MANAV RACHNA vidyanatariksha

MANAV RACHNA UNIVERSITY
(FORMERLY MANAV RACHNA COLLEGE OF ENGINEERING
NAAC ACCREDITED 'A' GRADE INSTITUTION)
Declared as State Private University under section 2f of the UGC act, 1956

DEPARTMENT OF PHYSICS.

"T3 Examination, May 2018"

Semester: II
Subject: Statistical Mechanics
Branch: M.Sc (Physics)
Course Type: Core
Time: 3 Hours
Max.Marks: 100

Date of Exam:17/05/2018
Subject Code: PHH509
Session: I
Course Nature: Hard
Program: M.Sc (Physics)
Signature: HOD/Associate HOD:

Note: Attempt any two questions from each part.

PART A (10*2=20)

Q1. Derive an expression for the fluctuations of mean number of particles in grand canonical ensembles.

Q2. For an assembly of an ideal gas, get the expression for entropy in terms of partition function.

Q3. Resolve Gibbs paradox.

PART B (20*2=40)

Q4. With the help of virial theorem, prove the For Bose-Einstein existence of dark matter in the spiral galaxy.

Q5. For Bose-Einstein gas, derive the relation for total energy

Q6. Using Ising model, derive a relation for partition function for a two dimensional square lattice.

PART C (20*2=40)

Q.7. Derive a relation for particle velocity in Brownian motion within the framework of Langevin theory.

Q.8. Deduce a Master Equation that govern the manner in which and the rate at which a given distribution of particles approaches a state of thermal equilibrium.

Q.9. With the help of Landau's phenomenological theory get the relations for specific heats.