PHY410 Homework Set 9

1. [5 pts] Kittel-Kroemer, problem 7-12.

2. [5 pts] In the *Physics Today* article by Collins, August, 1995, vol. 48, no. 8, p. 17, it is stated that a Bose-Einstein condensate of about 2000 ^{87}Rb atoms forms at a temperature of 170×10^{-9} K. Use the theory of the condensate from the textbook to estimate the concentration of Rubidium atoms in the sample. What is the mass density? Assuming a sample in the form of a sphere, what is the radius?

3. [5 pts] Kittel-Kroemer, problem 8-2. The situation here is of a heat engine coupled to a refrigerator, with the work produced by the engine used to drive the refrigerator.