Empirical and Molecular Formulas

Practice

TEKS 8Cii and 8Ciii

1. Benzene, one of the most elementary petrochemicals, has an empirical formula of CH and an experimentally determined molecular mass of 78 g/mol. What is its molecular formula?
2. Ethylene glycol, used as an automobile antifreeze, is 38.7% C, 6.9% H, and 51.6% O by mass. Its molar mass is 62.1 g/mol.
   1. What is the empirical formula of ethylene glycol?
   2. What is the molecular formula?
3. The koala dines exclusively on eucalyptus leaves. While eucalyptus oil is toxic to other animals, the koala’s digestive system detoxifies it. The major component of eucalyptus oil is eucalyptol. It contains 77.87% C, 11.76 %H and the remainder O. The experimentally determined molar mass is 154 g/mol.
   1. What is the empirical formula of this substance?
   2. What is the molecular formula of eucalyptol?
4. Serotonin is a compound that is written about in popular press regularly. It is a compound that conducts nerve impulses in the brain. It contains 68.2 % C, 6.86 %H, 15.9 % N, and 9.08 % O. Its molar mass is 176 g/mol.
   1. Determine the empirical formula for serotonin.
   2. Determine the molecular formula for serotonin.