SHIVAJI COLLEGE, UNIVERSITY OF DELHI

DEPARTMENT OF PHYSICS

INTERNAL TEST (Academic 2023-24)

Name of the Course : B.Sc Semester: VI

Name of the Paper : STATISTICAL MECHANICS Faculty Name : PARTH KASANA

Duration : 1 HOURS Maximum Marks: 10

Date of Test : 03/05/2024

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Questions:

1. A system consists of three independent particles(distinguishable) localized in space. Each particle has two states of energy 0 and Ɛ. When the system is in thermal equilibrium with a heat bath at temperature T, calculate its partition function.
2. Find out the average energy of a linear harmonic oscillator in thermal equilibrium with a heat bath at temperature T using partition function.
3. Consider two containers of volume V each. Each of them contains N atoms of same classical monoatomic gas and they are separated by a partition. Both gases are in thermal equilibrium with a heat bath at temperature T. show that after removal the partition the entropy of the gas is increases.

   Use partition fun of monoatomic gas as $Z = \left[\frac{V}{h^3}(2\pi mKT)^{\frac{3}{2}}\right]^N$
4. Obtain the expression for the thermodynamic probability of classical particle system and hence deduce Maxwell distribution function.

Faculty Signature: