**"Bring-Back" Quiz, Due Monday September 21 at the beginning of class.**
**<u>SHOW ALL WORK TO RECEIVE CREDIT</u>.**

1. Balance the following chemical reactions, then perform the requested calculations.

a.(4 Pts)  $\underline{2}$ $Al(NO_3)_3(aq)$ + $\underline{3}$ $Na_2S(aq)$ → $\underline{\ }$ $Al_2S_3(s)$ + $\underline{6}$ $NaNO_3(aq)$
22.4 g                    18.7 g                    ? g
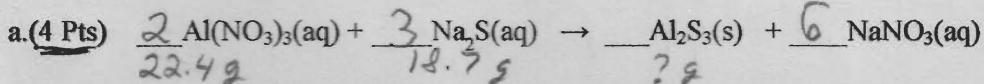
If 22.4 grams of aluminum nitrate are reacted with 18.7 grams of sodium sulfide, how many grams of aluminum sulfide will be produced?

Based on Al(NO₃)₃:  $\dfrac{22.4\,g\,Al(NO_3)_3}{}$ | $\dfrac{mol\,Al(NO_3)_3}{213.01\,g\,Al(NO_3)_3}$ | $\dfrac{1\,mol\,Al_2S_3}{2\,mol\,Al(NO_3)_3}$ | $\dfrac{150.17\,g\,Al_2S_3}{mol\,Al_2S_3}$ = $\boxed{7.90\,g\,Al_2S_3}$

Based on Na₂S:  $\dfrac{18.7\,g\,Na_2S}{}$ | $\dfrac{mol\,Na_2S}{78.05\,g\,Na_2S}$ | $\dfrac{1\,mol\,Al_2S_3}{3\,mol\,Al_2S_3}$ | $\dfrac{150.17\,g\,Al_2S_3}{mol\,Al_2S_3}$ = $12.0\,g\,Al_2S_3$

b. (4 Pts)  $\underline{2}$ $C_3H_8O_3(l)$ + $\underline{7}$ $O_2(g)$ → $\underline{6}$ $CO_2(g)$ + $\underline{8}$ $H_2O(l)$
12.7 mol            14.0 mol         ? moles
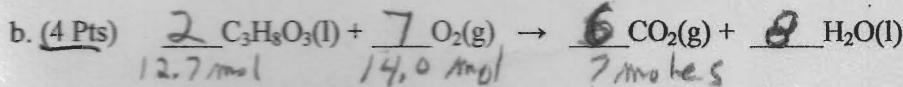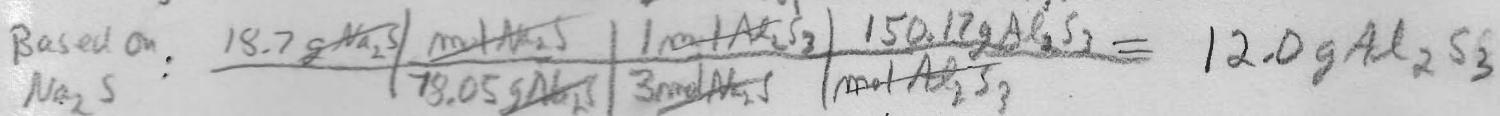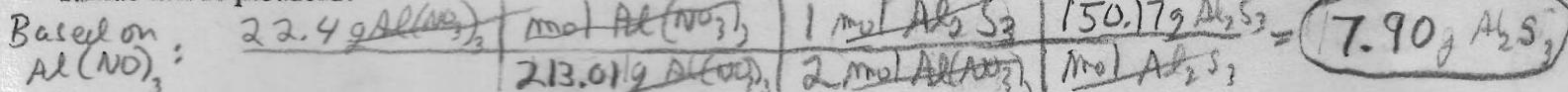
If 12.7 moles of $C_3H_8O_3$ are reacted with 14.0 moles of $O_2$, how many moles of $CO_2$ will be produced?

Based on C₃H₈O₃:  $\dfrac{12.7\,mol\,C_3H_8O_3}{}$ | $\dfrac{6\,mol\,CO_2}{2\,mol\,C_3H_8O_3}$ = $38.1\,mol\,CO_2$

