B.Sc. (First Semester) Examination, February/March-2022

B060101T

Statistics

Descriptive Statistics (Univariate) and Theory of Probability

Time : 1:30 Hours   **Maximum Marks-100**

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1. The idea of posteriori probabilities was introduced by :

   (A) Pascal

   (B) Peter and Paul

   (C) Thomas Bayes

   (D) None of these

2. The algebraic sum of the deviations about mean is :

   (A) Minimum

   (B) Maximum

   (C) Zero

   (D) None of these

3. Median is that value which :

   (A) Divides the series in two parts

   (B) Divides the series in eight parts

   (C) Divides the series in ten parts

   (D) Divides the series in hundred parts

4. Which measures of variation is most affected by extreme value :

   (A) S. D.

   (B) M. D.

   (C) Q. D.

   (D) Variance

5. If mean, median and mode of a distribution are equal, the distribution is called :

   (A) + vely Skewed

   (B) - vely Skewed

   (C) Symmetrical

   (D) None

6. The S.D. of 15 items is 6; if each item is increased by 2, then new S.D. will be :

   (A) 5

   (B) 6

   (C) 4

   (D) 2

7. Which one of the following is not a measure of dispersion :

(A) Range

(B) S.D.

(C) Mean Deviation

(D) First Quartile

8. The mean of the first n natural No. is :

(A) $\frac{n(n+1)}{2}$

(B) $\frac{(n+1)}{2}$

(C) $(n+1)\frac{(2n+1)}{6}$

(D) None of these

9. Which of the following is a measure of location :

(A) Mode

(B) Correlation

(C) S.D.

(D) Kurtosis

10. If A.M. of two items is 5 and G.M. is 4, the items are :

(A) 4 and 5

(B) 16 and 25

(C) 4 and 6

(D) 2 and 8

11. The Mean of x_1, x_2 _____ x_{10}, where $x_i = \frac{i^2}{7} + 5$; i = 1, 2 _____ 10, is :

(A) $\frac{11}{7}$

(B) $\frac{46}{7}$

(C) 5.5

(D) 10.5

12. A Distribution having two mode is called :

    (A) Unimodal

    (B) Bimodal

    (C) Tri Modal

    (D) None of these

13. Quartiles, Percentiles, Deciles are called :

    (A) Division values

    (B) Partition value

    (C) Eigen values

    (D) None of these

14. The mean of absolute deviations from an Average is called :

    (A) S. D.

    (B) M. D.

    (C) Q. D.

    (D) None of these

15. Which measure of dispersion ignores the Sign of deviation :

    (A) S. D.

    (B) Q. D.

    (C) M. D.

    (D) None of these

16. A Skewed Curve may be :

    (A) Positively Skewed

    (B) Negatively Skewed

    (C) Positively Skewed or Negatively Skewed

    (D) Symmetrical

17. Which of the following is a Measure of Skewness :

    (A) β_2

    (B) β_1

    (C) γ_2

    (D) None of above

18. The Relationship between mean deviation (M.D.) and Standard Deviation (S.D.) is :

    (A) 3 M. D. = 2 S. D.

    (B) 5 M. D. = 4 S. D.

    (C) 6 M. D. = 5 S. D.

    (D) M. D. = S. D.

19. The Relation between Quadratic Mean (Q. M.) and Arithmetic Mean (A. M.) is :

    (A) Q. M. = A. M.

    (B) Q. M. > A. M.

    (C) Q. M. < A. M.

    (D) Q. M. $\neq$ A. M.

20. The A. M. of n numbers of a series is $\bar{x}$. The sum of first (n-1) terms is K, the nth term will be :

    (A) K

    (B) $(n\bar{x} - K)$

    (C) $(\bar{x} - K)$

    (D) None of these

21. For positively skewed distribution

    (A) Mean = Median = Mode

    (B) Mean > Median > Mode

    (C) Mean < Median < Mode

    (D) None of these

22. When the coefficient of skewness is zero, the shape of the curve is :

(A) T shaped

(B) L shaped

(C) Symmetrical

(D) None

23. By Skewness we mean :

(A) Symmetry

(B) Lack in symmetry

(C) Flatness of the distribution

(D) None of these

24. Semi-interquartile Range is equal to :

(A) $\frac{4}{5}$ S.D.

(B) $\frac{2}{3}$ S.D.

(C) $\frac{3}{4}$ S.D.

