Statistics MCQ Question Bank

Second Paper

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1 Introduction to Probability

1.1 Permutation-Combination

1. **Three objects can be placed in 2 positions in – ways.**
   (a) 3   (b) 4   (c) 6   (d) 8

2. **In how many ways can a team of 2 be formed from 4 people?**
   (a) 4   (b) 6   (c) 8   (d) 12

3. $^{n}p_{r} =$
   (a) $\dfrac{n!}{(n-r)!}$ (b) $\dfrac{n!}{(n+r)!}$ (c) $\dfrac{n!}{r!}$ (d) $\dfrac{n!}{(r-n)!}$

4. $^{n}C_{r} =$
   (a) $\dfrac{n!}{(n-1)!(n+r)!}$ (b) $\dfrac{r!}{n!(n-r)!}$ (c) $\dfrac{n!(n-1)!}{r!}$ (d) $\dfrac{n!}{(r-n)!}$

1.2 Conceptual Questions

5. **10 out of each 100 people in a city walk to the office. If one is picked randomly, what is the probability s/he does not walk to the office?**
   (a) 0.95   (b) 0.10   (c) 0.90   (d) 0.01

6. **A coin is thrown thrice. How many outcomes are generated?**
   (a) 3   (b) 4   (c) 8   (d) 9

7. **A die is thrown twice. This is called –**
   (a) An experiment   (b) sample space   (c) A random experiment   (d) A trial

8. **Possible value of probability**
   i. -1   ii. 0.5   iii. 0
   Which one is correct?
   (a) i and ii   (b) i and iii   (c) ii and iii   (d) i, ii and iii

9. **An act repeated under some specific conditions is called –**
   (a) Event   (b) Experiment   (c) Sample   (d) Sample space

10. $P(0)$ **implies –**
    (a) A certain event   (b) An uncertain event   (c) An impossible event   (d) A probable event

11. **Events having some common elements are called –**
    (a) Complementary events   (b) Mutually exclusive events
    (c) Exhaustive events   (d) Non-Mutually exclusive events events

12. **The minimum value of probability is**
    (a) $-\alpha$ (b) 1   (c) 0   (d) -1

13. **Each element of sample space is called–**
    (a) Trial   (b) Experiment   (c) Variable   (d) Sample Point

14. **Two events not ocurring together are called–**
    (a) dependent Events
    (b) Independent Events
    (c) Mutually Exclusive Events
    (d) Marginal Events

15. **If A and B are independent, which formula is correct?**
    (a) $P(A \cap B) = P(A) \cdot P(B)$
    (b) $P(A \cap B) = P(\bar{A}) \cdot P(B)$
    (c) $P(A \cap B) = P(A) \cdot P(\bar{B})$
    (d) $P(A \cap \bar{B}) = P(A) \cdot P(B)$

    Answer the next three questions based on the following information.

    A card is drawn from of pack of playing cards.

16. **What is the probability that the card is a King?**
    (a) 0.0192
    (b) 0.25
    (c) 0.5
    (d) 0.0769

17. **P(The card is not from Diamonds)–**
    (a) $\frac{1}{2}$
    (b) 0
    (c) $\frac{3}{4}$
    (d) $\frac{1}{4}$

18. **P(The card is red or Clubs)**
    (a) $\frac{1}{4}$
    (b) $\frac{1}{2}$
    (c) $\frac{2}{3}$
    (d) $\frac{3}{4}$

19. **If a neutral die is thrown, the probability of having a digit greater than 6 is**
    (a) $\frac{1}{6}$
    (b) $\frac{0}{6}$
    (c) $\frac{2}{3}$
    (d) $\frac{3}{6}$

20. **Tossing a coin twice generates how many outcomes?**
    (a) 4
    (b) 16
    (c) 8
    (d) 2

21. **The probability of two disjoint sets happening together is:**
    (a) 0.5
    (b) 0
    (c) 1
    (d) $0 \leq x < 1$

