Statistics MCQ Question Bank

Second Paper

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Contents

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. **What is the probability that at least one item in a sample space will occurr?**
   (a) 0 (b) 0.5 (c) 1 (d) Undefined

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

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

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

9. $P(A \cap B) = P(A) \times P(B)$ **implies A & B are –**
   (a) Disjoint (b) Independent (c) Joint (d) Independent

10. **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) $P = \lim_{n(A)\to\infty} \frac{n(A)}{n(S)}$

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

12. **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) $P(A|B) = \frac{P(B|A)}{P(B|A)}$

13. **The third axiom of probability is –**
    (a) $0 \leq P(A) \leq 1$ (b) $P(S) = 1$
    (c) $P(A_1 U A_2 U \cdots U A_n) = \sum\limits_{i=1}^{\infty} P(A_i)$ (d) $P(A) = 1 - P(A)$

14. **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

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

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

16. $P(0)$ **implies –**

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

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

(a) Complementary events (b) Mutually exclusive events

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

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

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

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

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

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

(a) dependent Events (b) Independent Events

(c) Mutually Exclusive Events (d) Marginal Events

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

22. **Which of the following are disjoint events?**

(a) $A = \{1, 2, 3\}, B = \{4, 5\}$ (b) $A = \{a, b\}, B = \{b, c\}$

(c) $A = \{0\}, B = \{0, 1\}$ (d) $A = \{x, y\}, B = \{x, y\}$

23. **Which of the following are disjoint events?**

(a) $P = \{1, 2\}, Q = \{2, 3\}$ (b) $P = \{x\}, Q = \{x, y\}$

(c) $P = \{1, 3\}, Q = \{3, 5\}$ (d) $P = \{m, n\}, Q = \{p, q\}$

24. **Let the sample space be $S = \{1, 2, 3, \ldots, 10\}$. Which of the following pairs of events are disjoint?**

i. A: Number is prime, B: Number is greater than 3
ii. A: Number is even, B: Number is divisible by 3
iii. A: Number is less than 5, B: Number is greater than 6

Which one is correct?

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

25. **Let $S = \{1, 2, \ldots, 10\}$. Which of the following event pairs are disjoint?**

i. A: Number is divisible by 2, B: Number is divisible by 5
ii. A: Number is less than 7, B: Number is odd
iii. A: Number is a prime, B: Number is a multiple of 4

Which one is correct?

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

26. **Let the sample space be $S = \{1, 2, 3, \ldots, 10\}$. Which of the following pairs of events are disjoint?**

i. A: Number is a multiple of 4, B: Number is odd
ii. A: Number is less than 4, B: Number is greater than 8
iii. A: Number is a square, B: Number is even

Which one is correct?

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

27. **Let $S = \{1, 2, 3, \ldots, 10\}$. Which of the following pairs of events are disjoint?**

(a) A: Multiples of 3, B: Multiples of 5

(b) A: Prime numbers, B: Even numbers greater than 2

(c) A: Numbers less than 4, B: Numbers greater than 6

(d) All of the above

1.3 Numbers

28. **A number is randomly chosen from a list of 10 consecutive positive integers. What is the probability that the number selected is greater than the average (arithmetic mean) of all 10 integers?**

(a) $\frac{1}{3}$ (b) $\frac{3}{4}$ (c) $\frac{4}{10}$ (d) $\frac{1}{2}$

29. **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

30. **In a school, 15 out of 100 students prefer online classes over in-person classes. If a student is selected randomly, what is the probability that they prefer in-person classes?**

(a) 0.15 (b) 0.85 (c) 0.75 (d) 0.25

31. **A factory reports that 8 out of every 100 manufactured items are defective. If an item is chosen at random, what is the probability that it is not defective?**

(a) 0.08 (b) 0.92 (c) 0.80 (d) 0.12

32. **A hospital study finds that 12% of patients do not prefer evening appointments. If a patient is selected at random, what is the probability that they prefer evening appointments?**

(a) 0.12 (b) 0.78 (c) 0.88 (d) 0.18

33. **A survey shows that 5 out of every 200 customers in a store pay with cash. If a customer is picked randomly, what is the probability that they pay using another method?**

(a) 0.050 (b) 0.500 (c) 0.975 (d) 0.025

1.4 Coin-Die

34. **Tossing a die r times generates how many outcomes?**

(a) $6 \times r$ (b) r^6 (c) 6^r (d) 2^r

35. **Tossing a coin r times generates how many outcomes?**

(a) $2 \times r$ (b) r^2 (c) 2^r (d) 6^r

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

37. **A coin is thrown twice. What is the probability of getting 2 heads?**
(a) $\frac{1}{4}$ (b) $\frac{1}{3}$ (c) $\frac{1}{2}$ (d) $\frac{2}{4}$

38. **A fair coin is tossed twice. What is the probability of getting at least one tail?**
(a) $\frac{1}{4}$ (b) $\frac{1}{2}$ (c) $\frac{3}{4}$ (d) $\frac{1}{3}$

39. **Two fair coins are tossed simultaneously. What is the probability of getting exactly one head?**
(a) $\frac{1}{4}$ (b) $\frac{1}{2}$ (c) $\frac{3}{4}$ (d) $\frac{1}{3}$

