Statistics MCQ Question Bank

Second Paper

Abdullah Al Mahmud

www.statmania.info

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

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

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

10. **Two events not ocurring 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) umber 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) $\Sigma P(x_i) = 1$ (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:

    $P(x, y) = \frac{1}{21}(x + y); x = 1, 2, 3$ 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 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) $0 \leq P(X_i, Y_j) \leq 1$

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 $P(x) = \frac{1}{n}; x = 1, 2, 3, \cdots, n$, what is the value of $E(X)$?**
 (a) $\frac{n}{2}$ (b) $\frac{n-1}{2}$ (c) $\frac{n+1}{2}$ (d) $n + 1$

48. **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

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 $P(x) = \frac{1}{20}; x = 1, 2, 3, \cdots, 20$, 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 $P(X) = \frac{1}{10}; x = 1, 2, \cdots 10$, 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 $P(x) = \frac{4-|5-x|}{k}; x = 2, 3, 4, \cdots 8$, what is the value of $E(X)$?**

(a) 3   (b) 8   (c) 16   (d) 5

61. **If $P(x) = \frac{6-|7-x|}{k}; x = 2, 3, 4, \cdots 12$, what is the value of $E(X)$?**

(a) 6   (b) 9   (c) 13   (d) 36

62. **If $P(x) = \frac{3-|4-x|}{k}; x = 2, 3, 4, \cdots 6$, 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) $n \to \infty$ 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 $\sqrt{3}$.

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) $n \to \infty, p \to 0$ & 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

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

87. **Which one is a measure of reproduction?**
    i) CBR
    ii) CDR
    iii) NRR
    (a) i   (b) ii   (c) iii   (d) i and ii

88. **The number of people living per unit area is called–**
    (a) Population Index   (b) Population Density
    (c) Human Development Index   (d) Dependency Ratio

89. **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. (b) Experiment

2. (c) An impossible event

3. (a) Complementary events

4. (c) 0

5. (c) 6

6. (b) 6

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

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

9. (d) Sample Point

10. (c) Mutually Exclusive Events

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

12. (d) 0.0769

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

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

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

16. (a) 4

17. (b) 0

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

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

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

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

22. (b) 3

23. (b) i and iii

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

25. (b) Discrete random

26. (d) 1

27. (c) 0

28. (a) 2

29. (c) 14

30. (c) Probability mass function

31. (a) i and ii

32. (b) Weight

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

34. (c) 1

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

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

37. (d) Released version number of a software

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

39. (a) i

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

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

42. (c) Variance

43. (c) 0

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

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

46. (a) 0

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

48. (c) 16

49. (c) a

50. (a) 0

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

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

53. (a) 1

54. (d) Central tendency

55. (c) 2

56. (b) 5.5

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

58. (b) i

59. (c) 4

60. (d) 5

61. (d) 36

62. (b) 9

63. (d) 0

64. (b) 5

65. (a) 20

66. (b) 2

67. (a) np

68. (b) npq

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

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

71. (c) $np > 0$

72. (a) $Mean > Variance$

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

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

75. (c) 0.99

76. (b) m

77. (c) $Mean = Variance$

78. (c) m

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

80. (c) $m > 0$

81. (b) 5

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

83. (d) 2

84. (b) 3.46

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

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

87. (c) iii

88. (b) Population Density

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