    Answer the next three questions using the following information

    $P(A) = \frac{1}{3}, P(B) = \frac{1}{2} \& P(A \cup B) = \frac{7}{12}$

22. $P(A \cap B) =$?
    (a) $\frac{5}{12}$
    (b) $\frac{1}{2}$
    (c) $\frac{1}{4}$
    (d) $\frac{15}{16}$

23. $P(A \cap \bar{B}) =$?
    (a) $\frac{1}{4}$
    (b) $\frac{3}{4}$
    (c) $\frac{5}{6}$
    (d) $\frac{1}{12}$

24. **What is the probability that B occurs or A does not occur?**
    (a) $\frac{3}{4}$
    (b) $\frac{7}{12}$
    (c) $\frac{5}{12}$
    (d) $\frac{11}{12}$

25. **An un contains 10 red and 5 black balls. Two balls are drawn; what is the probability of getting two red balls?**
    (a) $\frac{3}{7}$
    (b) $\frac{4}{7}$
    (c) $\frac{20}{21}$
    (d) $\frac{2}{21}$

2 Random Variables

2.1 Concept of Random Variable

26. **A set of sample points tabulated along with their respective probabilities is an example of**
    –

    (a) Probability distribution
    (b) Probability function
    (c) Frequency distribution
    (d) Marginal probability distribution

27. **How many conditions does a probability density function have?**
    (a) 2   (b) 3   (c) 4   (d) 5

28. **Which one is a property of marginal probability density function?**

    (a) $\int_x f(x^2)\, dx = 1$ (b) $\int_x f(x^2)\, dx = 0.5$ (c) $\int_x f(x)\, dx = 1$ (d) $P(x \geq 1)$

29. **Which one is NOT an example of a continuous random variable –**
    (a) Weight   (b) Height   (c) Time   (d) Size of television

30. **Integrated value of $\frac{1}{4}x^4$ –**
    (a) $\frac{1}{20}x^5$ (b) $\frac{1}{20}x^5 + c$ (c) $\frac{1}{5}x^4$ (d) $\frac{5}{4}x^5$

31. **The conditions of a probability distribution are–**
    i. $\sum P(X) = 1$
    ii. $\sum P(X) = 0$
    iii. $0 \leq P(X) \leq 1$
    Which one is correct?
    (a) i and ii   (b) i and iii   (c) ii and iii   (d) i, ii and iii

32. **What is $F(\infty)$ for a distribution function $F(x)$?**
    (a) $-\infty$ (b) -1   (c) 0   (d) 1

33. **What is $F(-\infty)$ for a distribution function $F(x)$?**
    (a) $-\infty$ (b) -1   (c) 0   (d) 1

34. **How many types of random variables are there?**
    (a) 2   (b) 3   (c) 4   (d) 5

35. **Which of the following is not a discrete random variable?**
    (a) umber of students
    (b) Weight
    (c) Number of heads in coin toss
    (d) Population

36. **Which one is a property of a probability distribution?**
    (a) $P(x_i) = 0$ (b) $P(x_i \neq 1)$ (c) $\Sigma P(x_i) = 1$ (d) $\int_x P(X)dx \leq 1$

37. **Which one is not a discrete random variable?**
    (a) Number of studnets
    (b) Weight
    (c) Number of heads in five coin tosses
    (d) Released version number of a software

38. **Which one is a property of joint probability distribution?**
    (a) $P(X_i, Y_j) < 1$ (b) $P(X_i, Y_j) = 0$ (c) $P(X_i, Y_j) < 0$ (d) $0 \leq P(X_i, Y_j) \leq 1$

