

This worksheet is **due Wednesday, November 10 by 11:59 PM**. To complete the assignment, show in *detailed steps* how to get the answer that is given for each of the problems. *Failure to use this form for work and answers will result in a point penalty.*

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Problem 1: You take an aspirin tablet (which contains only carbon, hydrogen and oxygen) with a mass of 1.000 g and burn it in air to collect 2.20 g of carbon dioxide and 0.400 g of water. A molar mass experiment shows a value between 170 and 190 g/mol. What is the molecular formula for aspirin?

*Answer to Problem #1: C<sub>9</sub>H<sub>8</sub>O<sub>4</sub>*

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Problem 2: The reaction of 23.1 g of NH<sub>3</sub> and 18.3 g of O<sub>2</sub> produces 4.10 g of NO. What is the percent yield for this reaction? The equation for this reaction is:  $4 \text{NH}_3(\text{g}) + 5 \text{O}_2(\text{g}) \rightarrow 4 \text{NO}(\text{g}) + 6 \text{H}_2\text{O}(\text{g})$  *Note: Check **both** reactants for credit on this problem.*

*Answer to Problem #2: 29.9%*

Problem 3: What volume of 0.300 M NaCl is required to precipitate all the Pb<sup>2+</sup> ion from 25.0 mL of aqueous 0.440 M Pb(NO<sub>3</sub>)<sub>2</sub>?  
The reaction is: **Pb(NO<sub>3</sub>)<sub>2</sub>(aq) + 2 NaCl(aq) → PbCl<sub>2</sub>(s) + 2 NaNO<sub>3</sub>(aq)**

*Answer to Problem #3: 73.3 mL*

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Problem 4: If 1.00 mole of ethanol, CH<sub>3</sub>CH<sub>2</sub>OH, at 22.0 °C absorbs 1.45 kJ of heat, what is the final temperature of the ethanol? The specific heat capacity for ethanol is 2.44 J/gK.

*Answer to Problem #4: 34.9 °C*

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Problem 5: The standard molar enthalpy of formation of NH<sub>3</sub>(g) is -45.9 kJ/mol. What is the enthalpy change if 5.38 g of N<sub>2</sub>(g) and 3.32 g of H<sub>2</sub>(g) react to form NH<sub>3</sub>(g)? *Note:* Check **both** reactants for credit on this problem.

*Answer to Problem #5: -17.6 kJ*