

Statistics MCQ Question Bank

Second Paper

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1 Introduction to Probability

1. **An act repeated under some specific conditions is called –**
(a) Event (b) Experiment (c) Sample (d) Sample space
2. **$P(0)$ implies –**
(a) A certain event (b) An uncertain event (c) An impossible event (d) A probable event
3. **Events having some common elements are called –**
(a) Complementary events (b) Mutually exclusive events
(c) Exhaustive events (d) Non-Mutually exclusive events events
4. **The minimum value of probability is**
(a) $-\alpha$ (b) 1 (c) 0 (d) -1

1.1 Permutation-Combination

5. **Three objects can be placed in 2 positions in – ways.**
(a) 3 (b) 4 (c) 6 (d) 8
6. **In how many ways can a team of 2 be formed from 4 people?**
(a) 4 (b) 6 (c) 8 (d) 12
7. **${}^n p_r =$**
(a) $\frac{n!}{(n-r)!}$ (b) $\frac{n!}{(n+r)!}$ (c) $\frac{n!}{r!}$ (d) $\frac{n!}{(r-n)!}$
8. **${}^n C_r =$**
(a) $\frac{n!}{(n-1)!(n+r)!}$ (b) $\frac{r!}{n!(n-r)!}$ (c) $\frac{n!(n-1)!}{r!}$ (d) $\frac{n!}{(r-n)!}$
9. **Each element of sample space is called–**
(a) Trial (b) Experiment (c) Variable (d) Sample Point
10. **Two events not occurring together are called–**
(a) dependent Events (b) Independent Events
(c) Mutually Exclusive Events (d) Marginal Events
11. **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.
12. **What is the probability that the card is a King?**
(a) 0.0192 (b) 0.25 (c) 0.5 (d) 0.0769
13. **P(The card is not from Diamonds)–**
(a) $\frac{1}{2}$ (b) 0 (c) $\frac{3}{4}$ (d) $\frac{1}{4}$

14. **P(The card is red or Clubs)**
 (a) $\frac{1}{4}$ (b) $\frac{1}{2}$ (c) $\frac{2}{3}$ (d) $\frac{3}{4}$
15. **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) $\frac{3}{6}$
16. **Tossing a coin twice generates how many outcomes?**
 (a) 4 (b) 16 (c) 8 (d) 2
17. **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**
 $P(A) = \frac{1}{3}, P(B) = \frac{1}{2} \& P(A \cup B) = \frac{7}{12}$
18. $P(A \cap B) = ?$
 (a) $\frac{5}{12}$ (b) $\frac{1}{2}$ (c) $\frac{1}{4}$ (d) $\frac{15}{16}$
19. $P(A \cap \bar{B}) = ?$
 (a) $\frac{1}{4}$ (b) $\frac{3}{4}$ (c) $\frac{5}{6}$ (d) $\frac{1}{12}$
20. **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) $\frac{11}{12}$
21. **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

22. **How many conditions does a probability density function have?**
 (a) 2 (b) 3 (c) 4 (d) 5
23. **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

24. **What is the value of k?**
 (a) $\frac{7}{21}$ (b) $\frac{5}{21}$ (c) $\frac{1}{21}$ (d) 1
25. **What is the type of variable X?**
 (a) Discrete (b) Discrete random (c) Continuous (d) Continuous random

