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RANDOM EXPERIMENTS AND EVENTS

Trial and Event:

An experiment is called a **trial** if it results in anyone of the possible outcomes and all the possible outcomes are called **events**.

For Example:-

(i) Participation of player in the game to win a game, is a trial but winning or losing is an event.

(ii) Tossing of a fair coin is a trial and turning up head or tail are events.

Exhaustive Events:

Total possible outcomes of an experiment are called its **exhaustive events**.

For Example:-

(i) Tossing a coin has 2 exhaustive cases i.e. either head or tail may come upward.

(ii) Throwing of a die has 6 exhaustive cases because any one of six digits 1, 2, 3, 4, 5, 6 may come upward.

Favourable Events :

Those outcomes of a trial in which a given event may happen, are called **favourable cases** for that event.

For Example :-

(i) If a coin is tossed then favourable cases of getting H is 1.

(ii) If a dice is thrown then favourable case for getting 1 or 2 or 3 or 4 or 5 or 6, is 1.

Equally likely events:

Two or more events are said to be **equally likely events** if they have same number of favorable cases.

For Example:-

(i) The result of drawing a card from a well shuffled pack of cards, any card may appear in a draw, so 52 different cases are equally likely.

(ii) In tossing of a coin, getting of 'H' or 'T' are two equally likely events.

Mutually exclusive or disjoint events:

Two or more events are said to be **mutually exclusive**, if the occurrence of one prevents or precludes the occurrence of the others. In other words they cannot occur together.

For example:-

(i) In tossing of a coin, getting of 'H' or 'T' are two mutually exclusive events because then can not happen together.

(ii) In throwing of a dice, getting 1 or 2 or 3 or 4 or 5 or 6 are six mutually exclusive events.

Simple and Compound events :

If in any experiment only one event can happen at a time then it is called a **simple event**. If two or more events happen together then they constitute a **compound event.**

For Example :-

If we draw a card from a well shuffled pack of cards, then getting a queen of spade is a simple event and if two coins A and B are tossed together then getting 'H' from A and 'T' from B is a compound event.

Independent and Dependent events :

Two or more events are said to be **independent** if happening of one does not affect other events. On the other hand if happening of one event affects (partially or totally) other event, then they are said to be **dependent events.**

For Example :-

(i) If we toss two coins, then the occurrence of head on one coin does not influence the occurrence of head or tail on the other coin in any way. Hence these events are independent.

Sample Space:

The set of all possible outcomes of a trial is called its **sample space**. It is generally denoted by S and each outcome of the trial is said to be a point of sample of S.

For example :-

(i) If a dice is thrown once, then its sample space S = {1, 2, 3, 4, 5, 6}

(ii) If two coins are tossed together then its sample space S = {HT, TH, HH, TT}.

Check Your Progress

Q.1 The probability P(A) of an event is a-

(A) Real number

(B) Positive real number

(C) Non- negative real number

(D) Non- negative real number □ 1

Q.2 Winning a game by a player is-

(A) an experiment

(B) an event

(C) experiment and event both

(D) None of these

Q.3 In tossing a coin getting a head or tail is-

(A) Experiment (B) exclusive event

(C) Joint event (D) none of these

Q.4 The correct statement for any event A is-

(A) $0 \leq P(A) \leq 1$ (B) $0 = P(A) \leq 1$

(C) $P(A) = 1$ (D) $P(A) < 0$

Q.5 A coin is tossed three times. The probability that in the second toss head does not occur, is-

(A) 1 (B) 1/2

(C) 1/3 (D) 1/4

Q.6 The probability of coming up an even (odd) number in the throw of a die is-

(A) 1/6 (B) 1/2

(C) 1/3 (D) 2/3

Q.7 From a pack of playing cards three cards are drawn simultaneously. The probability that these are one king, one queen and one jack is-

(A) 64/5525 (B) 16/5525

(C) 128/5525 (D) 64/525

Q.8 The probability of getting difference of number as 5, when two dice are tossed together is-

(A) 1/9 (B) 1/18

(C) 1/12 (D) 5/36

Q.9 The probability of drawing a black king from a pack of 52 cards is-

(A) 1/13 (B) 1/26

(C) 2/13 (D) 4/13

Q.10 Three cards are drawn from a pack of 52 cards. The probability that they are of the same colour is-

(A) 4/17 (B) 22/225

(C) 3/17 (D) 2/17

Q.11 A bag contains 6 blue, 4 white and 6 red balls. Two balls are drawn at random. The probability that both the balls are red is-

(A) 1/3 (B) 1/6

(C) 1/8 (D) 2/9

Q.12 A bag contains 20 tickets numbered with 1 to 20. Three tickets are drawn. The probability that ticket number 7 is definitely included and ticket number 18 is not included is-

(A) 51/380 (B) 1/20

(C) 3/20 (D) None of these

Q.13 From a lottery of 30 tickets, marked 1, 2, 3,...., 30, four tickets are drawn. The chance that those marked 1 and 2 are among them is-

(A) 413/145 (B) 2/145

(C) 1/145 (D) 4/145

Q.14 The probability that a non leap year will have 53 Saturdays is-

(A) 1/7 (B) 2/7

(C) 6/7 (D) 5/7

Q.15 The probability that a non leap year will have 52 Fridays is-

(A) $\frac{1}{7}$ (B) $\frac{2}{7}$

(C) $\frac{5}{7}$ (D) $\frac{6}{7}$

Stretch Yourself

1. If 4 cards are drawn one by one from a pack of 52 cards, What is the probability that one will be from each suit
2. Three cards are drawn from a pack of 52 cards. What is the probability that they are of the same colour
3. There are 13 men and 2 women in a party. They are seated round a circular table. What is the probability that the two women will sit together.
4. Calculate is the probability that a leap year will have 52 Sundays.
5. A box contains 25 tickets numbered 1, 2,....25. If two tickets are drawn at random then find the probability that the product of their numbers is even.

Hint to Check your Progress

1 D 2 B 3 B 4 B 5 B 6 B 7 B 8 B 9 B 10 A
11 C 12 A 13 B 14 A 15 D