CHAPTER – 15
PROBABILITY

15.1 INTRODUCTION

EXPERIMENT:

The word experiment means an operation, which can produce well defined outcomes. The are two types of experiment:

(i) Deterministic experiment   (ii) Probabilistic or Random experiment

(i) **Deterministic Experiment:** Those experiment which when repeated under identical conditions, produced the same results or outcome are known as deterministic experiment. For example, Physics or Chemistry experiments performed under identical conditions.

(ii) Probabilistic or Random Experiment:- In an experiment, when repeated under identical conditions donot produce the same outcomes every time. For example, in tossing a coin, one is not sure that if a head or tail will be obtained. So it is a random experiment.

Sample space: The set of all possible out comes of a random experiment is called a sample space associated with it and is generally denoted by S. For example, When a dice is tossed then
S = {1, 2, 3, 4, 5, 6}.

Event: A subset of sample space associated with a random experiment is called an event. For example, In tossing a dice getting an even no is an event.

Favorable Event: Let S be a sample space associated with a random experiment and A be event associated with the random experiment. The elementary events belonging to A are know as favorable events to the event A. For example, in throwing a pair of dive, A is defined by "Getting 8 as the sum". Then following elementary events are as out comes: (2, 6), (3, 5), (4, 4) (5, 3) (6, 2). So, there are 5 elementary events favorable to event A.

PROBABILITY:

If there are n elementary events associated with a random experiment and m of them are favorable to an event A, then the probability of happening or occurrence of event A is denoted by P(A)

Thus, $P(A) = \dfrac{\text{Total number of favourable outcomes}}{\text{Total number of possible outcomes}} = \dfrac{m}{n}$

And $0 \leq P(A) \leq 1$

If,   P(A) = 0, then A is called impossible event

If,   P(A) = 1, then A is called sure event

        $P(A) + P(\overline{A}) = 1$

Where   P(A) = probability of occurrence of A.

       $P(\overline{A})$ = probability of non - occurrence of A.