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(To be filled in the OMR Sheet)

O.M.R. Serial No. | | | | | | | | |

प्रश्नपुस्तिका क्रमांक
Question Booklet No.

प्रश्नपुस्तिका सीरीज
Question Booklet Series
C

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

B060101T

Statistics

Descriptive Statistics (Univariate) and Theory of Probability

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

जब तक कहा न जाय, इस प्रश्नपुस्तिका को न खोलें

निर्देश : –

1. परीक्षार्थी अपने अनुक्रमांक, विषय एवं प्रश्नपुस्तिका की सीरीज का विवरण यथास्थान सही– सही भरें, अन्यथा मूल्यांकन में किसी भी प्रकार की विसंगति की दशा में उसकी जिम्मेदारी स्वयं परीक्षार्थी की होगी।
2. **इस प्रश्नपुस्तिका में 100 प्रश्न हैं, जिनमे से केवल 75 प्रश्नों के उत्तर परीक्षार्थियों द्वारा दिये जाने है। प्रत्येक प्रश्न के चार वैकल्पिक उत्तर प्रश्न के नीचे दिये गये हैं। इन चारों में से केवल एक ही उत्तर सही है। जिस उत्तर को आप सही या सबसे उचित समझते हैं, अपने उत्तर पत्रक (O.M.R. ANSWER SHEET)में उसके अक्षर वाले वृत्त को काले या नीले बाल प्वांइट पेन से पूरा भर दें। यदि किसी परीक्षार्थी द्वारा निर्धारित प्रश्नों से अधिक प्रश्नों के उत्तर दिये जाते हैं तो उसके द्वारा हल किये गये प्रथमतः यथा निर्दिष्ट प्रश्नोत्तरों का ही मूल्यांकन किया जायेगा।**
3. प्रत्येक प्रश्न के अंक समान हैं। आप के जितने उत्तर सही होंगे, उन्हीं के अनुसार अंक प्रदान किये जायेंगे।
4. सभी उत्तर केवल ओ०एम०आर० उत्तर पत्रक **(O.M.R. ANSWER SHEET)** पर ही दिये जाने हैं। उत्तर पत्रक में निर्धारित स्थान के अलावा अन्यत्र कहीं पर दिया गया उत्तर मान्य नहीं होगा।
5. ओ०एम०आर० उत्तर पत्रक **(O.M.R. ANSWER SHEET)** पर कुछ भी लिखने से पूर्व उसमें दिये गये सभी अनुदेशों को सावधानीपूर्वक पढ़ लिया जाय।
6. परीक्षा समाप्ति के उपरान्त परीक्षार्थी कक्ष निरीक्षक को अपनी प्रश्नपुस्तिका बुकलेट एवं ओ०एम०आर० शीट पृथक–पृथक उपलब्ध कराने के बाद ही परीक्षा कक्ष से प्रस्थान करें।
7. निगेटिव मार्किंग नहीं है।

महत्वपूर्ण : – **प्रश्नपुस्तिका खोलने पर प्रथमतः जॉच कर देख लें कि प्रश्नपुस्तिका के सभी पृष्ठ भलीभॉति छपे हुए हैं। यदि प्रश्नपुस्तिका में कोई कमी हो, तो कक्ष निरीक्षक को दिखाकर उसी सीरीज की दूसरी प्रश्नपुस्तिका प्राप्त कर लें।**

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1. 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

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

   (A) Origin

   (B) Mode

   (C) Median

   (D) None of these

3. Second Quartile is also known as :

   (A) M.D.

   (B) S.D.

   (C) Median

   (D) None of these

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

   (A) One

   (B) Three

   (C) Zero

   (D) None of these

5. 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

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

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

(B) A.M. $\geq$ G.M. $\geq$ H.M.

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

(D) None of these

7. Quartiles can be obtained by :

(A) Histogram

(B) Bar Diagram

(C) Ogive

(D) None of these

8. 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

9. 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

10. Two events A and B are equal if :

(A) $A \neq B$

(B) $A \subset B$

(C) $A > B$

(D) None of these

11. 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

12. 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

13. 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

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

(A) Mean

(B) Variance

(C) Median

(D) None of these

15. 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

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

17. 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

18. 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

19. 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

20. 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

21. A sequence of random variable $\{x_n\}, n = 1, 2\ldots\ldots\ldots$ 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

22. 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)

23. 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

24. 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

25. 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

26. 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

27. 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

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

(A) $M_x(t) = \sum_x e^{tx}$

(B) $M_x(t) = \sum_x e^t f(x)$

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

(D) None of these

29. 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

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

(A) $M_c(V_t)$

(B) $M_V(ct)$

(C) $M_x(t)$

(D) None of above

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

(A) $f(x) \geq 0, \sum_x f(x) < 1$

(B) $f(x) \geq 0, \sum_x f(x) = 1$

(C) $f(x) \leq 0, \sum_x f(x) = 1$

(D) None of above

32. 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

33. 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

34. 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

35. 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

36. 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) $P(A) - P(AB)$

37. 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) $P(A)P(B)$

38. 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)

