

Module - III

①

probability Theory :-

the word probability means chance.

In our daily life we use some words for probability.

Such as

① probably.

② possibility

③ chance etc.

These words are used for uncertainty.

Some Imp. words used in probability

① Experiment :- An experiment is an action which we do or intend to do.

i.e. Experiment is performed for getting some objectives.

②

09 Ex ① Tossing a coin.

10 ② Rolling a die.

11 ③ Trial :- The performance of an
12 experiment is called
13 trial.

14 Ex ① Tossing a coin, we get
15 $\{H, T\}$

16 ② Rolling a die, we get
17 $\{1, 2, 3, 4, 5, 6\}$
18
19

③ Random experiment :-

An experiment can be repeated under same condition, but the result can not be

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predicted in any repetition, is called random experiment.

i.e. An experiment is performed without any planning.

~~Ex~~ ① A ball is taken at random from a bag containing different colour balls.

④ Drawing a card from a well shuffled pack of card.

⑦ Honest coin :- A coin is said to be honest coin if it is made up of homogeneous material and its centre of gravity is at centre of the coin.

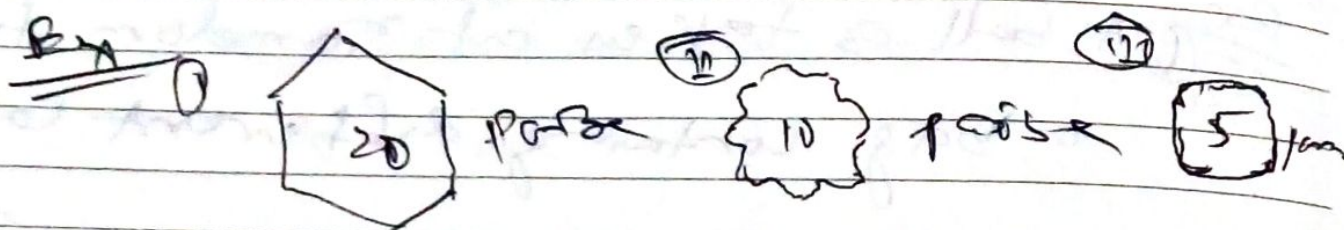
Ex 1 Rupee coin, 5 Rupee coin, 50 paise

It is also called fair coin.

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(5) Un fair coin :- A coin is said to be un fair coin if it is not honest..

It is also called biased coin.



(6) Out comes :- The results of an experiment is called out comes.

Ex ① A coin is tossed.

$\{H, T\}$ → outcomes

② Two coins are to used once

or

One coin is to used twice

⑤

the out comes are

H H

H T

T H

T T

→ out comes

$$2^2 = 4, \frac{1}{2}(4) = 2$$

$$\frac{1}{2}(2) = 1$$

③ one coin is tossed thrice.

or

three coins are tossed once.

H H H

H H T

H T H

H T T

T H H

T H T

T T H

T T T

→ out comes

$$2^3 = 8, \frac{1}{2}(8) = 4$$

$$\frac{1}{2}(4) = 2$$

$$\frac{1}{2}(2) = 1$$

④ one coin is tossed 4 times

or

4 coins are tossed once.



09

H H H H

$$2^4 = 16, \frac{1}{2}(16) = 8$$

10

H H H T

$$\frac{1}{2}(8) = 4, \frac{1}{2}(4) = 2$$

11

H H T H

$$\frac{1}{2}(2) = 1$$

12

H H T T

H T H H

H T H T

13

H T T H

14

H T T T

→ outcomes.

15

T H H H

T H H T

16

T H T H

T H T T

17

T T H H

T T H T

18

T T T H

19

T T T T

14

Ex
SUNDAY

A die is rolled once

$$\{1, 2, 3, 4, 5, 6\}$$

→ outcomes.

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one die is rolled twice.
or

Two dice are rolled once.

(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)

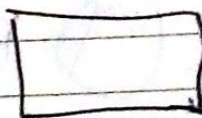
→ outcomes

⑦ Sample space :- The set of all possible outcomes of an experiment is called sample space.

It is denoted by 'S'.

Here 'S' is universal set.

represented by rectangle



09 Ex If a coin is tossed twice

10
$$S = \{HH, HT, TH, TT\}$$

11 The above are all elements of
12 Sample Space.

13 (8) Sample point / sample element :-

14
15 An element of Sample Space
16 's' is called sample element
17 or sample point.

18 Ex If $S = \{HH, HT, TH, TT\}$

19 Here (H-H) is a sample element
or
sample point.

20 (9) Event :- Any subset of a
sample space is called an event.

10 / 2018	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
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It is denoted by E .

is. $E \subseteq S$

(10) Simple event :- An event is said to be simple event if it consists of only one element of sample space.

Ex If a coin is tossed twice.

$$S = \{ (H, H), (H, T), (T, H), (T, T) \}$$

$$E_1 = \{ (H, H) \} \rightarrow \text{simple event.}$$

Ex A die is rolled once.

$$S = \{ 1, 2, 3, 4, 5, 6 \}$$

$$E_2 = \{ 6 \} \rightarrow \text{simple event}$$

OR An event is said to be simple event if it consists of one sample point or sample element.

(11) Sure event :- An event which consists of all sample points is called sure event.
It is also called Certain event.

Ex If a die is rolled once, then the event - numbers getting less than 7.

we get now

$$S = \{1, 2, 3, 4, 5, 6\}$$

Also $E = \{1, 2, 3, 4, 5, 6\} \rightarrow$ Sure event

(12) Compound event :-

An event is said to be compound event if it consists of more than one sample points or sample elements.

Ex A die is rolled once. then E_1 be the event getting even number and E_2 be the event getting odd number.

$$\therefore S = \{1, 2, 3, 4, 5, 6\}$$

$$E_1 = \{2, 4, 6\}$$

$$E_2 = \{1, 3, 5\}$$

→ Compound events

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203-072

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(13) Impossible event :-

An event is said to be impossible event if it has no sample element or sample point.

It is denoted by ϕ .

$$\phi = \{ \}$$

Ex (i) 33 days month in English Calendar

(ii) 8 days week in a month.

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(14) Mutually Exclusive event :-

Two events A and B are said to be mutually

(13)

exclusive events if they have no common elements.

i.e. $A \cap B = \emptyset$.

(15) Equally likely events :

Two events E_1 and E_2 are said to be equally likely events if the probability of happening of both are same.

Ex If a fair coin is tossed. then head and tail are equally likely.

(16) Independent event : Two events A and B are said to be independent events if probability of one does not affect the other.

i.e. $P(A \cap B) = P(A) \cdot P(B)$