

A carbohydrate on analysis gave the following composition: carbon = 40.0%; hydrogen = 6.71%, and oxygen made up the rest. Calculate the molecular formula of this organic compound which has a molecular mass of 181.

Assume the mass of the sample is equal tog then

1-Mass of each element

C = g H = g O = ~~.....~~ ~~.....~~

2-Mole of each element

Moles of C = (g C) $\times \frac{1 \text{ mol C}}{gC} =$ mol C

Moles of H = (g F) $\times \frac{1 \text{ mol F}}{gF} =$ mol H

Moles of O = (gO) $\times \frac{1 \text{ mol O}}{gO} =$ mol O

3-Dividing by the smallest number of moles to get the ratio

$$\frac{\text{mol}}{\text{mol}} C : \frac{\text{mol}}{\text{mol}} H : \frac{\text{mol}}{\text{mol}} O$$

If the numbers are close to the integer numbers, then round the numbers if not, multiply by the appropriate coefficient.

The empirical formula C_{.....} H_{....} O_{.....}

4- calculate the mass of the empirical formula

empirical formula= x + x +x =

5- calculate the molecular formula from the next equation

$$n = \frac{\text{molar mas}}{\text{mass of empirical formula}} \quad \text{then } \rightarrow n \times (\text{empirical formula})$$

$$n = \frac{\text{.....}}{\text{.....}} =$$

Molecular formula = $C_{\text{.....}}$ $H_{\text{....}}$ $O_{\text{.....}}$