Seat No.

Total No. of Pages : 16

P.G. Re Entrance Examination 2025
M. Sc. ENTRANCE
M.Sc. Statistics / Applied Statistics & Information
Subject Code : 58715

Day and Date : Thursday, 10/07/2025 **Total Marks : 100**
Time : 01.00 pm to 02.30 pm

Instructions:

1) All questions are compulsory.
2) Each question carries 1 mark.
3) Answers should be marked in the given OMR answer sheet by darkening the appropriate option.
4) Follow the instructions given on OMR sheet.
5) Rough work shall be done on the sheet provided at the end of question paper.

Question: Choose most correct alternatives

1. Standard error is the standard deviation of the sampling distribution of . . .

   A) Estimate
   B) Estimation
   C) Estimator
   D) Error Of Estimation

2. Convergence in probability of sample mean to population mean is implied by . . .

   A) CLT
   B) WLLN
   C) Convergence in Q.M.
   D) All Of The Above

3. In a randomized block design with 4 blocks and 5 treatments having one missing value, the error degrees of freedom will be . . .

   A) 12
   B) 11
   C) 10
   D) 9

4. EWMA charts are better than Shewhart control charts in detecting the . . . shifts.

   A) Large Process
   B) Medium Process
   C) Small Process
   D) Every Process

5. Which of the following is a particular case of Multinomial distribution?

   A) Normal
   B) Exponential
   C) Uniform
   D) Trinomial

6. The critical region of a likelihood ratio test criterion is always ...

   A) Left Tailed
   B) Right Tailed
   C) Two Tailed
   D) Either (B) Or (C)

7. In the optimal simplex table, $z_j - c_j = 0$ value indicates

   A) Unbounded Solution
   B) Cycling
   C) Alternative Solution
   D) Infeasible Solution

8. If Independent random variables X and Y are distributed as $X \sim G(1,5)$, $Y \sim G(1,10)$ respectively and define $U = X + Y$, $V = \frac{X}{X+Y}$, then ...

   A) U and V are also independent
   B) $U \sim G(1,15)$ And $V \sim \beta_1(5,10)$
   C) Neither (A) nor (B) are true
   D) Both A) and B) are true

9. If $X_1, \ldots, X_n$ is a random sample of size n from $N(\mu, \sigma^2)$, then unbiased estimators of μ and σ^2 are ...

   A) Sample Mean And Sample Mean Square
   B) Sample Median And Sample Mean Square
   C) Sample Mean And Sample Median
   D) Sample Mode And Sample Mean Square

10. Reliability function of a parallel system with component reliabilities P_1, P_2, P_3 is given by

    A) $P_1 + P_2 + P_3 - P_1P_2 - P_2P_3 - P_1P_3 + P_1P_2P_3$
    B) $1 - P_1P_2P_3$
    C) $P_1 + P_2 + P_3$
    D) None Of These

11. While analyzing the data of a $k \times k$ Latin square, the error d.f. in analysis of variance is equal to ...

A) $(k-1)(k-2)$
B) $k(k-1)(k-2)$
C) k^2-2
D) k^2-k-2

12. A decision rule to accept or reject a lot based on the results of one random sample is called a ...

A) Random-Sampling Plan
B) Double-Sampling Plan
C) Sequential Sampling Plan
D) Single-Sampling Plan

13. If $(X,Y) \sim BN(1,2,42,52,0.5)$ then the conditional distribution of X given $Y=2$ is ...

A) $N(2,7)$
B) $N(1,12)$
C) $N(1,6)$
D) None Of These

14. In SPRT, decision about the null hypothesis is taken after ...

A) Fixed Number Of Observations
B) Each Successive Observation
C) At Least Three Observations
D) Only One Observation

15. If a linear programming problem has the objective function $\max Z = 3x_1 + 2x_2$ with constraints $x_1 - x_2 > 1$ and $x_1 + x_2 > 3$ then the LPP has ...

