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

4. $^nC_r =$
   (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. **The probability of two disjoint sets happening together is:**
   (a) 0.5   (b) 0   (c) 1   (d) $0 \le x < 1$

6. **How many additive laws of probability are there?**
   (a) 1   (b) 2   (c) 3   (d) 4

7. $P(A \cup B) = P(A) + P(B)$ **implies A & B are –**
   (a) Disjoint   (b) Independent   (c) Joint   (d) Independent

8. **Which is the formula of classical approach of probability?**
   (a) $P = \frac{\text{No. of favorable outcomes}}{\text{Total no. of possible outcomes}}$ (b) $P = \frac{\text{No. of total outcomes}}{\text{No. of favorable outcomes}}$
   (c) $P = \lim_{n(S)\to\infty} \frac{n(A)}{n(S)}$ (d) $P = \lim_{n(A)\to\infty} \frac{n(A)}{n(S)}$

9. **Which is the formula of empirical/relative frequency approach of probability?**
   (a) $P = \frac{\text{No. of favorable outcomes}}{\text{Total no. of possible outcomes}}$ (b) $P = \frac{\text{No. of total outcomes}}{\text{No. of favorable outcomes}}$
   (c) $P = \lim_{n(S)\to\infty} \dfrac{n(A)}{n(S)}$ (d) $P = \lim_{n(A)\to\infty} \dfrac{n(A)}{n(S)}$

10. **What is the correct formula for conditional probability?**
    (a) $P(A|B) = \frac{P(A\cap B)}{P(B|A)}$ (b) $P(A|B) = \frac{P(A\cap B)}{P(A)}$ (c) $P(A|B) = \frac{P(A\cap B)}{P(B)}$ (d) $P(A|B) = \frac{P(B|A)}{P(B|A)}$

11. **The third axiom of probability is –**
    (a) $0 \le P(A) \le 1$ (b) $P(S) = 1$

    (c) $P(A_1 U A_2 U \cdots U A_n) = \sum_{i=1}^{\infty} P(A_i)$ (d) $P(A) = 1 - P(A)$

12. **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

13. **An act repeated under some specific conditions is called –**

    (a) Event   (b) Experiment   (c) Sample   (d) Sample space

14. $P(0)$ **implies –**

    (a) A certain event   (b) An uncertain event   (c) An impossible event   (d) A probable event

15. **Events having some common elements are called –**

    (a) Complementary events   (b) Mutually exclusive events

    (c) Exhaustive events   (d) Non-Mutually exclusive events events

16. **The minimum value of probability is**

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

17. **Each element of sample space is called–**

    (a) Trial   (b) Experiment   (c) Variable   (d) Sample Point

18. **Two events not ocurring together are called–**

    (a) dependent Events   (b) Independent Events

    (c) Mutually Exclusive Events   (d) Marginal Events

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

20. **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

1.3   Coin-Die

21. **A coin is thrown thrice. How many outcomes are generated?**

    (a) 3   (b) 4   (c) 8   (d) 9

22. **A die is thrown twice. This is called –**

    (a) An experiment   (b) sample space   (c) A random experiment   (d) A trial

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

24. **Tossing a coin twice generates how many outcomes?**

    (a) 4   (b) 16   (c) 8   (d) 2

25. **A die is rolled twice. How many possible outcomes are there?**

    (a) 6   (b) 12   (c) 36   (d) 18

1.4 Balls-Cards

26. **There are 3 red, 4 black, and 5 white balls in an urn. If two balls are randomly taken, what is the probability that both are red?**
    (a) $\frac{1}{66}$ (b) $\frac{1}{22}$ (c) $\frac{2}{22}$ (d) $\frac{3}{11}$

    Answer the next three questions based on the following information.

    A card is drawn from of pack of playing cards.

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

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

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

    Answer the next TWO questions based on the following information.

    An urn contains 5 red, 7 blue, and 8 green balls.

30. **What is the probability that the ball drawn is red?**
    (a) 0.26   (b) 0.25   (c) 0.2   (d) 0.4

31. **P(The ball drawn is not blue)–**
    (a) $\frac{13}{20}$ (b) 0.5   (c) $\frac{7}{20}$ (d) $\frac{8}{20}$

1.5 Set-Problems

Answer the next two questions based on the following information

For two exhaustive evenst A & B, P(A) = 0.7 and P(B) = 0.4

32. $P(A \cap B) = ?$
    (a) 0.1   (b) 0.3   (c) 0.6   (d) 1

33. **The events A & B are –**
    i. independent
    ii. dependent
    iii. not mutually exclusive
    Which one is correct?
    (a) i and ii   (b) i and iii   (c) ii and iii   (d) i, ii and iii
    (a) Choice   (b) Choice   (c) Choice   (d) Choice

