CH 222 Exam Prep I Worksheet Name: _____

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: **H_2O_2 + CH_3OH → H_2CO + 2 H_2O**

Bond:	C-C	C=C	C-O	C=O	C-H	O-H	O-O
Energy (kJ/mol)	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 NH_3(g) + 5 O_2(g) → 4 NO(g) + 6 H_2O(g)** *Note:* Check ***both*** reactants for credit on this problem.

Hint to Problem #2: **29.9%**

Problem 3: If 1.00 mole of ethanol, CH_3CH_2OH, 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.

$$2\ Pb(NO_3)_2(s) \rightarrow 2\ PbO(s) + 4\ NO_2(g) + O_2(g)$$

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

Problem 5: Iron reacts with hydrochloric acid to produce iron(II) chloride and hydrogen gas: **$Fe(s) + 2\ HCl(aq) \rightarrow FeCl_2(aq) + H_2(g)$** 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**