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

(A) Zero

(B) One

(C) Infinite

(D) Indeterminate quantity

40. 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) $P(A)P(B)$

41. Classical probability is also known as :

(A) Laplace's Probability

(B) Mathematical Probability

(C) Priori Probability

(D) All the above

42. 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

43. 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

44. 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

45. 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

46. 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

47. Probability is expressed as :

(A) Ratio

(B) Proportion

(C) Percentage

(D) All of the above

48. 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

49. Probability can take value from :

(A) $-\infty$ to ∞

(B) $-\infty$ to 1

(C) -1 to 1

(D) 0 to 1

50. The outcomes of tossing a coin is :

(A) Simple Event

(B) Mutually exclusive event

(C) Compound Event

(D) None of these

51. The idea of posteriori probabilities was introduced by :

(A) Pascal

(B) Peter and Paul

(C) Thomas Bayes

(D) None of these

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

(A) Minimum

(B) Maximum

(C) Zero

(D) None of these

53. 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

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

(A) S. D.

(B) M. D.

(C) Q. D.

(D) Variance

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

(A) + vely Skewed

(B) - vely Skewed

(C) Symmetrical

(D) None

56. 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

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

(A) Range

(B) S.D.

(C) Mean Deviation

(D) First Quartile

58. 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

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

(A) Mode

(B) Correlation

(C) S.D.

(D) Kurtosis

60. 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

61. 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

62. A Distribution having two mode is called :

(A) Unimodal

(B) Bimodal

(C) Tri Modal

(D) None of these

63. Quartiles, Percentiles, Deciles are called :

(A) Division values

(B) Partition value

(C) Eigen values

(D) None of these

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

(A) S. D.

(B) M. D.

(C) Q. D.

(D) None of these

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

(A) S. D.

(B) Q. D.

(C) M. D.

(D) None of these

66. A Skewed Curve may be :

(A) Positively Skewed

(B) Negatively Skewed

(C) Positively Skewed or Negatively Skewed

(D) Symmetrical

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

(A) β_2

(B) β_1

(C) γ_2

(D) None of above

68. 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.

69. 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.≠A. M.

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

(A) K

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

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

(D) None of these

71. For positively skewed distribution

(A) Mean = Median = Mode

(B) Mean > Median > Mode

(C) Mean < Median < Mode

(D) None of these

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

(A) T shaped

(B) L shaped

(C) Symmetrical

(D) None

73. By Skewness we mean :

(A) Symmetry

(B) Lack in symmetry

(C) Flatness of the distribution

(D) None of these

74. 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

75. Standard deviation is always measured from :

(A) Median

(B) Mean

(C) Mode

(D) Zero

76. 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

77. Mean Deviation about Median is :

(A) Minimum

(B) Maximum

(C) Zero

(D) Constant

78. 7^{th} decile is equal to :

(A) Median

(B) Q_1

(C) 70^{th} Percentile

(D) 5^{th} Octile

79. 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

80. 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

81. 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

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

(A) A. M.

(B) H. M.

(C) Mode

(D) Median

83. Pie-Diagrams are also called :

(A) Bar Diagrams

(B) Diagrams

(C) Circular Diagrams

(D) Circle Diagrams

84. 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.

85. 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°

86. Or frequency polygon has more than :

(A) One Side

(B) Two Side

(C) Three Side

(D) Four Side

87. 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

88. Ogive curve occur for :

(A) More than type distribution

(B) Less than type distribution

(C) Both (A) and (B)

(D) None of these

89. 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

90. 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

91. 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

92. 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

93. 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

94. 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

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

(A) Primary Data

(B) Secondary Data

(C) Data

(D) None

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

(A) Discrete

(B) Continuous

(C) Smooth

(D) None

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

(A) Quantitative Data

(B) Qualitative Data

(C) Measurement Statistics

(D) None of these

98. 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

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

(A) Economists

(B) Mathematicians

(C) Businessman

(D) Scientists

100. 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

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Rough Work / रफ कार्य

DO NOT OPEN THE QUESTION BOOKLET UNTIL ASKED TO DO SO

1. Examinee should enter his / her roll number, subject and Question Booklet Series correctly in the O.M.R. sheet, the examinee will be responsible for the error he / she has made.
2. **This Question Booklet contains 100 questions, out of which only 75 Question are to be Answered by the examinee. Every question has 4 options and only one of them is correct. The answer which seems correct to you, darken that option number in your Answer Booklet (O.M.R ANSWER SHEET) completely with black or blue ball point pen. If any examinee will mark more than one answer of a particular question, then the first most option will be considered valid.**
3. Every question has same marks. Every question you attempt correctly, marks will be given according to that.
4. Every answer should be marked only on Answer Booklet **(O.M.R ANSWER SHEET).**Answer marked anywhere else other than the determined place will not be considered valid.
5. Please read all the instructions carefully before attempting anything on Answer Booklet**(O.M.R ANSWER SHEET).**
6. After completion of examination please hand over the Answer Booklet **(O.M.R ANSWER SHEET)** to the Examiner before leaving the examination room.
7. There is no negative marking.

Note: On opening the question booklet, first check that all the pages of the question booklet are printed properly in case there is an issue please ask the examiner to change the booklet of same series and get another one.