Homework Assignments:

- Chapter 3 HW due Tomorrow (September 20), 11:55 pm
- Chapter 4 HW due September 26, 11:55 pm
- Quiz 2 (Covers the Chapters 3 and 4) will post this Friday and due Monday 11:59 pm
- Exam 1 will be on September 26 (Wednesday), 50 minutes (20 - 25 MCQs), covers chapters 1, 2, 3, and 4

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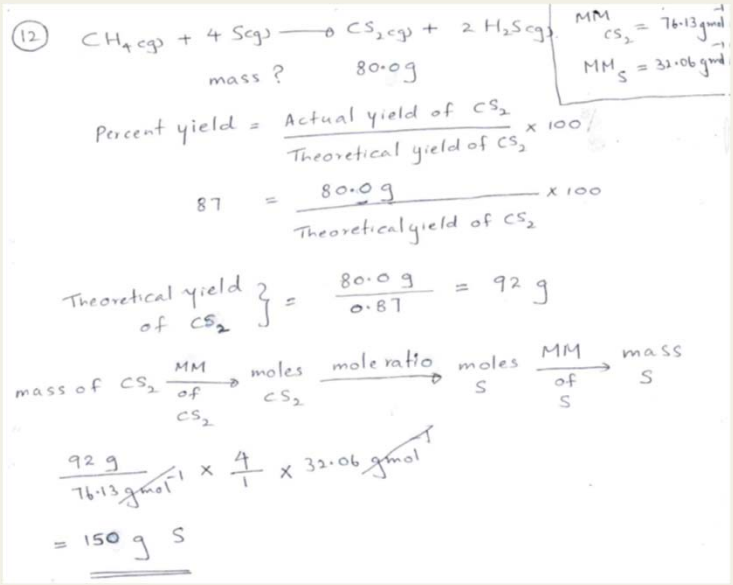
Questions from Percent Yield and solution stoichiometry:

12) The percent yield of the following reaction is consistently 87%.

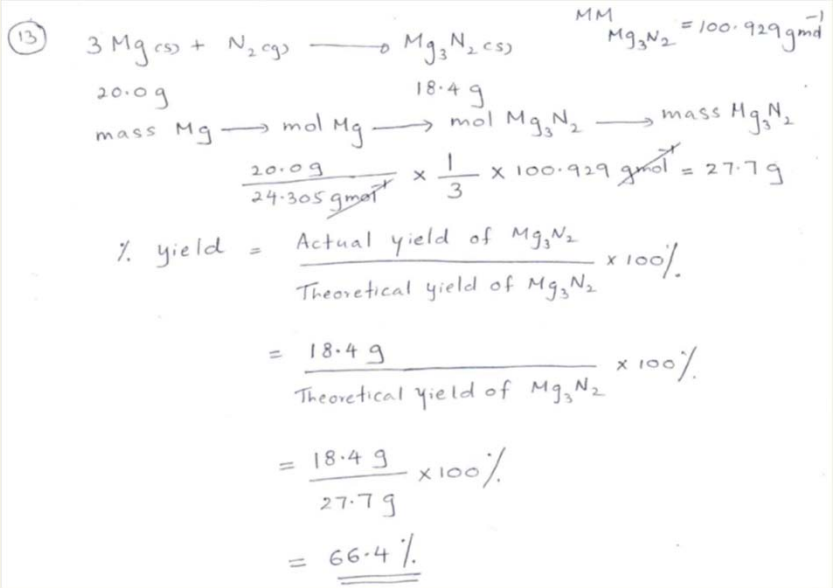
$$CH_4(g) + 4\,S(g) \rightarrow CS_2(g) + 2\,H_2S(g)$$

How many grams of sulfur would be needed to obtain 80.0 g of CS_2?



13) If 18.4 g of Mg_3N_2 forms from the reaction of 20.0 g of magnesium with excess nitrogen, what is the percent yield?

$$3\,Mg(s) + N_2(g) \rightarrow Mg_3N_2(s)$$



14) How many grams of H_2 can be prepared from 25.0 mL of 6.00 M H_2SO_4 and excess zinc?

$$Zn(s) + H_2SO_4(aq) \rightarrow ZnSO_4(aq) + H_2(g)$$

(14) $Zn_{(s)} + H_2SO_{4\,(aq)} \longrightarrow ZnSO_{4\,(aq)} + H_{2\,(g)}$

Excess; $V = 25.0\,mL$; $M = 6.00\,M$; mass ?

$n_{H_2SO_4} = M \times V$

$n_{H_2SO_4} = M \times V = 6.00\,mol\,L^{-1} \times 25.0 \times 10^{-3}\,L$

$= 0.150\,mol$

$n_{H_2} = 0.150\,mol \times \frac{1}{1} = 0.150\,mol$

mass of H_2 $= 0.150\,mol \times MM_{H_2}$

$= 0.150\,mol \times 2.016\,g\,mol^{-1}$

$= 0.302\,g$

15) What volume, in mL, of 0.512 M NaOH is required to react completely with 25.0 mL of 0.234 M H_2SO_4?

