5.62 Physical Chemistry II
Spring 2008

Information for Second Hour Exam

The exam will be closed book and closed notes, but you will be allowed *one* sheet of $8.5 \times 11''$ paper (both sides) with your own notes, equations, and inspirational quotations. Note that you must incorporate a subset of your notes for Exam I onto this single sheet.

You must bring a "simple" calculator. There will be a lot of numerical calculations.

Material covered:

Lectures 11-21
Problem Sets #4-#6

q_{trans}, q_{rot}, q^{*}_{vib} , $q_{electronic}$

Partition functions for internal degrees of freedom (including nuclear) of atoms, diatomic, and polyatomic molecules.

nuclear spin, ortho/para
symmetry number
ortho/para
Difference between q_{vib} and q^{*}_{vib}
Computation of Thermodynamic quantities for gases from spectroscopic data.

Classical Mechanical formulation of Q(N,V,T)

Equipartition
High-T and Low-T limits for all thermodynamic quantities, especially C_v and U.

Model inter-particle potentials

Intermolecular interactions
cluster expansion

van der Waals and Virial equation

Chemical equilibrium: μ^{o}_{A}, μ^{o}_{B}, etc. $\rightarrow K_p$

$K_p(T) \leftrightarrow$ partition functions, group factors by type

ΔD^{0}_{0}

Dulong and Petit and Einstein models for the heat capacity of a solid.