

171.304
Quantum Mechanics II.

PROBLEM SET # 9
April 13, 2009
(due 04/22/09)

1. Show that the average energy per particle for an ensemble of classical particles at temperature T is $\langle \mathcal{E} \rangle = \frac{3}{2}k_B T$.
2. For N electrons in a box of volume V at $T = 0$, show that the Fermi energy is given by

$$\epsilon_F = \frac{\hbar^2}{2m} (3\rho\pi^2)^{2/3},$$

where $\rho = N/V$ is the number density.

For the next two problems, read first 5.4.5 (Griffiths, p243)

3. 5.30 (Griffiths)
4. 5.31 (Griffiths)