Probability

Important Concepts

1. Probability is a concept which numerically measures a degree of uncertainty and therefore of certainty of the occurrence of events.

2. An action which results in one of several outcomes is called an experiment.

3. An experiment is called random if it has more than one possible outcome and cannot be predicted or determined in advance. i.e. Tossing a coin, Rolling a die.

4. The set of possible outcomes or the totality of all possible outcomes of an experiment constitutes the sample space.

5. An outcome of a random experiment is called an event.

6. The outcomes in an experiment which are favourable to an event which we are interested are called favourable out comes and all other outcomes are known as unfavourable outcomes.

7. The sum of the favourable and unfavourable outcomes is equal to the exhaustive number of events in experiment.

8. If there is no reason for any one outcome to occur is preference to any other outcome then we can say that the outcomes are equally likely.

9. 4 aces, 4 queens, 4 kings, and 4 jacks are called face cards.

Measurement of Probability

1. Probability of an Event = $\frac{\text{number of outcomes favourable to event}}{\text{number of all possible outcomes of the experiment}}$

   $\Rightarrow P(E) = \frac{n(E)}{n(S)}$

2. When the probability is based on an actual experiment, it is called an **empirical probability**

3. When a repetition of an experiment can be avoided for calculating the exact probability, the probability so obtained is called classical or theoretical probability.

4. In theoretical probability, the outcomes are equally likely.

5. For any event E, the event of non-occurrence of E is called its complementary event and is denoted by $\bar{E}$.

6. E and $\bar{E}$ are called complementary events.

7. The sum of probabilities of an event and its complementary event is always 1.

8. Impossible event: If the probability of an event = 0, the event is called an impossible event.

9. Sure event: If the probability of an event = 1, the event is called a certain event or a sure event.

10. Probability of any event can never be less than 0 or more than 1.

Important concepts

1. Tossing of two coins simultaneously or tossing one coin twice, gives the same outcomes.

2. In a coins is tossed n times or n coins are tossed simultaneously, the number of possible outcomes = 2^n.

3. Rolling a dice two times gives the same result as rolling two dice simultaneously.

4. If a dice is rolled n times or n-dice are rolled simultaneously, the number or outcomes = 6^n.