Name ___ *Key* _____   Name _____
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Please **show work on all questions** for **full credit & partial credit**. (20 total pts) green

1. What % is the element H in the molecule NH_3 (FW NH_3 = 17.04 g / mol) show work. (4 pts)

$$\left[\frac{3(1.01)}{17.04}\right] * 100 = 17.8\% \text{ H} \quad \text{by mass} \quad (BA-2)$$
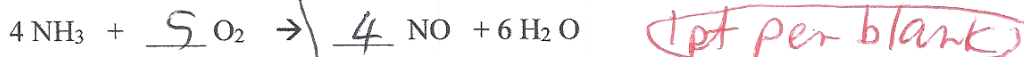
attempt −1

2 Give the molecular formula for a compound with empirical formula of CH (empirical formula mass = 13.02 g / mol) with a molecular formula mass of 26.04 g/mol. Show work. (4 pts)

$$\frac{26.04 \text{ molecular Fm}}{13.02 \text{ empirical Fm}} = 2 \qquad (CH)_2 \Rightarrow C_2H_2 \quad -1$$

3   a. Balance the following reaction by filing in the blanks with NUMBERS.   (2 pts)

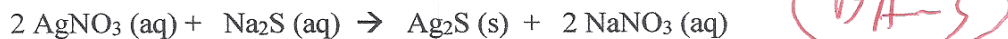$4 NH_3$ + __5__ O_2 → __4__ NO + 6 H_2O 1pt per blank

b. After you balance the reaction show that you balanced the reaction by showing all of the atoms of each type on the reactant and product side of the reaction. (4 pts)

$4N, \quad 4*3=12H \quad | \quad 4N, \quad 4\underline{O} + 6\underline{O} = 10\underline{O} \quad (BA-2)$

$10\underline{O} \qquad\qquad\qquad 6*2 = 12H$

4. Given the following balanced chemical reaction, (6 pts)   BA−3

$2 AgNO_3$ (aq) + Na_2S (aq) → Ag_2S (s) + 2 $NaNO_3$ (aq)

If I start with 125.2 grams of the $AgNO_3$ (FW $AgNO_3$ = 169.87 g/mol) how many grams of the Ag_2S (247.81 g/mol)   will I make ? Show work.

$$125.2 \text{ g AgNO}_3 \times \frac{1 \text{ mol AgNO}_3}{169.87 \text{ g AgNO}_3} \times \frac{1 \text{ mol Ag}_2S}{2 \text{ mol AgNO}_3} \times \frac{247.81 \text{ g Ag}_2S}{1 \text{ mol Ag}_2S}$$

$$= 91.32 \text{ g Ag}_2S \qquad \text{attempt −1}$$

Extra Credit: (4 pts)   For the reaction above, if the amount of $AgNO_3$ produces 1.25 moles of Ag_2S while the amount of the Na_2S produces 0.58 moles of the Ag_2S which is the limiting reagent ?

[$(AgNO_3)$ or (Na_2S)] (circle the limiting reagent)

Name ___*Key*_____   Name _____
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Please **show work on all questions** for **full credit & partial credit**. (20 total pts)

1.   What % is the element S in the molecule SO_2 (FW SO_2 = 64.07 g / mol) show work (4 pts)

$$\left(\frac{32.05}{64.07}\right) * 100 = 49.9 \% \quad S$$

(BA −2)
(attempt −1)

2   From % composition you obtain ratios of elements of Carbon - 2, Hydrogen – 3.5 and Oxygen – 1, what is the empirical formula ? show work. (4 pts)
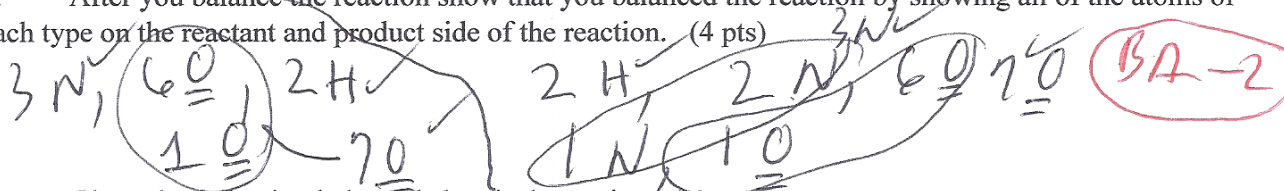
one of the steps for getting empirical formula
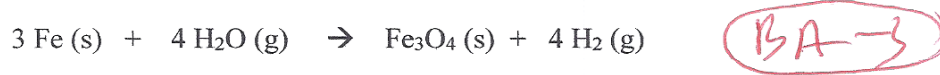
$$(C_2 H_{3.5} O_1) * 2 = C_4 H_7 O_2$$

3   a.   Balance the following reaction by filing in the blanks with NUMBERS.   (2 pts)

3 NO_2 + H_2O → _2_ HNO_3 + _1_ NO   *(1 pt per blank)*

b.   After you balance the reaction show that you balanced the reaction by showing all of the atoms of each type on the reactant and product side of the reaction.   (4 pts)

3 N, 6 O   2 H   2 H,   2 N, 6 O   7 O   *(BA −2)*
    1 O   — 7 O   1 N   1 O

4.   Given the following balanced chemical reaction, (6 pts)

3 Fe (s) + 4 H_2O (g) → Fe_3O_4 (s) + 4 H_2 (g)   *(BA −3)*

If I start with 452.7   grams of the Fe (FW Fe = 55.85 g/mol)   how many grams of the Fe_3O_4 (231.55 g/mol) will I make ?   Show work.

$$452.7 \text{ g Fe} \times \frac{1 \text{ mol Fe}}{55.85 \text{ g Fe}} \times \frac{1 \text{ mol } Fe_3O_4}{3 \text{ mol Fe}} \times \frac{231.55 \text{ g } Fe_3O_4}{1 \text{ mol } Fe_3O_4}$$

$$= 625.6 \text{ g } Fe_3O_4$$

(attempt −1)

Extra Credit: (4 pts)   For the reaction above if the amount of Fe produces 1.25 moles of H_2 while the amount of H_2O produces 15.2 moles of H_2 which is the limiting reagent ?

[(Fe) or (H_2)] (circle the limiting reagent)