Physics 410 -- Spring 2001

Homework #6, due Wednesday, February 28

1. [2] Kittel & Kroemer, Chapter 5, problem 6. The book walks you through this one.

2. [4] Kittel & Kroemer, Chapter 5, problem 8. Hint: For part (a), $\mathcal{Z}$ has only 2 terms in the sum, corresponding to the absorption site vacant or occupied. You want to find the value of ε_A so that $\langle N \rangle = 0.9$. For part (b), $\mathcal{Z}$ has 3 terms. Don't confuse N_{O_2} with N_{CO}.

3. [3] Kittel & Kroemer, Chapter 6, problem 3.
Is your answer to part (b) simply related to the Fermi-Dirac distribution function?

4. [4] Kittel & Kroemer, Chapter 6, problem 12. Start from scratch! You can either use the hard-wall boundary conditions as is done in the book, or you can use periodic boundary conditions as I have done in class. Do the integral using 2D polar coordinates. (In the 2D case, you can actually do the integral yourself instead of looking it up as you did for the 1D and 3D cases.) Define a 2D quantum concentration along the way.

5. [2] Kittel & Kroemer, Chapter 5, problem 10. The book walks you through this one too.