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

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) $P = \lim\limits_{n(S)\to\infty} \frac{n(A)}{n(S)}$ (d) $P = \lim\limits_{n(A)\to\infty} \frac{n(A)}{n(S)}$

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) $0 \leq P(A) \leq 1$ (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

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) $\frac{11}{12}$

Answer the next three questions using the following information CHECK $P(C) = \frac{2}{5}, P(D) = \frac{3}{4} \& P(C \cup D) = \frac{9}{10}$

37. $P(C \cap D) =?$

(a) $\frac{1}{10}$ (b) $\frac{5}{20}$ (c) $\frac{7}{20}$ (d) $\frac{4}{5}$

38. $P(C \cap \bar{D}) =?$

(a) $\frac{1}{10}$ (b) $\frac{2}{5}$ (c) $\frac{1}{5}$ (d) $\frac{3}{10}$

39. **What is the probability that D occurs or C does not occur?**

(a) $\frac{9}{10}$ (b) $\frac{7}{10}$ (c) $\frac{3}{4}$ (d) $\frac{11}{20}$

Answer the next three questions using the following information CHECK $P(E) = \frac{1}{4}, P(F) = \frac{3}{5} \& P(E \cup F) = \frac{11}{20}$

40. $P(E \cap F) =?$

(a) $\frac{1}{10}$ (b) $\frac{3}{20}$ (c) $\frac{7}{20}$ (d) $\frac{1}{4}$

41. $P(E \cap \bar{F}) =?$

(a) $\frac{1}{10}$ (b) $\frac{1}{5}$ (c) $\frac{3}{10}$ (d) $\frac{1}{20}$

42. **What is the probability that F occurs or E does not occur?**

(a) $\frac{11}{20}$ (b) $\frac{4}{5}$ (c) $\frac{3}{4}$ (d) $\frac{9}{10}$

43. **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

44. **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

45. **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

46. **How many conditions does a probability density function have?**

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

47. **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)	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{4}$

48. **What is F(1)**

(a) 0.65 (b) 0.75 (c) 0.5 (d) 1

49. $P(X \leq 1 \leq 3) =$–

(a) 0.75 (b) 0.70 (c) 0.95 (d) 1

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

51. **Which one is NOT an example of a continuous random variable** –

(a) Weight (b) Height (c) Time (d) Size of television

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

53. **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

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

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

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

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

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

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

ii. $P(X) \geq 0$ 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

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

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

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

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

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

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

59. **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

60. **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) $\int_x P(X)dx \leq 1$

61. **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

62. **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

63. **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

64. **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

65. **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

66. **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

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

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

68. $P(X > 0)$
    (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

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

70. **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

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

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

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

72. $F(2) =$ –

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

73. $P(x)$ **is a** –

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

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

74. **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

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

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

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

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

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

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

78. $f(x) = 4 - x; 1 < X < 5$**; 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 $y = 1, 2$

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

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

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

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

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

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

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

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

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

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

3 Mathematical Expectation

84. **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)	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{5}{12}$

85. **What is the value of** $E(X)$

(a) $\frac{15}{12}$ (b) $\frac{13}{12}$ (c) $\frac{1}{12}$ (d) $\frac{11}{13}$

86. **What is the value of** $E(X^2)$

(a) $\frac{25}{12}$ (b) $\frac{13}{12}$ (c) $\frac{23}{12}$ (d) $\frac{25}{13}$

87. **What is** $V(2X)$**?**

(a) 2.93 (b) 2.91 (c) 1.97 (d) 2.97

88. **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

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

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

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

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

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

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

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

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

93. **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) $n + 1$

94. **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

95. **Expected value of a constant a is –**

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

96. **The variance of a constant m is –**

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

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

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

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

99. **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

100. **Expectation measures –**

(a) Dispersion (b) Skewness (c) Kurtosis (d) Central tendency

101. **If** $E(X) = -0.5$**, then** $E(1 - 2X) =$**?**

(a) 0 (b) -1 (c) 2 (d) 1

102. **If** $P(X) = \frac{1}{10}; x = 1, 2, \cdots 10$**, then** $E(X) =$**?**

(a) 10 (b) 5.5 (c) 0 (d) 11

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

104. **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

105. **If** $E(X) = 2, E(X^2) = 8, V(X) = --$

(a) 0 (b) 2 (c) 4 (d) 8

106. **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

107. **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

108. **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

109. **If the variance of X is 3, what is the variance of V(3)?**

(a) 1 (b) 2 (c) 3 (d) 0

110. **If** $V(X) = 5,$**, what is** $V(X + 5)$?