40. **A coin is flipped twice. What is the probability of getting heads first and tails second?**
(a) $\frac{1}{4}$ (b) $\frac{1}{3}$ (c) $\frac{1}{2}$ (d) $\frac{2}{4}$

41. **If two fair coins are tossed together, what is the probability of getting at least one head?**
(a) $\frac{1}{2}$ (b) $\frac{1}{3}$ (c) $\frac{3}{4}$ (d) $\frac{1}{4}$

42. **A fair coin is tossed twice. What is the probability of getting two tails?**
(a) $\frac{1}{2}$ (b) $\frac{1}{3}$ (c) $\frac{1}{4}$ (d) $\frac{2}{4}$

43. **Two fair coins are tossed. What is the probability that at least one of them lands on tails?**
(a) $\frac{3}{4}$ (b) $\frac{1}{2}$ (c) $\frac{1}{4}$ (d) $\frac{1}{3}$

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

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

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

47. **A die is rolled twice. How many possible outcomes are there?**
(a) 6 (b) 12 (c) 36 (d) 18

1.5 Balls-Cards

48. **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) $\frac{3}{11}$

49. **There are 3 red, 4 black, and 5 white balls in an urn. If two balls are randomly taken, what is the probability that neither is red?**
(a) $\frac{5}{11}$ (b) $\frac{6}{11}$ (c) $\frac{3}{11}$ (d) $\frac{5}{22}$

50. **A jar contains 6 blue and 4 green marbles. If two marbles are drawn at random, what is the probability that both are blue?**
(a) $\frac{5}{18}$ (b) $\frac{1}{3}$ (c) $\frac{1}{2}$ (d) $\frac{1}{4}$

51. **A box has 7 black and 5 white balls. If one ball is drawn at random, what is the probability that it is not black?**

(a) $\frac{7}{12}$ (b) $\frac{5}{12}$ (c) $\frac{1}{2}$ (d) $\frac{1}{3}$

52. **A bag contains 8 red and 6 white balls. If two balls are drawn at random, what is the probability that they are of different colors?**

(a) $\frac{24}{91}$ (b) $\frac{58}{91}$ (c) $\frac{48}{91}$ (d) $\frac{72}{91}$

53. **A box contains 9 blue and 3 red balls. If two balls are randomly picked, what is the probability that at least one is red?**

(a) $\frac{3}{11}$ (b) $\frac{1}{3}$ (c) $\frac{18}{33}$ (d) $\frac{5}{11}$

Answer the next questions based on the following information.

A card is drawn from of pack of playing cards.

54. **What is the probability that the card is a King?**

(a) 0.0192 (b) 0.25 (c) 0.5 (d) 0.0769

55. **P(The card is not from Diamonds)–**

(a) $\frac{1}{2}$ (b) 0 (c) $\frac{3}{4}$ (d) $\frac{1}{4}$

56. **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.

57. **What is the probability that the ball drawn is red?**

(a) 0.26 (b) 0.25 (c) 0.2 (d) 0.4

58. **P(The ball drawn is not blue)–**

(a) $\frac{13}{20}$ (b) 0.5 (c) $\frac{7}{20}$ (d) $\frac{8}{20}$

1.6 Set-Problems

59. **For two independent events A and B, which one is correct?**

(a) $P(A \cap B) = P(A) \times P(B)$ (b) $P(A \cup B) = P(A) + P(B)$

(c) $P(A \cap B) = P(A) - P(B)$ (d) $P(A \cup B) = P(A) \times P(B)$

60. **For two mutually exclusive events A and B, which one is correct?**

(a) $P(A \cap B) = P(A) \times P(B)$ (b) $P(A \cup B) = P(A) + P(B)$

(c) $P(A \cap B) = P(A) - P(B)$ (d) $P(A \cup B) = P(A) \times P(B)$

61. **Which of the following correct?**

(a) $\frac{P(A)}{P(B)} = \frac{P(B|A)}{P(A|B)}$ (b) $\frac{P(A)}{P(A|B)} = \frac{P(B|A)}{P(B)}$ (c) $\frac{P(A)}{P(B)} = \frac{P(B|A)}{P(B)}$ (d) $\frac{P(A)}{P(B)} = \frac{P(A|B)}{P(B|A)}$

62. **The probability of rain is $\frac{1}{6}$ for any given day next week. What is the probability that it will rain on both Monday and Tuesday?**

(a) $\frac{1}{6}$ (b) $\frac{1}{36}$ (c) $\frac{5}{6}$ (d) $\frac{1}{17}$

63. **Given $P(A \cup B) = 0.7$, $P(A \cap B) = 0.2$, what are $P(A)$ and $P(B)$?**
(a) $P(A) = 0.5$ and $P(B) = 0.4$ (b) $P(A) = 0.4$ and $P(B) = 0.6$
(c) $P(A) = 0.4$ and $P(B) = 0.3$ (d) $P(A) = 0.7$ and $P(B) = 0.3$

64. **If $P(A) = 0.4$, $P(B) = 0.5$, and $P(A \cup B) = 0.7$, what is $P(A \cap B)$?**
(a) 0.2 (b) 0.1 (c) 0.3 (d) 0.4

65. **Given $P(A) = 0.3$, $P(A \cup B) = 0.6$, and $P(A \cap B) = 0.1$, what is $P(B)$?**
(a) 0.6 (b) 0.4 (c) 0.3 (d) 0.2