26. What is $F(\infty)$ for a distribution function $F(x)$?
 (a) $-\infty$ (b) -1 (c) 0 (d) 1
27. What is $F(-\infty)$ for a distribution function $F(x)$?
 (a) $-\infty$ (b) -1 (c) 0 (d) 1
28. 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
 $P(x) = \frac{x+1}{k}; x = 1, 2, 3, 4$
29. What is the value of k?
 (a) 10 (b) 11 (c) 14 (d) 15
30. $P(x)$ is a –
 (a) Joint probability distribution (b) Cumulative probability distribution
 (c) Probability mass function (d) Probability Density function
31. 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
32. Which of the following is not a discrete random variable?
 (a) number of students (b) Weight
 (c) Number of heads in coin toss (d) Population
33. Which one is a property of a probability distribution?
 (a) $P(x_i) = 0$ (b) $P(x_i \neq 1)$ (c) $\sum P(x_i) = 1$ (d) $\int_x P(X)dx \leq 1$
34. $f(x) = 2x; 0 < X < 3$; What is $F(3)$?
 (a) 3 (b) 0 (c) 1 (d) 0
- Answer the next two questions based on the following information:
 $P(x, y) = \frac{1}{21}(x + y); x = 1, 2, 3 \text{ and } y = 1, 2$
35. $P(x)=?$
 (a) $P(x) = \frac{2x+3}{21}$ (b) $P(x) = \frac{x+3}{27}$ (c) $P(x) = \frac{4x+3}{21}$ (d) $P(x) = \frac{2x+5}{21}$
36. $P(y)=?$
 (a) $\frac{y+2}{7}$ (b) $\frac{y+3}{7}$ (c) $\frac{3y+2}{7}$ (d) $\frac{y+2}{9}$
37. Which one is not a discrete random variable?
 (a) Number of students (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) $0 \leq P(X_i, Y_j) \leq 1$

39. 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)	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$

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

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

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

(a) $\frac{5}{6}$ (b) 0
(c) 1 (d) Can't be found from this information

3 Mathematical Expectation

42. 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

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

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

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

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

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

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

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

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

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

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

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

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

49. Expected value of a constant a is –

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

50. The variance of a constant m is –

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

51. **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) $V(X) + V(Y) + 2Cov(X, Y)$
52. **What is the value of $V(2X+5)$?**
 (a) $4V(X) - 5$ (b) 20 (c) $4V(X)$ (d) 0
53. **If $P(x) = \frac{1}{20}; x = 1, 2, 3, \dots, 20$, what is the standard deviation?**
 (a) 1 (b) 5.77 (c) 7.75 (d) 12.57
54. **Expectation measures –**
 (a) Dispersion (b) Skewness (c) Kurtosis (d) Central tendency
55. **If $E(X) = -0.5$, then $E(1 - 2X) = ?$**
 (a) 0 (b) -1 (c) 2 (d) 1
56. **If $P(X) = \frac{1}{10}; x = 1, 2, \dots, 10$, then $E(X) = ?$**
 (a) 10 (b) 5.5 (c) 0 (d) 11
57. **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) $V(X + Y) = V(X) - V(Y) + 2Cov(X, Y)$
58. **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
59. **If $E(X) = 2, E(X^2) = 8, V(X) = --$**
 (a) 0 (b) 2 (c) 4 (d) 8
60. **If $P(x) = \frac{4-|5-x|}{k}; x = 2, 3, 4, \dots, 8$, what is the value of $E(X)$?**
 (a) 3 (b) 8 (c) 16 (d) 5
61. **If $P(x) = \frac{6-|7-x|}{k}; x = 2, 3, 4, \dots, 12$, what is the value of $E(X)$?**
 (a) 6 (b) 9 (c) 13 (d) 36
62. **If $P(x) = \frac{3-|4-x|}{k}; x = 2, 3, 4, \dots, 6$, what is the value of k?**
 (a) 6 (b) 9 (c) 10 (d) 40
63. **If the variance of X is 3, what is the variance of $V(3)$?**
 (a) 1 (b) 2 (c) 3 (d) 0
64. **If $V(X) = 5$, what is $V(X + 5)$?**
 (a) 0 (b) 5 (c) 10 (d) 25
65. **If $V(X) = 5$, what is $V(2X + 5)$?**
 (a) 20 (b) 5 (c) 10 (d) 25

