

## Questions Calculations.

1.

$$1 \text{ mole} \rightarrow \begin{array}{l} 6.023 \times 10^{23} \\ \times \\ 1.76 \times 10^{34} \end{array}$$

$$\left( \frac{1 \text{ mole} \times 1.76 \times 10^{34}}{6.023 \times 10^{23}} \right)$$

$$= 2.92 \times 10^{10} \text{ moles of } \text{MgSO}_4.$$

$$\begin{aligned} \text{Mass} &= (\text{moles of } \text{MgSO}_4 \times \text{molar mass of } \text{MgSO}_4) \\ &= (2.92 \times 10^{10} \text{ moles} \times 120.366 \text{ g/mole}) \\ &= \underline{\underline{3.51 \times 10^{12} \text{ g of } \text{MgSO}_4}} \end{aligned}$$

2.

$$1 \text{ mole of } \text{CO}_2 \rightarrow 22.4 \text{ L.}$$

$$1 \text{ mole of } \text{CO}_2 \rightarrow \begin{array}{l} 44 \text{ g} \\ \times \\ 58.3 \text{ g} \end{array}$$

$$\left( \frac{1 \text{ mole} \times 58.3 \text{ g}}{44 \text{ g}} \right)$$

$$= 1.325 \text{ moles of } \text{CO}_2$$

$$\begin{array}{l} 1 \text{ mole of } \text{CO}_2 \rightarrow 22.4 \text{ L} \\ 1.325 \text{ moles} \rightarrow \end{array}$$

$$\left( \frac{1.325 \text{ moles} \times 22.4 \text{ L}}{1 \text{ mole}} \right)$$

$$= \underline{\underline{29.68 \text{ L of } \text{CO}_2}}$$

3.



Ratio:

6 : 2 : 2 : 3

6 moles of K  $\longrightarrow$   $5.01 \times 10^{25}$  Atoms  
3 moles of Ca  $\longleftarrow$

$$\left( \frac{3 \times 5.01 \times 10^{25}}{6} \right)$$

$2.505 \times 10^{25}$  Atoms

$6.023 \times 10^{23} \longrightarrow$  1 mole of Ca.

$2.505 \times 10^{25} \longrightarrow$  ?

$$\left( \frac{2.505 \times 10^{25} \times 1 \text{ mole}}{6.023 \times 10^{23}} \right)$$

$= 4.159 \times 10^1$  moles

Mass of Ca.

$= (\text{moles} \times \text{molar mass})$

$$\left( 4.159 \times 10^1 \text{ moles} \times 40 \text{ g/mole} \right)$$

$= \underline{\underline{1663.62 \text{ g}}}$

4.

% yield

$$\left( \frac{\text{Actual Yield} \times 100\%}{\text{Theoretical}} \right)$$

$$\left( \frac{1501 \text{ g}}{1663.62 \text{ g}} \right) \times 100\%$$

$= \underline{\underline{90.22\%}}$  yield.