

Physics 831 Practice Quiz #1 - Friday, Dec. 1

YOUR NAME: _____

1. Consider two deuterons (which are bosons with spin 1, $m = -1, 0, 1$). They occupy two single-particle levels with energies, 0 and ϵ .
 - (a) What is the probability that the system is at the lowest possible total energy as a function of the temperature T ?
 - (b) What is the average energy when $T = 0$?
 - (c) What is the average energy when $T = \infty$?

2. Beginning with the fundamental relation,

$$TdS = dE + PdV - \mu dN,$$

derive the relation,

$$\left. \frac{\partial V}{\partial E} \right|_{P/\mu, S} = \frac{1}{\mu^2} \left. \frac{\partial \mu}{\partial (P/\mu)} \right|_{E, S}.$$