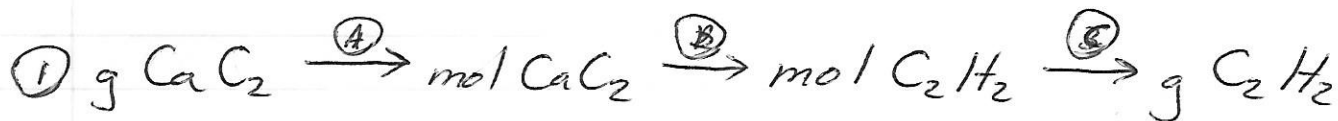


Three-step conversions Practice Problems



$$\textcircled{A} \text{ } 5.00 \text{ g CaC}_2 \times \frac{1 \text{ mol CaC}_2}{64.10 \text{ g CaC}_2} = 0.078 \text{ mol CaC}_2$$

$$\textcircled{B} \text{ } 0.078 \text{ mol CaC}_2 \times \frac{1 \text{ mol C}_2\text{H}_2}{1 \text{ mol CaC}_2} = 0.078 \text{ mol C}_2\text{H}_2$$

$$\textcircled{C} \text{ } 0.078 \text{ mol C}_2\text{H}_2 \times \frac{26.04 \text{ g C}_2\text{H}_2}{1 \text{ mol C}_2\text{H}_2} = 2.03 \text{ g C}_2\text{H}_2$$

CaC₂

$$1 \times \text{Ca} = 1 \times 40.08 \text{ g/mol} = 40.08 \text{ g/mol}$$

$$2 \times \text{C} = 2 \times 12.01 \text{ g/mol} = 24.02 \text{ g/mol}$$

$$64.10 \text{ g/mol}$$

C₂H₂

$$2 \times \text{C} = 2 \times 12.01 \text{ g/mol} = 24.02 \text{ g/mol}$$

$$2 \times \text{H} = 2 \times 1.01 \text{ g/mol} = 2.02 \text{ g/mol}$$

$$26.04 \text{ g/mol}$$



$$\textcircled{A} \text{ } 6.54 \text{ g KClO}_3 \times \frac{1 \text{ mol KClO}_3}{122.55 \text{ g KClO}_3} = 0.053 \text{ mol KClO}_3$$

$$\textcircled{B} \text{ } 0.053 \text{ mol KClO}_3 \times \frac{3 \text{ mol O}_2}{2 \text{ mol KClO}_3} = 0.0795 \text{ mol O}_2$$

$$\textcircled{C} \text{ } 0.0795 \text{ mol O}_2 \times \frac{6.02 \times 10^{23} \text{ molecules}}{1 \text{ mol}} = 4.79 \times 10^{22} \text{ molecules O}_2$$

KClO₃

$$1 \times \text{K} = 1 \times 39.10 \text{ g/mol} = 39.10 \text{ g/mol}$$

$$1 \times \text{Cl} = 1 \times 35.45 \text{ g/mol} = 35.45 \text{ g/mol}$$

$$3 \times \text{O} = 3 \times 16.00 \text{ g/mol} = 48.00 \text{ g/mol}$$

$$122.55 \text{ g/mol}$$

③ molecules NO $\xrightarrow{\text{A}}$ moles NO $\xrightarrow{\text{B}}$ moles NO₂ $\xrightarrow{\text{C}}$ L NO₂

A 5.00×10^{22} molecules NO $\times \frac{1 \text{ mol}}{6.02 \times 10^{23} \text{ molecules}} = 0.083 \text{ mol NO}$

B $0.083 \text{ mol NO} \times \frac{3 \text{ mol NO}_2(\text{g})}{1 \text{ mol NO}} = 0.249 \text{ mol NO}_2(\text{g})$

C $0.249 \text{ mol NO}_2(\text{g}) \times \frac{22.4 \text{ L}}{1 \text{ mol}} = 5.58 \text{ L NO}_2(\text{g})$

④ L O₂(g) $\xrightarrow{\text{A}}$ mol O₂(g) $\xrightarrow{\text{B}}$ mol H₂O(g) $\xrightarrow{\text{C}}$ L H₂O(g)

A $0.86 \text{ L O}_2(\text{g}) \times \frac{1 \text{ mol}}{22.4 \text{ L}} = 0.038 \text{ mol O}_2(\text{g})$

B $0.038 \text{ mol O}_2(\text{g}) \times \frac{18 \text{ mol H}_2\text{O}(\text{g})}{25 \text{ mol O}_2(\text{g})} = 0.027 \text{ mol H}_2\text{O}(\text{g})$

C $0.027 \text{ mol H}_2\text{O}(\text{g}) \times \frac{22.4 \text{ L H}_2\text{O}(\text{g})}{1 \text{ mol H}_2\text{O}(\text{g})} = 0.60 \text{ L H}_2\text{O}(\text{g})$