

*Worksheet due dates: **Mon, 11/13, 1:10 PM (01)**, **Wed, 11/15, 1:10 PM (H1)** or **11:59 PM (W1, email)**. To complete, show **detailed steps** on how to get the given answer for each problem. *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 NH₃(g) + 5 O₂(g) → 4 NO(g) + 6 H₂O(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 Pb²⁺ ion from 25.0 mL of aqueous 0.440 M Pb(NO₃)₂?
The reaction is: **Pb(NO₃)₂(aq) + 2 NaCl(aq) → PbCl₂(s) + 2 NaNO₃(aq)**

Answer to Problem #3: 73.3 mL

Problem 4: If 1.00 mole of ethanol, CH₃CH₂OH, 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 NH₃(g) is -45.9 kJ/mol. What is the enthalpy change if 5.38 g of N₂(g) and 3.32 g of H₂(g) react to form NH₃(g)? *Note:* Check **both** reactants for credit on this problem.

Answer to Problem #5: -17.6 kJ