Random Experiment :- An experiment is said to be random experiment if it satisfies the given 3 conditions

(i) All the outcomes are known in advance

(ii) In a particular trial, the actual outcomes is not known

(iii) We can repeat the experiment as many times as we wish.

Ex: Tossing a coin

(i) {H, T}

(ii) the actual outcomes is not known in a particular trial

(iii) We can repeat the tossing of a coin as many times as we wish.

→ All the conditions are satisfied so this is random experiment (R.E).

Ex: Rolling a dice

Sample Space ÷

No. 079

Sample space of random experiment is defined as the collection of all possible outcomes. It is denoted by Ω (Omega) or S.

(Ex): Random Experiment: Tossing a coin twice

$S = \{HH, HT, TH, TT\}$

Event ÷ A subset of sample space is known as event.

(Ex) R.E ÷ Tossing a coin

$S = \{H, T\}$

Then events are ϕ, S, $\{H\}$, $\{T\}$.

Note: ϕ is known as impossible events.

S is known as sure event.

Classical Defination of Probability ÷ Let S be the ~~sample~~ sample space associated with some R.E. Assume that the cardinality of S is n i.e $|S| = n$ (where each n is equally likely). Let A be the event and m be the outcomes that is favourable to event A then the prob. of event A is

$$P(A) = \frac{m}{n} = \frac{\text{favourable cases}}{\text{All possible outcomes}}$$

Ex: R.E ÷ Tossing a coin twice

$S = \{HH, HT, TH, TT\}$

$A = \{HH, HT, TH\}$ → getting atleast one Head

$|A| = 3$

cardinality $|S| = 4$

then $P(A) = \frac{3}{4}$

Mutually Exclusive Events ÷ let S be the sample space and A and B be the two events associated with R.E and A and B are said to be mutually exclusive from S then A and B are said to be mutually exclusive if they cannot happen together.

Mathematically, it is defined as $A \cap B = \phi$

Ex: R.E ÷ Tossing a coin twice

$S = \{HH, HT, TH, TT\}$

A = Getting Head on both toss = $\{HH\}$

B = Getting Tail on both toss = $\{TT\}$

$A \cap B = \phi \Rightarrow$ Events A and B are mutually exclusive.

· Real life example ÷

Moving forward and Backward No.080

Mutually Exhaustive Events ÷ Let A and B are two events then they are said to be mutually exhaustive if atleast one of these events is necessarily occured. Mathematically, it is defined as $A \cup B = S$.

Ex: R.E ÷ Tossing a coin twice

$S = \{HH, HT, TH, TT\}$

A = Getting atleast one Head = $\{HH, HT, TH\}$

B = Getting atleast one Tail = $\{HT, TH, TT\}$

$A \cup B = S$ ⇒ A and B are mutually exhastive.