What's on the final exam? – EVERYTHING! The final is cumulative, which means that it will include all of the topics that we covered this semester. Thus, the first part of the final exam study guide is the study guides for Exams 1-4. This document includes the material that we have covered since Exam #4 (items to be covered in lecture on Friday, December 11 are in blue).

Be able to:

1. Know the units on the x- and y-axes of a Boltzmann distribution graph
2. Interpret and compare Boltzmann distribution graphs for two different molecules or the same molecule at different temperatures
3. Look at several Boltzmann curves and, given molecular formulas, predict which curve belongs to which molecule.
4. Predict which of two gases will have a higher speed (heavier molecules have slower speeds when the temperature is the same).

Calculations you should be comfortable doing:

5. Determine the kinetic energy of a single molecule
6. Given the temperature, determine the average kinetic energy of a collection of molecules
7. Calculate the rms speed of a gas, given temperature and molar mass, or determine molar mass given temperature and rms speed
8. Use Graham's Law of Effusion to determine the molecular mass of a gas or to predict the rate of effusion of a gas.
9. Use the gas laws (Boyle's, Charles', Avogadro's, Ideal, Combined) to determine the value of an unknown parameter (P, V, n, or T). (You do not have to be able to identify a gas law by name.)
10. Determine molar mass given density, temperature and pressure, or determine density given molar mass, temperature and pressure.
11. Use Dalton's Law of Partial Pressures to determine the partial pressure of a gas.
12. Calculate the mole fraction of a gas or use the mole fraction to determine the partial pressure of a gas.

Concepts to understand:

1. What is pressure?
2. How kinetic molecular theory be used to provide a conceptual picture of the gas laws.
3. Terms:
    a. Volume
    b. Pressure

c. Gas Constant (make sure you have this value on your note sheet in J/mol-k and in L-atm/K-mol)
d. Kinetic energy
e. Speed/Velocity
f. Kinetic-molecular theory
g. Boltzmann Distribution
h. Diffusion
i. Effusion
j. Standard Temperature and Pressure
k. Mole fraction
l. Partial Pressure