is the molecular formula?

   c) Write a balanced chemical equation for the combustion reaction.

3) An organic compound has the following percent composition: carbon 49.48%, hydrogen 5.19%, oxygen 16.48% and nitrogen 28.85%. Its molecular weight is determined to be around 288 g/mol.

   a) What is the empirical formula?

   b) What is its molecular formula?

4) What are the empirical and molecular formulae for a compound with 86.88% carbon and 13.12% hydrogen and a molecular weight of about 345 g/mol?

5) What are the empirical and molecular formulae for a compound with 83.625% carbon and 16.375% hydrogen and a molecular weight of 388.78?

6) A 3.10 g sample of an unknown organic gas molecule composed of carbon, hydrogen and oxygen, undergoes complete combustion to produce 4.40 g of CO_2 and 2.70 g of H_2O.
   a) What is the empirical formula of this compound?

   c) If its formula mass is about 62 g/mol find its molecular formula?

Solution