UNIT 2

ASSIGNMENT V2

____/16

Name: _____

1. Write the (**complete) ionic** and **net ionic** formulae for the following processes: [4 pt]

   (a) (molecular) __NaOH(aq) + __$FeCl_3$(aq) → _____

   (ionic) _____

   (net ionic) _____

   (b) (molecular) __Al(s) + $CuCl_2$(aq) → _____

   (ionic) _____

   (net ionic) _____

2. A mixture containing $CaCO_3$, NH_4NO_3, $NaNO_3$ and $NaHCO_3$ is heated. These compounds go under *thermal decomposition* and decompose based on the following equations:

   (1) $CaCO_3(s) \rightarrow CaO(s) + CO_2(g)$

   (2) $NH_4NO_3(s) \rightarrow N_2O(g) + 2H_2O(g)$

   (3) $2NaNO_3(s) \rightarrow 2NaNO_2(s) + O_2(g)$

   (4) $2NaHCO_3(s) \rightarrow Na_2CO_3(s) + H_2O + CO_2$

   A 50.0g sample is heated and the following products are recorded: 8.96g of CaO, 7.69g of N_2O , 10.71g of CO_2 and 1.13g of O_2. What was the composition (by mass) of the sample? [4 pts]

3. Aspirin, $C_9H_8O_4$, is produced when salicyclic acid ($C_7H_6O_3$) is reacted with acetic anhydride ($C_4H_6O_3$):

$C_7H_6O_3 + C_4H_6O_3 \rightarrow C_9H_8O_4 + HC_2H_3O_2$

(a) How much salicyclic acid is required to produce 1.5 x 10^2kg of aspirin, assuming that all of the salicyclic acid is converted to aspirin? [2 pts]

(b) How much salicyclic acid would be required to produce 1.5 x 10^2kg of aspirin if only **80%** of the salicyclic acid was converted to aspirin? [1 pts]

(c) What is the theoretical yield of aspirin if 185kg of salicyclic acid is allowed to react with 125kg of acetic anhydride? [1 pts]

(d) If the situation described in part (c) produces 182kg of aspirin, what is the percent yield? [1 pts]

4. Balance the following in basic conditions: [3 pts]

$$Cr_2O_7^{2-}(aq) + HNO_2(aq) \rightarrow Cr^{3+}(aq) + NO_3^{-1}(aq)$$