66. **If $P(A) = 0.5$, $P(B) = 0.6$, and $P(A \cap B) = 0.3$, what is $P(A \cup B)$?**
(a) 0.8 (b) 0.9 (c) 0.7 (d) 1

67. **If $P(A) = 0.2$, $P(B) = 0.3$, and $P(A \cup B) = 0.4$, what is $P(A \cap B)$?**
(a) 0.9 (b) 0.2 (c) 0.3 (d) 0.1

68. **Given $P(A) = 0.7$, $P(A \cup B) = 0.9$, and $P(A \cap B) = 0.5$, what is $P(B)$?**
(a) 0.8 (b) 0.6 (c) 0.7 (d) 0.5

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

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

70. **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
$P(A) = \frac{1}{3}, P(B) = \frac{1}{2} \& P(A \cup B) = \frac{7}{12}$

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

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

73. **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
$P(C) = \frac{2}{5}, P(D) = \frac{3}{4} \& P(C \cup D) = \frac{9}{10}$

74. $P(C \cap D) =$?
(a) $\frac{1}{10}$ (b) $\frac{1}{4}$ (c) $\frac{7}{20}$ (d) $\frac{4}{5}$

75. $P(C \cap \bar{D}) =$?
(a) $\frac{1}{10}$ (b) $\frac{2}{5}$ (c) $\frac{2}{20}$ (d) $\frac{3}{10}$

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

(a) $\frac{17}{20}$ (b) $\frac{7}{10}$ (c) $\frac{3}{4}$ (d) $\frac{11}{20}$

Answer the next three questions using the following information:

$P(E) = \frac{1}{3}, P(F) = \frac{1}{4} \& P(E \cap F) = \frac{1}{10}$

77. $P(E \cup F) =?$

(a) $\frac{1}{58}$ (b) $\frac{3}{10}$ (c) $\frac{58}{60}$ (d) $\frac{58}{120}$

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

(a) $\frac{7}{40}$ (b) $\frac{7}{30}$ (c) $\frac{3}{10}$ (d) $\frac{1}{30}$

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

(a) $\frac{11}{30}$ (b) $\frac{19}{30}$ (c) $\frac{13}{40}$ (d) $\frac{23}{30}$

80. **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) $\frac{2}{21}$

1.7 Situation Set

Answer the next two questions based on the following information

For two comprehensive events A and $B, P(A) = 0.8,$ and $P(B) = 0.6;$

81. **What is the value of** $P(A \cap B)$?

(a) 0.1 (b) 0.2 (c) 0.3 (d) 0.4

82. **The events** A **and** B **are –**

i. independent
ii. dependent
iii. non-disjoint

Which one is correct?

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

1.8 Multiple Completion

83. $P(A) = 0$ **implies**

i. A is an impossible event
ii. A would ocurr in extreme cases
iii. $P(\bar{A})$ is a certain event

Which one is correct?

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

84. **If** A **is an uncertain event, which one is possible?**

i. $0 < P(A) < 1$
ii. $P(A) = 0.1$
iii. $P(A) = 0$

Which one is correct?

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

85. **If a die is thrown once, the probability of getting even numbers is –**

i. A certain event
ii. A composite event
iii. An uncertain event

Which one is correct?

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

2 Random Variables

2.1 Concept of Random Variable

86. **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

87. **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

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

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

89. **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

90. **A die is thrown thrice and the number of times a 6 appears is denoted by X. How many possible values can X take?**