    Answer the next three questions using the following information

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

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

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

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

37. **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

38. **Which is a discrete random variable?**
    (a) Age of students (b) Amount of Production in a factory
    (c) Height of workers (d) Page size in word processing softwares

39. **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

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

41. **A coin is tossed twice and no. of heads appeared is denoted by X. How many possible values of X are there?**
    (a) 1 (b) 2 (c) 0 (d) 3

    Answer the next two questions based on the following information

X	0	1	2
P(x)	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{4}$

42. **What is F(1)**
    (a) 0.65 (b) 0.75 (c) 0.5 (d) 1

43. **$P(X \leq 1 \leq 3) =-$**
    (a) 0.75 (b) 0.70 (c) 0.95 (d) 1

44. **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) $P(x \geq 1)$

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

46. **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) $\frac{5}{4}x^5$

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

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

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

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

Which one is correct?

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

48. **The conditions for a cumulative distribution function (CDF) are–**

i. $F(x)$ is non-decreasing.

ii. $0 \le F(x) \le 1$

iii. $\lim_{x \to \infty} F(x) = 1$

Which one is correct?

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

49. **The properties of a discrete probability distribution table are–**

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

ii. $P(X) \ge 0$ for all X

iii. Each probability corresponds to a discrete value.

Which one is correct?

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

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

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

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

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

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

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

53. **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

54. **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) $\int_x P(X)dx \le 1$

55. **Which one is not a discrete random variable?**

(a) Summation two die throw outcome   (b) Weight

(c) Number of heads in five coin tosses   (d) Released version number of a software

56. **Which one is not a discrete random variable?**

(a) Number of students in a class   (b) Weight of a package

(c) Shoe size   (d) Total goals scored in a match

57. **Which variable type can skip certain whole numbers?**

(a) Number of chapters read in a day   (b) Weight of a person

(c) Number of floors in a building   (d) Number of people boarding a train

58. **Which one is an example of a discrete random variable?**
    (a) The amount of liquid in a glass
    (b) Temperature readings at noon
    (c) Number of defective items in a batch
    (d) Exact age in years

59. **Identify which one is not a discrete variable.**
    (a) Number of cookies eaten
    (b) Height of students
    (c) Total cars in a parking lot
    (d) Number of siblings

60. **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 based on the following information

$$f(x) = kx; 0 < x < 5$$

61. **What is the value of $P(2 < x < 3)$**
    (a) $\frac{4}{5}$
    (b) $\frac{3}{5}$
    (c) $\frac{2}{5}$
    (d) $\frac{1}{5}$

62. $P(X > 0)$
    (a) 0.99
    (b) 0.5
    (c) 1
    (d) 0

Answer the next two questions using the following information

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

63. **What is the value of k?**
    (a) $\frac{7}{21}$
    (b) $\frac{5}{21}$
    (c) $\frac{1}{21}$
    (d) 1

64. **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

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

65. **What is the value of k?**
    (a) 10
    (b) 11
    (c) 14
    (d) 15

66. $F(2) = -$
    (a) $\frac{2}{14}$
    (b) $\frac{3}{11}$
    (c) $\frac{5}{14}$
    (d) $\frac{5}{11}$

67. $P(x)$ **is a** $-$
    (a) Joint probability distribution
    (b) Cumulative probability distribution
    (c) Probability mass function
    (d) Probability Density function

68. **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

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

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

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

    (a) 6   (b) 3   (c) 1   (d) 0

71. $f(x) = x^2; 0 < X < 4$**; What is** $F(4)$**?**

    (a) 16   (b) 0   (c) 4   (d) 1

72. $f(x) = 4 - x; 1 < X < 5$**; What is** $F(5)$**?**

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

    Answer the next two questions based on the following information:

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

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

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

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

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

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

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

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

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

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

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

3 Mathematical Expectation

78. **E(X) + E(Y) = ?**
    (a) E(X) - E(Y)   (b) E(X) + E(Y)   (c) 2E(X) - E(Y)   (d) $E(X) \times E(Y)$

    Answer the next THREE questions based on the following information

X	0	1	2
P(x)	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{5}{12}$

79. **What is the value of $E(X)$**
    (a) $\frac{15}{12}$ (b) $\frac{13}{12}$ (c) $\frac{1}{12}$ (d) $\frac{11}{13}$

80. **What is the value of $E(X^2)$**
    (a) $\frac{25}{12}$ (b) $\frac{13}{12}$ (c) $\frac{23}{12}$ (d) $\frac{25}{13}$