4 Binomial Distribution

66. How many parameters are there in a binomial distribution?
(a) 1 (b) 2 (c) 3 (d) 4
67. What is the Mean of Binomial Distribution?
(a) np (b) npq (c) nq (d) \sqrt{npq}
68. What is the Variance of Binomial Distribution?
(a) np (b) npq (c) nq (d) \sqrt{npq}
69. What is the Standard Deviation of Binomial Distribution?
(a) np (b) npq (c) nq (d) \sqrt{npq}
70. What is the Coefficient of Variation of Binomial Distribution?
(a) np (b) npq (c) $\frac{q}{np}$ (d) \sqrt{npq}
71. Which is true of mean (np) of Binomial Distribution?
(a) $np = 0$ (b) $np < 0$ (c) $np > 0$ (d) $np \neq 0$
72. In a Binomial distribution, how are mean and variance related?
(a) $Mean > Variance$ (b) $Mean < Variance$
(c) $Mean = Variance$ (d) $Mean = 2 \times Variance$
73. When does Binomial distribution tend to Poisson distribution?
(a) $n \rightarrow \infty$ and $p \rightarrow \infty$ (b) $n \rightarrow 0$ and $p \rightarrow 0$ (c) $n \rightarrow \infty$ and $p \rightarrow 0$ (d) $n \rightarrow 0$ and $p \rightarrow \infty$
- Answer the next two questions based on the following information.**
X is a binomial variate with expectation 4 and standard deviation $\sqrt{3}$.
74. 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) $10, \frac{1}{4}$
75. What is $P(X \neq 0)$?
(a) 0 (b) 0.01 (c) 0.99 (d) 1

5 Poisson Distribution

76. What is the mean of Poisson distribution
(a) $\frac{1}{\sqrt{m}}$ (b) m (c) $\frac{1}{m}$ (d) $1 + \frac{1}{m}$
77. Which relationship between mean and variance of Poisson Distribution is correct?
(a) $Mean > Variance$ (b) $Mean < Variance$ (c) $Mean = Variance$ (d) $Mean \neq Variance$
78. What is the Variance of Poisson Distribution(with parameter m)?
(a) $\frac{1}{\sqrt{m}}$ (b) $\frac{1}{m}$ (c) m (d) $\frac{1}{m+1}$
79. What is the Standard Deviation of Poisson Distribution(with parameter m)?
(a) $\frac{1}{\sqrt{m}}$ (b) $\frac{1}{m}$ (c) \sqrt{m} (d) $\frac{1}{m+1}$
80. Which one is true of the parameter (m) of Poisson Distribution?
(a) $m = 0$ (b) $m < 0$ (c) $m > 0$ (d) $m = 1$

81. The parameter of a Poisson Distribution is 5. What is its mean?
 (a) 2 (b) 5 (c) 2.24 (d) 25
82. When does Binomial Distribution tend to Poisson Distribution?
 (a) $n \rightarrow \infty, p \rightarrow 0$ & np is finite (b) $n \rightarrow \infty, p \rightarrow 0$ & np is infinite
 (c) $n \rightarrow \infty, p \rightarrow 0$ & np is finite (d) $n \rightarrow 0, p \rightarrow \infty$ & np is infinite
83. The parameter of a Poisson variate is 2. What is its variance?
 (a) 0 (b) 4 (c) $\sqrt{2}$ (d) 2
84. 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
85. 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

86. What is called the ratio of the dependent population to the earning population?
 (a) Dependency ratio (b) Sex ration (c) Population density (d) Growth rate
87. 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) $\frac{P}{A}$
88. In the following data, what is the dependency ratio?