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

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

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

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

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

94. **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

95. **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

96. **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

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

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

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

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

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

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

100. **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

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

102. **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

103. **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

104. **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

105. **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

106. **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

107. **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 Situation Set

Answer the next two questions based on the following information

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

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

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

109. $P(X \leq 1 \leq 3) =-$

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

Answer the next three questions based on the following information

X	0	1	2	3
P(X)	$\frac{1}{4}$	m	$\frac{1}{3}$	$\frac{1}{6}$

110. **What is the value of m?**

(a) $\frac{1}{3}$ (b) $\frac{5}{12}$ (c) $\frac{1}{4}$ (d) $\frac{1}{6}$

111. **Find** $F(2)$**.**

(a) $\frac{1}{2}$ (b) $\frac{3}{4}$ (c) $\frac{5}{6}$ (d) $\frac{2}{3}$

112. **What is** $P(X > 1)$**?**

(a) $\frac{1}{2}$ (b) $\frac{5}{12}$ (c) $\frac{1}{3}$ (d) $\frac{7}{12}$

Answer the next three questions based on the following information

X	1	2	3	4	5
P(X)	$\frac{1}{5}$	c	$\frac{1}{4}$	$\frac{1}{6}$	$\frac{1}{3}$

113. **What is the value of c?**

(a) $\frac{1}{3}$ (b) $\frac{1}{4}$ (c) $\frac{1}{20}$ (d) $\frac{1}{6}$

114. **Find** $P(2 < X \leq 4)$**.**

(a) $\frac{5}{12}$ (b) $\frac{1}{2}$ (c) $\frac{5}{6}$ (d) $\frac{2}{3}$

115. **What is** $P(X \leq 3)$**?**

(a) $\frac{9}{20}$ (b) $\frac{7}{10}$ (c) $\frac{1}{2}$ (d) $\frac{3}{4}$

Answer the next three questions based on the following information

x	1	2	3
P(x)	$\frac{1}{3}$	a	$\frac{1}{6}$

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

(a) $\frac{2}{3}$ (b) $\frac{5}{6}$ (c) $\frac{1}{2}$ (d) 1

117. **Find** $P(2 < X \leq 3)$

(a) $\frac{5}{6}$ (b) $\frac{2}{3}$ (c) $\frac{1}{2}$ (d) $\frac{1}{6}$

118. **What is P(X<3)?**

(a) $\frac{5}{6}$ (b) $\frac{2}{5}$ (c) $\frac{1}{9}$ (d) $\frac{1}{7}$

Answer the next two questions based on the following information

x	1	2	3
P(x)	$\frac{1}{3}$	$\frac{1}{2}$	$\frac{1}{6}$

119. **What is $F(2)$?**

(a) $\frac{2}{3}$ (b) $\frac{5}{6}$ (c) $\frac{1}{2}$ (d) 1

120. $P(1 < X \leq 2)$

(a) $\frac{5}{6}$ (b) $\frac{2}{3}$ (c) $\frac{1}{2}$ (d) $\frac{1}{6}$

Answer the next two questions based on the following information

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

121. **What is the value of** $P(2 < x < 3)$

(a) $\frac{4}{5}$ (b) $\frac{3}{5}$ (c) $\frac{2}{5}$ (d) $\frac{1}{5}$

122. $P(X > 0)$

(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

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

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

124. **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

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

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

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

126. $F(2) = -$

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

127. $P(x)$ **is a** $-$

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

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

128. **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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

2.3 Multiple Completion

138. **For a continuous random variable X with PDF $f(x) = 2x$, defined on $[0, 1]$:**

i. $f(x) \geq 0$ for all $x \in [0, 1]$
ii. $\int_0^1 f(x)\, dx = 1$
iii. $P(X > 1) = 0$

Which one is correct?

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

139. **For a continuous random variable X with PDF $f(x) = k(2 - x)$ defined on $0 \leq x \leq 2$:**

i. The value of k is 1.
ii. The cumulative distribution function $F(x) = x - \frac{x^2}{4}$ for $0 \leq x \leq 2$.
iii. $P(1 < X < 2) = \frac{3}{8}$

Which one is correct?

