

Molecular Formula - actual formula of a molecular compound.

Steps

- ① get E.F.
- ② get E.F. formula mass
- MF ③ get given (experimental) formula mass (M.F.M.)
- ④ calculate $X = \frac{MFM}{EFM} \quad \# \frac{3}{2}$
- ⑤ write MF $MF = X(EF)$
calculate

Example 1: Determine the molecular formula of the compound w/ an empirical formula of CH & a formula mass of 78.110 amu.

G: 78.110 amu, E.F. CH

U: MF

- ① CH
- ② 13.02 amu
- ③ 78.110 amu
- ④ $X = \frac{78.110 \text{ amu}}{13.02 \text{ amu}} = 5.999 \sim 6.0$
- ⑤ $X(CH) = 6(CH) = C_6H_6$

Example 2: A sample of a compound with a formula mass of 34.00 amu is found to consist of 0.44 g H & 6.92 g O. Find its molecular formula.

G: 34.00 amu

0.44 g H

6.92 g O

U: MF

① Find E.F.

① 0.44 g H

6.92 g O

② $\frac{0.44 \text{ g H}}{1} \times \frac{1 \text{ mol H}}{1.01 \text{ g H}} = 0.4356 \text{ mol H}$

$\frac{6.92 \text{ g O}}{1} \times \frac{1 \text{ mol O}}{16.00 \text{ g O}} = 0.4325 \text{ mol O}$

③ $\frac{0.4356 \text{ mol H}}{0.4325} : \frac{0.4325 \text{ mol O}}{0.4325}$

④ $1.007 \text{ mol H} : 1 \text{ mol O}$
 $1 \text{ mol H} : 1 \text{ mol O}$

⑤ HO

② 17.01 amu

③ 34.00 amu

④ $X = \frac{34.00 \text{ amu}}{17.01 \text{ amu}} = 1.999 \sim 2.0$

⑤ $X(HO) = 2(HO) = H_2O_2$