

Statistical Mechanics Assignment 6

Due: March 13, 11:00 a.m.

Marks: 19

In this assignment, you will study a lattice protein using the techniques described in the notes. In this case, a 1001 protein will be assumed to occupy a hexagonal lattice (reverse). (Additional hexagonal graph paper is available on the course web site.)

1. Draw all the structures of the lattice protein and calculate their energies. Don't forget that the two ends of the protein are distinguishable. Is the ground state unique? [7 marks]
2. Create a table of energy levels and degeneracies for the set of lattice proteins identified in question 1. [1 mark]
3. Plot a denaturation curve for $\Delta\epsilon_m = 5000$ J/mol. Discuss the differences (if any) between your curve and the one calculated in the notes for the square lattice. [5 marks]
4. Plot the heat capacity as a function of temperature. Again, compare your curve to the corresponding polymer on a square lattice. [6 marks]