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

3 Mathematical Expectation

140. **E(X+Y) = ?**

(a) E(X) - E(Y) (b) E(X) + E(Y) (c) 2E(X) - E(Y) (d) $E(X) \times E(Y)$

141. **E(4x+2Y) = ?**

(a) E(X) - E(Y) (b) 4E(X) + 2E(Y) (c) 2E(X) + 4E(Y) (d) $E(X) \times E(Y)$

142. **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

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

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

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

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

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

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

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

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

147. **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) $n + 1$

148. **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

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

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

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

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

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

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

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

153. **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

154. **Expectation measures –**

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

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

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

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

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

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

158. **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

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

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

160. **If** $E(X) = 3, E(X^2) = 11, V(X) = --$

(a) 2 (b) 5 (c) 6 (d) 4

161. **If** $E(X) = 4$**, what is** $E(3X - 2)$**?**

(a) 10 (b) 8 (c) 7 (d) 6

162. **If** $E(X) = 5, E(X^2) = 30, V(X) = --$

(a) 3 (b) 5 (c) 4 (d) 6

163. **If** $E(X) = 6$**, what is** $E(\frac{X}{2} + 1)$**?**

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

164. **If** $E(X) = 2, E(X^2) = 10, V(X) = --$

(a) 5 (b) 6 (c) 7 (d) 4

165. **If** $E(X) = 7$**, what is** $E(4X + 3)$**?**

(a) 28 (b) 30 (c) 31 (d) 29

166. **If** $E(X) = 3$**, what is** $E(5 - X)$**?**

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

167. **If** $E(X) = 4$ **and** $V(X) = 5$**, what is** $E(X^2)$**?**

(a) 9 (b) 16 (c) 21 (d) 25

168. **If** $E(X) = 3$ **and** $V(X) = 7$**, what is** $E(X^2)$**?**

(a) 9 (b) 10 (c) 16 (d) 18

169. **If** $E(X) = 5$ **and** $E(X^2) = 34$**, what is** $V(X)$**?**

(a) 6 (b) 9 (c) 10 (d) 7

170. **If** $E(X) = 2$ **and** $E(X^2) = 14$**, what is** $V(X)$**?**

(a) 10 (b) 9 (c) 8 (d) 7

171. **If** $E(X) = 6$ **and** $V(X) = 12$**, what is** $E(X^2)$**?**

(a) 36 (b) 40 (c) 48 (d) 50

172. **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

173. **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

174. **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

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

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

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

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

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

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

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

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

179. **If** $E(X^2) = 20$ **and** $V(X) = 11$**, what is** $E(X)$**?**

(a) 3 (b) 4 (c) 5 (d) 6

180. **If** $E(X^2) = 50$ **and** $V(X) = 14$**, what is** $E(X)$**?**

(a) 5 (b) 6 (c) 7 (d) 8

181. **If** $E(X^2) = 25$ **and** $V(X) = 9$**, what is** $E(X)$**?**

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

182. **If** $E(X^2) = 45$ **and** $V(X) = 21$**, what is** $E(X)$**?**

(a) $4\sqrt{3}$ (b) $2\sqrt{6}$ (c) $6\sqrt{2}$ (d) $7\sqrt{2}$

183. **If** $E(X^2) = 13$ **and** $V(X) = 4$**, what is** $E(X)$**?**

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

184. **If** $E(X) = 3$**, what is** $E(2X - 5)$**?**

(a) 1 (b) 3 (c) 5 (d) 7

185. **If** $E(X) = 4$**, what is** $E(\frac{X}{2} + 3)$**?**

(a) 4 (b) 5 (c) 6 (d) 7

186. **If** $E(X) = -2$**, what is** $E(3X + 7)$**?**

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

187. **If** $E(X) = 6$**, what is** $E(5 - X)$**?**

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

188. **If** $E(X) = 10$**, what is** $E(4X - 8)$**?**

(a) 12 (b) 40 (c) 28 (d) 32

189. **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

3.1 Situation Set

Answer the next THREE questions based on the following information

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

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

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

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

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

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

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

Answer the next THREE questions based on the following information

X	1	2	3
P(x)	$\frac{1}{6}$	$\frac{1}{2}$	$\frac{1}{3}$

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

(a) 2.00 (b) 2.17 (c) 2.33 (d) 2.50

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

(a) 5.17 (b) 4.83 (c) 5.00 (d) 5.33

195. **What is** $V(3X)$**?**

(a) 9.67 (b) 11.33 (c) 12.67 (d) 4.25

Answer the next two questions based on the following information

The probability function of random variable x is given below:

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

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

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

197. **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:

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

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

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

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

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

200. **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

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

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

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

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

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

3.2 Multiple Completion

203. **The possible relationship between $E(X) and E(X^2)$**

i. $E(X) \geq E(X^2)$
ii. $E(X) \leq E(X^2)$
iii. $E(X) = E(X^2)$

Which one is correct?

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

4 Binomial Distribution

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

214. **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

215. **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

216. **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) $\frac{(q+p)^2}{npq}$

217. **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, $P(x = 4) = \frac{1}{2}P(x = 5); n = 10$

218. **What is the mean?**

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

219. $P(x = 2) =$ —

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

220. **In a binomial distribution with** $p = 0.3$ **and** $n = 10$**, what is** $P(2)$**?**

(a) 0.2335 (b) 0.2668 (c) 0.3828 (d) 0.1211

221. **In a binomial distribution with** $p = 0.4$ **and** $n = 12$**, what is** $P(3)$**?**

(a) 0.0896 (b) 0.2131 (c) 0.1419 (d) 0.2942

222. **In a binomial distribution with** $p = 0.5$ **and** $n = 8$**, what is** $P(4)$**?**

(a) 0.2734 (b) 0.3125 (c) 0.2070 (d) 0.0898

223. **In a binomial distribution with** $p = 0.2$ **and** $n = 15$**, what is** $P(5)$**?**

(a) 0.1789 (b) 0.1887 (c) 0.1032 (d) 0.2413

224. **In a binomial distribution with $p = 0.6$ and $n = 9$, what is $P(6)$?**

(a) 0.2007 (b) 0.2508 (c) 0.2311 (d) 0.7682

225. **In a binomial distribution with $p = 0.3$ and $P(x) = 0.2508, n = 9, x =$?**

(a) 18 (b) 10 (c) 13 (d) 6

226. **In a binomial distribution with $p = 0.4$ and $P(x) = 0.1419$, what is n?**

(a) 5 (b) 6 (c) 12 (d) 15

227. **In a binomial distribution with $p = 0.5$ and $P(2) = 0.1093$, what is n?**

(a) 15 (b) 1 (c) 8 (d) 12

228. **In a binomial distribution with $p = 0.2$ and $P(x) = 0.9389$, $n =$?**

(a) 7 (b) 12 (c) 11 (d) 15

229. **In a binomial distribution with $p = 0.6$ and $P(5) = 0.02449$, $n =$?**

(a) 3 (b) 9 (c) 10 (d) 15

4.1 Situation Set

Answer the next THREE questions based on the following information

The mean of a Binomial distribution is 40 and standard deviation 6.

230. **What is the value of n?**

(a) 200 (b) 300 (c) 400 (d) 500

231. **What is the value of $1 - q$?**

(a) 0.5 (b) 0.2 (c) 0.3 (d) 0.1

232. **What is the value of $P(X \leq 40)$?**

(a) 0.52 (b) 0.54 (c) 0.45 (d) 0.91

4.2 Multiple Completion

233. **In a binomial distribution with parameters n and p:**

i. The expected value is given by $E(X) = np$.
ii. The variance is given by $V(X) = np(1 - p)$.
iii. The standard deviation is given by $\sqrt{np}$.

Which one is correct?

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

234. **Which of the following statements about a binomial distribution are true?**

i. The probability of success remains constant for each trial.
ii. The trials are dependent on each other.
iii. The number of trials is fixed in advance.

Which one is correct?

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

235. **Consider a binomial experiment. Which of the following statements is/are true?**

i. Each trial results in exactly one of two possible outcomes.
ii. The expected value is always greater than the variance.
iii. The probability mass function of a binomial distribution can be computed using the binomial formula.

Which one is correct?

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

236. **Which of the following is/are correct about the binomial distribution?**

i. The variance is maximized when $p = 0.5$.
ii. If $p = 1$, the distribution becomes degenerate.
iii. The standard deviation is given by $\sqrt{np(1-p)}$.

