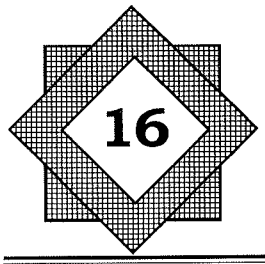

PROBABILITY

Some important definitions:-

(i) **Experiment:-** Performance that produces certain results.

(ii) **Trial:-** No. of times an experiment is repeated is known as trial.

(iii) **Random Experiment:-** Known after experiment is done, Experiment which can result in a several possible outcome.

(iv) **Sample Space:-** Set of all possible outcomes associated with random experiment.

(v) **Event:-** Any subset of sample space is known as event.

(vi) **Simple Event:-** Event having only one sample point is known as simple event.

(vii) **Compound Event (Composite Event):-**

Combination of two or more simple event is known as compound event.

(viii) **Mutually Exclusive Event:-**

When two or more events cannot occur simultaneously is known as mutually Exclusive event.

(ix) **Exhaustive Events:-**

All the outcomes of the experiment put together are called exhaustive events as no other result outside this can happen as a result of this experiment.

(x) **Equally Likely Event:-**

If any outcome of the experiment is not favoured or disfavoured compared to other outcomes they are called equally likely events.

(xi) **Complementary Event:-**

All the sample point of U other than A and is denoted by A'. Event A will not occur.

Definition of probability:-

(i) **Classical Definition (Prior Definition):-** $P(A) = \frac{\text{No.of favourable events}}{\text{Total No. of events}}$

Limitations:- (a) Total No. of outcomes finite and known.

(b) Every outcome is equally likely, mutually exclusive and exhaustive.

(ii) **Statistical Definition (Emperical Definition):-**

(a) Limiting case of classical definition.

(b) Also known as posterior definition.

$$P(A) = \lim_{n\to\infty} \frac{F_A}{n}$$

(iii) **Modern Definition (Advance and updated Definition)** Also known as Axiomatic definition.

Axioms: (a) $O \le P(A) \le 1$

(b) $P(S) = 1$

(c) A_1, A_2, A_3..... Exhaustive and exclusive then union is equal to sample space.

Two Important Theorems

1. **Addition theorem:-** For happening of either A or B.

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

Note: If A and B are mutually exclusive then $P(A \cap B) = 0$ i.e. $P(A \cup B) = P(A) + P(B)$.

2. **Multiplication theorem:-** If A and B are two independent events then the probability of simultaneous occurance is given as:- $P(A \cap B) = P(A).P(B)$.

Conditional Probability:- It is the probability of the happening of one event with an assumption that another event has already happened.

$$P(A/B) = \frac{P(A \cap B)}{P(B)}. \quad P(B/A) = \frac{P(A \cap B)}{P(A)}.$$

Law of total Probability:- If E_1, E_2..... E_n are n mutually exclusive events and A is any event associated with E_1 or E_2 or ..... E_n then.

$$P(A) = P(E_1).P(A/E_1) + P(E_2).P(A/E_2) + \ldots\ldots + P(E_n).P(A/E_n)$$

Mathematical Expectations of a Random Variable:- If x is a random variable which can takes value $x_1, x_2, \ldots\ldots x_n$ whose probabilities are $P_1, P_2, \ldots\ldots P_n$ respectively, then

(i). $E(x) = \mu = \Sigma P.x$ = Mean.

(ii). $E(x^2) = \sigma^2 = \Sigma Px^2 - \mu^2 = E[x - E(x)]^2 = E(x-\mu)^2$

Note: Variance in random variable $\Sigma P = 1$

Properties of Expected Value:-

(i) Expectation of a constant K is K. E(K) = K.

(ii) E (x + y) = E(x) + E(y)

(iii) E (kx) = k.E(x)

(iv) E (ax + b) = a E(x) + b

(v) E (ax + by) = a E(x) + b E(y)

(vi) E (x.y) = E(x). E(y)

(vii) E (x - y) = E (x) -E (y),
whenever x and y are independent.

Exercise-I

1. **When the number of cases favourable to the event A is none then P(A) is equal to[SM]**

   (a) 1 (b) 0 (c) 1 (d) none

2. **If P (A) = 7/8 then P (A^c) is equal to**

   (a) 0 (b) 1/2 (c) 7/6 (d) 1/8

3. **The probability that exactly one head appears in a single throw of two fair coins is[SM]**

   (a) 3/4 (b) 1/2 (c) 1/4 (d) none

4. **The probability that at least one head appears in a single throw of three fair coins is[SM]**

   (a) 1/8 (b) 7/8 (c) 1/3 (d) none

5. **Two unbiased coins are tossed. The probability of obtaining 'both heads' is[SM]**

   (a) 1/4 (b) 2/4 (c) 3/4 (d) none

6. **Two unbiased coins are tossed. The probability of obtaining one head and one tail is[SM]**

   (a) 1/4 (b) 2/4 (c) 3/4 (d) none

7. **Two unbiased coins are tossed. The probability of obtaining both tail is[SM]**

   (a) 2/4 (b) 3/4 (c) 1/4 (d) none

8. **Two unbiased coins are tossed. The probability of obtaining at least one head is[SM]**

   (a) 1/4 (b) 2/4 (c) 3/4 (d) none

9. **When two unbiased coins are tossed, the probability of obtaining 3 heads is[SM]**

   (a) 2/4 (b) 1/4 (c) 3/4 (d) 0

10. **When two unbiased coins are tossed, the probability of obtaining not more than 3 heads is[SM]**

    (a) 3/4 (b) 1/2 (c) 1 (d) 0

11. **When two unbiased coins are tossed, the probability of getting both heads or both tails is[SM]**

    (a)1/2 (b)3/4 (c)1/4 (d)none

12. **Three coins are tossed together. The probability of getting three tails is[SM]**

    (a) 5/8 (b) 3/8 (c) 1/8 (d) none

13. **Three coins are tossed together.The probability of getting exactly two heads is [SM]**

    (a) 5/8 (b) 3/8 (c) 1/8 (d) none

14. **Three coins are tossed together. The probability of getting at least two heads is [SM]**

    (a) 1/2 (b) 3/8 (c) 1/8 (d) none

15. **Three coins are tossed together. The probability of getting three tails is:**

    (a) 3/8 (b) 6/8 (c) 1/8 (d) None of these

16. **Three coins are tossed simultaneously. What is the probability that they will fall 2 heads and 1 tail?**

    (a) 3/7 (b) 3/8 (c) 5/8 (d) None of these

17. **4 coins are tossed. The probability that there are 2 heads is**

(a) 1/2 (b) 3/8 (c) 1/8 (d) none

18. **If 4 coins are tosed. The chance that there should be two tails is**

(a) 1/2 (b) 3/8 (c) 1/8 (d) none

19. **In a single throw with two dice the probability of getting a sum of five on the two dice is[SM]**

(a)1/9 (b)5/36 (c)5/9 (d) none

20. **In a single throw with two dice, the probability of getting a sum of six on the two dice is[SM]**

(a)1/9 (b)5/36 (c) 5/9 (d) none

21. **The chance of getting a sum of 10 in a single throw with two dice is[SM]**

(a) 10/36 (b) 1/12 (c) 5/36 (d) none

22. **The chance of getting a sum of 6 in a single throw with two dice is[SM]**

(a) 3/36 (b) 4/36 (c) 6/36 (d) 5/36

23. **Two dice with face marked 1, 2, 3, 4, 5, 6 are thrown simultaneously and the points on the dice are multiplied together. The probability that product is 12 is[SM]**

(a) 4/36 (b) 5/36 (c) 12/36 (d) none

24. **When a die is tossed, the sample space is[SM]**

(a) S ={1,2,3,4,5} (b) S ={1,2,3,4} (c) S ={1,2,3,4,5,6} (d) none

25. **Two dice are thrown at a time. The probability that the numbers shown are equal is[SM]**

(a) 2/6 (b) 5/6 (c) 1/6 (d) none

26. **Two dice are thrown at a time. The probability that 'the difference of numbers shown is 1' is[SM]**

(a) 11/18 (b) 5/18 (c) 7/18 (d) none

27. **Two dice are thrown together. The probability that 'the event the difference of numbers shown is 2' is[SM]**

(a) 2/9 (b) 5/9 (c) 4/9 (d) 7/9

28. **Two dice are thrown together. The probability of the event that the sum of numbers shown is greater than 5 is[SM]**

(a) 13/18 (b) 15/18 (c) 1 (d) none

29. **The probability of throwing more than 4 in a single throw from an ordinary die is [SM]**

(a) 2/3 (b) 1/3 (c) 1 (d) none

30. **Probability of throwing an odd no with an ordinary six faced die is[SM]**

(a) 1/2 (b) 1 (c) -1/2 (d) 0

31. **Two dice are thrown at a time. The probability that the numbers shown are equal is:**

(a) 5/6 (b) 2/6 (c) 1/6 (d) None of these

32. When two unbiased coins are tossed. The probability of getting both heads or both tails is:

(a) 1/4 (b) 1/2 (c) 1/3 (d) None of these

33. Two unbiased coins are tossed. The probability of obtaining at least one head is:

(a) 1/2 (b) 1/4 (c) 3/4 (d) None of these

34. What is the probability of getting an odd number in a throw of an unbiased die?

(a) 1/2 (b) 1/3 (c) 1/5 (d) None of these

35. Find the probability of getting a number

(i) greater than 2,

(a) 1/3 (b) 4/3 (c) 2/3 (d) None of these

(ii) less than 4,

(a) 1/2 (b) 1/4 (c) 4/3 (d) None of these

(iii) even number

(a) 1/3 (b) 1/2 (c) 2/3 (d) None of these

(iv) at the most 4 with an ordinary die.

(a) 1/3 (b) 4/3 (c) 2/3 (d) None of these

36. A die is tossed, find the probability of getting

(i) even number

(a) 1/2 (b) 4/3 (c) 2/3 (d) None of these

(ii) number over 4

(a) 1/2 (b) 1/4 (c) 1/3 (d) None of these

(iii) number under 4

(a) 1/3 (b) 1/2 (c) 2/3 (d) None of these

(iv) number at least 3.

(a) 1/3 (b) 4/3 (c) 2/3 (d) None of these

37. Three die are rolled simultaneously. Find the probability of getting a total of

(i) not more than 5,

(a) 5/108 (b) 6/108 (c) 7/108 (d) None of these

(ii) atleast 15, and

(a) 3/54 (b) 5/54 (c) 7/54 (d) None of these

(iii) exactly 8.

