Physics 3180 (Thermal Physics)
spring 2010

Problem Set 9

(due Friday, April 2)

1. Problem 7.8, page 265.
2. Problem 7.9, page 265.
3. Problem 7.10, page 265. Remember to distinguish single-particle states from system states. For example, to describe the ground state of the system, you need to specify the single-particle states of all five particles.
4. Problem 7.11, page 269.
5. Problem 7.13, parts (a) and (c), page 269.
6. Problem 7.18, page 271. I suggest abbreviating $x = (\epsilon - \mu)/kT$, as on page 267.
7. Problem 7.19, page 276.
8. Problem 7.26, pages 278–279. For part (c), you need to know that a ^{3}He nucleus has two possible spin orientations. The entropy of the solid is simply the entropy associated with these spin orientations. At *very* low temperatures the spins will align themselves into an ordered state, but this doesn't happen until far below the temperature range of interest in this problem.
9. Problem 7.28, page 282. This problem gives you a chance to review all of the concepts of this section, considering what changes and what doesn't for a two-dimensional system. Even though we live in a three-dimensional world, the results of this problem have important applications to the properties of surfaces and other materials (natural and fabricated) that conduct electricity more easily along two directions than along the third.
10. Problem 7.31, page 285. Although no series expansion is needed in the two-dimensional case, you'll still need to use some of the other tricks used on page 283.

Textbook Comments

Problem Set 9

With respect to the portion of your textbook that was covered by this problem set, including the problems themselves ...

Describe at least one thing that you liked about the book. Please be as specific as you can.

Describe at least one thing that you disliked about the book, or one way in which the book could be improved. Please be as specific as you can.