

Chapter 07

PERMUTATIONS AND COMBINATIONS

THEOREM-1:

The number of permutations of n -different objects taken 'r' at a time, where $0 < r \leq n$ and the objects do not repeat is $n(n-1)(n-2)\dots\dots(n-r+1)$ which is equivalent to ${}^n P_r$.

$$\text{So, } n(n-1)(n-2)\dots\dots(n-r+1) = {}^n P_r = \frac{n!}{(n-r)!}.$$

NOTE:

1. ${}^3 P_3$ means arrangement of three different objects among three places.
2. ${}^4 P_3$ means arrangement of four different objects among three places.
3. ${}^n P_n$ means arrangement of 'n' different objects among $n -$ places.

$$4. \quad {}^3 P_3 = \frac{3!}{(3-3)!} = \frac{3!}{0!} = \frac{3!}{1} = 1 \times 2 \times 3 = 6.$$

$$5. \quad {}^4 P_3 = \frac{4!}{(4-3)!} = \frac{4!}{1!} = 1 \times 2 \times 3 \times 4 = 24.$$

$$6. \quad {}^n P_n = \frac{n!}{(n-n)!} = \frac{n!}{0!} = \frac{n!}{1} = n!.$$