(a) 6/72 (b) 7/72 (c) 5/72 (d) None of these

38. What is the probability of getting two 'fives' if we throw 2 dice simultaneously?

(a) 2/36 (b) 5/36 (c) 1/36 (d) None of these

39. **A die is tossed twice, Find the probability of getting a difference of three.**
(a) 1/3 (b) 1/2 (c) 2/3 (d) 1/6

40. **If two unbiased dice are rolled together , what is the probability of getting no difference of points ?(SM)**
(a) 1 / 2 (b) 1 / 3 (c) 1 / 5 (d) 1 / 6

41. **Two dice are thrown together. The probability that 'the event the difference of numbers shown is 2' is(SM)**
(a) 2/9 (b) 5/9 (c) 4/9 (d) 7/9

42. **A die is tossed thrice, Find the probability of getting a sum of over 14 in three tosses.**
(a) 5/54 (b) 7/74 (c) 7/54 (d) 8/54

43. **Two dice with face marked 1 , 2 , 3 , 4 , 5 , 6 are thrown simultaneously and the points on the dice are multiplied together. The probability that product is 12 is**
(a) 4/36 (b) 5/36 (c) 12/36 (d) none

44. **Two dice are thrown at a time. The probability that 'the difference of numbers shown is 1' is**
(a) 11/18 (b) 5/18 (c) 7/18 (d) none

45. **Find the probability of getting 4 atleast once in 2 tosses of a fair die. (SM)**
(a) 5/6 (b) 7/6 (c) 1/6 (d) None

46. **If an unbiased die is rolled once, the odds in favour of getting a point which is a multiple of 3 is (SM)**
(a) 1:2 (b) 2:1 (c)1:3 (d) 3:1

47. **A card is drawn from a well-shuffled pack of playing cards. The probability that it is a spade is[SM]**
(a) 1/13 (b) 1/4 (c) 3/13 (d) none

48. **A card is drawn from a well-shuffled pack of playing cards. The probability that it is a king is[SM]**
(a) 1/13 (b) 1/4 (c) 4/13 (d) none

49. **A card is drawn from a well-shuffled pack of playing cards. The probability that it is the ace of clubs is[SM]**
(a)1/13 (b) 1/4 (c)1/52 (d) none

50. **If probability of drawing a spade from a well-shuffled pack of playing cards is 1/4 then the probability that of the card drawn from a well-shuffled pack of playing cards is 'not a spade' is[SM]**
(a) 1 (b) 1/2 (c) 1/4 (d) 3/4

51. **A card is drawn form a well-shuffled pack of playing cards. The probability that it is the ace of clubs is:**
(a) 1/7 (b) 1/4 (c) 1/52 (d) None of these

52. **A card is drawn from a well-shuffled pack of playing cards. The probability that it is a king is:**

(a) 1/13 (b) 1/4 (c) 1/2 (d) None of these

53. **Find the chance of getting an ace in a draw from a pack of 52 cards.**

(a) 4/52 (b) 3/52 (c) 7/52 (d) 4/26

54. **What is the probability of getting a king card in draw from a pack of 52 cards?**

(a) 2/13 (b) 1/13 (c) 7/13 (d) None of these

55. **What is the probability of getting a spade card in a draw from the pack of 52 cards?**

(a) 1/4 (b) 1/2 (c) 1/5 (d) None of these

56. **There are 10 balls numbered from 1 to 10 in a box. If one of them is selected at random, what is the probability that the number printed on the ball would be an odd number greater that 4 ?(SM)**

(a) 0.50 (b) 0.40 (c) 0.60 (d) 0.30

57. **Find the probability that a four digit number comprising the digits 2,5,6 and 7 would be divisible by 4.**

(a) 1/5 (b) 1/3 (c) 1/4 (d) 1/6

58. **Four digits 1 , 2 , 4 and 6 are selected at random to form a four digit number. What is the probability that the number so formed , would be divisible by 4 ?(SM)**

(a) 1 / 2 (b)1 / 5 (c) 1 / 4 (d) 1 / 3

59. **A single letter is selected at random from word 'PROBABILITY'. What is the probability that it is a vowel?**

(a) 3/11 (b) 4/11 (c) 5/11 (d) 6/11

60. **What is the chance that a leap year selected at random will contain 53 Sundays?(SM)**

(a) 2/7 (b) 1/7 (c) 3/7 (d) 6/7

61. **A bag contains 4 red and 5 green ball is drawn at random. What is the probability that it is red in colour?**

(a) 4/9 (b) 5/9 (c) 7/9 (d) None of these

62. **A bag contains 10 white and 10 black balls A ball is drawn from it. The probability that it will be white is**

(a) 1/10 (b) 1 (c) 1/2 (d) none

63. **A bag contains 15 one rupee coins , 25 two rupee coins and 10 five rupee coins . If a coin is selected at random from the bag, then the probability of not selecting a one rupee coin is:(SM)**

(a) 0.30 (b) 0.70 (c) 0.25 (d) 0.20

64. **Following are the wages of 8 workers in Rs.: 50 , 62 , 40 , 70 , 45 , 56 , 32 , 45**
If one of the workers is selected at random , what is the probability that his wage would be lower than the average wage ?(SM)
(a) 0.625 (b) 0.500 (c) 0.375 (d) 0.450

65. **A traffic census show that out of 1000 vehicles passing a junction point on a highway 600 turned to the right. The probability of an automobile turning the right is**
(a) 2/5 (b) 3/5 (c) 4/5 (d) none

For Q.No. 66 to 69

The following table gives distribution of wages of 100 workers -

Wages(in Rs.)	120-140	140-160	160-180	180-200	200-220	220-240	240-260
No. of workers:	9	20	0	10	8	35	18

66. **The probability that his wages are under Rs. 140 is**
(a) 20/100 (b) 9/100 (c) 29/100 (d) none

67. **An individual is selected at random from the above gruop. The probability that his wages are under Rs. 160 is :**
(a) 9/100 (b) 20/100 (c) 29/100 (d) none

68. **For the above table the probability that his wages are above Rs. 200 is.**
(a) 43/100 (b) 35/100 (c) 53/100 (d) 61/100

69. **For the above table the probability that his wages between Rs. 160 and 220 is**
(a) 30/100 (b) 10/100 (c) 38/100 (d) 18/100

70. **The table below shows the history of 1000 men :**

(a) Life (in years) :	60	70	80	90
No. survived:	1000	500	100	60

The probability that a man will survived to age 90 is
(a) 60/1000 (b) 160/1000 (c) 660/1000 (d) none

71. **If P(A) = 3/8 , P(B) = 1/3 then $P(B^C)$ is equal to**
(a) 1 (b) 1/3 (c) 2/3 (d) none

72. **If on an average 9 ships out of 10 return safely to a port ,the probability of one ship returns safely is**
(a) 1/10 (b) 8/10 (c) 9/10 (d) none

73. **A bag contain 6 white and 5 black balls. One ball is drawn. The probability that it is white is[SM]**
(a) 5/11 (b) 1 (c) 6/11 (d) 1/11

74. **A bag contains 10 white and 10 black balls A ball is drawn from it. The probability that it will be white is[SM]**

(a) 1/10 (b) 1 (c) 1/2 (d) none

75. **The probability of drawing a white ball from a bag containing 3 white and 8 Red balls is [SM]**

(a) 3/5 (b) 3/11 (c) 8/11 (d) none

76. **A traffic census show that out of 1000 vehicles passing a junction point on a highway 600 turned to the right. The probability of an automobile turning the right is[SM]**

(a) 2/5 (b) 3/5 (c) 4/5 (d) none

77. **In a non-leap year, the probability of getting 53 Sundays or 53 Tuesdays or 53 Thurdays is :**

(a) 1/7 (b) 2/7 (c) 3/7 (d) 4/7

78. **A man can kill a bird once in three shots. The probabilities that a bird is not killed is:**

(a) 1/3 (b) 2/3 (c) 1 (d) 0.

79. **Let a sample space be $S = \{X_1, X_2, X_3\}$ which of the fallowing defines probability space on S ?[SM]**

(a) $P(x_1) = 1/4, P(x_2) = 1/3, P(x_3) = 1/3$ (b) $P(x_1) = 0, P(x_2) = 1/3, P(x_3) = 2/3$

(c) $P(x_1) = 2/3, P(x_2) = 1/3, P(x_3) = 2/3$ (d) None

80. **Let P be a probability function on $S = \{X_1, X_2, X_3\}$ if $P(X_1) = 1/4$ and $P(X_3) = 1/3$ then $P(X_2)$ is equal to [SM]**

(a) 5/12 (b) 7/12 (c) 3/4 (d) none

Exercise-II

1. **A card is drawn from a pack of cards. Find the probability that it is**

(i) either an ace or a jack card

(a) 3/14 (b) 2/13 (c) 7/12 (d) None

(ii) a red card

(a) 1/2 (b) 1/3 (c) 1/4 (d) 1/5

(iii) either a spade or a heart card

(a) 1/3 (b) 1/5 (c) 1/3 (d) 1/2

(iv) either a club card or a queen of heart or a king of spade.

(a) 15/52 (b) 15/53 (c) 15/64 (d) 15/54

2. **A bag contains 4 white, 2 black, 3 yellow and 3 red balls. What is the probability of getting a white or a red ball drawn at random?**

(a) 7/13 (b) 7/12 (c) 7/15 (d) None

3. **A card is drawn from a pack of 52 cards. Calculate the probability of getting either a king or a queen card.**

(a) 7/13 (b) 2/13 (c) 7/15 (d) None

4. **What is the probability of drawing a 'heart' or a 'king' card from a pack of cards?**

(a) 4/13 (b) 5/13 (c) 2/13 (d) None

5. **From 25 tickets marked with first 25 numerals, a tickets is drawn. What is the probability that a drawn ticket is a multiple of 3 or 5?**

(a) 12/35 (b) 13/35 (c) 12/25 (d) None

6. **A card is drawn out of a pack of cards. Find the probability that a card is an ace, a king, a queen or a card of club.**

(a) 11/26 (b) 13/26 (c) 16/26 (d) None

7. **Find the probability of getting a king or an ace card in single draw from a pack of cards.**

(a) 2/13 (b) 10/26 (c) 11/26 (d) None

8. **From a pack of 52 cards, one card is drawn at random. What is the probability that it will be a queen of clubs or king of diamond?**

(a) 1/26 (b) 11/26 (c) 15/26 (d) None

9. **Thirty tickets of a cinema are marked with first 30 numerals. A ticket is drawn at random, find the probability that it is a multiple of 5 or 7.**

(a) 1/3 (b) 2/3 (c) 5/3 (d) None

10. **Find the probability of getting a sum of 8 or 10 or 11 in a single throw of 2 dice.**

(a) 5/18 (b) 7/18 (c) 9/18 (d) None

11. **Find the probability of getting a king or a queen or a jack card in a single draw from pack of cards.**

(a) 7/13 (b) 3/13 (c) 1/13 (d) None

12. **An urn contains 4 red, 5 black and 6 white balls. What is the probability that a ball drawn is either red or black in colour?**
(a) 9/15 (b) 11/15 (c) 5/15 (d) None

13. **Find the probability of drawing a card of club or a queen from a pack of cards.**
(a) 11/13 (b) 4/13 (c) 14/26 (d) None

14. **A bag contains 50 balls numbered from 1 to 50. One ball is drawn at random. Find the probability that a drawn ball is a multiple of 5 or 7.**
(a) 8/25 (b) 9/25 (c) 10/25 (d) None

15. **A card is drawn at random from a pack of cards. Find the probability that drawn card is either a club card or a king card or a queen card.**
(a) 5/52 (b) 19/52 (c) 7/52 (d) None

16. **A card is drawn from a pack of cards, find the probability that drawn card is a red in colour or an ace.**
(a) 7/13 (b) 5/13 (c) 3/13 (d) None

17. **A book containing 100 pages numbered from 1 to 100 numerals. A page is opened and selected, find the probability that opened page is a multiple of either 9 or 10.**
(a) 1/5 (b) 3/5 (c) 7/5 (d) None

18. **A number is selected at random from the first 1000 natural numbers. What is the probability that the number so selected would be a multiple of 7 or 11 ?**
(a) 0.25 (b) 0.32 (c) 0.22 (d) 0.33

19. **A , B and C are three mutually exclusive and exhaustive events such that P (A) = 2 P (B) = 3P (C). What is P (B) ?(SM)**
(a) 6 / 11 (b) 3 / 11 (c) 1 / 6 (d) 1 / 3

20. **If P(A) =a , P(B) = b and P (A $\cap$ B) = c then the expression of P (A' $\cap$ B') in terms of a , b and c is(SM)**
(a) 1 - a - b - c (b) a + b - c (c) 1 + a - b - c (d) 1 - a - b + c

21. **For two events A and B , P (B) = 0.3 , P (A but not B) = 0.4 and P (not A) = 0.6 . The events A and B are(SM)**
(a) exhaustive (b) independent (c) equally likely (d) mutually exclusive