2.2 Misc

Answer the next two questions using the following information

x	1	2	3	4	5	6
P(x)	k	2k	3k	4k	5k	6k

39. **What is the value of k?**

    (a) $\frac{7}{21}$ (b) $\frac{5}{21}$ (c) $\frac{1}{21}$ (d) 1

40. **What is the type of variable X?**

    (a) Discrete   (b) Discrete random   (c) Continuous   (d) Continuous random

    Answer the next THREE questions using the following information

    $$P(x) = \frac{x+1}{k}; x = 1, 2, 3, 4$$

41. **What is the value of k?**

    (a) 10   (b) 11   (c) 14   (d) 15

42. $F(2) = -$

    (a) $\frac{2}{14}$ (b) $\frac{3}{11}$ (c) $\frac{5}{14}$ (d) $\frac{5}{11}$

43. $P(x)$ **is a** $-$

    (a) Joint probability distribution   (b) Cumulative probability distribution

    (c) Probability mass function   (d) Probability Density function

44. **The example of a discrete random variable is–**

    i. Binomial variate

    ii. Poisson variate

    iii. Normal variate

    Which one is correct?

    (a) i and ii   (b) i and iii   (c) ii and iii   (d) i, ii and iii

45. $f(x) = 2x; 0 < X < 3$**; What is F(3)?**

    (a) 3   (b) 0   (c) 1   (d) 0

    Answer the next two questions based on the following information:

    $P(x, y) = \frac{1}{21}(x + y); x = 1, 2, 3$ and $y = 1, 2$

46. **P(x)=?**

    (a) $P(x) = \frac{2x+3}{21}$ (b) $P(x) = \frac{x+3}{27}$ (c) $P(x) = \frac{4x+3}{21}$ (d) $P(x) = \frac{2x+5}{21}$

47. **P(y)=?**

    (a) $\frac{y+2}{7}$ (b) $\frac{y+3}{7}$ (c) $\frac{3y+2}{7}$ (d) $\frac{y+2}{9}$

48. **If** $f(x) = kx^3; -1 \leq x \leq 1$**, then k is**

    i) positive

    ii) negative

    iii) lies from -1 to 1

    (a) i   (b) ii   (c) iii   (d) i and ii

    Answer the next two questions based on the following information.

