Dep. of Physics Shivaji College

B.Sc(H) - V

Paper: Statistical Physics

Assignment No. 1

Due Date of Submission 19/04/2024

Que: 1. Consider a paramagnetic solid consisting of N particles each having a magnetic moment μ, that can either be parallel or antiparallel to to an external magnetic field B.

(i) find total internal energy and the entropy of the system.

(ii) Explain how it is possible for such a system to attain negative temprature.

2. Explain Planck's law of Black Body radiation. Discuss its limiting case for large and small wavelengths.

3. State and prove principal of equipartition of energy.

4. A body at 1600k emits maximum energy at a wavelength 20,000 Å. If the sun emits maximum energy at wavelengths 5500 Å. What would be temperature of the sun?

5. Given a System of 5 weakly interacting distinguishable particles which can occupy any of the three energy level of energy 0, ε and 2ε. If the total energy of the system be 5ε (a) Write all possible macrostate and number of Corresponding microstates.

(b) Find entropy of this system.