PHYS 328
HOMEWORK #11

Due : Tuesday, 4 Dec. 2012

1. Verify that the chemical potential used in the hemoglogibin example on p. 259 of the text is in fact approximately - 0.6 eV. You will need to review the results of section 6.2 to calculate the value of Z_{int}. State expliclitly all values/approximations you are using.

2. In eq. 7.10 in the text, identify all terms that have a temperature dependence and then determine the temperature dependence of the chemical potential. Does this dependence make sense given what you know about chemical potential? Explain your reasoning.

3. Text problem 7.8

4. Text problem 7.9

5. Text problem 7.11

6. Text problem 7.13

7. Write a short Mathematica program to verify the plot in Fig. 7.6 of the text. Assume that μ is constant (even though it will vary with temp); choose representative values for μ as you let ϵ vary from 0 to values greater than μ. Plot all three graphs (for high, low, and intermediate values of T) on one set of axes. Submit your output and your program with your homework.

You must use Mathematica for problem 7, and may use it to help with any calculations throughout the assignment. If you use Mathematica, please submit your output with your homework.