Physics 410 -- Spring 2018

Homework #10, due Friday, April 20

1. [3] Kittel & Kroemer, Chapter 9, problem 1.

2. [3] Kittel & Kroemer, Chapter 9, problem 2.
Notice the curious result. There are more ionized hydrogen atoms than there are atoms in the first excited state. You may find this counterintuitive, since it takes more energy to ionize an atom than to excite it. But you can see from the way you did this problem that the two calculations are completely different. In one case you used the theory of chemical reactions, in the other you just used the Boltzmann factor. The difference is that ionizing a hydrogen atom involves a large increase in the entropy of the system.

3. [3] Kittel & Kroemer, Chapter 10, problem 2.
This problem is mostly about units. If you get the units right, the rest is easy.

4. [3] Kittel & Kroemer, Chapter 10, problem 3.

5. [3] Kittel & Kroemer, Chapter 10, problem 5.