

Problem Set #12

Physics 436

Friday, 15 April 2022

The following problems come from Schroeder's *An Introduction to Thermal Physics*:

- Problem 6.44 on page 251 (*10 points*) \Rightarrow In this short problem, you work out a result we used in class.
- Problem 7.8 on page 265 (*10 points*) \Rightarrow This simple problem will give you some practice counting states for particles which are distinguishable, bosons, or fermions. After answering part (e), comment on how reasonable your answer is. Reread the middle paragraph on page 263 and think about how dilute the system is.
- Problem 7.9 on page 265 (*10 points*) \Rightarrow Make sure to compute the quantity $v_Q/(V/N)$ in order to justify any claim you make about using Boltzmann statistics. After finding the temperature in the second part of the problem, look up the temperature range for which nitrogen is a liquid at atmospheric pressure.
- Problem 7.19 on page 276 (*10 points*) \Rightarrow Give the Fermi energy in eV, and give the pressure and bulk modulus in atm. Look up the boiling point of copper after you have found T_F .
- Problem 7.20 on page 276 (*10 points*) \Rightarrow This short problem has an interesting answer. In addition to calculating T_F , find v_Q and think about equation (7.19) on page 264.

Due date: **Friday, 29 April 2022**