

Step-1

Let G be a complete graph with 6 nodes.

A graph consists of a set of vertices or nodes and a set of edges that connect them. Between any two nodes there is an edge.

Step-2

The number of sections of two nodes from 6 nodes is,

$$\begin{aligned} {}^6C_2 &= \frac{6!}{4!2!} \\ &= \frac{6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}{(4 \cdot 3 \cdot 2 \cdot 1)(2 \cdot 1)} \\ &= 15 \end{aligned}$$

Therefore, a complete graph with 6 nodes has 15 edges.

Step-3

We know that a spanning tree has $n-1$ edges if the graph is connected.

If the spanning tree containing six nodes then it has $6-1=5$ edges.

Therefore, a spanning tree connecting all six nodes has 5 edges and there are $n^{n-2} = 6^4$ spanning trees.