(a) 0 (b) 5 (c) 10 (d) 25

111. **If** $V(X) = 5,$**, what is** $V(2X + 5)$?

(a) 20 (b) 5 (c) 10 (d) 25

112. **If** $E(X) = 2$ **and** $E(X^2) = 8$**, then the value of the** $V(X) =$?

(a) 0 (b) 2 (c) 4 (d) 8

113. **If** $P(x) = \dfrac{1}{15}; x = 1, 2, 3, \cdots 15$**, 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:

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

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

(a) 6 (b) 10 (c) 15 (d) 20

115. **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:

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

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

(a) 18 (b) 25 (c) 12 (d) 24

117. **What is $E(X)$?**

(a) 1.75 (b) 2.92 (c) 3.25 (d) 2.25

118. **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

$$P(x) = \frac{x-1}{k}; x = 2, 3, 4, 5$$

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

(a) 2 (b) 5 (c) 10 (d) 25

120. **What is $E(X)$?**

(a) 0.425 (b) 0.525 (c) 0.725 (d) 0.625

4 Binomial Distribution

121. **How many parameters are there in a binomial distribution?**

(a) 1 (b) 2 (c) 3 (d) 4

122. **What is the Mean of Binomial Distribution?**

(a) np (b) npq (c) nq (d) $\sqrt{npq}$

123. **What is the Variance of Binomial Distribution?**

(a) np (b) npq (c) nq (d) $\sqrt{npq}$

124. **What is the Standard Deviation of Binomial Distribution?**

(a) np (b) npq (c) nq (d) $\sqrt{npq}$

125. **What is the Coefficient of Variation of Binomial Distribution?**

(a) np (b) npq (c) $\frac{q}{np}$ (d) $\sqrt{npq}$

126. **Which is true of mean (np) of Binomial Distribution?**

(a) $np = 0$ (b) $np < 0$ (c) $np > 0$ (d) $np \neq 0$

127. **In a Binomial distribution, how are mean and variance related?**

(a) $Mean > Variance$ (b) $Mean < Variance$

(c) $Mean = Variance$ (d) $Mean = 2 \times Variance$

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

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

130. **What is** $P(X \neq 0)$?

(a) 0 (b) 0.01 (c) 0.99 (d) 1

131. **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

132. **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

133. **What is the skewness of binomial distribution?**

(a) $\frac{(q-p)^2}{np}$ (b) $\frac{(q-p)^2}{np}$ (c) $\frac{(p+1)^2}{npq}$ (d) $\frac{(q+p)^2}{npq}$

134. **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

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

135. **What is the mean?**

(a) 6.25 (b) 5.15 (c) 8.52 (d) 5.22

136. $P(x = 2) =$ —

(a) 0.0053 (b) 0.0069 (c) 0.0085 (d) 0.94

5 Poisson Distribution

137. **The no. of parameters in a Poisson distribution is —**

(a) 1 (b) 2 (c) 3 (d) 4

138. **What is the mean of Poisson distribution**

(a) $\frac{1}{\sqrt{m}}$ (b) m (c) $\frac{1}{m}$ (d) $1 + \frac{1}{m}$

139. **Which relationship between mean and variance of Poisson Distribution is correct?**

(a) $Mean > Variance$ (b) $Mean < Variance$ (c) $Mean = Variance$ (d) $Mean \neq Variance$

140. **What is the Variance of Poisson Distribution(with parameter m)?**

(a) $\frac{1}{\sqrt{m}}$ (b) $\frac{1}{m}$ (c) m (d) $\frac{1}{m+1}$

141. **What is the Standard Deviation of Poisson Distribution(with parameter m)?**