Exercise-III

1. **A student is trying to seek admission in either of the two colleges. The probability that he is admitted in first college is 3/5 and that in second college is 1/3. Find the probability that he is admitted in atleast one of the college.**

   (a) 0 (b) 0 (c) $\frac{11}{15}$ (d) None of these

2. **The odds in favour of solving question A are 7 : 6. The odds against B in solving the same question are 11 : 8. If a question is given to both of them, find the probability that question will be solved.**

   (a) 0 (b) $\frac{181}{247}$ (c) 0 (d) None of these

3. **A person is known to hit the target in 3 out of 4 shorts whereas another person is known to hit the target in 2 out of 3 shots. Find the probability of the target being hit at all when they both try.**

   (a) 0 (b) 11/12 (c) 0 (d) None of these

4. **A person is known to hit the target in 3 out of 4 shots whereas another persons is known to hit 4 out of 5 shots. Find the probability of the target being hit when they both try.**

   (a) 20/19 (b) 18/20 (c) 19/20 (d) None of these

5. **A problem of probability is given to 3 teachers A, B and C whose changes of solving it are 2/3, 3/4 and 4/5 respectively. Find the probability that the problem will be soloved.**

   (a) 60/60 (b) 59/60 (c) 59/60 (d) None

6. **A problem is given to three students, A, B and C whose chances of solving are 1/3, 1/4 and 1/5. Find the probability that the problem will be solved.**

   (a) 3/5 (b) 4/5 (c) 2/5 (d) None

7. **A problem in statistics is given to four students A,B,C and D Whose chances of solving it are ½,1/3,1/4 and ¼. Find the probability that question is solved.**

   (a) 12/16 (b) 13/16 (c) 15/16 (d) None

8. **What is the probability of having at least one 'six' from 3 throws of a perfect die ?**

   (a) 5/6 (b) $(5/6)^3$ (c) $1 - (1/6)^3$ (d) $1 - (5/6)^3$

9. **A problem in probability was given to three CA students A , B and C whose chances of solving it are 1 / 3 , 1 / 5 and 1 / 2 respectively. What is the probability that the problem would be solved ?(SM)**

   (a) 4 / 15 (b) 7 / 8 (c) 8 / 15 (d) 11 / 15

Exercise-IV

1. **Find the probability of having atleast one son in a family if there are two children in a family on an average.**

(a) 2/4 (b) 3/4 (c) 7/4 (d) None of these

2. **What is the probability of getting heads in two throws of a coin?**

(a) $\frac{2}{4}$ (b) $\frac{1}{4}$ (c) $\frac{3}{4}$ (d) None of these

3 **Find the probability of throwing three ace in three throws of an unbiased die.**

(a) $\frac{3}{216}$ (b) $\frac{5}{216}$ (c) $\frac{1}{216}$ (d) None of these

4. **A coin and 2 die are tossed. Find the probability that coin will fall head and die will show even number.**

(a) $\frac{3}{8}$ (b) $\frac{1}{8}$ (c) $\frac{5}{8}$ (d) None of these

5. **A person itends to marry a girl who is beautiful, graduate and employed. The probability of getting a beautiful girl is 30%, that of a graduate is 60% and that of a employed is 20%. Find the probability that he is married to a girl of his wisdom.**

(a) $\frac{9}{250}$ (b) $\frac{7}{250}$ (c) $\frac{5}{250}$ (d) None of these

6. **Three ships A, B and C sail from India to London. Odds in favour of their arriving safely are 2 : 5, 3 : 8 and 4 : 7 respectively. Find the probability that they all arrive safely.**

(a) $\frac{27}{887}$ (b) $\frac{24}{847}$ (c) $\frac{25}{887}$ (d) None of these

7. **Find the probability of drawing a king, a queen and a knave in this order from a pack of cards in three successive draws presuming that cards drawn are not replaced.**

(a) $\frac{8}{16575}$ (b) $\frac{3}{16575}$ (c) $\frac{2}{16575}$ (d) None of these

8. **In an urn, there are 12 red and 8 green balls. Two balls are drawn at random one after another without being replacing the first. Find the probability that**

(i) both drawn balls are red,

(a) 32/95 (b) 35/33 (c) 33/95 (d) None of these

(ii) both drawn balls are green, and

(a) 14/95 (b) 5/19 (c) 8/19 (d) None of these

(iii) first drawn ball is red and second drawn ball is green.

(a) $\frac{23}{95}$ (b) $\frac{25}{95}$ (c) $\frac{24}{95}$ (d) None of these

9. **Find the probability of throwing two ace in two throws of an unbaised die.**

(a) 2/36 (b) 5/36 (c) 3/36 (d) 1/36

10. **Find the probability of getting 3 tails in 3 tosses of a coin.**

(a) 3/8 (b) 1/8 (c) 5/8 (d) None

11. **Two cards are drawn from a pack of cards in succession with replacement of first card. Find the probability that both are the card of 'heart'.**

(a) 3/16 (b) 7/16 (c) 1/16 (d) None

12 **A class consists of 30 boys and 20 girls. 10 of the students are rich and only 20 students are fair complexioned. Find the probability of selecting a fair complexioned rich boy.**

(a) 8/125 (b) 6/125 (c) 8/125 (d) 4/125

13 **The odds in favour of passing driving test by Ram is 3:5 and odds in favour of passing the same test by Sohan is 3:2. What is the probability that both will pass the test?**

(a) 9/40 (b) 7/40 (c) 5/40 (d) None

14 **Find the probability of drawing a king and an ace in this order from a pack of cards in two successive draws presuming that first card drawn is not replaced.**

(a) 6/663 (b) 8/663 (c) 4/663 (d) None

15. **Two cards are drawn from a pack of cards in succession without replacing first one. Find the probability that both are the cards of club.**

(a) 3/17 (b) 1/17 (c) 5/17 (d) None

16. **An article consists of two parts 9 out of 100 are likely to be defective in first part and 5 out of 100 are likely to be defective in second part. Find the probability that assembled part will not be defective.**

(a) 0.8645 (b) 0.8646 (c) 0.8645 (d) None

17. **If P $(\overline{A} \cup \overline{B})$ = 5/6 , P(A) = 1/2 and P $(\overline{B})$ = 2/3 , what is P (A $\cup$ B) ?**

(a) 1/3 (b) 5 / 6 (c) 2 / 3 (d) 4 / 9

18. **What is the probability that 4 children selected at random would have different birthdays ?(SM)**

(a) $\frac{364\times363\times362}{(365)^3}$ (b) $\frac{6\times5\times4}{7^3}$ (c) 1/365 (d) $(1/7)^3$

19. **The odds in favour of one student passing a test are 3:7. The odds against another student passing at are 3:5. The probability that both pass is**

(a) 7/16 (b) 21/80 (c) 9/80 (d) 3/16

20. **The odds in against of one student passing a test are 3:7. The odds favour another student passing at are 3:5. The probability that both pass is**

(a) 7/16 (b) 21/80 (c) 9/80 (d) 3/16

21. **A speaks truth in 60% cases and B in 70% cases. In what percentage of cases are they likely to contradict each other in stating the same fact?**

(a) 48% (b) 45% (c) 46% (d) None

22. **A bag contains 5 red and 3 black balls. Another bag contains 6 red and 4 black balls. If one ball is drawn from each bag, find the probability that one is red and other is black ball.**

(a) 19/40 (b) 17/40 (c) 15/40 (d) None

23. **A bag contains 10 red and 5 white balls. Four balls are drawn one by one without replacing the previous one. Find the probability that they are alternatively of different colour.**

(a) $\frac{12}{91}$ (b) $\frac{10}{91}$ (c) $\frac{8}{91}$ (d) NOne

24. **The odds against a certain event are 5 : 2 and odds in favour of another event are 7 : 3. Find the probability that**

(i) only one event will take place

(a) 39/17 (b) 41/70 (c) 39/70 (d) None of these

(ii) atleast one event will take place.

(a) $\frac{13}{14}$ (b) $\frac{9}{14}$ (c) $\frac{11}{14}$ (d) None

25. **The probability that India wins a football match against Pakistan is 1/3. If they play 3 matches, find the probability that--**

(i) India will win all the 3 matches

(a) 17/27 (b) 1/27 (c) 8/27 (d) None

(ii) India will lose all the 3 matches

(a) 17/27 (b) 19/27 (c) 8/27 (d) None

(iii) India will win atleast 1 matches

(a) 17/27 (b) 19/27 (c) 8/27 (d) None

(iv) India will win atleast 2 matches

(a) 7/27 (b) 3/37 (c) 5/27 (d) None

26. **Out of 3 groups of children, one child is selected at random from each group. The groups consist of (i) 3 girls and 1 boy, (ii) 2 girls and 2 boys, and (iii) 1 girl and 3 boys. Find the probability that selected 3 children consist of 1 girl and 2 boys.**

(a) $\frac{13}{32}$ (b) $\frac{11}{32}$ (c) $\frac{15}{32}$ (d) None

27. **A bag contains 5 red and 4 green balls. Another bag contains 4 red and 6 green balls. A ball is drawn from first bag and is placed in second. A ball is then drawn from second bag. What is the probability that it is red?**

(a) $\frac{43}{99}$ (b) $\frac{45}{99}$ (c) $\frac{41}{99}$ (d) None

28. **Two cards are drawn from a pack of cards in succession presuming that drawn cards are replaced. What is the probability that both drawn cards are of the same suit?**

(a) 3/4 (b) 1/4 (c) 5/4 (d) None

29. **A husband and a wife appear in an interview for 2 vacancies for the same post. The probability of selection of husband is 4/5 and that of wife is 3/4. Find the probability that only one of them is selected.**

(a) 7/20 (b) 5/20 (c) 3/20 (d) None

30. **A bag contains 4 red and 5 green balls. Another bag contains 5 red and 7 green balls. If one ball is drawn from each bag, find the probability that one is red and one is green ball.**

(a) 51/108 (b) 55/108 (c) 53/108 (d) None

31. **Two balls are drawn from a bag containing 5 white and 7 black balls at random. What is the probability that they would be of different colours?**

(a) 35/ 66 (b) 30/66 (c) 12 / 66 (d) none of these

32. **What is the chance of getting at least one defective item if 3 items are drawn randomly from a lot containing 6 items of which 2 are defective item ?**

(a) 0.30 (b) 0.20 (c) 0.80 (d) 0.50

33. **A box contains 5 white and 7 black balls. Two successive drawn of 3 balls are made (i) with replacement (ii) without replacement. The probability that the first draw would produce white balls and the second draw would produce black balls are respectively.(SM)**

(a) 6 / 321 and 3 / 926 (b) 1 / 20 and 1 / 30

(c) 35 / 144 and 35 / 108 (d) 7 / 968 and 5 / 264

34. **There are three boxes with the following composition :(SM)**

Box I : 5 Red + 7 White + 6 Blue balls Box II: 4 Red + 8 White + 6 Blue balls

Box III : 3 Red + 4 White + 2 Blue ball

If one ball is drawn at random from each box , then what is the probability that they would be of same colour ?

