Permutation and Combination

Important Tips & Tricks:

Factorial

The continued product of first 'n' natural numbers is called the 'n factorial' and is denoted by

n!

i.e $n! = 1 \times 2 \times 3 \times 4 \times \ldots\ldots\ldots \times (n-1) \times n$

Ex : $4! = 1 \times 2 \times 3 \times 4$

1.nPr = n!/(n-r)!

2.nPn = n!

3.nP1 = n

1.nCr = n!/(r! (n-r)!)

2.nC1 = n

3.nC0 = 1 = nCn

4.nCr = nCn-r

5.nCr = nPr/r!

The number of all permutations of n distinct items or objects taken 'r' at a time is n(n-1)(n-2)...........(n-(r-1)) = $^{n}P_{r}$

The number of all permutations of n distinct objects taken all at a time is n!

- The number of ways of selecting r items or objects from a group of n distinct items or objects is $^nC_r = \frac{n!}{(n-r)!r!}$

· If there are n subjects of which p_1 are alike of one kind; p_2 are alike of another kind; p_3 are alike of third kind and so on and p_r are alike of r^{th} kind, such that $(p_1 + p_2 + \dots p_r) = n$.

Then, number of permutations of these n objects is = $\frac{n!}{(p_1!).(p_2)!.....(p_r!)}$

· The number of all combinations of n things, taken r at a time is:

= $^nC_r = \frac{n!}{(r!)(n-r!)} = \frac{n(n-1)(n-2)\ \dots\ \text{to } r \text{ factors}}{r!}$.