

Exercises in Statistical Mechanics

Based on course by Doron Cohen, has to be proofed
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This exercises pool is intended for a graduate course in “statistical mechanics”. Some of the problems are original, while other were assembled from various undocumented sources. In particular some problems originate from exams that were written by B. Horovitz (BGU), S. Fishman (Technion), and D. Cohen (BGU).

==== [Exercise 3010] Heat capacity of ideal Bose gas

N bosons with spin 1 and mass m are in a tank with volume V . The gas is in thermic equilibrium in temperature T . Write explicit expression using N, m, V, T for T_c , and also explicit expressions for the chemical potential, the energy and the pressure in the boundaries $T_c \ll T, T < T_c$. Get an explicit expression for C_v in the temperatures boundaries $0 \leq T \leq T_c$ and complete the missing details in the graph.

$$C_v(T = T_c) \geq = ?$$

$$C_v(T_c \ll T) = ?$$