(a) 89 / 729 (b) 97 / 729 (c) 82 / 729 (d) 23 / 32

35. **A bag contains 8 red and 5 white balls. Two successive draws of 3 balls are made without replacement before the second trail. The probability that the first draw will produce 3 white balls and the second 3 red balls is (SM)**

(a) 5 / 223 (b) 6 / 257 (c) 7 / 429 (d) 3 / 548

36. **There are two boxes containing 5 white and 6 blue balls and 3 white and 7 blue balls and respectively. If one of the boxes is selected at random and a ball is drawn from it , then the probability that the ball is blue is (SM)**

(a) 115 / 227 (b) 83 / 250 (c) 137 / 220 (d) 127/ 250

37. **There are three persons aged 60 , 65 and 70 years old. The survival probabilities for these three persons for another 5 years are 0.7 , 0.4 and 0.2 respectively. What is the probability that at least two of them would survive another five years ?(SM)**

(a) 0.425 (b) 0.456 (c) 0.392 (d) 0.388

38. **Tom speaks truth in 30 percent cases and Dick speaks truth in 25 percent cases. What is the probability that they would contradict each other ?(SM)**

(a) 0.325 (b) 0.400 (c) 0.925 (d) 0.075

39. **An urn contains 8 red, 3 white and 9 blue balls. If 3 balls are drawn at random, determine the probability that**

(i) all 3 are red

(a) 14/285 (b) 3/95 (c) 7/95 (d) None

(ii) all 3 are white

(a) 5/98 (b) 1/1140 (c) 7/95 (d) None

(iii) 2 are red and 1 blue ball

(a) 5/98 (b) 21/95 (c) 7/95 (d) None

(iv) one of each colour is drawn

(a) 5/98 (b) 3/95 (c) 18/95 (d) None

(v) balls are drawn in order red, white and blue.

(a) 5/98 (b) 3/95 (c) 7/95 (d) None

40. **From a pack of 52 cards, two cards are drawn at random. Find the chances that one is king and other is jack.**

(a) 7/663 (b) 5/663 (c) 8/663 (c) None

41. **Find the probability of drawing 4 cards of different suits in 4 successive draws from a pack of cards.**

(a) 2197/20825 (b) 2199/20825 (c) 2196/20825 (d) None

42. **An urn contains 4 red, 5 green and 6 black balls. Three balls are drawn at random. Find the probability that they will be of black colours.**

(a) 5/93 (b) 4/91 (c) 3/93 (d) None

43. **A bag contains 4 white. 5 red and 6 green balls. Three balls are drawn at random. What is the chance that a white, a red and a green ball is drawn?**

(a) 23/91 (b) 21/91 (c) 24 / 91 (d) None

44. **From a pack of cards, 4 cards are drawn, find the probability that**

(i) they are different suit.

(a) $\frac{2197}{20825}$, (b) $\frac{1}{270725}$, (c) $\frac{44}{4165}$. (d) None

(ii) the are all king,and

(a) 1/270725 (b) 2175/270725 (c) 44/4165 (d) None

(iii) they are of same suit

(a) 1/270725 (b) 2175/270725 (c) 44/4165 (d) None

45. **A packet of 10 electronic components is known to include 2 defectives. If a sample of 4 components is selected at random from the packet, what is the probability that the sample does not contain more than 1 defective ?**

(a) 1 / 3 (b) 2 / 3 (c) 13 / 15 (d) 3 / 15

Exercise -V

1. **In connection with a random experiment, it is found that** (SM)
   P(A) = 2/3, P(B)=3/5 and P(A or B) = 5/6
   Evaluate the following probabilities:

   (i) P(A/B)
   (a) 13/18 (b) 13 / 60 (c) 31/60 (d) 0.775

   (ii) P (B/A)
   (a) 13/20 (b) 13 / 60 (c) 31/60 (d) 0.775

   (iii) P(A'/B)
   (a) 0.655 (b) 13 / 60 (c) 31/60 (d) 5/18

   (iv) P(A/B')
   (a) 0.655 (b) 13 / 60 (c) 31/60 (d) 7/12

   (v) P(A'/B')
   (a) 5/12 (b) 13 / 60 (c) 31/60 (d) 0.775

2. **Given that for two events A and B, P (A) = 3 / 5 , P(B) = 2 / 3 and P(A $\cup$ B) = 3 / 4 , what is P(A/B)?(SM)**
   (a) 0.655 (b) 13 / 60 (c) 31/60 (d) 0.775

3. **If P (A) = 2 / 3 , P (B) = 3/4 , P(A/B) = 2/3 , then what is P(B / A) ?(SM)**
   (a) 1 / 3 (b) 2 / 3 (c) 3/4 (d) 1 / 2

4. **It is given that a family of 2 children has a girl , what is the probability that the other child is also a girl ?(SM)**
   (a) 0.50 (b) 0.75 (c) 1 / 3 (d) 2 / 3

5. **Two coins are tossed simultaneously. What is the probability that the second coin would show a tail given that the first coin has shown a head ?(SM)**
   (a) 0.50 (b) 0.25 (c) 0.75 (d) 0.125

6. **For a group of students , 30% , 40% and 50% failed in Physics, Chemistry and at least one of the two subjects respectively. If an examinee is selected at random, what is the probability that he passed in Physics if it is known that he failed in Chemistry ?(SM)**
   (a) 1 / 2 (b) 1 /3 (c) 1/ 4 (d) 1 / 6

7. **Given that P (A) = 1 / 2 , P(B) = 1 / 3 , P (A $\cap$ B) = 1 / 4 , what is P(A' / B')(SM)**
   (a) 1 / 2 (b) 7 / 8 (c) 5 / 8 (d) 2 / 3

8. **In formula** $P(B/A), P(A)$ **is(SM)**
   (a) greater than zero (b) less than zero
   (c) equal to zero (d) greater than equal to zero

9. **A family has 2 children. The probability that both of them are boys if it is known that one of them is a boy**
   (a) 1 (b) 1/2 (c) 3/4 (d) none

10. **The Probability of the occurrence of a number greater then 2 in a throw of a die if it is known that only even numbers can occur is :**

(a) 1/3 (b) 1/2 (c) 2/3 (d) none

11. **There are two urns. The first urn contains 3 red and 5 white balls whereas the second urncontains 4 red and 6 white balls. A ball is taken at random from the first urn and is transferred to the second urn. Now another ball is selected at random from the second urn. The probability that the second ball would be red is :(SM)**

(a) 7 / 20 (b) 35 / 88 (c) 17 / 52 (d) 3 / 20

12. **Consider Urn 1:2 white balls, 3 black balls**

Urn II : 4 white balls, 6 black balls one ball is randomly transferred from first to second urn, then one ball is drawn from II Urn. The probability that drawn ball is white is

(a) 22/65 (b) 22/46 (c) 22/55 (d) 21/45

13. **An urn contains 2 red and 1 green balls. Another urn contains 2 red and 2 green balls. An urn was selected at random and then a ball was drawn from it. If it was found to be red then the probaibility that it has been drawn from urn one is _____.**

(a) 4/7 (b) 3/7 (c) 2/3 (d) 7/12.

14. **A bag contains 4 white and 5 red balls and another bag contains 4 red and 5 white balls. One bag is chosen at random and a draw of 2 balls is then made. Find the probability that one is white and other is red.**

(a) 3/9 (b) 7/9 (c) 5/9 (d) None

15. **A bag contains 5 red and 3 black balls and second bag contains 4 red and 5 black balls. One of these bag Is selected at random and a draw of 2 balls is made from it. What is the probability that one of them is red and other is black?**

(a) 275/503 (b) 275/504 (c) 275/507 (d) None

16. **8 balls are placed at random in three bags. What is the probability that the first bag will contain 3 balls ?(SM)**

(a) 0.2731 (b) 0.3256 (c) 0.1924 (d) 0.3443

17. **X and Y stand in a line with 6 other people. What is the probability that there are 3 persons between them ?(SM)**

(a) 1 / 5 (b) 1 /6 (c) 1 / 7 (d) 1 / 3

Exercise - VI

1. **What is the expectation of getting a sum of less than 4 in a throw of 2 dice in 600 trials?**
   (a) 48 (b) 50 (c) 47 (d) None

2. **If the probability of a person selected for the post of a lecturer with Ph.D.is 0.4 and 0.6 if he/she has previous experience. The probability is 0.2 if he/she has both. Out of 200 applicants, what is the expected number that selected candidate is either Ph.D. or has some experience?**
   (a) 160 (b) 159 (c) 157 (d) None

3. **A and B play for a prize of Rs. 99. The prize is to be won by a player who first throws 6 with one die. A first throws and if he fails B throws and if he fails A again throws and so on. Find their respective expectations.**
   (a) 54,45 (b) 44, 55 (c) 43, 56 (d) None

4. **An unbiased coin is tossed three times. Find the expected value of the number of heads and also its standard deviation.(SM)**
   (a) 1.2 ; 0.86 (b)1.3 ; 0.85 (c)1.5 ; 0.87 (d) None

5. **In a business venture, a man can make a profit of Rs. 50,000 or incur a loss of Rs.20,000. The probabilities of making profit or incurring loss , from the past experience, are known to be 0.75 and 0.25 respectively. What is his expected profit ?**(SM)
   (a) Rs. 32,400 (b) Rs. 32, 500 (c) Rs. 32,600 (d) None

6. **A box contains 12electronic lamps of which 5 are defectives. A man selects three lamps at random.What is the expected number of defective lamps in his selection?**(SM)
   (a) 1.24 (b) 1.25 (c) 1.26 (d) None

7. **Moidul draws 2 balls from a bag containing 3 white and 5 red balls. He get Rs. 500 if he draws a white ball and Rs. 200 if he draws a red ball. What is his expectation? If he is asked to pay Rs. 400 for paticipating in the game, would he consider it a fair game and participate?**(SM)
   (a) Rs. 624 (b) 623 (c) Rs. 625 (d) None

8. **A number is selected at random from a set containing the first 100 natural numbers and another number is selected at random from another set containing the first 200 natural numbers. What is the expected value of the product?**(SM)
   (a) 5073.25 (b) 5075.25 (c) 5076.00 (d) None

9. **A dice is thrown repeatedly till a 'six' appears. Write down the sample space. Also find the expected number of throws.**(SM)
   (a) 5 (c) 4 (c) 6 (d) None

10. **A random variable x has the following probability distribution. What is the value of k.**(SM)

X:	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
P(X):	**0**	**2k**	**3k**	**k**	**2k**	**k^2**	**$7k^2$**	**$2k^2+k=1$**

   (a) 2/10 (b) 1/10 (c) 3/10 (d) None

11. The probability of winning of a person is 6/11 and at a result he gets Rs. 77 / =. The expectation of this person is

(a) Rs. 35/= (b) Rs. 42/= (c) Rs. 58/= (d) none

12. If x and y are independent , then

(a) $E(xy) = E(x) \times E(y)$ (b) $E(xy) = E(x) + E(y)$

(c) $E(x - y) = E(x) + E(y)$ (d) $E(x - y) = E(x) + x\,E(y)$

13. If a random variable x assumes the values x_1, x_2, x_3, x_4 with corresponding probabilities p_1, p_2, p_3, p_4 then the expected value of x is

(a) $p_1 + p_2 + p_3 + p_4$ (b) $x_1p_1 + x_2p_3 + x_3p_2 + x_4p_4$

(c) $p_1x_1 + p_2x_2 + p_3x_3 + p_4x_4$ (d) none of these

14. f(x) , the probability mass function of a random variable x satisfies(SM)

(a) $f(x) > 0$ (b) $\sum_x f(x) = 1$ (c) (a) or (b) (d) $f(x) \geq 0$ and $\sum_x f(x) = 1$

15. Variance of a random variable x is given by (SM)

(a) $E(x-\mu)^2$ (b) $E[x-E(x)]^2$ (c) $E(x^2 - \mu)$ (d) (a) or (b)

16. If x and y are random variables having expected values as 4.5 and 2.5 respectively , then the expected value of (x - y) is

(a) 2 (b) 7 (c) 6 (d) 0

17. If a random variable x assumes the values 0, 1 and 2 with probabilities 0.30, 0.50 and 0.20, then its expected value is (SM)

(a) 1.50 (b) 3 (c) 0.90 (d) 1

18. The probability distribution of a random variable x is given below :

x :	1	2	4	5	6
y :	0.15	0.25	0.20	0.30	0.10

What is the standard deviation of x ?(SM)