x	4	5	6	3	2	1
P(X)	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$

49. The value of $P(3 < X < 5)$ is:

(a) $\frac{1}{2}$ (b) $\frac{1}{6}$ (c) $\frac{1}{3}$ (d) 0

50. $P(x \neq 2) is :$

(a) $\frac{5}{6}$ (b) 0

(c) 1   (d) Can't be found from this information

3   Mathematical Expectation

51. What is the expected value of of the squared deviation of the value of the random variable from their mean?

(a) Arithmetic Mean   (b) Expectation   (c) Variance   (d) Co-variance

52. What is the minimum value of variance a random variable?

(a) $-\infty$ (b) 1   (c) 0   (d) -1

53. If $y = ax + b$, what is the value of $V(y)$?

(a) $aV(X)$ (b) $a^2 V(X)$ (c) $V(X)$ (d) a^2

54. If $y = ax + b$, what is the value of $E(y)$?

(a) $aE(X) + b$ (b) $a^2 E(X)$ (c) $E(X)$ (d) b

55. What is the value of $V(5)$?

(a) 0   (b) 25   (c) 5   (d) 1

56. If $P(x) = \frac{1}{n}; x = 1, 2, 3, \cdots, n$, what is the value of $E(X)$?

(a) $\frac{n}{2}$ (b) $\frac{n-1}{2}$ (c) $\frac{n+1}{2}$ (d) $n + 1$

57. If $P(x) = \frac{4 - |5 - x|}{k}; x = 2, 3, 4, \cdots 8$, what is the value of k?

(a) 5   (b) 8   (c) 16   (d) 24

58. Expected value of a constant a is −

(a) 1   (b) Variance   (c) a   (d) a+1

59. The variance of a constant m is −

(a) 0   (b) 1   (c) m   (d) m^2

60. What is $V(X - Y) equal to$?

(a) $V(X) + V(Y)$ (b) $V(X) + V(Y) - 2Cov(X, Y)$

(c) $V(X) - V(Y)$ (d) $V(X) + V(Y) + 2Cov(X, Y)$

61. What is the value of V(2X+5)?

(a) $4V(X) - 5$ (b) 20   (c) $4V(X)$ (d) 0

62. If $P(x) = \frac{1}{20}; x = 1, 2, 3, \cdots, 20$, what is the standard deviation?

(a) 1   (b) 5.77   (c) 7.75   (d) 12.57

63. **Expectation measures –**
   (a) Dispersion   (b) Skewness   (c) Kurtosis   (d) Central tendency

64. **If $E(X) = -0.5$, then $E(1 - 2X) =$?**
   (a) 0   (b) -1   (c) 2   (d) 1

65. **If $P(X) = \frac{1}{10}; x = 1, 2, \cdots 10$, then $E(X) =$?**
   (a) 10   (b) 5.5   (c) 0   (d) 11

66. **Which formula of variance is correct?**
   (a) $V(X + Y) = V(X) + V(Y) - 2Cov(X, Y)$ (b) $V(X + Y) = V(X) + V(Y) + 2Cov(X, Y)$
   (c) $V(X + Y) = V(X) + V(Y) - 2Cov(X, Y)$ (d) $V(X + Y) = V(X) - V(Y) + 2Cov(X, Y)$

67. **X is a constant; what is the value of $V(\frac{X}{2})$?**
   i) 0
   ii) $\frac{1}{2}$
   iii) $\frac{1}{4}$
   (a) ii   (b) i   (c) iii   (d) i and iii

68. **If $E(X) = 2, E(X^2) = 8, V(X) = --$**
   (a) 0   (b) 2   (c) 4   (d) 8

69. **If $P(x) = \frac{4-|5-x|}{k}; x = 2, 3, 4, \cdots 8$, what is the value of $E(X)$?**
   (a) 3   (b) 8   (c) 16   (d) 5

70. **If $P(x) = \frac{6-|7-x|}{k}; x = 2, 3, 4, \cdots 12$, what is the value of $E(X)$?**
   (a) 6   (b) 9   (c) 13   (d) 36

71. **If $P(x) = \frac{3-|4-x|}{k}; x = 2, 3, 4, \cdots 6$, what is the value of k?**
   (a) 6   (b) 9   (c) 10   (d) 40

72. **If the variance of X is 3, what is the variance of V(3)?**
   (a) 1   (b) 2   (c) 3   (d) 0

73. **If $V(X) = 5,$, what is $V(X + 5)$?**
   (a) 0   (b) 5   (c) 10   (d) 25

74. **If $V(X) = 5,$, what is $V(2X + 5)$?**
   (a) 20   (b) 5   (c) 10   (d) 25

4   Binomial Distribution

75. **How many parameters are there in a binomial distribution?**
   (a) 1   (b) 2   (c) 3   (d) 4

76. **What is the Mean of Binomial Distribution?**
   (a) np   (b) npq   (c) nq   (d) $\sqrt{npq}$

77. **What is the Variance of Binomial Distribution?**
   (a) np   (b) npq   (c) nq   (d) $\sqrt{npq}$

78. **What is the Standard Deviation of Binomial Distribution?**
    (a) np   (b) npq   (c) nq   (d) $\sqrt{npq}$

79. **What is the Coefficient of Variation of Binomial Distribution?**
    (a) np   (b) npq   (c) $\frac{q}{np}$ (d) $\sqrt{npq}$

80. **Which is true of mean (np) of Binomial Distribution?**
    (a) $np = 0$ (b) $np < 0$ (c) $np > 0$ (d) $np \neq 0$

81. **In a Binomial distribution, how are mean and variance related?**
    (a) $Mean > Variance$ (b) $Mean < Variance$
    (c) $Mean = Variance$ (d) $Mean = 2 \times Variance$

82. **When does Binomial distribution tend to Poisson distribution?**
    (a) $n \to \infty$ and $p \to \infty$ (b) $n \to 0$ and $p \to 0$ (c) $n \to \infty$ and $p \to 0$ (d) $n \to 0$ and $p \to \infty$
    Answer the next two questions based on the following information.
    X is a binomial variate with expectation 4 and standard deviation $\sqrt{3}$.

