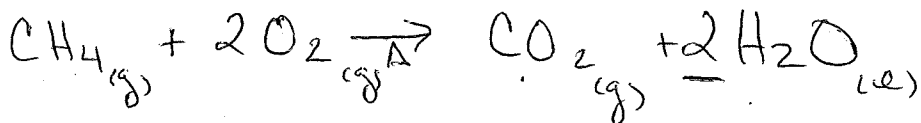


Reactions

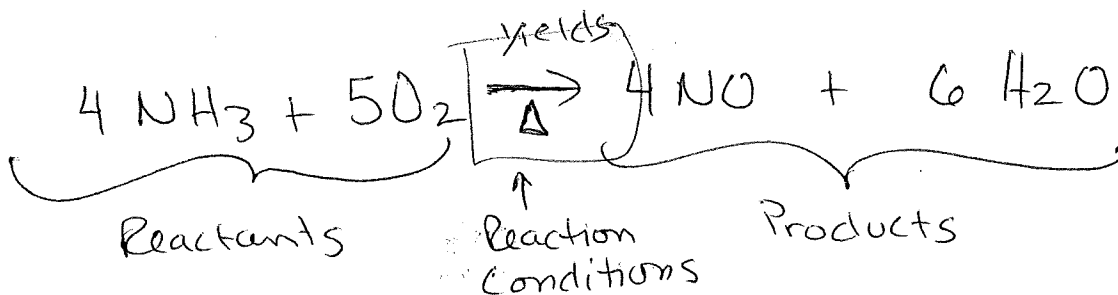
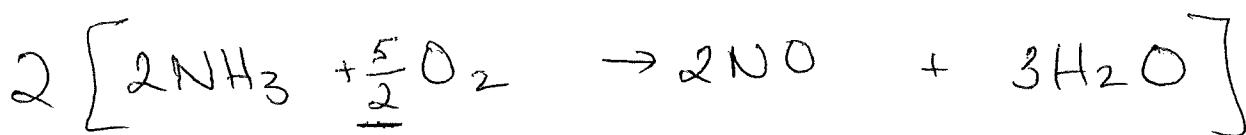
Stoichiometry

- % yield

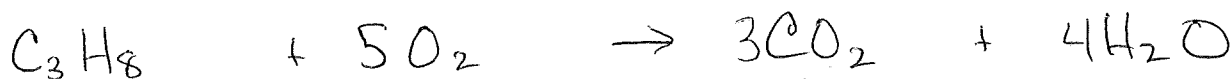
- L.R.



g - gas l - liquid s - solid aq - aqueous



Stoichiometry



100.0g

g?

1. Balance

(12.011 + 2 x 15.99)

100.0g	1 mole $\text{C}_3\text{H}_8$	3 moles $\text{CO}_2$	43.991g	= 299.3g
	44.097g	1 mole $\text{C}_3\text{H}_8$	1 mole $\text{CO}_2$	

2. Convert to moles

3. Mole to mole ratio

4. Convert to mass

What mass of  $\text{O}_2$  is needed to make  
299.3g of  $\text{CO}_2$ ?

$$\frac{299.3g CO_2}{43.99g} \left| \frac{1 \text{ mole } CO_2}{3 \text{ mole } CO_2} \right| \frac{5 \text{ mole } O_2}{1 \text{ mole } O_2} \left| \frac{31.98g}{362.6g} \right| = \boxed{O_2}$$



A happy grad student made 32.5g of  $P_4O_{10}$  from 52.9g of  $KClO_3$ .  
 What is the actual & theoretical yield?

How much  $P_4O_{10}$  does 52.9g of  $KClO_3$  make?

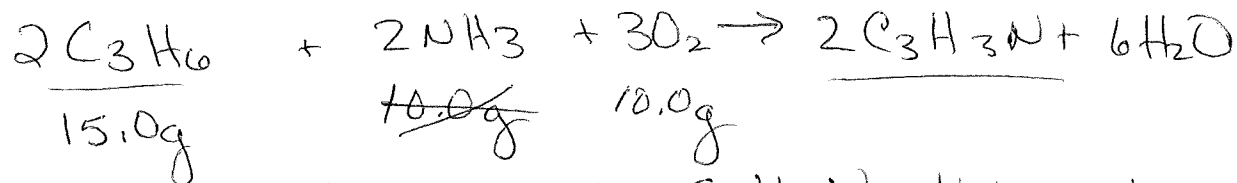
$$\frac{52.9g KClO_3}{122.52g} \left| \frac{1 \text{ mole}}{10 \text{ mole}} \right| \frac{3 \text{ mole}}{1 \text{ mole } P_4O_{10}} \left| \frac{283.795g}{36.8g} \right| = 36.8g$$

Theoretical
Theoretical  

yield.

$$\star \% \text{ Yield} = \frac{\text{actual}}{\text{theoretical}} = \frac{32.5g}{36.8g} \times 100 = \underline{88.3\%}$$

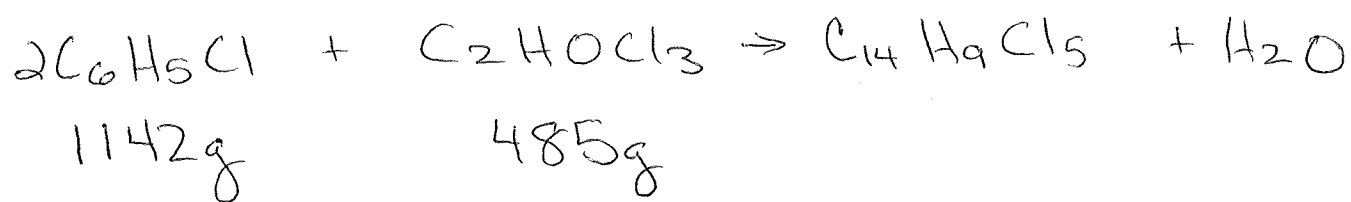
Limiting Reagent - One substance runs out.  
 L.R.



What is the ~~the~~ most  $C_3H_3N$  that can be made?

$$\frac{15.0g C_3H_6}{42.08g} \left| \frac{1 \text{ mole } C_3H_6}{2 \text{ mole}} \right| \frac{2 \text{ mole}}{1 \text{ mole}} \left| \frac{53.064g}{18.9g} \right| = 18.9g$$

$$\frac{10.0g O_2}{31.98g} \left| \frac{1 \text{ mole } O_2}{3 \text{ mole}} \right| \frac{2 \text{ mole}}{1 \text{ mole } C_3H_3N} \left| \frac{53.064g}{11.1g} \right| = \boxed{11.1g} \leftarrow \text{most}$$



% yield? When 200.0g of  $\text{C}_{14}\text{H}_9\text{Cl}_5$  is made?

A:  $\frac{1170\text{g}}{1166\text{g}} = \text{Theoretical}$   
 $17.2\% = \% \text{ yield.}$