(a) 1.49 (b) 1.56 (c) 1.69 (d)1.72

19. A packed of 10 electronic components is known to include 3 defectives.If 4 components are selected from the packet at random , what is the expedted value of the number of defective ?(SM)

(a) 1.20 (b) 1.21 (c) 1.69 (d) 1.72

20. The probability that there is at least one error in an account statement prepared by 3 persons A , B and C are 0.2 , 0.3 and 0.1 respectively. If A , B and C prepare 60 , 70 and 90 such statements, then the expected number of correct statements(SM)

(a)170 (b) 176 (c)178 (d) 180

21. A bag contains 6 white and 4 red balls. If a person draws 2 balls and receives Rs. 10 and Rs. 20 for a white and red balls respectively , then his expected amount is

(a) Rs. 25 (b) Rs. 26 (c) Rs. 29 (d) Rs. 28

22. The probability distribution of a random variable is as follows :

x :	1	2	4	6	8
p :	k	2k	3k	3k	k

The variance of x is

(a) 2.1 (b) 4.41 (c) 2.32 (d) 2.47

23. The expected number of head in 100 tosses of an unbiased coin is

(a) 100 (b) 50 (c) 25 (d) none

24. When expected value is negative the result is

(a) favourable (b) unfavourable (c) both (d) none to these

25. The expected value of X , the sum of the scores , when two dice are rolled is

(a) 9 (b) 8 (c) 6 (d) 7

Exercise - VII

1. **The limitations of the classical definition of probability**
   (a)It is applicable when the total number of elementary events is finite
   (b) It is applicable if the elementary events are equally likely
   (c) It is applicable if the elementary events are mutually independent
   (d) (a) and (b)

2. **According to the statistical definition of probability , the probability of an event A is the**
   (a) limiting value of the ratio of the no. of times the event A occurs to the number of times the experiment is repeated
   (b) the ratio of the frequency of the occurrences of A to the total frequency
   (c) the ratio of the frequency of the occurences of A to the non-occurrence of A
   (d) the ratio of the favourable elementary events to A to the total number of elementary events.

3. **If one of outcomes cannot be expected to occur in preference to the other in an experiment the events are:**
   (a) simple events (b)compound events (c)favourable events (d)equally likely events

4. **Subjective probability may be used in**
   (a) Mathematics (b) Statistics (c) Management (d) Accountancy

5. **An experiment is known to be random if the result of the experiment(SM)**
   (a) Can not be predicted (b) Can be predicted
   (c) Can be split into further experiments (d) Can be selected at random

6. **If P(A) = P(B) , then(SM)**
   (a) A and B are the same events (b) A and B must be same events
   (c) A and B may be different events (d) A and B are mutually exclusive events

7. **The complete group of all possible outcomes of a random experiment given an ..... set of events.**
   (a) mutually exclusive (b) exhaustive (c) both (d) none

8. **The classical definition of probability is based on the feasibility at subdividing the possible outcomes of the experiments into**
   (a) mutually exclusive and exhaustive (b) mutually exclusive and equally likely
   (c) exhaustive and equally likely (d)mutually exclusive , exhaustive and equally likely cases.

9. **Which of the following pairs of events are mutually exclusive ?**
   (a) A: The student reads in a school. B: He studies Philosophy.
   (b) A: Raju was born in India. B: He is a fine Engineer.
   (c) A: Ruma is 16 years old. B: She is a good singer.
   (d) A: Peter is under 15 years of age. B: Peter is a voter of Kolkata.

10. **Addition Theorem of Probability states that for any two events A and B ,**
    (a) $P(A \cup B) = P(A) + P(B)$ (b) $P(A \cup B) = P(A) + P(B) + P(A \cap B)$
    (c) $P(A \cup B) = P(A) + P(B) - P(A \cap B)$ (d) $P(A \cup B) = P(A) \times P(B)$

11. **If two events cannot occur simultaneously in the same trial then they are**

(a) mutually exclusive events (b) simple events (c) favourable events (d) none

12. **If for two events A and B , $P(A \cup B) = 1$, then A and B are**

(a) Mutually exclusive events (b) Equally likely events (c) Exhaustive events (d) Dependent

13. **If an unbaised coin is tossed once , then the two events Head and Tail are**

(a) Mutually exclusive (b) Exhaustive (c) Equally likely (d) All these (a) , (b) and (c)

14. **For two events A and B , $P(A \cup B) = P(A) + P(B)$ only when**

(a) A and B are equally likely events (b) A and B are exhaustive events

(c) A and B are mutually independent (d) A and B are mutually exclusive

15. **For any two events A and B, (SM)**

(a) $P(A) + P(B) > P(A \cap B)$ (b) $P(A) + P(B) < P(A \cap B)$

(c) $P(A) + P(B) \geq P(A \cap B)$ (d) $P(A) \times P(B) \leq P(A \cap B)$

16. **If A and B mutually exclusive events , then(SM)**

(a) $P(A) = P(A - B)$ (b) $P(B) = P(A - B)$ (c) $P(A) = P(A \cap B)$ (d) $P(B) = P(A \cap B)$

17. **If A , B and C are mutually exclusive and exhaustive events then what is the probability that they occur simultaneously ?**

(a) 1 (b) 0.50 (c) 0 (d) any value between o and 1

18. **All possible outcomes of a random experiment forms the[SM]**

(a) events (b) sample space (c) both (d) none

19. **If one of outcomes cannot be expected to occur in preference to the other in an experiment the events are[SM]**

(a) simple events (b) compound events (c) favourable events (d) equally likely events

20. **If two events cannot occur simultaneously in the same trial then they are[SM]**

(a) mutually exclusive events (b) simple events (c) favourable events (d) none

21. **The definition of probability fails when the no of possible outcomes of the experiment is infinite[SM]**

(a) True (b) false (c) both (d) none

22. **The terms "chance" and probability are synonymous[SM]**

(a) True (b) false (c) both (d) none

23. **Probability of the sample space is[SM]**

(a) 0 (b) 1/2 (c) 1 (d) none

24. **Sum of all probabilities of mutually exclusive and exhaustive events is equal to[SM]**

(a) 0 (b) 1/2 (c) 3/4 (d) 1

25. **P (B/A) defines the probability that event B occurs on the assumption that A has happened[SM]**

(a) Yes (b) no (c) both (d) none

26. **The complete group of all possible outcomes of a random experiment given an set of events.[SM]**

(a) mutually exclusive (b) exhaustive (c) both (d) none

27. **When the event is 'certain' the probability of it is[SM]**

(a) 0 (b) 1/2 (c) 1 (d) none

28. **The classical definition of probability is based on the feasibility at subdividing the possible outcomes of the experiments into[SM]**

(a) mutually exclusive and exhaustive (b) mutually exclusive and equally likely

(c) exhaustive and equally likely d) mutually exclusive,exhaustive and equally likely cases.

29. **Probability of occurrence of at least one of the events A and B is denoted by[SM]**

(a) P(AB) (b) P(A+B) (c) P(A/B) (d) none

30. **Probability of occurrence of A as well as B is denoted by[SM]**

(a) P(AB) (b) P(A+B) (c) P(A/B) (d) none

31. **Which of the following relation is true ?[SM]**

(a) $P(A)- P(A^C)= 1$ (b) $P(A)+ P(A^C)= 1$ (c) $P(A) P(A^C)= 1$ (d) None

32. **If events A and B are mutually exclusive, the probability that either A or B occurs is given by [SM]**

(a) P (A+B)= P(A)- P(B) (b) P (A+B)=P(A)+ P(B)- P(AB)

(c) P (A+B)= P(A)- P(B)+ P(AB) (d) P (A+B)= P(A)+ P(B)

33. **The probability of occurrence of at least one of the 2 events A and B (which may not be mutually exclusive) is given by[SM]**

(a) P(A+B)= P(A)- P(B) (b) P(A+B)= P(A)+ P(B)- P(AB)

(c) P(A+B)= P(A)- P(B)+ P(AB) (d) P(A+B)= P(A)+P (B)

34. **If events A and B are independent, the probability of occurrence of A as well as B is given by[SM]**

(a) P(AB)= P(A/B) (b) P(AB)= P(A)/ P(B) (c) P(AB)= P(A)P(B) (d) None

35. **For the condition P(AB)= P(A)P(B)two events A and B are said to be[SM]**

(a) dependent (b) independent (c) equally like (d) none

36. **The conditional probability of an event B on the assumption that another event A has actually occurred is given by[SM]**

(a) P(B/A)= P(AB)/P(A) (b) P(A/B)= P(AB)/ P(B)

(c) P(B/A)= P(AB) (d) P(A/B)= P(AB)/ P(A)P(B)

37. **If P (A)=1/3 , P(B)=1/4 , the events A & B are[SM]**

(a) not equally likely (b) mutually exclusive (c) equally likely (d) none

38. **If events A and B are independent then[SM]**

(a) A^C and B^C are dependent (b) A^C and B are dependent

(c) A and B^C are dependent (d) A^C and B^C are also independent

39. **Probability mass function is always[SM]**

(a)0 (b) greater than 0 (c) greater than equal to 0 d) less than 0

40. **The sum of probability mass function is equal to[SM]**

(a) -1 (b) 0 (c) 1 (d) none

41. **When X is a continuous function f(x)is called[SM]**

(a) probability mass function (b) probability density function

(c) both (d) None

42. **If two events are independent then[SM]**

(a) P(B/A)= P(AB) P(A) (b) P(B/A)= P(AB) P(B)

(c) P(B/A)= P(B) (d) P(B/A)P(A)

43. **When expected value is negative the result is[SM]**

(a) favourable (b) unfavourable (c) both (d) none to the above

44. **In formula P(B/A), P(A) is[SM]**

(a) greater than zero (b) less than zero (c) equal to zero (d) greater than equal to zero

45. **Two events A and B are mutually exclusive means they are[SM]**

(a) not disjoint (b) disjoint (c) equally likely (d) none

46. **The probability space in tossing two coins is[SM]**

(a) {(H,H),(H,T),(T,H)} (b) {(H,T),(T,H),(T,T)}

(c) {(H,H),(H,T),(T.H), (T,T)} (d) none

47. **If A is an event and A^C its a complementary event then[SM]**

(a) $P(A)=P(A^C)-1$ (b) $P(A^C)=1-P(A)$ (c) $P(A)=1+P(A^C)$ (d) none

48. **The value of P(S) were S is the sample space is[SM]**

(a) -1 (b) 0 (c) 1 (d) none

49. **For a event A which is certain, P (A) is equal to[SM]**

(a) 1 (b) 0 (c) -1 (d) none

50. **When none of the outcomes is favourable to the event then the event is said to be[SM]**

(a) certain (b) sample (c) impossible (d) none

51. **A card is drawn from a well shuffled deck of 52 cards. Let E_1 : "a king or a queen is drawn" E_2 : "a queen or a jack is drawn", then**

(a) E_1 and E_2 are exclusive (b) E_1 and E_2 are independent

(c) E_1 and E_2 are not independent (d) none of these

52. **Initially, probability was a branch of [SM]**

(a) Physics (b) Statistics (c) Mathematics (d) Economics.

53. **Two broad divisions of probability are [SM]**

(a) Subjective probability and objective probability

(b) Deductive probability and non–deductive probability

(c) Statistical probability and Mathematical probability

(d) None of these.

54. **Subjective probability may be used in [SM]**

(a) Mathematics (b) Statistics (c) Management (d) Accountancy.

55. **An event that can be split into further events is known as [SM]**

(a) Complex event (b) Mixed event (c) Simple event (d) Composite event.

