

Worksheet due dates: **Mon, 2/2, 1:10 PM (L1)** , **Wed, 2/4, 1:10 PM (L2)** or **Fri, 2/6, 1:10 PM (L3)**. 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: Using the bond energies in the table below, estimate ΔH for the reaction: $\text{H}_2\text{O}_2 + \text{CH}_3\text{OH} \rightarrow \text{H}_2\text{CO} + 2 \text{H}_2\text{O}$

<i>Bond:</i>	C-C	C=C	C-O	C=O	C-H	O-H	O-O
<i>Energy (kJ/mol)</i>	347	614	358	799	413	463	146

Answer to Problem #1: -345 kJ

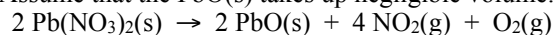
Problem 2: The reaction of 23.1 g of NH_3 and 18.3 g of O_2 produces 4.10 g of NO . What is the percent yield for this reaction? The equation for this reaction is: $4 \text{NH}_3(\text{g}) + 5 \text{O}_2(\text{g}) \rightarrow 4 \text{NO}(\text{g}) + 6 \text{H}_2\text{O}(\text{g})$ *Note: Check **both** reactants for credit on this problem.*

Hint to Problem #2: 29.9%

Problem 3: 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 #3: **34.9°C***

Problem 4: A 3.31 g sample of lead(II) nitrate is heated in an evacuated cylinder with a volume of 1.62 L. The salt decomposes when heated according to the equation below. Assuming complete decomposition, what is the pressure in the cylinder after decomposition and cooling to a temperature of 300. K? Assume that the PbO(s) takes up negligible volume.



*Answer to Problem #4: **0.380 atm***

Problem 5: Iron reacts with hydrochloric acid to produce iron(II) chloride and hydrogen gas: $\text{Fe(s)} + 2\text{HCl(aq)} \rightarrow \text{FeCl}_2(\text{aq}) + \text{H}_2(\text{g})$
The H_2 gas from the reaction of 2.2 g of iron with excess acid is collected in a 10.0-L flask at 25°C . What is the pressure of the H_2 gas in atm in this flask?

*Answer to Problem #5: **0.096 atm***