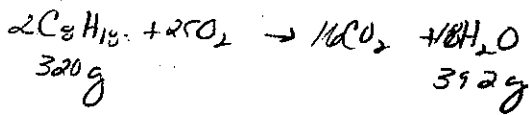


STOICHIOMETRY - MIXED REVIEW #2 - HONORS CHEM

1. Octane,  $C_8H_{18}$ , is burned in air. If 320 g of octane are burned and 392 g of water are recovered, what is the percent yield of the experiment?
2. Consider the following reaction:  
$$Zn + 2HCl \rightarrow ZnCl_2 + H_2$$

If 124.0 g of zinc is reacted with 150.0 g of hydrochloric acid, how many grams of each product will be formed? How many grams of excess reactant will remain?
3. How many milliliters of a 5.0% HCl solution are required to react with 12.5 g of magnesium? The density of the acid solution is 1.04 g/ml.
4. Nitrogen combines with oxygen in the atmosphere during lightning flashes to form nitrogen monoxide, which then goes on to further react with oxygen to produce nitrogen dioxide. What mass of nitrogen dioxide will be produced from the reaction of 428.0 g of nitrogen?
5. Aluminum is added to silver nitrate. How many grams of silver will be produced from the reaction of 0.135 mol of aluminum?

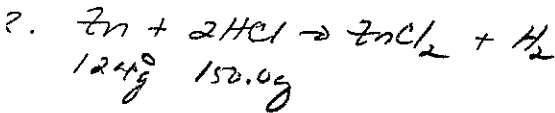
Honors Review #2



$$320g \text{ C}_8\text{H}_{18} \left( \frac{1 \text{ mol}}{114g \text{ C}_8\text{H}_{18}} \right) \left( \frac{18 \text{ mol H}_2\text{O}}{2 \text{ mol C}_8\text{H}_{18}} \right) \left( \frac{18.0g \text{ H}_2\text{O}}{1 \text{ mol H}_2\text{O}} \right) = 450g \text{ H}_2\text{O}$$

2 SF

$$\% \text{ yield} = \frac{392g}{450g} \times 100 = 87\%$$



$$124g \text{ Zn} \left( \frac{1 \text{ mol Zn}}{65.3g \text{ Zn}} \right) \left( \frac{1 \text{ mol H}_2}{1 \text{ mol Zn}} \right) \left( \frac{2.0g \text{ H}_2}{1 \text{ mol H}_2} \right) = 3.798g \text{ H}_2$$

$$150.0g \text{ HCl} \left( \frac{1 \text{ mol HCl}}{36.5g} \right) \left( \frac{1 \text{ mol H}_2}{2 \text{ mol HCl}} \right) \left( \frac{2.0g \text{ H}_2}{1 \text{ mol H}_2} \right) = 4.110g \text{ H}_2$$

$$124.8g \text{ Zn} \left( \frac{1 \text{ mol Zn}}{65.3g \text{ Zn}} \right) \left( \frac{1 \text{ mol ZnCl}_2}{1 \text{ mol Zn}} \right) \left( \frac{136.3g}{1 \text{ mol ZnCl}_2} \right)$$

$$= 260.5g \text{ ZnCl}_2$$

Excess:

$$124.8g \text{ Zn} \left( \frac{1 \text{ mol Zn}}{65.3g} \right) \left( \frac{2 \text{ mol HCl}}{1 \text{ mol Zn}} \right) \left( \frac{36.5g}{1 \text{ mol HCl}} \right)$$

$$150.0 - 138.5g = 11.5g \text{ HCl excess}$$



12.5g  no?  
5g

$$12.5g \text{ Mg} \left( \frac{1 \text{ mol Mg}}{24.3g \text{ Mg}} \right) \left( \frac{2 \text{ mol HCl}}{1 \text{ mol Mg}} \right) \left( \frac{36.5g}{1 \text{ mol HCl}} \right) = 37.6g \text{ HCl}$$

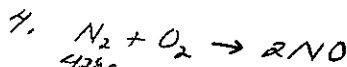
$$37.6g \left( \frac{1 \text{ ml}}{1.04g} \right) = 36.1 \text{ ml}$$

$$5.0g = \frac{37.6g \text{ HCl}}{\text{mass solution}} \times 100$$

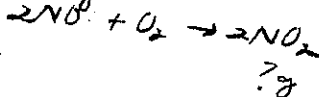
$$750g = \text{mass solution}$$

$$D = \frac{m}{V}$$

$$V = \frac{m}{D} = \frac{750g}{1.04g/ml} = 721 \rightarrow 720 \text{ ml}$$

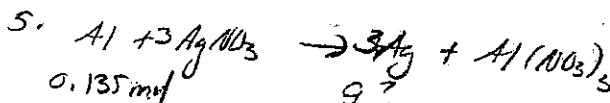


428g



$$428.0g \text{ N}_2 \left( \frac{1 \text{ mol N}_2}{28.0g} \right) \left( \frac{2 \text{ mol NO}}{1 \text{ mol N}_2} \right) \left( \frac{2 \text{ mol NO}_2}{2 \text{ mol NO}} \right) \left( \frac{46.0g}{1 \text{ mol NO}_2} \right)$$

$$1406g \text{ NO}_2$$



0.135 mol  g?

$$0.135 \text{ mol Al} \left( \frac{3 \text{ mol Ag}}{1 \text{ mol Al}} \right) \left( \frac{107.9g}{1 \text{ mol Ag}} \right) = 43.7g \text{ Ag}$$