**Question:**

Combustion analysis of 150.0 mg of 1,2,3-benzenetriol, a compound composed of carbon, hydrogen, and oxygen, gives 64.3 mg of H₂O and 314.2 mg of CO₂.

What is the empirical formula of 1,2,3-benzenetriol? Express your answer as a chemical formula.

**Answer:**

Let’s find the number of moles and the mass for each element, starting with carbon:

\[ n(C) = n(CO_2) = \frac{m(CO_2)}{M(CO_2)} = \frac{314.2}{44.01} = 7.14 \text{ mmol}; m(C) = n(C) \times M(C) = 85.67 \text{ mg} \]

\[ n(H) = 2n(H_2O) = 2 \times \frac{m(H_2O)}{M(H_2O)} = 2 \times \frac{64.3}{18.05} = 7.14 \text{ mmol}; m(H) = 7.14 \text{ mg} \]

The mass of oxygen can be found through the mass of the compound:

\[ m(O) = m(\text{comp.}) - m(C) - m(H) = 150 - 85.67 - 7.14 = 57.19 \text{ mg} \]

\[ n(O) = \frac{m(O)}{M(O)} = \frac{57.19}{16} = 3.57 \text{ mmol} \]

Then, let’s find the relation between the number of the moles of different elements:

\[ n(C):n(H):n(O) = \frac{7.14}{7.14}:\frac{7.14}{7.14}:\frac{3.57}{7.14} = 2:2:1 \]

Thus, empirical formulae of the compound is \(C_{2x}H_{2x}O_x\). As the number of the oxygen atoms in the compound is 3, then \(x=3\).

The final formulae of 1,2,3 benzenetriol is \(C_6H_6O_3\).