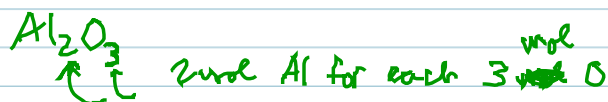
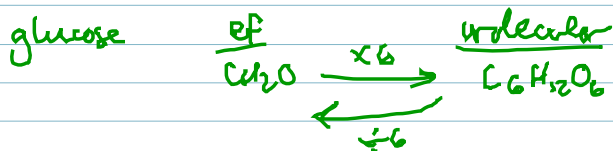


empirical formula (ef)
 → formula w/ smallest subscripts



molecular formula
 "true" formula



ef = $C_2H_4NO_2$ possible molecular formula:
 $C_2H_4NO_2$
 $C_4H_8N_2O_4$
 $C_6H_{12}N_3O_6$

compound sample : 18g C, 21g N. Molar mass = 52g/mol

ef C: $18g \times \frac{1 \text{ mol}}{12.01g} = 1.4988$
 $\frac{1.4988}{1.4988} = 1$

N: $21g \times \frac{1 \text{ mol}}{14.01g} = 1.4989$
 $\frac{1.4989}{1.4988} = 1$

ef = CN

ef molar mass

C: $1 \times 12.01 = 12.01$

N: $1 \times 14.01 = 14.01$

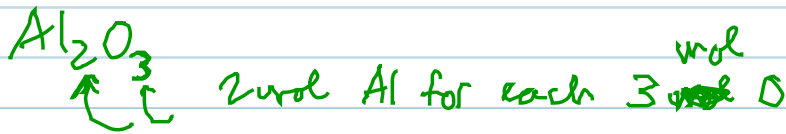
$\frac{12.01 + 14.01}{26.02g/mol}$

round $\downarrow \approx 0.1$
 round $\uparrow \approx 0.9$

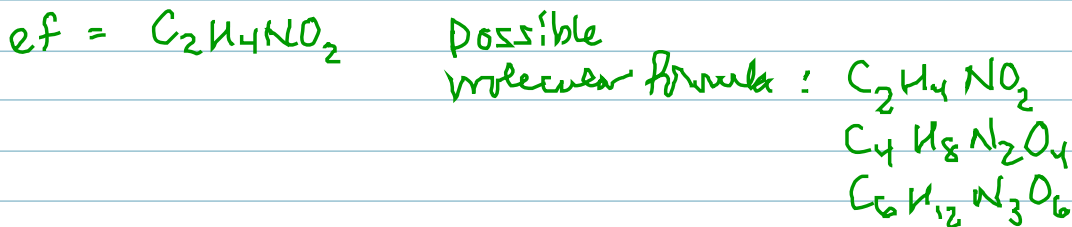
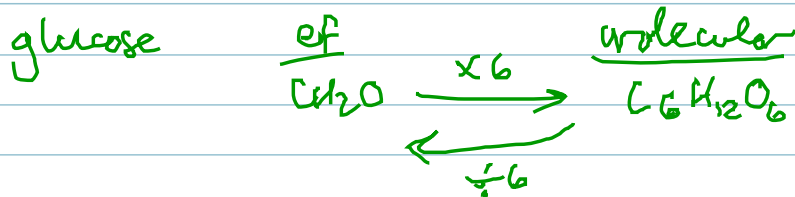
$\frac{52g/mol}{26.02g/mol} \approx 2$

molecular formula = C_2N_2

empirical formula (ef)
 → formula w/ smallest subscripts



molecular formula
 "true" formula



compound sample : 18g C, 21g N, molar mass = 52g/mol

ef C: $18g \times \frac{1 \text{ mol}}{12.01g} = 1.4988$
 $\frac{1.4988}{1.4988} = 1$

N: $21g \times \frac{1 \text{ mol}}{14.01g} = 1.4989$
 $\frac{1.4989}{1.4988} = 1$

ef = CN

ef molar mass

C: $1 \times 12.01 = 12.01$

N: $1 \times 14.01 = 14.01$

26.02g/mol

round ↓ ≈ 0.1

round ↑ ≈ 0.9

$\frac{52g/mol}{26.02g/mol} = 2$

molecular formula = C_2N_2

0.153g sample ; molar mass = 30 g/mol

0.1224g C, 0.0306g H molecular formula = ?

$$\text{C: } 0.1224\text{g} \times \frac{1\text{mol}}{12.01\text{g}} = 0.010 \quad \frac{0.010}{0.010} = 1$$

$$\text{H: } 0.0306\text{g} \times \frac{1\text{mol}}{1.01\text{g}} = 0.030 \quad \frac{0.030}{0.010} = 3$$

CH₃

$$\text{C: } 1 \times 12.01 = 12.01$$

$$\text{H: } 3 \times 1.01 = 3.03$$

$$\underline{15.04\text{g/mol}}$$

$$\frac{30}{15.04} = 2$$

(2)

C₂H₆

molecular formula

ef

CH₃

C₂H₆