ENSEMBLES

A system is defined as the collection of a no. of particles. An ensemble is defined as a collection of a large no. of macroscopically identical but essentially independent systems.

These may be of many types but most commonly used are the following

(1) Micro-Canonical Ensemble.
(2) Canonical ensemble
(3) Grand-Canonical ensembles

These are defined as below:-

(1) Micro Canonical Ensemble : It is the collection of a large no. of independent system, having the same energy (E) same volume (V) and the same no. of identical particles (N) There is no interaction between the particles.

(2) Canonical Ensemble: It is the assembly of a large no. of systems having the same temp. (T), same volume (V) and same no. of identical particles (N). Heat can be exchanged between the system which therefore will attain a common temperature.

(3) Grand-Canonical Ensemble: It is collection of large no. of systems having same temp (T) same volume (V) and same chemical potential (μ).

Chemical potential is the ratio of Gibbs function (G) of the system to the no. of particles it contains.

In this assembly exchange of heat as well as of particles between the system

can take place so that the systems arrive at a common temperature and chemical potential.