(D) None

25. Standard deviation is always measured from :

(A) Median

(B) Mean

(C) Mode

(D) Zero

26. If n = 20, $\Sigma x = 6$, and $\Sigma x^2 = 821$, the value of Mean and S.D. are:

(A) 0.3, 6.4

(B) 3, 6.4

(C) 0.3, 64

(D) None

27. Mean Deviation about Median is :

   (A) Minimum

   (B) Maximum

   (C) Zero

   (D) Constant

28. 7th decile is equal to :

   (A) Median

   (B) Q_1

   (C) 70th Percentile

   (D) 5th Octile

29. The A. M. of the numbers 2, 7, 9, x, 6 is 7, then the value of x is :

   (A) 13

   (B) 11

   (C) 10

   (D) None

30. If median of a series is 10, two observations 8 and 21 are added to the series, the median of new series is :

   (A) 12

   (B) 8

   (C) 10

   (D) 11

31. If a constant 5 is added to each observation of a set, the mean is :

   (A) Increased by 5

   (B) Decreased by 5

   (C) 5 times occur

   (D) Not affected

32. Which of the following can be found from a histogram ?

    (A) A. M.

    (B) H. M.

    (C) Mode

    (D) Median

33. Pie-Diagrams are also called :

    (A) Bar Diagrams

    (B) Diagrams

    (C) Circular Diagrams

    (D) Circle Diagrams

34. Which of the following Series represents a ratio scale ?

    (A) 1, 2, 3, 5, 8 etc.

    (B) 1, 2, 4, 8, 15, 30 etc.

    (C) 1, 2, 3, 5, 9 etc.

    (D) 1, 2, 4, 8, 16, 32 etc.

35. The number of Science, Art and Commerce graduates working in company is 30, 70 and 50 respectively. If we represent these figures by a pie-chart, the Angle Corresponding to Science graduates would be :

    (A) 30°

    (B) 45°

    (C) 72°

    (D) 90°

36. Or frequency polygon has more than :

    (A) One Side

    (B) Two Side

    (C) Three Side

    (D) Four Side

37. In an Ogive Curve, the points are plotted for :

    (A) The values and frequencies

    (B) The values and cumulative frequencies

    (C) Frequencies and cumulative frequencies

    (D) None of the above

38. Ogive curve occur for :

    (A) More than type distribution

    (B) Less than type distribution

    (C) Both (A) and (B)

    (D) None of these

39. The series :

Marks	No. of Students
20-30	5
30-40	14
40-50	24
50-60	12
60-70	9
70-80	2

    is of the type,

    (A) Discrete Series

    (B) Continuous Series

    (C) Individual Series

    (D) None of these

40. Which of the following information is true about a frequency distribution ?

    (A) An ogive is a graph of cumulative frequency

    (B) A Histogram is a line chart

    (C) The width of classes should be equal

    (D) A frequency polygon is a bar chart

41. A Data has a maximum value of 88 and minimum value of 24. A frequency distribution in ascending order with eight classes is to be constructed. The first Interval shall be :

(A) 88 and over

(B) 24 and less

(C) 80 and less than 88

(D) 24 and less than 32

42. The sum of the frequencies of a particular class and of all the classes prior of the particular class is called :

(A) Frequency

(B) Cumulative frequency

(C) Distribution table

(D) None

43. Which of the following is primary data ?

(A) Census of population data

(B) Whole sale price index number

(C) Statistics contained in Reserve Bank of India

(D) Data collected through own field survey

44. Primary Data is performed over secondary data because :

(A) It is concise and accurate

(B) It contains no errors

(C) It shows greater details

(D) None of the above

45. Data originally collected for an investigation is known a :

(A) Primary Data

(B) Secondary Data

(C) Data

(D) None

46. If definite breaks are not visible, data is called :

(A) Discrete

(B) Continuous

(C) Smooth

(D) None

47. Classification according to some attributes is an example of :

(A) Quantitative Data

(B) Qualitative Data

(C) Measurement Statistics

(D) None of these

48. Which of the following represents data ?

(A) A single data

(B) Only two value in a set

(C) A group of value in a set

(D) None of the above

49. In the development of statistical methods, the greatest contribution is that of :

(A) Economists

(B) Mathematicians

(C) Businessman

(D) Scientists

50. The statement, "Statistics is both a science and an art." was given by :

(A) R. A. Fisher

(B) Tippet

(C) L.R. Connor

(D) A. L. Bowley

51. While tabulating the grouped data :

    (A) Each group must have frequencies

    (B) frequency can be Negative

    (C) It is necessary to have frequencies

    (D) None

52. "Less than" and "More than" ogives intersect at :

    (A) Origin

    (B) Mode

    (C) Median

    (D) None of these

53. Second Quartile is also known as :

    (A) M.D.

    (B) S.D.

    (C) Median

    (D) None of these

54. If an observation in series is zero, the G.M. is :

    (A) One

    (B) Three

    (C) Zero

    (D) None of these

55. Which one of the following true :

    (A) Mean + Mode = 3(Mean - Median)

    (B) Mean - Mode = 3(Mean - Median)

    (C) Mean - Mode = 3(Mean + Median)

    (D) None of these

56. The Relation between A.M., G.M and H.M. is :

(A) A.M. < G.M. < H.M.

