e-Edge Education Centre

EEE- CONCEPT CAPSULE (PROBABILITY)

Important terms

(i) **Probability :** Probability is a concept which numerically measures the degree of certainty of the occurrence of events.

(ii) **Experiment :** An operation which can produce some well-defined outcomes is called an experiment.

(iii) **Event :** The collection of all or some of the possible outcomes is called an event.

(iv) **Equally likely events :** A given number of events are said to be equally likely if none of them is expected to occur in preference to the others.

Some special sample spaces

(i) A die is thrown once

$S = \{1,2,3,4,5,6\}; n(S) = 6$

(ii) Two dice are thrown together

or

A die is thrown twice

$$S = \begin{Bmatrix} (1,1),(1,2),(1,3),(1,4),(1,5),(1,6) \\ (2,1),(2,2),(2,3),(2,4),(2,5),(2,6) \\ (3,1),(3,2),(3,3),(3,4),(3,5),(3,6) \\ (4,1),(4,2),(4,3),(4,4),(4,5),(4,6) \\ (5,1),(5,2),(5,3),(5,4),(5,5),(5,6) \\ (6,1),(6,2),(6,3),(6,4),(6,5),(6,6) \end{Bmatrix}$$

$n(S) = 6^2$

PROBABILITY

Probability of occurrence of an event

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

Complementary event : Let E be an event and (not E) be an event which occurs only when E does not occur.

The event (not E) is called the complementary event of E.

Clearly, $P(E) + P(\text{not } E) = 1$.

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

$$0 \le P(E) \le 1$$

Sum of the probabilities of all the outcomes of random experiment is 1

Some special sample spaces

(i) A coin is tossed once

$S = \{H, T\}; n(S) = 2$

(ii) A coin is tossed twice

or

Two coins are tossed simultaneously

$S = \{HH, HT, TH, TT\}; n(S) = 4 = 2^2$

(iii) A coin is tossed three times

or

Three coins are tossed simultaneously

$$S = \begin{Bmatrix} HHH, HHT, HTH, THH \\ TTT, TTH, THT, HTT \end{Bmatrix}; n(S) = 8 = 2^3$$