Department of Physics, University of Maryland, College Park, MD 20742-4111

Physics 404   **HOMEWORK ASSIGNMENT #9**   **Fall 2013**

Due date: Thursday, Nov. 21   **Deadline:** Tuesday, ~~Nov. 26~~ → **Dec. 3**

1. (7) 7.26 Liquid ^{3}He as a degenerate Fermi gas.

2. (10) 7.28 a,b,c,e D=2 Fermi gas. The answer for part d is $\mu = \ln\left[\exp(\varepsilon_F/k_B T) - 1\right]$

3. (8) 7.33a,b Semiconductors: gaps, chemical potential, holes, etc.

   In 7.33 b (and in 7.34 b,c), use $\int_0^\infty \sqrt{x}\, e^{-x} dx = \sqrt{\pi}\,/\,2$

   While 7.34 a-d is NOT assigned, take a look at it; solutions to it will be provided.

4. (10) Thermodynamics of a photon gas. For ease of writing, you are welcome to use *a* as given after eqn. (7.88)

   a) 7.45, first sentence only. To use the formula, you first need to find U(V,S,N) from eqns. (7.86) and (7.89).

   b) 7.46 a, b, c

5. (5) 7.54 a Using Stefan's law.