UNIT 3: PERMUTATION AND COMBINATION

FORMULA SHEET

- *Fundamental principle of counting*: If an event can occur in m different ways, following which another event can occur in n different ways, then the total number of occurrence of the events in the given order is $m \times n$.

- The number of permutations of n different things taken r at a time, where repetition is not allowed, is denoted by ^nP_r and is given by $^nP_r = \dfrac{n!}{(n-r)!}$ where $0 \le r \le n$.

- $n! = 1 \times 2 \times 3 \times \cdots \times n$

- $n! = n \times (n-1)!$

- The number of permutations of n different things, taken r at a time, where repetition is allowed, is n^r.

- The number of permutations of n objects taken all at a time, where p_1 objects are of first kind, p_2 objects are of the second kind, ..., p_k objects are of the kth kind and rest, if any, are all different is $\dfrac{n!}{p_1! \, p_2! \, p_3! \cdots p_k!}$

- The number of combinations of n different things taken r at a time, denoted by ^nC_r, is given by $^nC_r = \dfrac{n!}{r!(n-r)!}$, $0 \le r \le n$.

- $^nC_r + {}^nC_{r-1} = {}^{n+1}C_r$