

# Dumas Method - 1 of 1

(I)

$$M.M. = \frac{m}{V} \frac{RT}{P}$$

$$m = 451.75g - 451.00 = 0.75g$$

$$T = 99.95 + 273.15 = 373.10 K$$

$$M.M. = \frac{0.75g}{0.5000L} \cdot \frac{0.08201 \cdot 373.1}{0.9936}$$

$$V = 0.5000 L$$

$$P = \frac{755.1 \text{ mmHg}}{760 \frac{\text{mmHg}}{\text{atm}}} = 0.9936 \text{ atm}$$

$$M.M. = 46.19 \frac{g}{\text{mol}}$$

(II)

$$1.91g \text{ CO}_2 \cdot \frac{1 \text{ mol CO}_2}{44.01g \text{ CO}_2} = 4.34 \cdot 10^{-2} \text{ mol CO}_2 = 4.34 \cdot 10^{-2} \text{ mol C}$$

$$0.521g \text{ C}$$

$$1.17g \text{ H}_2\text{O} \cdot \frac{1 \text{ mol H}_2\text{O}}{18.02g} \cdot \frac{2H}{1 \text{ H}_2\text{O}} = 1.30 \cdot 10^{-1} \text{ mol H}$$

$$0.309g \cdot 10^{-1} g \text{ H}$$

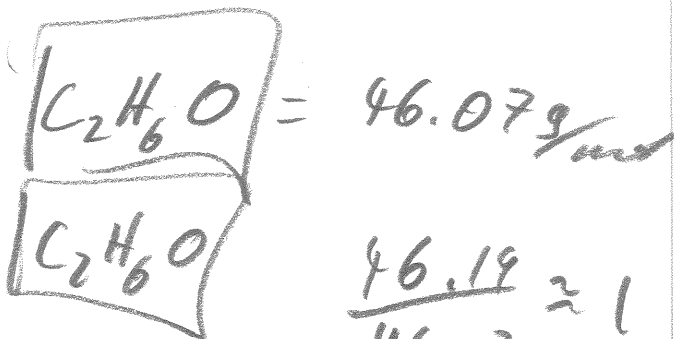
$$gH + gC = 0.652 \neq 1.00g$$

$$gO = 1.00 - 0.652 = 0.348g \text{ O} = 2.18 \cdot 10^{-2} \text{ mol O}$$

$$\frac{4.34 \cdot 10^{-2} \text{ mol C}}{2.18 \cdot 10^{-2}} \approx 2$$

$$\frac{1.30 \cdot 10^{-1} \text{ mol H}}{2.18 \cdot 10^{-2}} \approx 6$$

$$\frac{2.58 \cdot 10^{-2} \text{ mol O}}{2.18 \cdot 10^{-2}} = 1$$



$$\frac{46.19}{46.07} \approx 1$$