83. **What are the values of the parameters (mean and probability)?**
    (a) $16, \frac{1}{4}$ (b) $16, \frac{3}{4}$ (c) $15, \frac{1}{4}$ (d) $10, \frac{1}{4}$

84. **What is $P(X \neq 0)$?**
    (a) 0   (b) 0.01   (c) 0.99   (d) 1

5   Poisson Distribution

85. **What is the mean of Poisson distribution**
    (a) $\frac{1}{\sqrt{m}}$ (b) m (c) $\frac{1}{m}$ (d) $1 + \frac{1}{m}$

86. **Which relationship between mean and variance of Poisson Distribution is correct?**
    (a) $Mean > Variance$ (b) $Mean < Variance$ (c) $Mean = Variance$ (d) $Mean \neq Variance$

87. **What is the Variance of Poisson Distribution(with parameter m)?**
    (a) $\frac{1}{\sqrt{m}}$ (b) $\frac{1}{m}$ (c) m (d) $\frac{1}{m+1}$

88. **What is the Standard Deviation of Poisson Distribution(with parameter m)?**
    (a) $\frac{1}{\sqrt{m}}$ (b) $\frac{1}{m}$ (c) $\sqrt{m}$ (d) $\frac{1}{m+1}$

89. **Which one is true of the parameter (m) of Poisson Distribution?**
    (a) $m = 0$ (b) $m < 0$ (c) $m > 0$ (d) $m = 1$

90. **The parameter of a Poisson Distribution is 5. What is its mean?**
    (a) 2   (b) 5   (c) 2.24   (d) 25

91. **When does Binomial Distribution tend to Poisson Distribution?**
    (a) $n \to \infty, p \to 0$ & np is finite   (b) $n \to \infty, p \to 0$ & np is infinite
    (c) $n \to \infty, p 0 \infty$ & np is finite   (d) $n \to 0, p \to \infty$ & np is infinite

92. **The parameter of a Poisson variate is 2. What is its variance?**
    (a) 0   (b) 4   (c) $\sqrt{2}$ (d) 2

93. **X is a Poisson variate. P(2) = P(4). What is the value of the parameter?**

(a) 12   (b) 3.46   (c) 3.6   (d) 4

94. **Mean of a Poisson variate is a. What is its standard deviation?**

(a) 0   (b) a   (c) $a^{\frac{1}{2}}$ (d) a^2

6   Vital Statistics

95. **What is the called the ratio of the dependent population to the earning population?**

(a) Dependency ratio   (b) Sex ration   (c) Population density   (d) Growth rate

96. **What is the formula of population density?**

(a) $\frac{M}{F} \times 100$ (b) $\frac{F}{M} \times 100$ (c) $\frac{B}{P} \times 100$ (d) $\frac{P}{A}$

97. **In the following data, what is the dependency ratio?**

Age	0-14	15-24	25-34	35-44	45-54	55-64	65+
Populatation	31,500	40,000	48,000	41,000	32,000	25,000	16,000

(a) 35.54%   (b) 25.54%   (c) 23.24%   (d) 31.25%

98. **Crude Birth Rate (CBR) is:**

(a) $\frac{B}{P} \times 100$ (b) $\frac{B}{P} \times 1000$ (c) $\frac{P}{B} \times 100$ (d) $\frac{F}{P} \times 100$