(a) $\frac{1}{\sqrt{m}}$ (b) $\frac{1}{m}$ (c) $\sqrt{m}$ (d) $\frac{1}{m+1}$

142. **Which one is true of the parameter (m) of Poisson Distribution?**

(a) $m = 0$ (b) $m < 0$ (c) $m > 0$ (d) $m = 1$

143. **The parameter of a Poisson Distribution is 5. What is its mean?**

(a) 2 (b) 5 (c) 2.24 (d) 25

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

145. **The parameter of a Poisson variate is 2. What is its variance?**

(a) 0 (b) 4 (c) $\sqrt{2}$ (d) 2

146. **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

147. **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

148. **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

149. **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

150. **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)

151. **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) 0.31 (b) 0.48 (c) 0.60 (d) 0.25

152. **A City 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

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

154. **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%

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

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

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

i) CBR
ii) CDR
iii) NRR

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

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

(a) Population Index (b) Population Density

(c) Human Development Index (d) Dependency Ratio

158. **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

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

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

160. **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) $P(A_1 U A_2 U \cdots U A_n) = \sum_{i=1}^{\infty} P(A_i)$
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
34. (c) $\frac{1}{4}$
35. (a) $\frac{1}{4}$
36. (d) $\frac{11}{12}$
37. (b) $\frac{5}{20}$
38. (c) $\frac{1}{5}$
39. (a) $\frac{9}{10}$
40. (b) $\frac{3}{20}$
41. (a) $\frac{1}{10}$
42. (d) $\frac{9}{10}$
43. (a) $\frac{3}{7}$
44. (d) Page size in word processing softwares
45. (a) Probability distribution
46. (b) 3
47. (d) 3
48. (b) 0.75
49. (a) 0.75
50. (c) $\int_x f(x)\,dx = 1$
51. (d) Size of television
52. (b) $\frac{1}{20}x^5 + c$
53. (b) i and iii
54. (d) i, ii, and iii
55. (d) i, ii, and iii
56. (d) 1
57. (c) 0
58. (a) 2
59. (b) Weight
60. (c) $\Sigma P(x_i) = 1$
61. (d) Released version number of a software
62. (b) Weight of a package
63. (c) Number of floors in a building
64. (c) Number of defective items in a batch
65. (b) Height of students
66. (d) $0 \leq P(X_i, Y_j) \leq 1$
67. (d) $\frac{1}{5}$
68. (c) 1
69. (c) $\frac{1}{21}$
70. (b) Discrete random
71. (c) 14

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

73. (c) Probability mass function

74. (a) i and ii

75. (c) 1

76. (c) 1

77. (d) 1

78. (c) 1

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

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

81. (a) i

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

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

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

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

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

87. (d) 2.97

88. (c) Variance

89. (c) 0

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

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

92. (a) 0

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

94. (c) 16

95. (c) a

96. (a) 0

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

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

99. (a) 1

100. (d) Central tendency

101. (c) 2

102. (b) 5.5

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

104. (b) i

105. (c) 4

106. (d) 5

107. (d) 36

108. (b) 9

109. (d) 0

110. (b) 5

111. (a) 20

112. (c) 4

113. (d) 8

114. (b) 10

115. (d) 3.0

116. (d) 24

117. (b) 2.92

118. (a) 1.05

119. (c) 10

120. (c) 0.725

121. (b) 2

122. (a) np

123. (b) npq

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

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

126. (c) $np > 0$

127. (a) $Mean > Variance$

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

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

130. (c) 0.99

131. (b) i and iii

132. (c) Mean is greater than variance

133. (a) $\frac{(q-p)^2}{np}$

134. (c) p < q

135. (a) 6.25

136. (b) 0.0069

137. (a) 1

138. (b) m

139. (c) $Mean = Variance$

140. (c) m

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

142. (c) $m > 0$

143. (b) 5

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

145. (d) 2

146. (b) 3.46

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

148. (a) 0.036

149. (a) Dependency ratio

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

151. (b) 0.48

152. (c) 26,000

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

154. (b) 25.54%

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

156. (c) iii

157. (b) Population Density

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

159. (a) Arithmetic growth

160. (b) 0.1