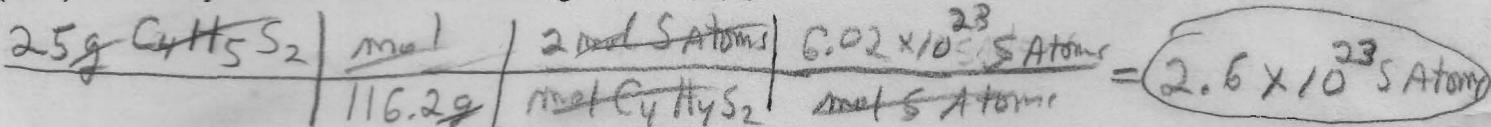Based on O₂:  $\dfrac{14.0\,mol\,O_2}{}$ | $\dfrac{6\,mol\,CO_2}{7\,mol\,O_2}$ = $\boxed{12.0\,mol\,CO_2}$
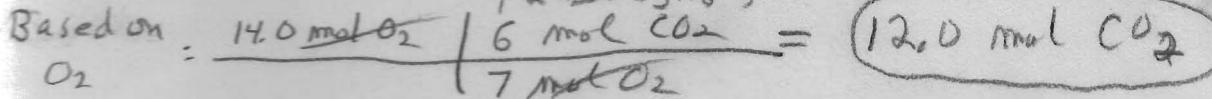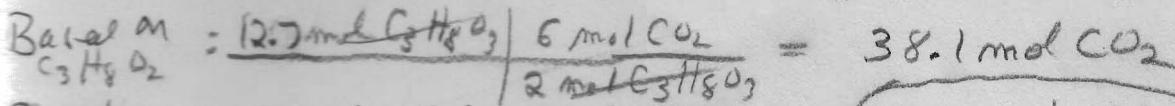
2. (3 Pts)  Calculate the percentages by mass of <u>chlorine</u> and <u>nitrogen</u> in $PtCl_2(NH_3)_2$.

$\%\,Cl = \dfrac{70.90}{300.08} \times 100 = \boxed{23.63\%\,Cl}$

$\%\,N = \dfrac{28.02}{300.08} \times 100 = \boxed{9.337\%\,N}$

6 × 1.01 = 6.06
2 × 14.01 = 28.02
2 × 35.45 = 70.90
1 × 195.1 = 195.1
300.08

3. (3 Pts)  How many sulfur atoms are there in 25 grams of $C_4H_4S_2$?

$\dfrac{25\,g\,C_4H_4S_2}{}$ | $\dfrac{mol}{116.2\,g}$ | $\dfrac{2\,mol\,S\,Atoms}{mol\,C_4H_4S_2}$ | $\dfrac{6.02\times10^{23}\,S\,Atoms}{mol\,S\,Atoms}$ = $\boxed{2.6\times10^{23}\,S\,Atoms}$

4. (3 Pts)  How many grams of hydrogen are in 56.0 g of $CH_3OH$?

$\dfrac{56.0\,g\,CH_3OH}{}$ | $\dfrac{4(1.008)\,g\,H_2}{32.04\,g\,CH_3OH}$ = $\boxed{7.05\,g\,H_2}$
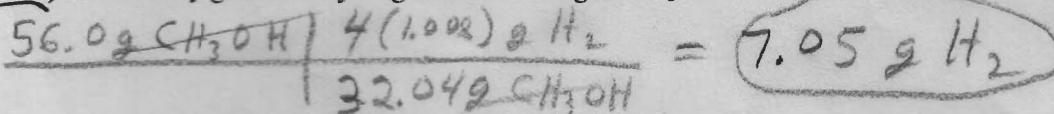
5. (4 Pts)  Determine the empirical formula for a compound that contains 29% Na, 41% S, and 30% O by mass?

Assume 100 g so % = g

Na:  $\dfrac{29\,g}{}$ | $\dfrac{mol}{23\,g}$ = 1.26

S:  $\dfrac{41\,g}{}$ | $\dfrac{mol}{32.07\,g}$ = 1.28

O:  $\dfrac{30\,g}{}$ | $\dfrac{mol}{16\,g}$ = 1.87

÷ by smallest  1.26 ÷ 1.26 = 1

1.28 ÷ 1.26 = 1

1.87 ÷ 1.26 = 1.5

so × 2 S, i.e.

$\boxed{Na_2S_2O_3}$

6. (4 Pts)  The combustion of $C_3H_8$ produces $CO_2$ and $H_2O$:     $C_3H_8 + 5O_2 → 3CO_2 + 4H_2O$
                                                                        3.2 mol   15.0 mol            ? g
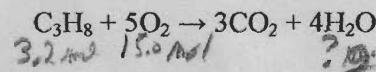
How many grams of water can be produced from 3.2 moles of propane and 15.0 moles of oxygen?

Based on C₃H₈:  $\dfrac{3.2\,mol\,C_3H_8}{}$ | $\dfrac{4\,mol\,H_2O}{1\,mol\,C_3H_8}$ | $\dfrac{18.02\,g\,H_2O}{mol\,H_2O}$ = $230\,g\,H_2O$

Based on O₂:  $\dfrac{15.0\,mol\,O_2}{}$ | $\dfrac{4\,mol\,H_2O}{5\,mol\,O_2}$ | $\dfrac{18.02\,g\,H_2O}{mol\,H_2O}$ = $\boxed{216\,g\,H_2O}$