

CHAPTER FOUR

Molecular Mass

4.12 Calculate the molecular mass (in amu) of each of the following substances: (a) CH_4 , (b) NO_2 , (c) SO_3 , (d) C_6H_6 , (e) NaI , (f) K_2SO_4 , (g) $\text{Ca}_3(\text{PO}_4)_2$.

4.13 Calculate the molar mass of the following substances:

(a) Li_2CO_3 , (b) CS_2 , (c) CHCl_3 (chloroform), (d) $\text{C}_6\text{H}_8\text{O}_6$ (ascorbic acid, or vitamin C), (e) KNO_3 , (f) Mg_3N_2 .

4.14 Calculate the molar mass of a compound if 0.372 mole of it has a mass of 152 g.

4.15 How many molecules of ethane (C_2H_6) are present in 0.334 g of C_2H_6 ?

4.16 Calculate the number of C, H, and O atoms in 1.50 g of glucose ($\text{C}_6\text{H}_{12}\text{O}_6$), a sugar.

4.17 Urea [$(\text{NH}_2)_2\text{CO}$] is used for fertilizer and many other things. Calculate the number of N, C, O, and H atoms in 1.68×10^4 g of urea.

4.18 Pheromones are a special type of compound secreted by the females of many insect species to attract the males for mating. One pheromone has the molecular formula $\text{C}_{19}\text{H}_{38}\text{O}$. Normally, the amount of this pheromone secreted by a female insect is about 1.0×10^{-12} g. How many molecules are there in this quantity?

4.19 The density of water is 1.00 g/mL at 4°C . How many water molecules are present in 2.56 mL of water at this temperature?