Physics 410 - 2003

Thermal Physics

Problem Set 6

1. Evaluate the partition function and the free energy of an ideal gas from the classical expression for the partition function (4 pt)

2. Calculate the average kinetic energy of an atom $\langle p^2/2M \rangle$ for a classical ideal gas. (3 pt) Do the same for a classical nonideal gas, that is for the case where the Hamiltonian function has not only the kinetic energy, but also the potential energy of interaction between particles (4 pt)

3. Chapter 4, p. 110, problem 1 (4 pt)

4. Chapter 4, p. 111, problem 6 (5 pt)

You need to have 20 points (no extra credit points)

The problems are from Kittel & Kroemer, *Thermal Physics*, 2nd edition, (Freeman, NY 1980).