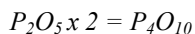


1. The empirical formula of a compound is found to be P_2O_5 . Experiments show that the molar mass of the compound is 283.9 g/mol. What is the molecular formula of the compound?

$$P_2O_5 \quad 2(31.0 \text{ g}) + 5(16.0 \text{ g}) = 142.0 \text{ g} \qquad 283.9 / 142.0 = 2$$



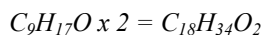
2. A compound has the following % composition—76.54 % C, 12.13 % H, and 11.33 % O. If its molar mass is 282.5 g/mol, what is its molecular formula?

$$? \text{ mol C} = 76.54 \text{ g C} \times \frac{1 \text{ mol C}}{12.0 \text{ g C}} = 6.38 \text{ mol C}$$

$$? \text{ mol H} = 12.13 \text{ g H} \times \frac{1 \text{ mol H}}{1.0 \text{ g H}} = 12.13 \text{ mol H}$$

$$? \text{ mol O} = 11.33 \text{ g O} \times \frac{1 \text{ mol O}}{16.0 \text{ g O}} = 0.708 \text{ mol O}$$

$$C_{6.38}H_{12.13}O_{0.708} = C_9H_{17}O \qquad 9(12.0 \text{ g}) + 17(1.0 \text{ g}) + 16.0 \text{ g} = 141.0 \text{ g} \qquad 282.5 / 141.0 = 2$$



3. What is the formula for a hydrate which consists of 90.7 % SrC_2O_4 and 9.30 % H_2O ?

$$? \text{ mol SrC}_2\text{O}_4 = 90.7 \text{ g SrC}_2\text{O}_4 \times \frac{1 \text{ mol SrC}_2\text{O}_4}{175.6 \text{ g SrC}_2\text{O}_4} = 0.517 \text{ mol SrC}_2\text{O}_4$$

$$? \text{ mol H}_2\text{O} = 9.30 \text{ g H}_2\text{O} \times \frac{1 \text{ mol H}_2\text{O}}{18.0 \text{ g H}_2\text{O}} = 0.517 \text{ mol H}_2\text{O}$$

$$0.517 / 0.517 = 1$$