56. **If $P(A \cap B) = 0$, then the two events A and B are [SM]**

(a) Mutually exclusive (b) Exhaustive (c) Equally likely (d) Independent

57. **If for two events A and B, P(AUB) = 1, then A and B are [SM]**

(a) Mutually exclusive events (b) Equally likely events (c) Exhaustive events (d) Dependent events.

58. **If an unbiased coin is tossed once, then the two events Head and Tail are [SM]**

(a) Mutually exclusive (b) Exhaustive (c) Equally likely (d) All these (a), (b) and (c).

59. **If P(A) = P(B), then the two events A and B are [SM]**

(a) Independent (b) Dependent (c) Equally likely (d) Both (a) and (c).

60. **If for two events A and B, $P(A \cap B) \neq P(A) \times P(B)$, then the two events A and B are [SM]**

(a) Independent (b) Dependent

(c) Not equally likely (d) Not exhaustive.

61. **If P(A/B) = P(A), then [SM]**

(a) A is independent of B (b) B is independent of A (c) B is dependent of A (d) Both (a) and (b).

62. **If two events A and B are independent, then [SM]**

(a) A and the complement of B are independent

(b) B and the complement of A are independent

(c) Complements of A and B are independent

(d) All of these (a), (b) and (c).

63. **If two events A and B are independent, then [SM]**

(a) They can be mutually exclusive (b) They can not be mutually exclusive

(c) They can not be exhaustive (d) Both (b) and (c).

64. **If two events A and B are mutually exclusive, then [SM]**

(a) They are always independent (b) They may be independent

(c) They can not be independent (d) They can not be equally likely.

65. **If a coin is tossed twice, then the events 'occurrence of one head', 'occurrence of 2 heads' and 'occurrence of no head' are [SM]**

(a) Independent (b) Equally likely (c) Not equally likely (d) Both (a) and (b).

66. **If P(A) = 0, then the event A [SM]**

(a) will never happen (b) will always happen (c) may happen (d) may not happen

67. **If P(A) = 1, then the event A is known as [SM]**

(a) symmetric event (b) dependent event (c) improbable event (d) sure event.

68. **If p : q are the odds in favour of an event, then the probability of that event is [SM]**

(a) p/q (b) p/p+q (c) q/p+q (d) None

69. **If P(A) = 5/9, then the odds against the event A is [SM]**

(a) 5 : 9 (b) 5 : 4 (c) 4 : 5 (d) 5 : 14

70. **If A, B and C are mutually exclusive and exhaustive events, then P(A) + P(B) + P(C) equals to [SM]**

(a)1/ 3 (b) 1 (c) 0 (d) any value between 0 and 1.

71. **If A denotes that a student reading in a school and B denotes that he playing cricket, then [SM]**

(a) $P(A \cap B) = 1$ (b) $P(A \cup B) = 1$ (c) $P(A \cap B) = 0$ (d) $P(A) = P(B)$.

72. **P(B/A) is defined only when [SM]**

(a) A is a sure event (b) B is a sure event

(c) A is not an impossible event (d) B is an impossible event.

73. **P(A/B') is defined only when [SM]**

(a) B is not a sure event (b) B is a sure event

(c) B is an impossible event (d) B is not an impossible event.

74. **For two events A and B, $P(A \cup B) = P(A) + P(B)$ only when [SM]**

(a) A and B are equally likely events (b) A and B are exhaustive events

(c) A and B are mutually independent (d) A and B are mutually exclusive.

75. **For any two events A and B, [SM]**

(a) $P(A-B) = P(A) - P(B)$ (b) $P(A-B) = P(A) - P(A \cap B)$

(c) $P(A-B) = P(B) - P(A \cap B)$ (d) $P(B-A) = P(B) + P(A \cap B)$.

76. **The number of conditions to be satisfied by three events A, B and C for complete independence is [SM]**

(a) 2 (b) 3 (c) 4 (d) any number.

77. **Values of a random variable are [SM]**

(a) always positive numbers. (b) always positive real numbers.

(c) real numbers (d) natural numbers.

78. **Expected value of a random variable [SM]**

(a) is always positive (b) may be positive or negative

(c) may be positive or negative or zero (d) can never be zero.

79. **If all the values taken by a random variable are equal then [SM]**

(a) its expected value is zero (b) its standard deviation is zero

(c) its standard deviation is positive (d) its standard deviation is a real number

Question Bank

1. **The probability of an event can assume any value between:** **[F-08]**
   (a) 0 and 1 (b) -1 and 0 (c) -1 and 1 (d) None of these

2. **In a pack of playing cards with two jokers probability of getting king of spade is** **[J-10]**
   (a) 4/13 (b) 4/52 (c) 1/52 (d) 1/54

3. **Three identical dice are rolled. The probability that the same number will appear on each of them is:** **[N-07]**
   (a)1/6 (b) 1/12 (c) 1/36 (d) 1

4. **The limiting relative frequency of probability is:** **[D-08]**
   (a) Axiomatic (b) Classical (c) Statistical (d) mathematical

5. **If x be the sum of two numbers obtained when two die are thrown simultaneously then $P \geq 7$ is[J-10]**
   (a) 5/12 (b) 7/12 (c)11/15 (d)3/8

6. **If two dice are thrown together then the probability of getting multiple of 3 on one die and multiple of 2 on other die is :** **[D-12]**
   (a) 2/3 (b) 1/6 (c) 1/3 (d) none

7. **Two coins are tossed simultaneously. Find the probability of getting exactly one head** **[D-13]**
   (a) 3/4 (b) 2/3 (c) 1/4 (d) 1/2

8. **An unbiased die is thrown twice. The probability of the sum of numbers obtained on the two faces being divisible by 4 is:** **[D-14]**
   (a) 7/36 (b) 1/3 (c) 11/36 (d) ¼

9. **In a non-leap year, the probability of getting 53 Sundays or 53 Tuesdays or 53 Thursdays is: [F-07]**
   (a) $\frac{4}{7}$ (b) $\frac{2}{7}$ (c) $\frac{3}{7}$ (d) $\frac{1}{7}$

10. **The odds are 9:5 against a person who is 50 years living till he is 70 and 8:6 against a person who is 60 living till he is 80. Find the probability at least one of them will be alive after 20 years:[F-08]**
    (a) $\frac{11}{14}$ (b) $\frac{22}{49}$ (c) $\frac{31}{49}$ (d) $\frac{35}{49}$

11. **The probability that a trainee will remain with a company is 0.8. The probability that an employee earns more than Rs. 20,000 per month is 0.4. The probability that an employee, who was a trainee and remained with the company or who earns more than R. 20,000 per month is 0.9. What is the probability that an employee earns more than Rs. 20,000 per month given that he is a trainee, who stayed with the company?** **[J-08]**
    (a) 5/8 (b) 3/8 (c) 1/8 (d) 7/8

12. **The odds in favour of A solving a problem is 5:7 and odds against B solving the same problem is 9:6. What is the probability that if both of them try, the problem will be solved?** **[D-10]**
    (a) 117/180 (b) 181/200 (c) 147/180 (d) 119/180

13. **If $P(A \cup B) = P(A)$, Find $P(A \cap B)$.** **[J-11]**
    (a) P(A).P(B) (b) P(A) + P(B) (c) 0 (d) P(B)

14. **The probability of Girl getting scholarship is 0.6 and the same probability for Boy is 0.8. Find the probability that at least one of the categories getting scholarship.**
(a) 0.32 (b) 0.44 (c) 0.92 (d) None of the above

15. **One Card is drawn from pack of 52, what is the probability that it is a king or a queen? [D-11]**
(a) 11/13 (b) 2/13 (c) 1/13 (d) None of these

16. **A card is drawn out of a standard pack of 52 cards. What is the probability of drawing a king or red colour? [J-12]**
(a) ¼ (b) 4/13 (c) 7/13 (d) 1/2

17. **The odds against A solving a problem are 4 to 3. And the odds in favour of B solving the same problem are 7 to 5. What is the probability that the problem will be solved if they both try?[D-12]**
(a) $\frac{15}{21}$ (b) $\frac{16}{21}$ (c) $\frac{17}{21}$ (d) $\frac{13}{21}$

18. **The probability of a cricket team winning match at Kanpur is 2/5 and losing match at Delhi is 1/7 what is the Probability of the team winning atleast one match ? [D-13]**
(a) 3/35 (b) 32/35 (c) 18/35 (d) 17/35

19. **From a pack of cards, two are drawn, the first being replaced before the second is drawn. The chance that the first is a diamond and the second is king is: [M-07]**
(a) $\frac{1}{52}$ (b) $\frac{3}{2704}$ (c) $\frac{4}{13}$ (d) $\frac{3}{52}$

20. **The theory of compound probability states that for any two events A and B;**
(a) $P(A \cap B) = P(A) \times P(B)$ (b) $P(A \cap B) = P(A) \times P(B/A)$
(c) $P(A \cup B) = P(A) \times P(B/A)$ (d) $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

21. **Suppose E and F are two events of a random experiment. If the probability of occurrence of E is 1/5 and the probability of occurrence of F given E is 1/10, then the probability of non-occurrence of at least one of the events E and F is: [A-07]**
(a) $\frac{1}{50}$ (b) $\frac{2}{25}$ (c) $\frac{13}{50}$ (d) $\frac{49}{50}$

22. **An article consists of two parts A and B The manufacturing process of each part is such that probability of defect in A is 0.08 and that B is 0.05. What is the probability that the assembled product will not have any defect? [N-07]**
(a) 0.934 (b) 0.864 (c) 0.85 (d) 0.874

23. **If P(A) = p and P (B) = q, then : [J-08]**
(a) $P(A/B) \leq q/p$ (b) $P(A/B) \geq p/q$
(c) $P(A/B) \leq p/q$ (d) $P(A/B) \geq q/p$

24. **If A and B are two independent events and $P(A \cup B) = 2/5$; P(B) = 1/3. Find P(A). [J-09]**
(a) 2/9 (b) -1/3 (c) 2/10 (d) 1/10

25. **A bag contains 12 balls of which 3 are red 5 balls are drawn at random. Find the probability that in 5 balls 3 are red.** **[J-09]**

(a) 3/132 (b) 5/396 (c) 1/36 (d) 1/22

26. **P(A) = 2/3; P(B) = 3/5; P(A ∪ B) = 5/6 Find P(B/A)** **[D-09]**

(a) 11/20 (b) 13/20 (c) 13/18 (d) None

27. **If P(A ∩ B) = P(A) x P(B), then the events are:** **[D-09]**

(a) Independent events (b) Mutually exclusive events

(c) Exhaustive events (d) Mutually inclusive events

28. **Consider two events A and B not mutually exclusive, such that P(A)= ¼,P(B) = 2/5, P(A ∪ B) = ½ then P (A. $\bar{B}$) is** **[J-10]**

(a) 3/7 (b) 2/10 (c)1/10 (d) None of the above

29. **If P(A/B) = P(A), then A and B are** **[D-10]**

(a) Mutually exclusive events (b) Dependent events (c) Independent events (d) Composite events

30. **A bag contains 3 white and 5 black balls and second bag contains 4 white and 2 black balls. If one ball is taken from each bag, the probability that both the balls are white is _____[D-10]**

(a) 1/3 (b) ¼ (c) ½ (d) None of these

31. **Let A and B two events in a sample space S such that P(A) = $\frac{1}{2}$; P($\bar{B}$)= $\frac{5}{8}$, P(A ∪ B)= $\frac{3}{4}$; Find P($\bar{A} \cap \bar{B}$)** **[J-12]**

(a) ¾ (b) ¼ (c) 3/18 (d) None of these.

