

**Chapter # 6:****Probability****1. What is meant by equally likely events?**

Ans: when each outcome of a sample space is as likely to occur as any other, the outcomes are said to be equally likely. For example, if we toss a fair coin, the head is as likely to occur as the tail.

**2. What is meant by exhaustive events?**

Ans: outcomes are said to be exhaustive if they constitute the entire sample space. For example, if we toss a coin, the possible outcomes are a head and a tail. There is no other possibility, the coin will not stand on the edge.

**3. What is meant by permutation?**

Ans: An arrangement of all or some of a set of objects in a definite order is called permutation. Suppose we have different objects marked A, B, C, and D. with two objects A and B, the arrangements AB and BA are different permutations. With three objects A, B, and C, the permutations ABC, ACB, BCA, CBA and CAB are different permutations.

**4. Give classical definition of probability.**

Ans: Classical probability is the statistical concept that measures the likelihood (probability) of something happening. In a classic sense, it means that every statistical experiment will contain elements that are equally likely to happen (equal chances of occurrence of something).

(The ratio of the number of favorable outcomes to the number of all possible outcomes is called probability.)

$$P(A) = \frac{\text{no. of favourable outcomes}}{\text{no. of possible outcomes}} = \frac{m}{n}$$

**5. Define sample space.**

Ans: The set or collection of all possible outcomes of an experiment is called the sample space. It is denoted by "S". For example, when we toss a coin the sample space will be:  $S = \{H, T\}$  and for a rolling die:  $S = \{1, 2, 3, 4, 5, 6\}$

**6. What is sample point?**

Ans: Each element of a sample space is called a sample point.

**7. Define composite event.**

Ans: If the event consists of more than one sample points, it is called a composite/compound event. For example, when two coins are tossed, the event  $A = \{HH\}$  that two heads appear is simple but the event  $B = \{HH, HT, TH\}$  that at least one head appears is a compound event.

**8. What are independent events?**

Ans: Two events A and B are said to be independent, if the occurrence of one event does not affect the occurrence of the other event.

**9. What is meant by dependent events?**

Ans: Two events A and B are said to be dependent, if the occurrence of one event affects the occurrence of other event.

**10. Define simple event.**

Ans: If an event consists of one sample points, it is called simple event.



**11. What do you mean by not-mutually exclusive events?**

Ans: Two events A and B are said to be not mutually exclusive, if they can occur together.

**12. Explain mutually exclusive events.**

Ans: Two events A and B are said to be mutually exclusive events, if they cannot occur together. Suppose we toss a coin and the head occurs, but the tail cannot. This type of events is known as mutually exclusive events.

**13. If  $P(A) = 1/3$ ,  $P(A \cup B) = 1/2$  and  $P(A \cap B) = 1/10$ , find  $P(B)$ .**

Ans: By addition law of not mutually exclusive events:

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$P(B) = 0.933 \quad \text{Ans.}$$

**14. What is the probability of getting both sixes when two fair dice are thrown simultaneously?**

Ans: Sample of two dice:

	1	2	3	4	5	6
1	(1, 1)	(1, 2)	(1, 3)	(1, 4)	(1, 5)	(1, 6)
2	(2, 1)	(2, 2)	(2, 3)	(2, 4)	(2, 5)	(2, 6)
3	(3, 1)	(3, 2)	(3, 3)	(3, 4)	(3, 5)	(3, 6)
4	(4, 1)	(4, 2)	(4, 3)	(4, 4)	(4, 5)	(4, 6)
5	(5, 1)	(5, 2)	(5, 3)	(5, 4)	(5, 5)	(5, 6)
6	(6, 1)	(6, 2)	(6, 3)	(6, 4)	(6, 5)	(6, 6)

Let A be the event of getting both sixes.

$$P(A) = 1/36 \quad \text{Ans.}$$

**15. A fair die is rolled, what is the probability of getting an odd number?**

Ans: Sample space of a rolling die:  $S = \{1, 2, 3, 4, 5, 6\}$

Let A be the event of getting odd numbers:  $A = \{1, 3, 5\}$

$$P(A) = \frac{m}{n}$$

$$P(A) = \frac{3}{6}$$

$$P(A) = 0.5$$

Ans.

**16. What is a Venn diagram?**

Ans: A simple and instructive way of representing the relationship between sets is by means of diagrams, called Venn Euler diagram or simply Venn diagram. In this diagram, the universal set U is represented by a rectangle, and subsets are represented by circles inside the rectangle.

**17. For two mutually exclusive events A and B if  $P(A) = 0.25$  and  $P(B) = 0.40$ , then find  $P(A \cup B)$ .**

Ans:  $P(A \cup B) = P(A) + P(B)$

$$P(A \cup B) = 0.65$$

Ans.



**18. Define event.**

Ans: The possible outcome of an experiment is called an event. Thus an event is a subset of the sample space. Events are usually denoted by few capital letters A, B, C....

**19. What will be the sample space if two coins are tossed?**

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

**20. A card is selected from 52 playing cards. What is probability that the card is king?**

Ans:  $P(A) = 4/52$       **Ans.**

**21. If  $P(A) = 0.5$  and  $P(B) = 0.2$ , find  $P(A \cup B)$  when 'A' and 'B' are mutually exclusive events.**

Ans:  $P(A \cup B) = P(A) + P(B)$

$P(A \cup B) = 0.70$       **Ans.**

**22. What is the range of probability?**

Ans: The range of probability is between 0 to 1.

**23. Define the term combination.**

Ans: When a selection of objects is made without paying regard to the order of selection, it is called combination." It is denoted by  ${}^n C_r$ .

$${}^n C_r = \binom{n}{r} = \frac{n!}{r!(n-r)!}$$

