KFUPM
Department of Physics
Phys530

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Homework #4

Due on Sunday, Nov. 31, 2006

Problem 1

Problem 3.34 from your textbook.

Problem 2

Problem 3.35 from your textbook.

Problem 3

a- Problem 4.3 from your textbook.

b- Check your approximation in (ii) and (iii), by plotting the "exact" and approximated p(N,V) as a function of N. Use the following parameters: `

- Case (ii), use p = 0.25; and $N^{(0)} = 100$.
- Case (iii), use p = 0.025; and $N^{(0)} = 1000$.

Comment on your plots.

Problem 4

Consider non-interacting particles of mass m confined to a large container. Some of these particles are absorbed on the surface of the container such that they are free only to move in a two-dimensional space parallel to the surface of the container. Suppose the surface binding energy per molecules is $\varepsilon^{(2)}$, show that, at equilibrium, the number of particles absorbed on the surface per unit area, n_s, is given by

$$n^{(2)} = \frac{p}{kT}\left(\frac{h^2}{2\pi mkT}\right)^{1/2} e^{\varepsilon^{(2)}/kT}.$$

Here p and T are the pressure and the temperature of the container, respectively.

Problem 5

Problem 4.10 from your textbook.