32. **Find the probability of drawing a spade on each of two consecutive draws from a well shuffled pack of cards , without replacement :** **[J-12]**

(a) 2/51 (b) 1/17 (c) 4/51 (d) 5/51

33. **If P(A) = 0.45 , P(B) = 0.35 and P(A & B) = 0.25 , then P(A/B) ?** **[D-13]**

(a) 1.4 (b) 1.8 (c) 0.714 (d) 0.556

34. **Let the distribution function of a random variable X be F(x) = P(X ≤ x). Then F(5) - F(2) is:[J-14]**

(a) P (2 < X < 5) (b) P (2 ≤ X < 5) (c) P (2 ≤ X ≤ 5) (d) P (2 < X ≤ 5)

35. **An urn contains 9 balls two of which are red, three blue and four black. Three balls are drawn at random. The probability that they are of same colour is:** **[N-06]**

(a) $\frac{3}{27}$ (b) $\frac{20}{31}$ (c) $\frac{5}{84}$ (d) None

36. **The probability of getting qualified in IIT - JEE and AIEEE by a students are respectively $\frac{1}{5}$ and $\frac{3}{5}$. The probability that the student gets qualified for atleast one of the these tests is;[M-07]**

(a) $\frac{17}{25}$ (b) $\frac{22}{25}$ (c) $\frac{8}{25}$ (d) $\frac{3}{25}$

37. A bag contains 8 red and 5 white balls. Two successive draws of 3 balls are made without replacement. The probability that the first draw will produce 3 white balls and second 3 red balls is: [A-07]

(a) $\frac{6}{255}$ (b) $\frac{5}{548}$ (c) $\frac{7}{429}$ (d) $\frac{3}{233}$

38. Consider Urn 1:2 white balls, 3 black balls [D-10]

Urn II : 4 white balls, 6 black balls one ball is randomly transferred from first to second urn, then one ball is drawn from II Urn. The probability that drawn ball is white is

(a) 22/65 (b) 22/46 (c) 22/55 (d) 21/45

39. A bag contains 5 Red balls , 4 Blue balls and 'm' Green Balls. If the random probability of picking two green balls is 1/7. Find the value of m [J-11]

(a) 5 (b) 7 (c) 6 (d) none of the above

40. Four married couples have gathered in a room. Two persons are selected at random amongst them, find the probability that selected persons are a gentleman and a lady but not a Couple.[D-11]

(a) 1/7 (b) 3/7 (c) 1/8 (d) 3/8

41. Arun & Tarun appear for an interview for two vacancies. The probability of Arun's selection is 1/3 and that of Tarun's selection is 1/5 Find the probability that only one of them will be selected.[J-12]

(a) 2/5 (b) 4/5 (c) 6/5 (d) 8/5

42. A bag contains 6 red balls and some blue balls. If the probability of drawing a blue ball from the bag is twice that of drawing red ball. Find the no. of blue balls in the bag : [D-12]

(a) 10 (b) 12 (c) 14 (d) 16

43. A box contains 2 red , 3 green and 2 blue balls. Two balls are drawn at random. What is the probability that none of the balls drawn is blue ? [J-13]

(a) 10/21 (b) 11/21 (c) 2/7 (d) 5/7

44. The odds that a book will be favourably received by 3 independent reviewers are 5 to 2 , 4 to3 and 3 to 4 respectively. What is the probability that out of 3 reviewers a majority will be favourable ?[J-13]

(a) 209/343 (b) 209/434 (c) 209/443 (d) 209/350

45. An urn contains 2 red and 1 green balls. Another urn contains 2 red and 2 green balls. An urn was selected at random and then a ball was drawn from it. If it was found to be red then the probaibility that it has been drawn from urn one is _____. [J-14]

(a) 4/7 (b) 3/7 (c) 2/3 (d) 7/12.

46. A letter is taken out at random from the word RANGE and another is taken out from the word PAGE. The probability that they are the same letters is: [N-06]

(a) 1/20 (b) 3/20 (c) 3/5 (d) 3/4

47. **Among the examinees in an examination 30%, 35% and 45% failed in statistics, in Mathematics and in at least one of the subjects respectively. An examinee is selected at random Find the probability that the failed in mathematics only; [N-07]**

(a) 0.15 (b) 0.25 (c) 0.254 (d) 0.55

48. **If 10 men, among whom are A and B, stand in a row, what is the probability that there will be exactly 3 men between A and B? [F-08]**

(a) 11/15 (b) 4/15 (c) 1/15 (d) 2/15

49. **The probability of selecting a sample of size 'n' out of a population of size N by simple random sampling with replacement is : [J-13]**

(a) 1/N (b) $1/N^n$ (c) $1/{}^{N}C_{n}$ (d) $\frac{1}{{}^{N}C_{n} \, n!}$

50. **There are six slips in a box and numbers 1, 1, 2, 2, 3, 3 are written on these slips. Two slips are taken at random from the box. The expected values of the sum of numbers on the two slips is:[N-06]**

(a) 5 (b) 3 (c) 4 (d) 7

51. **The probability that there is at least one error in an account statement prepared by A is 0.3 and for B and C, they are 0.4 and 0.45 respectively, A, B and C prepared 20, 10 and 40 statements respectively. The expected number of correct statement in all is: [F-07]**

(a) 32 (b) 45 (c) 42 (d) 44

52. **Amitabh plays a game of tossing a dice. If the number less than 3 appears, he is getting Rs. a, otherwise he has to pay Rs. 10. If the game is fair, find a: [M-07]**

(a) 25 (b) 20 (c) 22 (d) 18

53. **A box contains 12 electric lamps of which 5 are defectives. A man selects three lamps at random. What is the expected number of defective lamps in his selection? [A-07]**

(a) 1.25 (b) 2.50 (c) 1.05 (d) 2.03

54. **Daily demand for calculators is having the following probability distribution: [N-07]**

Demand:	**1**	**2**	**3**	**4**	**5**	**6**
Probability:	**0.10**	**0.15**	**0.20**	**0.25**	**0.18**	**0.12**

Determine the variance of the demand.

(a) 2.54 (b) 2.93 (c) 2.22 (d) 2.19

55. **An urn contain 6 white and 4 black balls. 3 balls are drawn without replacement. What is the expected number of white balls.**

(a) 1.8 (b) 1.2 (c) 1.1 (d) None

56. **A random variable x hs the following probability distribution [J-08]**

x :	**-2**	**3**	**1**
P(X = x)	**1/3**	**1/2**	**1/6**

Find E (x^2) and E (2x+5)

(a) 6 and 7 resp. (b) 5 and 7 resp. (c) 7 and 5 resp. (d) 7 and 6 resp

57. **A random variable X has the following probability distribution**

X	0	1	2	3
P(x)	0	2k	3k	k

Then P(X < 3) would be

(a) 1/6 (b) 1/3 (c) 2/3 (d) 5/6

58. **E (XY) is also knows as:** **[D-09]**

(a) E(X) + E (Y) (b) E (X) E (Y) (c) E (X) -E (Y) (d) E (X) ÷ E(Y)

59. **E (13x+9) = _____.** **[J-10]**

(a) 13x (b) 13E(x) (c) 13E(x) +9 (d) 9

60. **A dice is thrown once. What is the mathematical expectation of the number on the dice?[D-10]**

(a) 16/6 (b) 13/2 (c) 3.5 (d) 4.5

61. **Two unbiased dice are thrown. The Expected value of the sum of numbers on the upper side is; [D-11]**

(a) 3.5 (b) 7 (c) 12 (d) 6

62. **A player tosses two fair coins, he wins Rs 5 if 2 heads appear, Rs 2 if one head appears and Rs 1 if no head occurs. Find his expected amount of winning.** **[J-12]**

(a) 2.5 (b) 3.5 (c) 4.5 (d) 5.5

63. **Find the expected value of the following probability distribution :** **[D-12]**

x	:	-20	-10	30	75	80
P (x = x)	:	3/20	1/5	1/2	1/10	1/20

(a) 20.5 (b) 22.5 (c) 21.5 (d) 24.5

64. **A player tosses 3 fair coins. He wins Rs. 5 if three heads appear, Rs. 3 if two heads appear , Rs. 1 if one head occurs . On the other hand , he losses Rs. 15 if 3 tails occur. Find expected gain of the player:** **[J-13]**

(a) 0.15 (b) 0.25 (c) 0.35 (d) 0.45

65. **Find the expected value of the following probability distribution :** **[D-13]**

X	:	-20	-10	30	75	80
P(x)	:	3/20	1/5	1/2	1/10	1/20

(a) 20.5 (b) 21.5 (c) 22.5 (d) 24.5

66. **A discrete random variable X takes three values -1, 2 and 3 with probabilities** $p(-1) = \frac{1}{3}, p(2) = \frac{1}{3}, p(3) = \frac{1}{3}$ **then E (|X|) is:** **[D-14]**

(a) 3/2 (b) 5/2 (c) 2 (d) 9/2

67 **When an unbiased dice is rolled, find the odds in favour of getting of multiple of 3. [D-14]**

(a) 1/6 (b) 1/4 (c) 1/2 (d) 1/3

68 **In a discrete random variable X follows uniform distribution and assumes only the values 8,9,11,15,18,20 Then P(X ≤ 15) is _____.** **[J-16]**

(a) $\frac{1}{2}$ (b) $\frac{1}{3}$ (c) $\frac{2}{3}$ (d) $\frac{2}{5}$

69 **A bag contains 6 white and 5 red balls. One ball is drawn. The probability that it is red is : [D-16]**
(a) 5/11 (b) 6/11 (c) 1/11 (d) None of the these

70 **Three coins are rolled, what is the probability of getting exactly two heads : [D-15]**
(a) 1/8 (b) 3/8 (c) 7/8 (d) 5/8

71 **If two unbiased dice are rolled, what is the probability of getting points neither sum 3 nor 6? [J-16]**
(a) 0.25 (b) 0.50 (c) 0.75 (d) 0.80

72 **Two dice are tossed. What is the probability that the total is divisible by 3 or 4. [J-16]**
(a) $\frac{20}{36}$ (b) $\frac{21}{36}$ (c) $\frac{14}{36}$ (d) None of these.

73 **$P(A_1) = 3/8$; $P(A_2) = 2/3$; $P(A_1 \cap A_2) = 1/4$ then A_1 and A_2 will be [J-15]**
(a) Mutually exclusive & independent (b) Exclusive but not independent
(c) Independent but not exclusive (d) None

74 **Two letter are drawn at random from word "Home" find the probability that there is no vowel. [D-15]**
(a) 5/6 (b) 1/6 (c) 1/3 (d) None of these

75 **A bag contains 15 one rupee coins, 25 two rupee coins and 10 five rupee coins. If a coin is selected at random from the bag, then the probability of not selecting a one rupee coin is :**
(a) 0.30 (b) 0.70 (c) 0.25 (d) 0.20

76 **If $P(A) = \frac{2}{3}$, $P(B) = \frac{3}{5}$ and $P(A \cup B) = \frac{5}{6}$ then $P\left(\frac{A}{B'}\right)$ is [J-16]**
(a) $\frac{7}{12}$ (b) $\frac{5}{12}$ (c) $\frac{1}{4}$ (d) $\frac{1}{2}$

77 **There are 6 positive and 8 negative numbers. Four numbers are selected at random without replacement and multiplied. Find the probability that the product is positive. [J-15]**
(a) $\frac{420}{1001}$ (b) $\frac{409}{1001}$ (c) $\frac{70}{1001}$ (d) $\frac{505}{1001}$

78 **A bag contains 4 Red and 5 Black balls. Another bag contains 5 Red and 3 Black balls. If one ball is drawn at random from each bag. Then the probability that one Red and one Black drawn is [J-16]**
(a) $\frac{12}{72}$ (b) $\frac{25}{72}$ (c) $\frac{37}{72}$ (d) $\frac{13}{72}$

