CHAPTER 15 : Probability

Fundamentals :

- **Experiment :** An operation which can produce some well defined outcomes.
- **Sample Space :** It is the total number of possible outcomes of a random experiment.
- **Event :** Any subset of a sample space is called an event.
- **Elementary Event :** Each outcome of any random experiment.
- **Sure Event (Certain event) :** An event which always occurs whenever the random experiment is performed.
- **Impossible Event :** An event which never occurs whenever the random experiment is performed.
- **Favourable Event :** The cases which ensure the occurrence of an event.

Probability

Probability $P(E)$ of an event E is defined as :

$$P(E) = \frac{\text{Number of favourable outcomes}}{\text{Total number of outcomes}}$$

In short,

$$P(E) = \frac{\text{Numbers of elements in favourable event}}{\text{Number of elements in the sample space}}$$

Complementary Events

An event associated with a random experiment denoted by (not E) which happens only when E does not happen is called the complement of event E.

$$P(\text{not } E) = 1 - P(E)$$

Tips :

1. Sum of the probabilities of all the elementary events of an experiment is 1.

$$P(E_1) + P(E_2) + P(E_3) + \dots\dots\dots\dots + P(E_n) = 1$$

2. Probability of Sure Event is 1.

3. Probability of an Impossible Event is 0.

4. Probability of any event lies between 0 and 1 (including 0 and 1) *i.e.* $0 \leq P(E) \leq 1$.

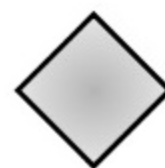5. 52 cards are divided into 4 suits of 13 cards each. The suits are.

SPADE

HEARTS

DIAMONDS

CLUBS

6. Out of 52 cards, 26 are red in colour and 26 are black in colour

7. In each suit, there is an Ace, a King, a Queen, a Jack, 10, 9, 8, 7, 6, 5, 4, 3 and 2.

8. King, Queen and Jack are called **Face cards.**