Which one is correct?

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

5 Poisson Distribution

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

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

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

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

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

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

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

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

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

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

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

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

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

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

244. **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

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

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

246. **The parameter of a Poisson variate is 5. What is its variance?**

(a) 10 (b) 5 (c) $\sqrt{5}$ (d) 25

247. **A Poisson distribution has a mean of 3. What is the variance?**

(a) 9 (b) 3 (c) $\sqrt{3}$ (d) 0

248. **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

249. **X is a Poisson variate. P(3) = P(5). What is the value of the parameter?**

(a) 4.5 (b) 5 (c) 2.3 (d) 4.1

250. **For a Poisson variate X, if P(1) = P(3), what is the variance?**

(a) 2.5 (b) 3.2 (c) 2.45 (d) 4.5

251. **For a Poisson variate X, if $P(2) = P(3)$, what is the variance?**

(a) 3 (b) 4 (c) 5 (d) 6

Answer the next two questions based on the following information

For a Poisson variate X, if P(2) = P(5).

252. **What is standard deviation?**

(a) 1.978 (b) 1.998 (c) 1.989 (d) 1.889

253. **What is the value of P(2)?**

(a) 0.25 (b) 0.14 (c) 0.15 (d) 0.02

254. **The standard deviation of a poisson distribution is 2. What is the parameter?**

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

255. **Mean of a Poisson variate is a. What is its standard deviation?**

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

256. **The standard deviation of a Poisson distribution is 3. What is the parameter?**

(a) 6 (b) 9 (c) 3 (d) 4

257. **For a Poisson distribution with a mean of 5, what is the variance?**

(a) 5 (b) 10 (c) 25 (d) 15

258. **If the variance of a Poisson distribution is 4, what is $P(2)$?**

(a) 0.1465 (b) 0.1954 (c) 0.1839 (d) 0.2184

259. **If the variance of a Poisson distribution is 3.5, what is $P(1)$?**

(a) 0.1465 (b) 0.1057 (c) 0.1839 (d) 0.2184

260. **A Poisson distribution has a mean of 7. What is the standard deviation?**

(a) 3.2 (b) 4.1 (c) 2.65 (d) 1.78

261. **If $P(2)$ in a Poisson distribution with parameter λ equals 0.2240, what is the parameter λ?**

(a) 2.4551 (b) 1.2515 (c) 1.2115 (d) 2.5112

262. **A Poisson distribution has a mean of 4. What is $P(3)$?**

(a) 0.1465 (b) 0.1954 (c) 0.1839 (d) 0.2381

263. **If the variance of a Poisson distribution is 3, what is the mean?**

(a) 3 (b) $\sqrt{3}$ (c) 2 (d) 6

264. **For a Poisson distribution with mean 6, what is the probability of $P(0)$?**

(a) 0.0895 (b) 0.012 (c) 0.0454 (d) 0.0024

265. **The mean of a Poisson distribution is 10. What is its standard deviation?**

(a) 5 (b) $\sqrt{10}$ (c) 10 (d) $\sqrt{20}$

266. **Given that the parameter of a Poisson distribution is 8, what is the variance?**

(a) 4 (b) 8 (c) $\sqrt{8}$ (d) 16

5.1 Multiple Completion

267. **For a Poisson-distributed variable with mean $\lambda = 4$, which of the following is true?**

i. $E(X) = 4$
ii. $V(X) = 2$
iii. $E(X^2) = 18$

Which one is correct?

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

268. **If $X \sim$ Poisson$(m = 3)$, which of the following holds?**

i. $E(X) = 3$
ii. $V(X) = 3$
iii. $E(X^2) = 12$

Which one is correct?

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

269. **For a Poisson distribution, which of the following statements are true?**

i. The mean and variance are always equal.
ii. The distribution is always symmetric.
iii. The probability of zero occurrences is given by e^{-m}.

Which one is correct?

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

270. **A Poisson-distributed random variable has mean $\lambda = 6$. Among the following properties —**

i. $E(X) = 6$
ii. $V(X) = 6$
iii. $P(X = 0) = e^{-6}$

Which one is correct?

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

271. **For a Poisson process with $\lambda = 5$, which of the following is true?**

i. The standard deviation is $\sqrt{5}$.
ii. $P(X \geq 1) = 1 - e^{-5}$.
iii. $E(X^2) = 30$

Which one is correct?

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

5.2 Problems

272. **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

273. **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

274. **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)

275. **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

276. **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

Answer the following 2 questions based on the information given below.

City	Population (in thousands)	Area (in km^2
Gamma	1200	400
Delta	800	320

277. **What is the population density of City Delta?**

(a) 2 people/km^2 (b) 4 people/km^2 (c) 2.5 people/km^2 (d) 2.2 people/km^2

278. **Which city is less densely populated?**

(a) Gamma (b) Delta

(c) Both are equal (d) Cannot be determined

Answer the following two questions based on the information given below.

In a city, the total number of live births in a year was 2,400. The number of women aged 15-49 years in the population was 48,000.

