1 .Define labelled tree. Explain Cayley's formula with suitable example.

- A labeled tree is a tree in which each vertex is assigned a unique label or identifier. The labels distinguish the vertices from one another. In other words, the structure of the tree is considered along with the specific labels assigned to each vertex.

- Cayley's formula provides a way to calculate the number of labeled trees that can be formed with a given number of vertices. The formula is as follows:

$$T_n = n^{n-2}$$

Here, T_n represents the number of labeled trees with n vertices. The formula shows that the number of labeled trees is equal to n^{n-2}, where n is the number of vertices.

Let's illustrate Cayley's formula with an example for a tree with 4 vertices ($n = 4$):

$$T_4 = 4^{4-2} = 4^2 = 16$$

- So, there are 16 labeled trees with 4 vertices. Note that Cayley's formula provides a general method for counting labeled trees and is applicable to trees of any size.