

CSIR NET-JRF, GATE, IIT-JAM, JEST, TIFR and GRE for Physics H.N. 28 A/1, Jia Sarai, Near IIT-Delhi, Hauz Khas, New Delhi-110016 Contact: +91-89207-59559, 8076563184

Website: <a href="mailto:www.pravegaa.com">www.pravegaa.com</a> | Email: <a href="mailto:pravegaaeducation@gmail.com">pravegaaeducation@gmail.com</a>

## Chapter 8 Canonical Ensemble (E,V,N)

## 1. Why we need Canonical Ensemble approach when already we have Microcanonical ensemble in place?

 ${f T}$ he requirement for the canonical systems is twofold:

- (a) Using the asymptotic expressions of  $\Omega(E)$  (Density of states) for microcanonical ensemble, complete thermodynamics of the system could be derived in a straight forward manner. However, for most physical systems, the *mathematical* problem of determining  $\Omega(E)$  is quite difficult. So, an alternative approach within the framework of the ensemble theory is unavoidable.
- (b) Practically, it is difficult to measure or keep energy constant. But the temperature T can be kept constant using a reservoir (large heat capacity) in contact with the system.

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