(B) A.M. ≥ G.M. ≥ H.M.

(C) A.M. > G.M. > H.M.

(D) None of these

57. Quartiles can be obtained by :

(A) Histogram

(B) Bar Diagram

(C) Ogive

(D) None of these

58. If $U = (x - a)/h$, a and h being constants then $\phi_U(t)$ is :

(A) $e^{it/h}\phi_x(t)$

(B) $e^{-iat/h}\phi_x(t/h)$

(C) Both (A) and (B)

(D) None of above

59. The conditional distribution $f(y/x)$ is equal to :

(A) $f(x, y)/g(x); g(x) \neq 0$

(B) $f(x, y)/f(x); f(x) \neq 0$

(C) Both (A) and (B)

(D) None the above

60. Two events A and B are equal if :

(A) $A \neq B$

(B) $A \subset B$

(C) $A > B$

(D) None of these

61. If $P(A \cap B) = P(A) P(B)$, the events A and B are :

(A) Independent

(B) Mutually exclusive

(C) Both (A) and (B)

(D) None of these

62. For any two events A and B :

(A) $P(A \cap B) \leq P(A) \leq P(A \cup B) \leq P(A) + P(B)$

(B) $P(A) + P(B) \geq P(A) \geq P(A \cup B)$

(C) $P(A \cap B) \geq P(A) \geq P(A \cup B) \geq P(A) + P(B)$

(D) None of these

63. If a and b are constants, then $E(ax + b)$ is :

(A) $E(a)X + b$

(B) $aE(x) + b$

(C) $E(ax) + E(b)$

(D) None of these

64. The value of $E(x^2) - [E(x)]^2$ is called :

(A) Mean

(B) Variance

(C) Median

(D) None of these

65. If x is random variable with its mean $\bar{x}$, the expression $E(x - \bar{x})^2$ represents :

(A) The variable of x

(B) Second central moment

(C) Both (A) and (B)

(D) None of these

66. If X and Y are two random variables, then :

   (A) $E\{(XY)^2\} = E(X^2)\,E(Y^2)$

   (B) $E\{(XY)^2\} = E(X^2Y^2)$

   (C) $E\{(XY)^2\} \geq E(X^2)\,E(Y^2)$

   (D) $E\{(XY)^2\} \leq E(X^2)\,E(Y^2)$

67. If x is a random variable, $E\,(e^{itx})$ is known as :

   (A) Characteristic function

   (B) M.G.F.

   (C) P.d.f.

   (D) All the above

68. Which of the following is true :

   (A) If x and y are independent then $f_{xy} = 0$

   (B) If $f_{xy} = 0$ then x and y may or may not be independent

   (C) Both (A) and (B)

   (D) None of these

69. If X_1 and X_2 are independent then $V(X_1 - X_2)$ is equal to :

   (A) $V(X_1) - V(X_2)$

   (B) $V(X_1) + V(X_2)$

   (C) $V(X_1) - V(X_2) - 2\cos(X_1X_2)$

   (D) None of these

70. The covariance of two independent variates is equal to :

   (A) Zero

   (B) Units

   (C) The sum of their expectations

   (D) The product of their expectations

71. A sequence of random variable $\{x_n\}, n = 1, 2 \ldots \ldots$ is said to converge to a constant c strongly if :

(A) $\lim_{n \to \infty} P[|x_n = c|] = 1$

(B) $\lim_{n \to \infty} P[|x_m - c| > \varepsilon] = 0$

(C) Both (A) and (B)

(D) None of these

72. Which of the following is true in case of convergence in probability :

(A) $\lim_{n \to \infty} P[|x_n - c| \geq \varepsilon] = 0$

(B) $\lim_{n \to \infty} P[|x_n - c| \leq \varepsilon] = 0$

(C) $\lim_{n \to \infty} P[|x_n| \geq \varepsilon] = 0$

(D) Both (A) and (B)

73. The characteristic function exists always for :

(A) A discrete random variable

(B) A continuous random variable

(C) Both (A) and (B)

(D) None of these

74. The cumulant generating function of the sum of independent random variable :

(A) The sum of their cumulant generating functions

(B) The product of their cumulant generating functions

(C) The difference of their cumulant generating functions

(D) None of these

75. The logarithm of the moment generating function of a distribution is called :

(A) Cumulant generating function

(B) p.d.f.