279. **Calculate the General Fertility Rate (GFR) for the city.**

(a) 40 per 1,000 women (b) 50 per 1,000 women (c) 60 per 1,000 women (d) 30 per 1,000 women

280. **If live births increase to 3,000 while the number of women aged 15-49 remains the same, what is the new GFR?**

(a) 55 per 1,000 women (b) 65 per 1,000 women (c) 50 per 1,000 women (d) 62.5 per 1,000 women

281. **The population of a city is 500,000, and the number of live births recorded in a year is 8,000. What is the Crude Birth Rate (CBR)?**

(a) 12 per 1,000 (b) 16 per 1,000 (c) 20 per 1,000 (d) 22 per 1,000

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

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

283. **In the following data, what is the dependency ratio?**

(a) 35.54% (b) 25.54% (c) 23.24% (d) 31.25%

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

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

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

i) CBR
ii) CDR
iii) NRR

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

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

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

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

288. **Total number of children born to each 1000 people in any country or region is called –**

(a) TFR (b) GFR (c) CBR (d) GRR

289. **A city has a dependency ratio of 0.48. If the working-age population (15–64) is 62,500, what is the number of dependents (ages 0–14 and 65+)?**

(a) 30,000 (b) 25,000 (c) 22,000 (d) 20,000

290. **The dependency ratio of a town is 0.60. If there are 40,000 people aged 15–64, how many individuals are considered dependents?**

(a) 22,000 (b) 26,500 (c) 24,000 (d) 25,000

6.1 Growth Rates

291. **If n in $P_n = P_o(1+r)^n$ is split into infinite parts and r adjusted accordingly, what type of growth do we have?**

(a) Simple growth (b) Arithmetic growth (c) Exponential growth (d) Geometric growth

Answer the next two questions based on the following information

Year	1	2	3	4
Population	100	110	120	130

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

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

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

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

294. **In exponential growth, when is a population doubled?**

(a) $\frac{\log_{10} 2}{r}$ (b) $\frac{\log_e 2}{r}$ (c) $\frac{\log_e 2}{r^2}$ (d) $\frac{\log_e 3}{r}$

295. **If a population exponentially declines, when is it reduced to half?**

(a) $\frac{\log_{10} 2}{r}$ (b) $\frac{\log_e 2}{r}$ (c) $\frac{\log_e 2}{r^2}$ (d) $\frac{\log_e 3}{r}$

296. **How long does it take for a population to triple in exponential growth?**

(a) $\frac{\log_{10} 3}{r}$ (b) $\frac{\log_e 3}{r}$ (c) $\frac{\log_e 3}{r^2}$ (d) $\frac{\log_e 2}{r}$

Answer the next two questions based on the following information

Statement

297. **Vital statistics records –**

i. marriage
ii. birth
iii. sickness and death

Which one is correct?

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

Answer Key:

1. (c) 6
2. (b) 6
3. (a) $\frac{n!}{(n-r)!}$
4. (a) $\frac{n!}{(n-1)!(n+r)!}$
5. (c) 1
6. (b) 0
7. (b) 2
8. (a) Disjoint
9. (b) Independent
10. (a) $P = \frac{\text{No. of favorable outcomes}}{\text{Total no. of possible outcomes}}$
11. (a) $P = \frac{\text{No. of favorable outcomes}}{\text{Total no. of possible outcomes}}$
12. (a) $P(A|B) = \frac{P(A \cap B)}{P(B|A)}$
13. (c) $P(A_1 U A_2 U \cdots U A_n) = \sum_{i=1}^{\infty} P(A_i)$
14. (c) ii and iii
15. (b) Experiment
16. (c) An impossible event
17. (a) Complementary events
18. (c) 0
19. (d) Sample Point
20. (c) Mutually Exclusive Events
21. (a) $P(A \cap B) = P(A) \cdot P(B)$
22. (a) $A = \{1, 2, 3\}, B = \{4, 5\}$
23. (d) $P = \{m, n\}, Q = \{p, q\}$
24. (c) ii and iii
25. (a) i and iii
26. (a) i and ii
27. (d) All of the above
28. (d) $\frac{1}{2}$
29. (c) 0.90
30. (b) 0.85
31. (b) 0.92
32. (c) 0.88
33. (c) 0.975
34. (c) 6^r
35. (c) 2^r
36. (c) 8
37. (a) $\frac{1}{4}$
38. (c) $\frac{3}{4}$
39. (b) $\frac{1}{2}$
40. (a) $\frac{1}{4}$
41. (c) $\frac{3}{4}$
42. (c) $\frac{1}{4}$
43. (a) $\frac{3}{4}$
44. (a) An experiment
45. (b) $\frac{0}{6}$
46. (a) 4
47. (c) 36
48. (b) $\frac{1}{22}$
49. (b) $\frac{6}{11}$
50. (b) $\frac{1}{3}$
51. (b) $\frac{5}{12}$
52. (c) $\frac{48}{91}$
53. (d) $\frac{5}{11}$
54. (d) 0.0769
55. (c) $\frac{3}{4}$
56. (d) $\frac{3}{4}$
57. (a) 0.26
58. (a) $\frac{13}{20}$
59. (a) $P(A \cap B) = P(A) \times P(B)$
60. (b) $P(A \cup B) = P(A) + P(B)$
61. (d) $\frac{P(A)}{P(B)} = \frac{P(A|B)}{P(B|A)}$
62. (b) $\frac{1}{36}$
63. (a) $P(A) = 0.5$ and $P(B) = 0.4$
64. (a) 0.2
65. (b) 0.4
66. (c) 0.7
67. (d) 0.1
68. (c) 0.7
69. (a) 0.1
70. (c) ii and iii

