

CHAPTER 15 : Probability

● Fundamentals :

1. **Experiment** : An operation which can produce some well defined outcomes.
2. **Sample Space** : It is the total number of possible outcomes of a random experiment.
3. **Event** : Any subset of sample space is called event.
4. **Elementary Event** : Each outcome of any random experiment.
5. **Sure Event (Certain event)** : An event which always occurs whenever the random experiment is performed.
6. **Impossible Event** : An event which never occurs whenever the random experiment is performed.
7. **Favourable Event** : The cases which ensure the occurrence of an event.
8. **Probability** : Probability $P(E)$ of an event E is defined as :

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

$$P(E) = \frac{\text{Favourable Event}}{\text{Sample Space}}$$

9. **Complement Events** : An event associated with a random experiment denoted by $P(\text{not-}E)$ which happens only when E does not happen is called the complement of event E .

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

● Tips :

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

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

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 is each. The suits are :

SPADE		HEARTS	
DIAMONDS		CLUBS	

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