CH 222 Exam Prep II Worksheet Name: _____

Worksheet due dates: **Mon, 2/24, 1:10 PM** *(01)* **, Wed, 2/26, 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: 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 #1: **0.380 atm**

Problem 2: How much energy is needed to convert 64.0 g of ice at 0.00 °C to liquid water at 75.0 °C? Note that the Heat of fusion for water = 333 J/g.

Answer to Problem #2: **41.4 kJ**

Problem 3: Concentrated nitric acid is 70.0% by mass HNO_3 in water. The density of this acid is 1.42 g/cm^3. What is the molarity of the acid?

Answer to Problem #3: **15.8 M**

Problem 4: A 5.50 g sample of a compound is dissolved in 250. g of benzene. The freezing point of this solution is 1.02 °C below that of pure benzene. What is the molar mass of the compound? (k_f for benzene = -5.12 °C/m)

Answer to Problem #4: **110. g/mol**

Problem 5: Polyethylene is a synthetic polymer or plastic with many uses. 1.40 g of a polyethylene sample was dissolved in enough benzene to make 100. mL of solution, and the osmotic pressure was found to be 1.86 torr at 25 °C. What is the molar mass of the polyethylene?

Answer to Problem #5: **$1.40 * 10^5$ g/mol**