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

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

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

74. (b) $\frac{1}{4}$

75. (c) $\frac{2}{20}$

76. (a) $\frac{17}{20}$

77. (c) $\frac{58}{60}$

78. (b) $\frac{7}{30}$

79. (d) $\frac{23}{30}$

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

81. (d) 0.4

82. (c) ii and iii

83. (b) i and iii

84. (a) i and ii

85. (b) i and iii

86. (d) Page size in word processing softwares

87. (a) Probability distribution

88. (b) 3

89. (d) 3

90. (d) 4

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

92. (d) Size of television

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

94. (b) i and iii

95. (d) i, ii, and iii

96. (d) i, ii, and iii

97. (d) 1

98. (c) 0

99. (a) 2

100. (b) Weight

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

102. (d) Released version number of a software

103. (b) Weight of a package

104. (c) Number of floors in a building

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

106. (b) Height of students

107. (d) $0 \leq P(X_i, Y_j) \leq 1$

108. (b) 0.75

109. (a) 0.75

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

111. (c) $\frac{5}{6}$

112. (a) $\frac{1}{2}$

113. (c) $\frac{1}{20}$

114. (a) $\frac{5}{12}$

115. (c) $\frac{1}{2}$

116. (c) $\frac{1}{2}$

117. (d) $\frac{1}{6}$

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

119. (b) $\frac{5}{6}$

120. (c) $\frac{1}{2}$

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

122. (c) 1

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

124. (b) Discrete random

125. (c) 14

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

127. (a) Probability mass function

128. (a) i and ii

129. (c) 1

130. (c) 1

131. (d) 1

132. (c) 1

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

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

135. (a) i

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

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

138. (d) i, ii and iii

139. (c) ii

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

141. (b) 4E(X) + 2E(Y)

142. (c) Variance

143. (c) 0

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

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

146. (a) 0

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

148. (c) 16

149. (c) a

150. (a) 0

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

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

153. (a) 1

154. (d) Central tendency

155. (c) 2

156. (b) 5.5

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

158. (b) i

159. (c) 4

160. (a) 2

161. (a) 10

162. (b) 5

163. (a) 4

164. (b) 6

165. (c) 31

166. (a) 2

167. (c) 21

168. (c) 16

169. (b) 9

170. (a) 10

171. (c) 48

172. (d) 5

173. (d) 36

174. (b) 9

175. (d) 0

176. (b) 5

177. (a) 20

178. (c) 4

179. (a) 3

180. (b) 6

181. (c) 4

182. (b) $2\sqrt{6}$

183. (c) 4

184. (a) 1

185. (b) 5

186. (a) 1

187. (c) -1

188. (d) 32

189. (d) 8

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

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

192. (d) 2.97

193. (b) 2.17

194. (a) 5.17

195. (d) 4.25

196. (b) 10

197. (d) 3.0

198. (d) 24

199. (b) 2.92

200. (a) 1.05

201. (c) 10

202. (c) 0.725

203. (b) i and iii

204. (b) 2

205. (a) np

206. (b) npq

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

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

209. (c) $np > 0$

210. (a) $Mean > Variance$

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

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

213. (c) 0.99

214. (b) i and iii

215. (c) Mean is greater than variance

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

217. (c) p < q

218. (a) 6.25

219. (b) 0.0069

220. (c) 0.3828

221. (c) 0.1419

222. (a) 0.2734

223. (c) 0.1032

224. (b) 0.2508

225. (b) 10

226. (c) 12

227. (c) 8

228. (d) 15

229. (b) 9

230. (c) 400

231. (d) 0.1

232. (b) 0.54

233. (a) i and ii

234. (b) i and iii

235. (d) i, ii and iii

236. (d) i, ii and iii

237. (a) 1

238. (b) m

239. (c) $Mean = Variance$

240. (c) m

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

242. (c) $m > 0$

243. (b) 5

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

245. (d) 2

246. (b) 5

247. (b) 3

248. (b) 3.46

249. (a) 4.5

250. (c) 2.45

251. (a) 3

252. (a) 1.978

253. (c) 0.15

254. (c) 4

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

256. (b) 9

257. (a) 5

258. (a) 0.1465

259. (b) 0.1057

260. (c) 2.65

261. (b) 1.2515

262. (b) 0.1954

263. (a) 3

264. (d) 0.0024

265. (b) $\sqrt{10}$

266. (b) 8

267. (b) i and iii

268. (d) i, ii and iii

269. (b) i and iii

270. (d) i, ii and iii

271. (d) i, ii and iii

272. (a) 0.036

273. (a) Dependency ratio

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

275. (b) 0.48

276. (c) 26,000

277. (b) 4 people/km^2

278. (b) Delta

279. (b) 50 per 1,000 women

280. (d) 62.5 per 1,000 women

281. (b) 16 per 1,000

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

283. (b) 25.54%

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

285. (c) iii

286. (b) Population Density

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

288. (c) CBR

289. (a) 30,000

290. (c) 24,000

291. (c) Exponential growth

292. (a) Arithmetic growth

293. (b) 0.1

294. (b) $\frac{\log_e 2}{r}$

295. (b) $\frac{\log_e 2}{r}$

296. (b) $\frac{\log_e 3}{r}$

297. (d) i, ii and iii