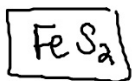


$$1. a) \frac{46.6\% \text{Fe}}{55.85} \quad \frac{53.44\% \text{S}}{32.07}$$

$$\frac{0.83}{0.83}$$

$$1$$



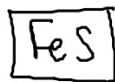
$$\frac{53.44\% \text{S}}{32.07}$$

$$\frac{1.67}{0.83}$$

$$2$$

$$b) \frac{63.35\% \text{Fe}}{55.85}$$

$$1.13$$



$$\frac{36.47\% \text{S}}{32.07}$$

$$1.14$$

$$c) \frac{26.67\% \text{K}}{39.10}$$

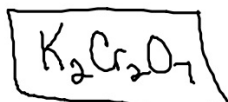
$$\frac{0.68}{0.68}$$

$$1(2)$$

$$\frac{35.4\% \text{Cr}}{52.00}$$

$$\frac{0.68}{0.68}$$

$$1(2)$$



$$\frac{38.00\% \text{O}}{16.00}$$

$$\frac{2.38}{0.68}$$

$$3.5(2)$$

$$d) \frac{21.8\% \text{Mg}}{24.31}$$

$$\frac{0.9}{0.9}$$

$$1(2)$$

$$\frac{27.9\% \text{P}}{30.97}$$

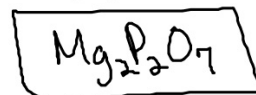
$$\frac{0.9}{0.9}$$

$$1(2)$$

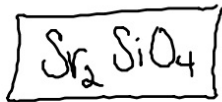
$$\frac{50.3\% \text{O}}{16.00}$$

$$\frac{3.14}{0.9}$$

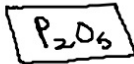
$$3.5(2)$$



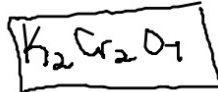
$$\begin{array}{ccc}
 1. e) & \frac{65.7\% \text{Sr}}{87.62} & \frac{10.4\% \text{Si}}{28.09} & \frac{23.9\% \text{O}}{16.00} \\
 & \frac{0.75}{0.37} & \frac{0.37}{0.37} & \frac{1.49}{0.37} \\
 & 2 & 1 & 4
 \end{array}$$



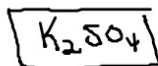
$$\begin{array}{cc}
 2. a) & \frac{8.87\text{g P}}{30.97} & \frac{11.43\text{g O}}{16.00} \\
 & \frac{0.286}{0.286} & \frac{0.714}{0.286} \\
 & 1(2) & 2.5(2)
 \end{array}$$



$$\begin{array}{ccc}
 b) & \frac{1.03\text{g K}}{39.01} & \frac{1.18\text{g Cr}}{52.00} & \frac{1.27\text{g O}}{16.00} \\
 & \frac{0.026}{0.023} & \frac{0.023}{0.023} & \frac{0.079}{0.023} \\
 & 1(2) & 1(2) & 3.5(e)
 \end{array}$$



$$\begin{array}{ccc}
 c) & \frac{21.52\text{g K}}{39.10} & \frac{8.82\text{g S}}{32.07} & \frac{17.62\text{g O}}{16.00} \\
 & \frac{.55}{.28} & \frac{.28}{.28} & \frac{1.10}{.28} \\
 & 2 & 1 & 4
 \end{array}$$



Stoichiometry

- ① write a balanced equation
- ② Determine given + needed
- ③ Determine type of problem
- ④ Line-up given and required conversions - this includes the molar ratio.

The molar ratio comes from the coefficients of a balanced equation

coefficients \rightarrow $\frac{\# \text{ mol of needed}}{\# \text{ mol of given}}$

- ⑤ Complete math - check your labels.

Stoichiometry

Steps:

- ① Write a balanced chemical reaction.
- ② Determine given + needed
- ③ Determine the molar ratio — Created from the coefficients of a balanced equation.

coefficients \rightarrow $\frac{\# \text{ mol need}}{\# \text{ mol given}}$

- ④ Determine the type of problem.
- ⑤ Set up conversions + complete math

Types

mole \rightarrow mole (1 conv. = molar ratio)

mass \rightarrow mole (2 conv. = molar mass, molar ratio)
A

mole \rightarrow mass (2 conv. = molar ratio, molar mass)
B

* mass \rightarrow mass (3 conv. = molar mass, molar ratio, molar mass)
given need

Vol \rightarrow mol

mol \rightarrow Vol

* Vol \rightarrow Vol

* mass \rightarrow Vol

* Vol \rightarrow mass

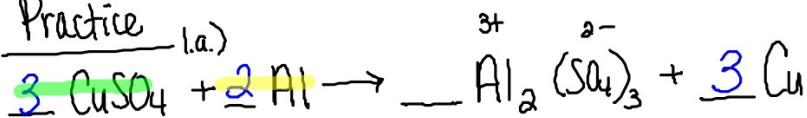
* exchange 22.4L where is volume is used

master equation

$$\text{Amt. given} \times \frac{1 \text{ mol given}}{\text{molar mass} \text{ -or- } 22.4\text{L}} \times \underbrace{\frac{\# \text{ mol needed}}{\# \text{ mol given}}}_{\text{molar ratio}} \times \frac{\text{molar mass} \text{ -or- } 22.4\text{L}}{1 \text{ mol needed}} = \text{theoretical yield}$$

$$\% \text{ yield} = \frac{\text{Your lab result}}{\text{theoretical yield}} \times 100$$

Practice 1.a.)



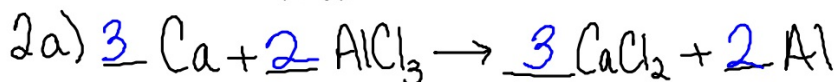
given: 0.5 mol Al need: ? moles CuSO₄ Type: mol → mol

$$0.5 \text{ mol Al} \times \frac{3 \text{ mol CuSO}_4}{2 \text{ mol Al}} = (0.5 \times 3) \div 2 = .75 \rightarrow \boxed{0.8 \text{ mol CuSO}_4}$$

1sf

molar ratio

2+ 1-

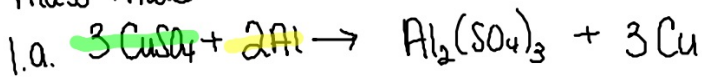


given: 2.5 mol Ca needed: ? mol AlCl₃ Type: mol → mol

$$2.5 \text{ mol Ca} \times \frac{2 \text{ mol AlCl}_3}{3 \text{ mol Ca}} = \boxed{1.7 \text{ mol AlCl}_3}$$

2sf

mass \rightarrow mole



given: 13.5g Al needed: $? \text{ mol CuSO}_4$ Type: mass \rightarrow mol

$$13.5\text{g Al} \times \frac{1 \text{ mol Al}}{26.98 \text{ g Al}} \times \frac{3 \text{ mol CuSO}_4}{2 \text{ mol Al}} = 0.751 \text{ mol CuSO}_4$$

3sf
molar mass

2c. given: 8.5g Al need: $? \text{ g Cu}$ Type: mass \rightarrow mass

$$8.5\text{g Al} \times \frac{1 \text{ mol Al}}{26.98 \text{ g Al}} \times \frac{3 \text{ mol Cu}}{2 \text{ mol Al}} \times \frac{63.55 \text{ g Cu}}{1 \text{ mol Cu}} = 30. \text{ g Cu}$$