(C) Characteristic function

(D) None of these

76. Which of the following are true :

(A) A random variable may not have any moment although its M.G.F. exists

(B) A random variable may have same moments although its moment generating function does not exist

(C) Both (A) and (B)

(D) None of these

77. Let x be a random variable and ax+b, be its linear function the $M_{ax+b}(t)$ is :

(A) $e^{bt}M_x(at)$

(B) $e^{at}M_x(bt)$

(C) $e^{abt}M_x(t)$

(D) None of these

78. The moment generating function of a discrete random variable is given by :

(A) $M_x(t) = \sum\limits_{x} e^{tx}$

(B) $M_x(t) = \sum\limits_{x} e^t f(x)$

(C) $M_x(t) = \sum\limits_{x} e^{tx} f(x)$

(D) None of these

79. All the cumulant are independent of change of origin except :

(A) The first

(B) The Last

(C) Both (A) and (B)

(D) None of these

80. If $X = cV$, then $M_x(t)$:

(A) $M_c(V_t)$

(B) $M_V(ct)$

(C) $M_x(t)$

(D) None of above

81. For f(x) to be a discrete probability distribution f(x) should satisfy the following conditions :

(A) $f(x) \geq 0, \underset{x}{\Sigma} f(x) < 1$

(B) $f(x) \geq 0, \underset{x}{\Sigma} f(x) = 1$

(C) $f(x) \leq 0, \underset{x}{\Sigma} f(x) = 1$

(D) None of above

82. The cumulative distribution F(x) of a continuous random variable X is defined as $F(x) = \int_{-\infty}^{x} f(t)\,dt$ and the limits of X are :

(A) $-\infty < x < 0$

(B) $0 < x < \infty$

(C) $-\infty < x < \infty$

(D) None of above

83. Two random variables X and Y are said to be independent if :

(A) $E(XY) = 1$

(B) $E(XY) = 0$

(C) $E(XY) = E(X)\,E(Y)$

(D) $E(XY) =$ any constant

84. If X is a random variable, the $E(t^x)$ is known as :

(A) Characteristic function

(B) Moment generating function

(C) Probability generating function

(D) None of these

85. If odds for an event and are 5:1, the probability of non-happening of the event is :

(A) 1/2

(B) 5/6

(C) 1/3

(D) 1/6

86.   For Any two events A and B, P(A-B) is equal to :

(A) $P(A) - P(B)$

(B) $P(B) - P(A)$

(C) $P(B) - P(AB)$

(D) $P(A) - P(AB)$

87.   If A and B are two events, the probability of occurrence of either A or B is given as:

(A) $P(A) + P(B)$

(B) $P(A \cup B)$

(C) $P(A \cap B)$

(D) $P(A)P(B)$

88.   If $B \subset A$, the probability of P(A/B) is equal to :

(A) Zero

(B) One

(C) P(A)/P(B)

(D) P(B)/P(A)

89.   If A is an event, the conditional probability of A given :

(A) Zero

(B) One

(C) Infinite

(D) Indeterminate quantity

90.   If A and B are two events, the probability of occurrence of A and B simultaneously is :

(A) $P(A) + P(B)$

(B) $P(A \cup B)$

(C) $P(A \cap B)$

(D) $P(A)P(B)$

91. Classical probability is also known as :
    (A) Laplace's Probability
    (B) Mathematical Probability
    (C) Priori Probability
    (D) All the above

92. Which of the following is true ?
    (A) $P(A \cap B) \leq P(A) \leq P(A \cup B) \leq P(A) + P(B)$
    (B) $P(A \cap B) \geq P(A) \geq P(A \cup B) \geq P(A) + P(B)$
    (C) $P(A) \leq P(A \cap B) \leq P(A) + P(B) \leq P(A \cup B)$
    (D) None of these

93. If an event A is independent of the events, B (B ∩ C), then A and C are :
    (A) Independent
    (B) Dependent
    (C) Mutually exclusive
    (D) None of these

94. If P(A) = 0.4, P(B) = 0.2 and the events A and B are mutually exclusive then P(AB)
    is :
    (A) 0.08
    (B) 0
    (C) 0.6
    (D) None of the above

95. If for two events A and B, $P(A \cup B) = 0.6, P(A) = 0.8$ and $P(A \cap B) = 0.6$, then
    P(B) is :
    (A) 0.60
    (B) 0.40
    (C) 0.8
    (D) None of these

96. If P(B/A) = P(B), then the two events A and B are :

(A) Independent

(B) Equally likely

(C) Dependent

(D) None of above

97. Probability is expressed as :

(A) Ratio

(B) Proportion

(C) Percentage

(D) All of the above

98. If P(A∪B) = P(A) + P(B), then the two events A and B are :

(A) Independent

(B) Equally likely

(C) Dependent

(D) None of above

99. Probability can take value from :
(A) $-\infty$ to ∞
(B) $-\infty$ to 1
(C) -1 to 1
(D) 0 to 1

100. The outcomes of tossing a coin is :
(A) Simple Event
(B) Mutually exclusive event
(C) Compound Event
(D) None of these

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Rough Work / रफ कार्य

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