U.G. 5th Semester Examination – 2024
PHYSICS
[HONOURS]
Course Code : PHY-H-CC-P-12
(Statistical Mechanics)
[New Syllabus]
[PRACTICAL]

Full Marks : 20   Time : 2 Hours

The figures in the right-hand margin indicate marks.

Answer any **two** of the following: 10×2=20

Use any of the following programming languages C / C++/ Scilab / MATLAB / Python /Fortran for solving the problems.

1. Write a program to Plot Planck's law for Black Body radiation and compare it with Wein's Law and Rayleigh-Jeans Law at high temperature (room temperature) and low temperature.

2. Write a program to plot Specific Heat of Solids by comparing (a) Dulong-Petit law, (b) Einstein distribution function, (c) Debye distribution function for high temperature (room temperature) and low temperature and compare them for these two cases.

3. Write a program to plot Maxwell-Boltzmann distribution, Fermi-Dirac distribution and Bose-Einstein distribution functions versus temperature.

4. Write a program to plot the occupation number distribution for a Bose-Einstein gas as a function of energy for different temperatures. Discuss the conditions for Bose-Einstein condensation.

5. Write a program to calculate the partition Function for a system with four discrete energy levels $(0, 1\times10^{21}, 2\times10^{21}, 3\times10^{21}$ Jouls). Then use it to derive: (a) Average energy, (b) Entropy, and (e) Heat capacity.

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