06/01/21 Dr Sanjeet Kumar || M.PHY CC-8 Statistical Mechanics.
HOD Physics HDSGHSS

The Probability of a distribution:

Consider a large box divided into k cells of areas $a_1, a_2, a_3, \ldots, a_k$. Let us throw N identical (but distinguishable) balls into the box in a completely random manner, so that no part of the box is favoured. The no. of balls falling in each cell, and then repeat the expt. a large number of times. A particular distribution of balls among the cells occurs more than any other. This is known as the most probable distribution. A large cell is more likely to be hit than a small cell.

The probability P that the balls be distributed in a certain way among the cells depends upon two factors:

(i) The a priori probability G_i of the distribution, which is based upon the properties of each cell, and

(ii) the thermodynamic probability W of the distribution, which is the number of different sequences in which the balls may be distributed among the cells without changing the number in each cell.