81. **What is $V(2X)$?**
    (a) 2.93   (b) 2.91   (c) 1.97   (d) 2.97

82. **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

83. **What is the minimum value of variance a random variable?**
    (a) $-\infty$ (b) 1   (c) 0   (d) -1

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

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

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

87. **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) $n + 1$

88. **If $P(x) = \dfrac{4 - |5 - x|}{k}; x = 2, 3, 4, \cdots 8$, what is the value of k?**
    (a) 5   (b) 8   (c) 16   (d) 24

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

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

91. **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) $V(X) + V(Y) + 2Cov(X, Y)$

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

93. **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

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

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

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

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

98. **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

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

100. **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

101. **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

102. **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

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

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

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

106. **If $E(X) = 2$ and $E(X^2) = 8$, then the value of the $V(X) =$?**
    (a) 0   (b) 2   (c) 4   (d) 8

107. **If $P(x) = \frac{1}{15}; x = 1, 2, 3, \cdots 15$, what is the value of the expectation?**
    (a) 8.5   (b) 7.5   (c) 7   (d) 8

Answer the next two questions based on the following information

The probability function of random variable x is given below:
$$P(x) = \frac{x}{k}; x = 1, 2, 3, 4$$

108. **What is the value of k?**
    (a) 6   (b) 10   (c) 15   (d) 20

109. **What is $E(X)$?**
    (a) 2.25   (b) 3.5   (c) 2.5   (d) 3.0

Answer the next three questions based on the following information

The probability function of random variable x is given below:
$$P(x) = \frac{2x+1}{k}; x = 1, 2, 3, 4$$

110. **What is the value of k?**
    (a) 18   (b) 25   (c) 12   (d) 24

111. **What is $E(X)$?**
    (a) 1.75   (b) 2.92   (c) 3.25   (d) 2.25

112. **What is $V(X)$?**
    (a) 1.05   (b) 3.0   (c) 1.5   (d) 1.25

Answer the next two questions based on the following information

The probability function of random variable x is given below
$$P(x) = \frac{x-1}{k}; x = 2, 3, 4, 5$$

113. **What is the value of k?**
    (a) 2   (b) 5   (c) 10   (d) 25

114. **What is $E(X)$?**
    (a) 0.425   (b) 0.525   (c) 0.725   (d) 0.625

4   Binomial Distribution

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

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

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

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

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

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

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

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

123. **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) $10, \frac{1}{4}$

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

125. **The characteristics of binomial distribution–**
    i. $E(X) > V(X)$
    ii. $E(X) = V(X)$
    iii. $E(X) = np$
    Which one is correct?
    (a) i and ii   (b) i and iii   (c) ii and iii   (d) i, ii and iii

126. **What is true of binomial distribution?**
    (a) There is one parameter   (b) Number of trial is fixed
    (c) Mean is greater than variance   (d) Skewness is negative

127. **What is the skewness of binomial distribution?**
    (a) $\dfrac{(q-p)^2}{np}$ (b) $\dfrac{(q-p)^2}{np}$ (c) $\dfrac{(p+1)^2}{npq}$ (d) $\dfrac{(q+p)^2}{npq}$

128. **When is a binomial distribution positively skewed?**
    (a) p > q   (b) p = q   (c) p < q   (d) p+q < 1
    Answer the next two questions based on the following information

$$\text{In a binomial distribution, } P(x = 4) = \tfrac{1}{2}P(x = 5); n = 10$$

129. **What is the mean?**
    (a) 6.25   (b) 5.15   (c) 8.52   (d) 5.22

130. $P(x = 2) = $ ——
    (a) 0.0053   (b) 0.0069   (c) 0.0085   (d) 0.94

5 Poisson Distribution

131. **The no. of parameters in a Poisson distribution is —**
    (a) 1   (b) 2   (c) 3   (d) 4

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

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

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

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

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

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

138. **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

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

140. **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

141. **Mean of a Poisson variate is a. What is its standard deviation?**
    (a) 0   (b) a   (c) $a^{\frac{1}{2}}$ (d) a^2

5.1 Problems

142. **On average, 1 in 1000 houses in a city gets a fire-burn in a year.If there are 2000 houses, what is the probability that, in a certain year, exactly 5 house will be burnt?**
    (a) 0.036   (b) 0.040   (c) 0.027   (d) 0.091

6 Vital Statistics

143. **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

144. **Which of the following best describes the dependency ratio?**

   (a) The ratio of the elderly population to the working-age population

   (b) The ratio of the combined non-working (0-14 and 65+) population to the working-age (15-64) population

   (c) The proportion of young dependents (0-14) in the population

   (d) The total population divided by the number of children (0-14)

