

This worksheet is **due at the time of your second lecture exam**. 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.*

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: C₉H₈O₄

Problem 2: The reaction of 23.1 g of NH₃ and 18.3 g of O₂ 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^{2+} ion from 25.0 mL of aqueous 0.440 M $\text{Pb}(\text{NO}_3)_2$? The reaction is: $\text{Pb}(\text{NO}_3)_2(\text{aq}) + 2 \text{NaCl}(\text{aq}) \rightarrow \text{PbCl}_2(\text{s}) + 2 \text{NaNO}_3(\text{aq})$

Answer to Problem #3: 73.3 mL

Problem 4: If 1.00 mole of ethanol, $\text{CH}_3\text{CH}_2\text{OH}$, 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

Problem 5: The standard molar enthalpy of formation of $\text{NH}_3(\text{g})$ is -45.9 kJ/mol. What is the enthalpy change if 5.38 g of $\text{N}_2(\text{g})$ and 3.32 g of $\text{H}_2(\text{g})$ react to form $\text{NH}_3(\text{g})$? *Note:* Check **both** reactants for credit on this problem.

Answer to Problem #5: -17.6 kJ