Clicker/Poll Question

Assume a system has two energy levels, where one particle at most can exist at either energy level (indistinguishable / particles of the same type). How many terms will appear in the grand partition function?

A. 1
B. 2
C. 4
D. 7
E. ???

Clicker/Poll Question

Assume a system has two energy levels: 0eV and 1eV, where one particle at most can exist at either energy level. If the chemical potential is -0.5eV, what is the most likely state of the system?

A. Zero particles at either energy level
B. One particle at the lower energy level
C. Both energy levels filled (one particle each)
D. There is more than one state with the highest probability
E. ???

Clicker/Poll Question

In finding μ_{CO}, the textbook says "If it is 100 times less abundant, then its chemical potential is lower by roughly $kT \ln 100 = 0.12$ eV." Why does the textbook say "roughly"? There are *two* answers (the effects partially cancel each other out).

A. The statement assumes that the masses of CO and O_2 are the same.
B. The statement assumes that the bond energies of either molecule to the heme site are the same.
C. The whole setup assumes one heme site (not realistic).
D. The statement assumes that Z_{int} for CO and O_2 are the same.
E. The author is lazy and is just guessing.

Clicker/Poll Question

Suppose we have three indistinguishable particles and four different spatial wave functions (“orbitals”) to put them in. How many different states exist?

A. 4 if fermions, 15 if bosons
B. 4 if fermions, 20 if bosons
C. 3 if fermions, 12 if bosons
D. 3 if fermions, 18 if bosons
E. ???

Clicker/Poll Question

Suppose we have a bosonic system. What is the expected number of bosons that will be found at energy level $E = 0$, assuming the chemical potential is $\mu = -15kT$?

A. Much less than 1 boson.
B. Between 1 and 1000 bosons.
C. Much greater than 1000 bosons
D. ???