## Physics 227 Homework 7 - Due April 3, 2009

Problem 1: 15.3-1. Note, the 'two-state system' of Callen is a simplified version of the problem of the spin lattice in the presence of a magnetic field, worked out in class.

Problem 2: Read through section 15-4 (the Polymer model), and use this knowledge to solve problem 15.4-4.

Problem 3: Consider again the Einstein crystal discussed in class. Calculate the number of states  $\Omega(E)$  with energy less than (or equal to) the energy E. Find the number of states with energies between  $E - \Delta$  and E, where  $\Delta < E$ . Show that for  $N \gg 1$  (i.e.  $\sim 10^{23}$ ) that  $\Omega(E) = \tilde{\Omega}(E) - \tilde{\Omega}(E - \Delta) \approx \tilde{\Omega}(E)$ . How can this be? What does it imply for statistical mechanics calculations? [See problems 15.5-1 and 15.5-2 for some assistance.]