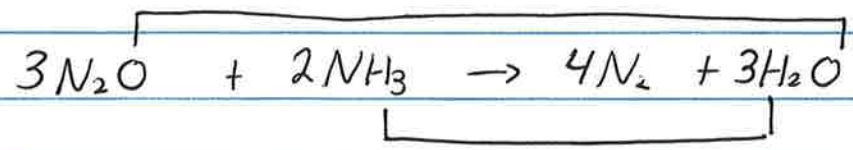
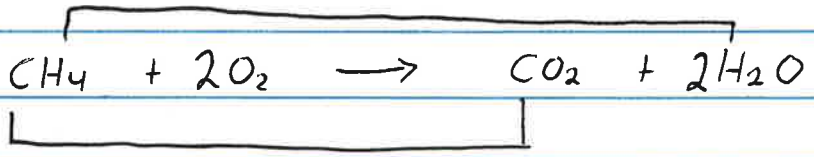
Today: 9/14 Sections 3.4-3.5
Sunday: 9/16 Problem club with Ali
Monday: 9/17 Finish ch 3

Balance these using link lines:

A)



b) the combustion of methane, CH_4.



- Starting with 85.0 g Fe_2O_3, how many grams of C is needed?

159.70 g/mol 12.01 g/mol 55.85 g/mol 44.01 g/mol

$$2\,Fe_2O_3(s) + 3\,C(s) \rightarrow 4\,Fe(s) + 3\,CO_2(g)$$

$$85.0\text{ g } Fe_2O_3 \left|\frac{1\text{ mol } Fe_2O_3}{159.70\text{ g } Fe_2O_3}\right|\frac{3\text{ mol C}}{2\text{ mol } Fe_2O_3}\left|\frac{12.01\text{ g C}}{1\text{ mol C}}\right| = 9.59\text{ g C}$$

- What mass iron is expected?

$$85.0\text{ g } Fe_2O_3 \left|\frac{1\text{ mol } Fe_2O_3}{159.70\text{ g } Fe_2O_3}\right|\frac{4\text{ mol Fe}}{2\text{ mol } Fe_2O_3}\left|\frac{55.85\text{ g Fe}}{1\text{ mol Fe}}\right| = 59.45\text{ g Fe}$$

- Starting with 113 g Fe_2O_3 and 14.0 g C, what is the TY of CO_2?

$$113\text{ g } Fe_2O_3 \left|\frac{1\text{ mol } Fe_2O_3}{159.70\text{ g } Fe_2O_3}\right| = 0.70\text{ mol } Fe_2O_3 \div 2 = 0.35 \text{ (LR)}$$

$$14.0\text{ g C}\left|\frac{1\text{ mol C}}{12.01\text{ g C}}\right| = 1.17 \div 3 = 0.39$$

$$113\text{ g } Fe_2O_3 \left|\frac{1\text{ mol } Fe_2O_3}{159.70\text{ g } Fe_2O_3}\right|\frac{3\text{ mol } CO_2}{2\text{ mol } Fe_2O_3}\left|\frac{44.01\text{ g } CO_2}{1\text{ mol } CO_2}\right| = 46.7\text{ g } CO_2$$

n_C used up $0.708\ mol\ Fe_2O_3 \left| \frac{3\ mol\ C}{2\ mol\ Fe_2O_3} \right. = 1.06\ mol\ C$

$1.17\ mol - 1.06\ mol = 0.11\ mol\ C$ left over

$$\%\ yield = 100\% \frac{actual}{theoretical}$$

Starting with 113g Fe_2O_3 and 14.0g C, what is the theoretical yield of Fe?

$$TY = \frac{0.708\ mol\ Fe_2O_3 \left| \frac{4\ mol\ Fe}{2\ mol\ Fe_2O_3} \right.}{} = 1.42\ mol\ Fe$$

- Suppose during one experiment 1.32 mol Fe were obtained, what is the percent yield?

$$\%\ yield = 100\% \frac{1.32}{1.42} = 92.56\%$$

Tylenol $C_8H_9NO_2$ — % composition

$8 \times 12.01\ g/mol = 96.08$	$\%C = 100\% \frac{96.08}{151.16}$	$=$	$63.56\%\ C$
$+\ 9 \times 1.008\ g/mol = 9.072$	$\%H = 100\% \frac{9.072}{151.16}$	$=$	$6.00\%\ H$
$+\ 1 \times 14.01\ g/mol = 14.01$	$\%N = 100\% \frac{14.01}{151.16}$	$=$	$9.27\%\ N$
$+\ 2 \times 16.00\ g/mol = 32.00$	$\%O = 100\% \frac{32.00}{151.16}$	$=$	$21.17\%\ O$
$MM = 151.16\ g/mol$			100%

Fructose has C, H, O

assume 100g sample ÷ atomic mass → get moles!

40.00 % C → 40g C ÷ 12.01 = 3.33 mol

6.71 % H → 6.71 g H ÷ 1.008 = 6.66 mol

53.29 % O → 53.29 g O ÷ 16.00 = 3.33 mol

→ Divide by smallest | multiply by integer

C	1	
H	2	(NA)
O	1	

formula: CH_2O