Age	0-14	15-24	25-34	35-44	45-54	55-64	65+
Populataion	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%
89. Crude Birth Rate (CBR) is:
 (a) $\frac{B}{P} \times 100$ (b) $\frac{B}{P} \times 1000$ (c) $\frac{P}{B} \times 100$ (d) $\frac{F}{P} \times 100$
90. Which one is a measure of reproduction?
 i) CBR
 ii) CDR
 iii) NRR
 (a) i (b) ii (c) iii (d) i and ii
91. The number of people living per unit area is called—
 (a) Population Index (b) Population Density
 (c) Human Development Index (d) Dependency Ratio
92. 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. (b) Experiment | 24. (c) $\frac{1}{21}$ | 48. (c) 16 |
| 2. (c) An impossible event | 25. (b) Discrete random | 49. (c) a |
| 3. (a) Complementary events | 26. (d) 1 | 50. (a) 0 |
| 4. (c) 0 | 27. (c) 0 | 51. (c) $V(X) - V(Y)$ |
| 5. (c) 6 | 28. (a) 2 | 52. (c) $4V(X)$ |
| 6. (b) 6 | 29. (c) 14 | 53. (a) 1 |
| 7. (a) $\frac{n!}{(n-r)!}$ | 30. (c) Probability mass function | 54. (d) Central tendency |
| 8. (a) $\frac{n!}{(n-1)!(n+r)!}$ | 31. (a) i and ii | 55. (c) 2 |
| 9. (d) Sample Point | 32. (b) Weight | 56. (b) 5.5 |
| 10. (c) Mutually Exclusive Events | 33. (c) $\sum P(x_i) = 1$ | 57. (b) $V(X + Y) = V(X) + V(Y) + 2Cov(X,$ |
| 11. (a) $P(A \cap B) = P(A) \cdot P(B)$ | 34. (c) 1 | 58. (b) i |
| 12. (d) 0.0769 | 35. (a) $P(x) = \frac{2x+3}{21}$ | 59. (c) 4 |
| 13. (c) $\frac{3}{4}$ | 36. (c) $\frac{3y+2}{7}$ | 60. (d) 5 |
| 14. (d) $\frac{3}{4}$ | 37. (d) Released version number of a software | 61. (d) 36 |
| 15. (b) $\frac{0}{6}$ | 38. (d) $0 \leq P(X_i, Y_j) \leq 1$ | 62. (b) 9 |
| 16. (a) 4 | 39. (a) i | 63. (d) 0 |
| 17. (b) 0 | 40. (b) $\frac{1}{6}$ | 64. (b) 5 |
| 18. (c) $\frac{1}{4}$ | 41. (a) $\frac{5}{6}$ | 65. (a) 20 |
| 19. (a) $\frac{1}{4}$ | 42. (c) Variance | 66. (b) 2 |
| 20. (d) $\frac{11}{12}$ | 43. (c) 0 | 67. (a) np |
| 21. (a) $\frac{3}{7}$ | 44. (b) $a^2V(X)$ | 68. (b) npq |
| 22. (b) 3 | 45. (a) $aE(X) + b$ | 69. (d) \sqrt{npq} |
| 23. (b) i and iii | 46. (a) 0 | 70. (c) $\frac{q}{np}$ |
| | 47. (c) $\frac{n+1}{2}$ | 71. (c) $np > 0$ |
| | | 72. (a) $Mean > Variance$ |
| | | 73. (c) $n \rightarrow \infty$ and $p \rightarrow 0$ |

74. (a) $16, \frac{1}{4}$ 81. (b) 5 87. (d) $\frac{P}{A}$
75. (c) 0.99 82. (a) $n \rightarrow \infty, p \rightarrow 0$ & np is finite 88. (b) 25.54%
76. (b) m 83. (d) 2 89. (b) $\frac{B}{P} \times 1000$
77. (c) $Mean = Variance$ 84. (b) 3.46 90. (c) iii
78. (c) m 85. (c) $a^{\frac{1}{2}}$ 91. (b) Population Density
79. (c) \sqrt{m} 86. (a) Dependency ratio 92. (b) $GFR = \frac{B}{F_{15-49}} \times 1000$
80. (c) $m > 0$