

A sample was decomposed in the laboratory and found to have 38.67g C, 16.22g H, and 45.11g N.

a) Find the molecular formula of this compound if the Formula mass is 62.12 g/mole.

b) Determine how many H atoms would be in a 3.50g sample of this compound

Answer

a) Firstly we must determine the proportion of atoms in the compound:

$$\text{C} : \text{H} : \text{N} = (38,67\text{g} / 12 \text{ g}\cdot\text{mol}^{-1}) : (16,22\text{g} / 1 \text{ g}\cdot\text{mol}^{-1}) : (45,11\text{g} / 14 \text{ g}\cdot\text{mol}^{-1}) = 1 : 5 : 1.$$

So, the formula of compound is CH_5N .

But, taking into consideration that mass of compound $62,12 \text{ g}\cdot\text{mol}^{-1}$, the formula will be $\text{C}_2\text{H}_{10}\text{N}_2$.

$$\text{b) } N(\text{H}) = 3,50\text{g} / 62,12\text{g}\cdot\text{mol}^{-1} * 6,02*10^{23}\text{moleculs}\cdot\text{mol}^{-1} * 10 = 0,34 * 10^{24} \text{ H atoms.}$$