

Homework #5 Feb 5, 2016*

Problems (HH= Hook & Hall)

#1 Calculate the density of states of electrons in 1 dimension, and find the expressions for the Fermi momentum and Fermi energy.

#2 Find the Length of a box in 1 dimensions containing 10^{23} electrons, so that the Fermi temperature is 10000K.

#3 In the above problem, calculate the fraction of electrons excited to states above the Fermi energy, upon raising the temperature from 0 temperature to 300 K, by integrating the density of states times the Fermi function- assuming that the chemical potential is unchanged. Verify that it is of the $O(T/T_F)$.

*(Given ahead of time so that you can be better prepared)