(15) $2NaOH_{(aq)} + H_2SO_{4\,(aq)} \longrightarrow Na_2SO_{4\,(aq)} + 2H_2O_{(l)}$

V ? 0.512 M; $V = 25.0\,mL$; $M = 0.234\,M$

$n_{H_2SO_4} = M \times V = 0.234\,mol\,L^{-1} \times 25.0 \times 10^{-3}\,L$

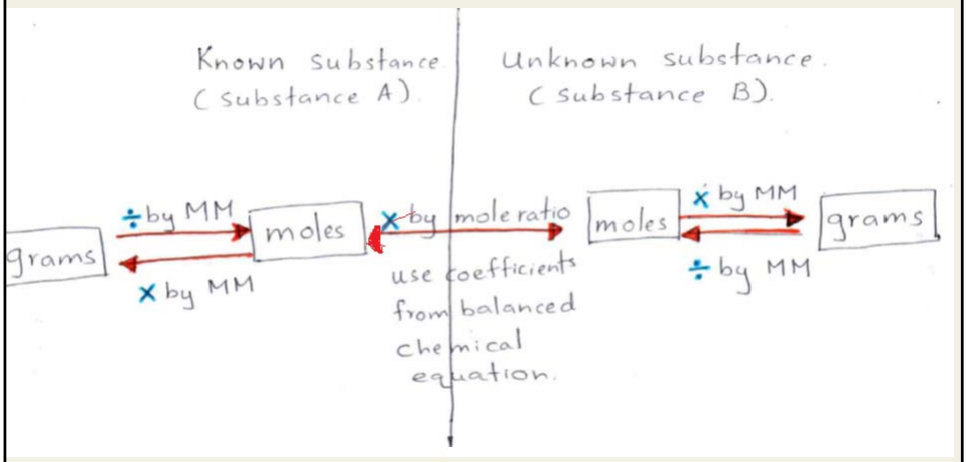
$= 5.85 \times 10^{-3}\,mol$

$n_{NaOH} = 5.85 \times 10^{-3}\,mol \times \frac{2}{1} = 1.17 \times 10^{-2}\,mol$

$n = M \times V$

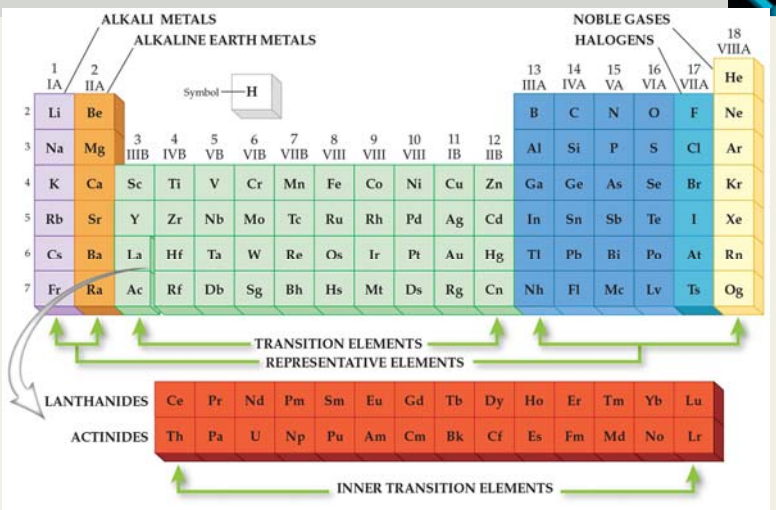
$V_{NaOH} = \frac{n_{NaOH}}{M_{NaOH}} = \frac{1.17 \times 10^{-2}\,mol}{0.512\,mol\,L^{-1}}$

$= 22.9\,mL$



MM = Molar mass

Groupings of Elements



- The inner transition elements are divided into the ***lanthanide series*** and the ***actinide series***.

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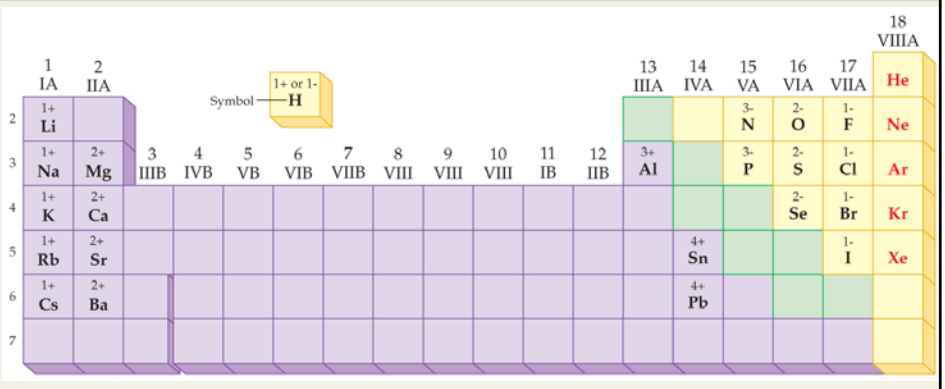
Ionic Charges



- Metals have a positive ionic charge equal to their group number
- Nonmetals have a negative ionic charge equal to 8 minus their A group number.

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Table 2.3: Common Monatomic Ions

Cation Name	Symbol	Anion Name	Symbol
Sodium ion	Na^+	Fluoride ion	F^-
Lithium ion	Li^+	Chloride ion	Cl^-
Potassium ion	K^+	Bromide ion	Br^-
Magnesium ion	Mg^{2+}	Sulfide ion	S^{2-}
Aluminum ion	Al^{3+}	Nitride ion	N^{3-}

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Common cations: (Table 2.5)

Sodium ion	Na^+
Magnesium ion	Mg^{2+}
Iron(II) ion	Fe^{2+}
Iron(III) ion	Fe^{3+}
Silver ion	Ag^+
Ammonium ion	NH_4^+
Potassium ion	K^+
Calcium ion	Ca^{2+}
Copper(I) ion	Cu^+
Copper(II) ion	Cu^{2+}
Zinc ion	Zn^{2+}
Hydronium ion	H_3O^+

Common anions (Table 2.6)

Halides	F^-, Cl^-, Br^-, I^-
Nitrate	NO_3^-
Phosphate	PO_4^{3-}
Carbonate	CO_3^{2-}
Sulfate	SO_4^{2-}
Hydroxide	OH^-
Cyanide	CN^-
Oxide	O^{2-}

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