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) $\frac{n!}{(n-r)!}$ (b) $\frac{n!}{(n+r)!}$ (c) $\frac{n!}{r!}$ (d) $\frac{n!}{(r-n)!}$

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

1.2 Conceptual Questions

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

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

7. **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

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

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

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

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

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

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

14. **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) $P(A \cap \bar{B}) = P(A) \cdot P(B)$

1.3 Problems of Probability

Answer the next three questions based on the following information.

A card is drawn from of pack of playing cards.

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

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

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

18. **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) $\frac{3}{6}$

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

20. **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

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

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

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

23. **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) $\frac{11}{12}$

24. **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

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

26. **The conditions of a probability distribution are–**

i. $\sum P(X) = 1$

ii. $\sum P(X) = 0$

iii. $0 \leq P(X) \leq 1$

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

Answer the next two questions using the following information

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

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

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

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

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

29. **What is $F(\infty)$ for a distribution function $F(x)$?**

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

30. **What is $F(-\infty)$ for a distribution function $F(x)$?**

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

31. **How many types of random variables are there?**

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

Answer the next two questions using the following information

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

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

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

33. **$P(x)$ is a –**

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

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

34. **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

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. $f(x) = 2x; 0 < X < 3$**; 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 $y = 1, 2$

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

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

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

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

40. **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

41. **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) $0 \leq P(X_i, Y_j) \leq 1$

42. **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)	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$

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

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

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

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

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

3 Mathematical Expectation

45. **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

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

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

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

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

48. **If $y = ax + b$, what is the value of $E(y)$?**
(a) $aE(X) + b$ (b) $a^2E(X)$ (c) $E(X)$ (d) b

49. **What is the value of $V(5)$?**
(a) 0 (b) 25 (c) 5 (d) 1

50. **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) $n + 1$

51. **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

52. **Expected value of a constant a is –**
(a) 1 (b) Variance (c) a (d) a+1

53. **The variance of a constant m is –**
(a) 0 (b) 1 (c) m (d) m^2

54. **What is $V(X - Y)equalto$?**
(a) $V(X) + V(Y)$ (b) $V(X) + V(Y) - 2Cov(X, Y)$
(c) $V(X) - V(Y)$ (d) $V(X) + V(Y) + 2Cov(X, Y)$

55. **What is the value of V(2X+5)?**
(a) $4V(X) - 5$ (b) 20 (c) $4V(X)$ (d) 0

56. **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

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

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

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

60. **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) $V(X + Y) = V(X) - V(Y) + 2Cov(X, Y)$

61. **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

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

63. **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

64. **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

65. **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

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

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

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

4 Binomial Distribution

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

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

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

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

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

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

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

76. **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 $\sqrt{3}$.

77. **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, $\frac{1}{4}$

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

5 Poisson Distribution

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

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

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

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

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

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

85. **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) $n \to \infty, p0\infty$ & np is finite (d) $n \to 0, p \to \infty$ & np is infinite

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

87. **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

88. **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

89. **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

90. **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) $\frac{P}{A}$

91. **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%

92. **Crude Birth Rate (CBR) is:**
(a) $\frac{B}{P} \times 100$ (b) $\frac{B}{P} \times 1000$ (c) $\frac{P}{B} \times 100$ (d) $\frac{F}{P} \times 100$

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

i) CBR
ii) CDR
iii) NRR

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

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

(a) Population Index (b) Population Density
(c) Human Development Index (d) Dependency Ratio

95. **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) $GFR = \frac{G_i}{F15-49} \times 1000$

Answer Key:

1. (c) 6
2. (b) 6
3. (a) $\frac{n!}{(n-r)!}$
4. (a) $\frac{n!}{(n-1)!(n+r)!}$
5. (c) 8
6. (a) An experiment
7. (c) ii and iii
8. (b) Experiment
9. (c) An impossible event
10. (a) Complementary events
11. (c) 0
12. (d) Sample Point
13. (c) Mutually Exclusive Events
14. (a) $P(A \cap B) = P(A) \cdot P(B)$
15. (d) 0.0769
16. (c) $\frac{3}{4}$
17. (d) $\frac{3}{4}$
18. (b) $\frac{0}{6}$
19. (a) 4
20. (b) 0
21. (c) $\frac{1}{4}$
22. (a) $\frac{1}{4}$
23. (d) $\frac{11}{12}$
24. (a) $\frac{3}{7}$
25. (b) 3
26. (b) i and iii
27. (c) $\frac{1}{21}$
28. (b) Discrete random
29. (d) 1
30. (c) 0
31. (a) 2
32. (c) 14
33. (c) Probability mass function
34. (a) i and ii
35. (b) Weight
36. (c) $\Sigma P(x_i) = 1$
37. (c) 1
38. (a) $P(x) = \frac{2x+3}{21}$
39. (c) $\frac{3y+2}{7}$
40. (d) Released version number of a software
41. (d) $0 \leq P(X_i, Y_j) \leq 1$
42. (a) i
43. (b) $\frac{1}{6}$
44. (a) $\frac{5}{6}$
45. (c) Variance
46. (c) 0
47. (b) $a^2V(X)$
48. (a) $aE(X) + b$
49. (a) 0
50. (c) $\frac{n+1}{2}$
51. (c) 16
52. (c) a
53. (a) 0
54. (c) $V(X) - V(Y)$
55. (c) $4V(X)$
56. (a) 1
57. (d) Central tendency
58. (c) 2
59. (b) 5.5
60. (b) $V(X+Y) = V(X) + V(Y) + 2Cov(X,Y)$
61. (b) i
62. (c) 4
63. (d) 5
64. (d) 36
65. (b) 9
66. (d) 0
67. (b) 5
68. (a) 20
69. (b) 2
70. (a) np
71. (b) npq
72. (d) $\sqrt{npq}$
73. (c) $\frac{q}{np}$

74. (c) $np > 0$

75. (a) $Mean > Variance$

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

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

78. (c) 0.99

79. (b) m

80. (c) $Mean = Variance$

81. (c) m

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

83. (c) $m > 0$

84. (b) 5

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

86. (d) 2

87. (b) 3.46

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

89. (a) Dependency ratio

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

91. (b) 25.54%

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

93. (c) iii

94. (b) Population Density

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