

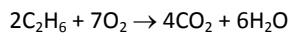
## LIMITING REAGENT PROBLEMS

- 1 Write a balanced equation
2. Write down the coefficients of all the reactants and products
3. Convert the mass of the reactants given to moles
4. Determine the Limiting reagent using simple ratio and proportion

$$n = \frac{m}{M_m}$$

$$m = n \times M_m$$

- Denominators of the ratios are obtained from the balanced equation
- Numerator is the moles of the reactant given
- X gives the number of moles of the second reactant.
- Use the value of X to determine if the reactant is completely used up or is in excess
- Once the limiting reagent is determined use only these values to compute the quantities of products formed in moles
- Convert the moles back to mass



		2C <sub>2</sub> H <sub>6</sub>	+	7O <sub>2</sub>	→	4CO <sub>2</sub>	+	6H <sub>2</sub> O	
Mole Ratio	Coefficients	2		7		4		6	
Given	Mass	25g		15g		?		?	
Given	Moles	$\frac{25g}{30.08g/mol} = 0.83170$		$\frac{15g}{32g/mol} = 0.5mol$					
Find	LR	$\frac{0.83170}{2}$ 0.83170 needs 2.9 moles we don't have that so ∴ O <sub>2</sub> is LIMITING REAGENT		$\frac{x}{7} = 2.9$ x = 20.3 moles		AMOUNT OF C <sub>2</sub> H <sub>6</sub> needed $\frac{y}{4} = 0.5$ y = 2			
Actual Values	Moles Being Used	0.14 moles C <sub>2</sub> H <sub>6</sub>		0.5 mol O <sub>2</sub>		$\frac{0.14}{2} = \frac{CO_2}{4}$ n <sub>CO<sub>2</sub></sub> = $\frac{0.14 \times 4}{2} = 0.28$ moles		$\frac{0.14}{2} = \frac{H_2O}{6}$ n <sub>H<sub>2</sub>O</sub> = $\frac{0.14 \times 6}{2} = 0.3$ mol	
Convert	Moles to Mass	mass = $0.14 \times 30.08 = 4.21g$		mass = $0.5 \times 32 = 16g$		mass = $0.28 \times 44.01g = 12.32g$		mass = $0.3 \times 18.02g = 5.406g$	

4.21 g C<sub>2</sub>H<sub>6</sub> reacts with 16 g O<sub>2</sub> to produce 12.32 g CO<sub>2</sub> and 5.41 g H<sub>2</sub>O