79 **In a game, cards are thoroughly shuffled and distributed equally among four players. What is the probability that a specific player gets all the four kings? [J-16]**
(a) $\frac{{}^{13}C_4 \times {}^{48}C_{12}}{{}^{52}C_{13}}$ (b) $\frac{{}^{4}C_4 \times {}^{48}C_{9}}{{}^{52}C_{13}}$ (c) $\frac{{}^{13}C_4 \times {}^{52}C_{4}}{{}^{52}C_{13}}$ (d) $\frac{{}^{4}C_4 \times {}^{39}C_{9}}{{}^{52}C_{13}}$

80 **An unbiased coin is tossed 3 times, the expected value of the number of heads is[J-15]**
(a) 2.5 (b) 1.0 (c) 1.5 (d) 2

81. **The probability of getting atleast one 6 from 3 throws of a perfect die is [J-17]**
(a) $\frac{5}{6}$ (b) $\left(\frac{5}{6}\right)^3$ (c) $1-\left(\frac{1}{6}\right)^3$ (d) $1-\left(\frac{5}{6}\right)^3$

82. For any two events A and B [J-17]

(a) P(A-B) = P(A)-P(B) (b) P(A-B) = P(A) - P(A∩B)

(c) P(A-B) = P(B) - P(A∩B) (d) P(B-A) = P(B) - P(A∩B)

83. If $P(A) = \frac{2}{3}$, $P(B) = \frac{1}{4}$, $P(A \cap B) = \frac{1}{12}$ then $P\left(\frac{B}{A}\right) =$ [J-17]

(a) 1/8 (b) 7/8 (c) 8/7 (d) None

84. For the events A & B if $P(A) = \frac{1}{2}$, $P(B) = \frac{1}{3}$ and $P(A \cap B) = \frac{1}{4}$ then $P\left(\frac{A}{B}\right) =$ [D-17]

(a) 1/2 (b) 1/6 (c) 2/3 (d) 3/4

85. If A & B are two mutually exclusive events such that $P(A \cup B) = \frac{2}{3}$, $P(A) = \frac{2}{5}$, then P (B) : [D-17]

(a) 4/15 (b) 4/9 (c) 5/9 (d) 7/15

86. If a brother and a sister are applied for 2 vacancies in the same post. The probability that brother will select is 1/7 and that of sister is 1/5, then the probability that (i) Both will select (ii) Only one will select, (iii) None of them will select : [D-17]

(a) $\frac{1}{35}, \frac{10}{35}, \frac{24}{35}$ (b) $\frac{27}{35}, \frac{7}{35}, \frac{14}{35}$ (c) $\frac{3}{35}, \frac{24}{35}, \frac{11}{35}$ (d) $\frac{24}{35}, \frac{6}{35}, \frac{20}{35}$

87. The distribution of demand is as follows: [D-17]

Demand	5	6	7	8	9	10
Probability	0.05	0.1	0.3	0.4	0.1	0.05

The mean is given by

(a) 7.55 (b) 7.85 (c) 1.25 (d) 8.35

88. What is the probability of having at least one six from 3 throws of a perfect die? (J-18)

(a) $\frac{5}{6}$ (b) $\left(\frac{5}{6}\right)^3$ (c) $1-\left(\frac{1}{6}\right)^3$ (d) $1-\left(\frac{5}{6}\right)^3$

89. The probability of winning the game of a team is 2/3. What is the probability of winning more than half of games in four games: (J-18)

(a) 16/27 (b) 27/64 (c) 19/81 (d) 8/64

90. A coin is tossed six times, then the probability of obtaining heads and tails alternatively is (N-18)

(a) 1/2 (b) 1/64 (c) 1/32 (d) 1/16

91. Ram is known to hit a target in 2 out of 3 shots where as Shyam is known to hit the same target in 5 out of 11 shots. What is the probability that the target would be hit if they both try? (N-18)

(a) 9/11 (b) 3/11 (c) 10/33 (d) 6/11

92. Two different dice are thrown simultaneously then the probability, that the sum of two numbers appearing on the top of dice is 9 as (N-18)

(a) 8/9 (b) 1/9 (c) 7/9 (d) None of these

93. **If P $(A \cup B) = 0.8$ and $P(A \cap B) = 0.3$, then $P(\bar{A}) + P(\bar{B})$ is equal to (N-18)**
(a) 0.3 (b) 0.5 (c) 0.7 (d) 0.9

94. **The probability that a student is not a swimmer is 1/5, then the probablity that out of 5 students four are swimmer is. (N-18)**
(a) $\left(\frac{4}{5}\right)^4\left(\frac{1}{5}\right)$ (b) ${}^5C_1\left(\frac{1}{5}\right)^4\left(\frac{4}{5}\right)$ (c) ${}^5C_4\left(\frac{4}{5}\right)^4\left(\frac{1}{5}\right)$ (d) None of these

95. **If a coin is Tosssed 5 times then the probability of getting Tail and Head occurs alternatively is [J-19]**
(a) $\frac{1}{8}$ (b) $\frac{1}{16}$ (c) $\frac{1}{32}$ (d) $\frac{1}{64}$

96. **According to bayee's theorem, [J-19]**

$$P(E_k / A) = \frac{p(E_k)P(A/E_k)}{\sum_{i=1}^{n} P(E_i)P(A/E_i)} \text{ here}$$

(a) E_1, E_2_____ **are mutually exclusive**
(b) $P(E/A_1), P(E/A_2)$_____ are equal to 1
(c) $P(A_1/E), P(A2/E)$_____ are equal to 1
(d) A & E_1's are disjoint sets.

97. **If two letters are taken at random from the word HOME, what is the Probability that none of the letters would be vowels: [N-19]**
(a) 1/6 (b) 1/2 (c) 1/3 (d) 1/4

98. **A bag contains 15 one rupee coins, 25 two rupee coins and 10 five rupee coins. If a coin is selected at random from the bag, then the probability of not selecting a one rupee coin is: [N-19]**
(a) 0.30 (b) 0.70 (c) 0.25 (d) 0.20

99. **The chance of getting 7 or 11 in a throw of 2 dice is [N-19]**
(a) 7/9 (b) 5/9 (c) 2/9 (d) None of these

100. **The peson A speaks truth 75% times and B in 80% of times, In what percentage of times are they likely to contradict each other in narrating the same incident ? [N-20]**
(a) 0.60 (b) 0.6 (c) 0.65 (d) 0.35

101. **A basket contains 15 apples, 24 mangoes and 10 bananas. If a fruit is selected at random from the basket, then the probability of not selecting as apple is- [N-20]**
(a) 0.20 (b) 0.25 (c) 0.30 (d) 0.70

102. **If an unbiased coin is tossed twice, the probbillity of obtaining at least one tail is - [N-20]**
(a) 1 (b) 0.5 (c) 0.75 (d) 0.25

103. **When three fair dice are rolled simultaneously, what is the probabilityof getting a number on third die greater then the sum of numbers appeared on the first two dice ? [N-20]**
(a) 12/216 (b) 24/216 (c) 36/216 (d) None of these

104. **Two fair dice are rolled simultaneously What is the probability of getting a sum of the out comes from the dice is a multiple of 3 ? [N-20]**
(a) 4/36 (b) 12/36 (c) 6/36 (d) 9/36

[CH.-16] [PROBABILITY]									
EXERCISE - I									
1	b	19	a	35 (iii)	b	47	b	65	b
2	d	20	b	35 (iv)	c	48	a	66	b
3	b	21	b	36 (i)	a	49	c	67	c
4	b	22	d	36 (ii)	c	50	d	68	d
5	a	23	a	36 (iii)	b	51	c	69	d
6	b	24	c	36 (iv)	c	52	a	70	a
7	c	25	c	37 (i)	a	53	a	71	c
8	c	26	b	37 (ii)	b	54	b	72	c
9	d	27	a	37 (iii)	b	55	a	73	c
10	c	28	a	38	c	56	d	74	c
11	a	29	b	39	d	57	b	75	b
12	c	30	a	40	d	58	d	76	b
13	b	31	c	41	a	59	b	77	c
14	a	32	b	42	a	60	a	78	b
15	c	33	c	43	a	61	a	79	b
16	b	34	a	44	b	62	c	80	a
17	b	35 (i)	c	45	d	63	b		
18	b	35 (ii)	a	46	a	64	b		
EXERCISE-II									
1	(i) b	3	b	8	a	13	b	18	c
	(ii) a	4	a	9	a	14	a	19	b
	(iii) d	5	c	10	a	15	b	20	d
	(iv) a	6	a	11	b	16	a	21	d
2	b	7	a	12	a	17	a		
Exercise-III									
1	c	3	b	5	b	7	b	9	d
2	b	4	c	6	a	8	d		

Exercise-IV									
1	b	12	b	24 (ii)	c	34	a	43	c
2	b	13	a	25 (i)	b	35	c	44 (i)	a
3	c	14	c	25 (ii)	c	36	c	44 (ii)	a
4	b	15	b	25 (iii)	b	37	d	44 (iii)	c
5	a	16	a	25 (iv)	a	38	b	45	c
6	b	17	c	26	a	39 (i)	a		
7	a	18	a	27	c	39 (ii)	b		
8 (i)	c	19	d	28	b	39 (iii)	b		
8 (ii)	a	20	b	29	a	39 (iv)	c		
8 (iii)	c	21	c	30	c	39 (v)	b		
9	d	22	a	31	a	40	c		
10	b	23	b	32	c	41	a		
11	c	24 (i)	b	33	d	42	b		

Exercise-V									
1 (i)	a	2	d	7	c	12	c	17	c
1 (ii)	a	3	c	8	a	13	a		
1 (iii)	d	4	c	9	d	14	c		
1 (iv)	d	5	a	10	c	15	b		
1 (v)	a	6	a	11	b	16	a		

Exercise-VI									
1	b	6	b	11	b	16	a	21	d
2	a	7	c	12	a	17	c	22	b
3	a	8	b	13	c	18	c	23	b
4	c	9	c	14	d	19	a	24	b
5	b	10	b	15	d	20	c	25	d

Exercise-VII									
1	d	18	b	35	b	52	c	69	c
2	a	19	d	36	a	53	a	70	b
3	d	20	a	37	a	54	c	71	c
4	c	21	a	38	d	55	d	72	c
5	a	22	a	39	c	56	a	73	a
6	c	23	c	40	c	57	c	74	d
7	b	24	d	41	b	58	d	75	b
8	d	25	a	42	c	59	c	76	c
9	d	26	b	43	b	60	b	77	c
10	c	27	c	44	a	61	d	78	c
11	a	28	d	45	b	62	d	79	b
12	c	29	b	46	c	63	b		
13	d	30	a	47	b	64	c		
14	d	31	b	48	c	65	c		
15	c	32	d	49	a	66	a		
16	a	33	b	50	c	67	d		
17	c	34	c	51	c	68	b		

QUESTION BANK									
1	d	22	d	43	a	64	b	85	a
2	d	23	c	44	a	65	b	86	a
3	c	24	d	45	a	66	c	87	a
4	c	25	d	46	b	67	c	88	d
5	b	26	b	47	a	68	c	89	a
6	d	27	a	48	d	69	a	90	c
7	d	28	c	49	b	70	b	91	a
8	d	29	c	50	c	71	d	92	b
9	c	30	b	51	c	72	a	93	d
10	c	31	b	52	b	73	c	94	c
11	b	32	b	53	a	74	b	95	b
12	a	33	c	54	c	75	b	96	a
13	d	34	d	55	a	76	a	97	a
14	c	35	c	56	a	77	d	98	b
15	b	36	a	57	d	78	c	99	c
16	c	37	c	58	b	79	b	100	d
17	b	38	c	59	c	80	c	101	d
18	b	39	c	60	c	81	d	102	c
19	a	40	b	61	b	82	b	103	d
20	b	41	a	62	a	83	a	104	b
21	d	42	b	63	c	84	d		

Space For Notes

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