145. **City A has 12,000 individuals aged 0-14, 35,000 aged 15-64, and 5,000 aged 65+. What is the dependency ratio?**

   (a) 0.32   (b) 0.48   (c) 0.60   (d) 0.25

146. **City B has a dependency ratio of 0.52. If its working-age population (15-64) is 50,000, what is the total number of dependents (0-14 and 65+)?**

   (a) 15,600   (b) 20,000   (c) 26,000   (d) 30,000

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

148. **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%

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

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

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

   i) CBR
   ii) CDR
   iii) NRR

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

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

   (a) Population Index   (b) Population Density

   (c) Human Development Index   (d) Dependency Ratio

152. **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 the next two questions based on the following information

Year	1	2	3	4
Population	100	110	120	130

153. **Which type of growth is seen here?**

   (a) Arithmetic growth   (b) Geometric growth   (c) Exponential growth   (d) None

154. **What is the rate of increase?**

   (a) 1   (b) 0.1   (c) 10   (d) 1%

Answer Key:

1. (c) 6

2. (b) 6

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

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

5. (b) 0

6. (b) 2

7. (a) Disjoint

8. (a) $P = \frac{\text{No. of favorable outcomes}}{\text{Total no. of possible outcomes}}$

9. (a) $P = \frac{\text{No. of favorable outcomes}}{\text{Total no. of possible outcomes}}$

10. (a) $P(A|B) = \frac{P(A \cap B)}{P(B|A)}$

11. (c) $P(A_1 U A_2 U \cdots U A_n) = \sum\limits_{i=1}^{\infty} P(A_i)$

12. (c) ii and iii

13. (b) Experiment

14. (c) An impossible event

15. (a) Complementary events

16. (c) 0

17. (d) Sample Point

18. (c) Mutually Exclusive Events

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

20. (c) 0.90

21. (c) 8

22. (a) An experiment

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

24. (a) 4

25. (c) 36

26. (b) $\frac{1}{22}$

27. (d) 0.0769

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

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

30. (a) 0.26

31. (a) $\frac{13}{20}$

32. (a) 0.1

33. (c) ii and iii

33. (a) Choice

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

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

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

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

38. (d) Page size in word processing software

39. (a) Probability distribution

40. (b) 3

41. (d) 3

42. (b) 0.75

43. (a) 0.75

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

45. (d) Size of television

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

47. (b) i and iii

48. (d) i, ii, and iii

49. (d) i, ii, and iii

50. (d) 1

51. (c) 0

52. (a) 2

53. (b) Weight

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

55. (d) Released version number of a software

56. (b) Weight of a package

57. (c) Number of floors in a building

58. (c) Number of defective items in a batch

59. (b) Height of students

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

61. (d) $\frac{1}{5}$

62. (c) 1

63. (c) $\frac{1}{5}$

64. (b) Discrete random

65. (c) 14

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

67. (c) Probability mass function

68. (a) i and ii

69. (c) 1

70. (c) 1

71. (d) 1

72. (c) 1

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

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

75. (a) i

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

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

78. (b) E(X) + E(Y)

79. (b) $\frac{13}{12}$

80. (b) $\frac{13}{12}$

81. (d) 2.97

82. (c) Variance

83. (c) 0

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

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

86. (a) 0

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

88. (c) 16

89. (c) a

90. (a) 0

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

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

93. (a) 1

94. (d) Central tendency

95. (c) 2

96. (b) 5.5

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

98. (b) i

99. (c) 4

100. (d) 5

101. (d) 36

102. (b) 9

103. (d) 0

104. (b) 5

105. (a) 20

106. (c) 4

107. (d) 8

108. (b) 10

109. (d) 3.0

110. (d) 24

111. (b) 2.92

112. (a) 1.05

113. (c) 10

114. (c) 0.725

115. (b) 2

116. (a) np

117. (b) npq

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

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

120. (c) $np > 0$

121. (a) $Mean > Variance$

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

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

124. (c) 0.99

125. (b) i and iii

126. (c) Mean is greater than variance

127. (a) $\dfrac{(q-p)^2}{np}$

128. (c) p < q

129. (a) 6.25

130. (b) 0.0069

131. (a) 1

132. (b) m

133. (c) $Mean = Variance$

134. (c) m

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

136. (c) $m > 0$

137. (b) 5

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

139. (d) 2

140. (b) 3.46

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

142. (a) 0.036

143. (a) Dependency ratio

144. (b) The ratio of the combined non-working population

145. (b) 0.48

146. (c) 26,000

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

148. (b) 25.54%

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

150. (c) iii

151. (b) Population Density

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

153. (a) Arithmetic growth

154. (b) 0.1