Stoichiometry Practice

1. Each of the following equations represents a metabolic activity carried out by various species of living organisms. <u>Balance each equation.</u>

a.	$N_2 + H_2 \rightarrow$	NH ₃	(nitrogen fixation)
b.	CO_2 + H_2O \rightarrow	$C_6H_{12}O_6 + O_2$	(photosynthesis)
C.	$H_2S + O_2 \rightarrow$	H ₂ SO ₄	
d.	$C_6H_{12}O_6 \rightarrow$	CH ₃ CH ₂ OH + CO	₂ (alcoholic fermentation)
e.	$CO_2 + H_2S \rightarrow$	$C_6H_{12}O_6 + S +$	H ₂ O
f.	$C_6H_{12}O_6 \rightarrow$	CH₃CHOHCOOH	(lactic acid fermentation)
g.	$NH_4Cl + O_2 \rightarrow$	HNO ₂ + HCl	+ H ₂ O

2. Calculate the molar mass for each of the following:

3.	How many moles are in each of the following samples?			
	a.	174.1 g sulfuric acid (H_2SO_4)	c.	$0.3520 \text{ g of Ca}(NO_3)_2$

b. 121 g of ethanol (C_2H_6O) d. 8923 g of NH_4NO_3

4.	How many grams are in each of the following samples?						
	a. 0.275 mol Dopamine ($C_8H_{11}NO_2$)	с.	55.35 mol Water				

b. 0.538 mol Calcium Nitrate d. 7.230 mol Iron (III) Carbonate

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- 5. Answer the following questions given this equation:
 - $\mathsf{BF}_3 \quad + \qquad \mathsf{Li}_2\mathsf{SO}_3 \quad \xrightarrow{} \quad \mathsf{B}_2(\mathsf{SO}_3)_3 \quad + \qquad \mathsf{LiF}$
 - a. Balance the equation
 - b. Calculate molar masses for each molecule
 - c. If 37.29g BF₃ is reacted with excess Li_2SO_3 , how many grams of $B_2(SO_3)_3$ could be formed by the reaction? How many grams of LiF?

- d. If 189.4g of LiF are desired, how many grams of Li₂SO₃ are required? How many grams BF₃?
- e. If 71.90g BF₃ are reacted with 77.01g Li₂SO₃:
 - i. Which reactant will be the limiting reagent?
 - ii. How many grams of LiF can be made, given this limit?
 - iii. How many grams of the excess reagent will remain leftover?
 - iv. If, in the laboratory, the actual mass of LiF produced was 56.22g, what is the percent yield for the reaction?

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6. Answer the following questions given this equation:

 $AlBr_3 + K_2SO_4 \rightarrow KBr + Al_2(SO_4)_3$

- a. Balance the equation
- b. Calculate molar masses for each molecule
- c. If 500.g of AlBr₃ are reacted with excess K_2SO_4 , how many grams of KBr are possible? How many grams Al₂(SO₄)₃ possible?

d. If 190.0g KBr is desired, how many grams K₂SO₄ would be needed? How many grams AlBr₃?

- e. If 91.97g AlBr₃ are reacted with 152.01g K_2SO_4 :
 - i. Which reactant will be the limiting reagent?
 - ii. How many grams of KBr can be made, given this limit?
 - iii. How many grams of the excess reagent will remain leftover?
 - iv. If, in the laboratory, the percent yield of this reaction is 65.2%, how many grams of KBr will actually be produced after completing the reaction?