99. **Which one is a measure of reproduction?**

i) CBR
ii) CDR
iii) NRR

(a) i   (b) ii   (c) iii   (d) i and ii

100. **The number of people living per unit area is called–**

(a) Population Index   (b) Population Density

(c) Human Development Index   (d) Dependency Ratio

101. **Which formula of GFR is accurate?**

(a) $GFR = \frac{B}{P} \times 1000$ (b) $GFR = \frac{B}{F_{15-49}} \times 1000$

(c) $GFR = \frac{B_i}{F_i} \times 1000$ (d) $GFR = \frac{G_i}{F{15-49}} \times 1000$

Answer Key:

1. (c) 6

2. (b) 6

3. (a) $\dfrac{n!}{(n-r)!}$

4. (a) $\dfrac{n!}{(n-1)!(n+r)!}$

5. (c) 0.90

6. (c) 8

7. (a) An experiment

8. (c) ii and iii

9. (b) Experiment

10. (c) An impossible event

11. (a) Complementary events

12. (c) 0

13. (d) Sample Point

14. (c) Mutually Exclusive Events

15. (a) $P(A \cap B) = P(A) \cdot P(B)$

16. (d) 0.0769

17. (c) $\frac{3}{4}$

18. (d) $\frac{3}{4}$

19. (b) $\frac{0}{6}$

20. (a) 4

21. (b) 0

22. (c) $\frac{1}{4}$

23. (a) $\frac{1}{4}$

24. (d) $\frac{11}{12}$

25. (a) $\frac{3}{7}$

26. (a) Probability distribution

27. (b) 3

28. (c) $\displaystyle\int_x f(x)\,dx = 1$

29. (d) Size of television

30. (b) $\frac{1}{20}x^5 + c$

31. (b) i and iii

32. (d) 1

33. (c) 0

34. (a) 2

35. (b) Weight

36. (c) $\Sigma P(x_i) = 1$

37. (d) Released version number of a software

38. (d) $0 \leq P(X_i, Y_j) \leq 1$

39. (c) $\frac{1}{21}$

40. (b) Discrete random

41. (c) 14

42. (c) $\frac{5}{14}$

43. (c) Probability mass function

44. (a) i and ii

45. (c) 1

46. (a) $P(x) = \frac{2x+3}{21}$

47. (c) $\frac{3y+2}{7}$

48. (a) i

49. (b) $\frac{1}{6}$

50. (a) $\frac{5}{6}$

51. (c) Variance

52. (c) 0

53. (b) $a^2 V(X)$

54. (a) $aE(X) + b$

55. (a) 0

56. (c) $\frac{n+1}{2}$

57. (c) 16

58. (c) a

59. (a) 0

60. (c) $V(X) - V(Y)$

61. (c) $4V(X)$

62. (a) 1

63. (d) Central tendency

64. (c) 2

65. (b) 5.5

66. (b) $V(X + Y) = V(X) + V(Y) + 2Cov(X, Y)$

67. (b) i

68. (c) 4

69. (d) 5

70. (d) 36

71. (b) 9

72. (d) 0

73. (b) 5

74. (a) 20

75. (b) 2

76. (a) np

77. (b) npq

78. (d) $\sqrt{npq}$

79. (c) $\frac{q}{np}$

80. (c) $np > 0$

81. (a) $Mean > Variance$

82. (c) $n \to \infty$ and $p \to 0$

83. (a) 16, $\frac{1}{4}$

84. (c) 0.99

85. (b) m

86. (c) $Mean = Variance$

87. (c) m

88. (c) $\sqrt{m}$

89. (c) $m > 0$

90. (b) 5

91. (a) $n \to \infty, p \to 0$ & np is finite

92. (d) 2

93. (b) 3.46

94. (c) $a^{\frac{1}{2}}$

95. (a) Dependency ratio

96. (d) $\frac{P}{A}$

97. (b) 25.54%

98. (b) $\frac{B}{P} \times 1000$

99. (c) iii

100. (b) Population Density

101. (b) $GFR = \frac{B}{F_{15-49}} \times 1000$