A) Infinite Solutions
B) Unique Solutions
C) No Solutions
D) Unbounded Solution

16. If $X \sim \beta_1(m,n)$ with mean 0.25 and variance 1/8, then values of m and n are respectively ...

A) 1/4, 3/8
B) 1/8, 3/8
C) 1/8, 3/4
D) 1/2, 3/8

17. If T_n is an unbiased and consistent estimator based on a random sample of size n for parameter θ, then T_n^2 is ... for θ^2.

A) Unbiased And Consistent
B) Biased And Consistent
C) Unbiased And Inconsistent
D) Biased And Inconsistent

18. Chebyshev's inequality is used to obtain ...

A) Lower Bound For Probability
B) Lower Bound For Variance
C) Upper Bound For Variance
D) Both B And C Are True

19. Efficiency of experimental design D_1 over design D_2 is denoted by E. If $E > 1$, then design D_1 is ... efficient than design D_2.

A) Less
B) More
C) Equally
D) None Of These

20. Which of the following is used for generating sequences?

A) Seq( )
B) Sequence( )
C) Order( )
D) Orderasc( )

21. If X follows Cauchy distribution with parameters (μ, λ), then Q.D. is ...

A) $\mu - \lambda$
B) $\mu + \lambda$
C) μ
D) λ

22. Which of the following non-parametric test is applicable for paired samples?

A) Run Test
B) K-S Test
C) Sign Test
D) Median Test

23. For any primal problem and its dual ...

A) Optimal Value Of Objective Functions Is Same
B) Primal will have an optimal solution iff dual does too
C) Both Primal And Dual May Be Infeasible
D) All Of The Above

24. If random variable x $X \sim N(0, 1/2)$ and $Y \sim N(0, 1/2)$ are independently distributed, then $Z = (X - Y)^2 + (X + Y)^2$ is ...

A) $G(1/2, 1)$
B) $G(1, 1)$
C) $N(0, 1)$
D) None Of These

25. If $X_1, X_2, \ldots, X_n$ is a random sample from uniform$(0, \theta)$ distribution, then a consistent estimator of θ/e is .... Where e is universal constant

A) Sample Mean
B) Sample Geometric Mean
C) Sample Harmonic Mean
D) Sample Mean Square

26. If X_1, X_2, X_3 is a sample from the probability density function (pdf) $f(x) = 2x$, $0 < x < 1$, then pdf of third order statistic Y is ...

A) $24Y^5(1 - Y^2)$
B) $Y^5(1 - Y^2)$
C) $24(1 - Y^2)$
D) None Of These

27. Two linear combinations $\sum C_i t_i$ and $\sum d_i t_i$ of treatment means are orthogonal contrasts if ...

A) $\sum C_i = 0$ And $\sum d_i = 0$
B) $\sum d_i = 0$
C) $\sum C_i = 0$
D) $\sum C_i = 0$, $\sum d_i = 0$, And $\sum C_i d_i = 0$

28. In double sampling plan, if number of defects are lies in between two cutoff numbers C_1 and C_2, then ...

A) Accept The Lot
B) Reject The Lot
C) Take Another Sample
D) None Of These

29. If X follows Pareto distribution with parameters $\alpha = 3$, $\beta = 5$, then $E(X)$ is ...

A) 7.5
B) 8.5
C) 7
D) 8

30. Following is the arrangement of male (M) and female (F) in a queue:
MMFMFFMFFMFFFMMMFFFM
Total number of runs in this queue is ...

A) 09
B) 01
C) 20
D) 11

31. A transportation problem (TP) with minimization of objective function has an alternate optimal solution whenever in optimal TP table for each empty cell ...

A) $c_{ij} - (u_i + v_j) > 0$
B) $c_{ij} - (u_i + v_j) < 0$
C) $c_{ij} - (u_i + v_j) \geq 0$
D) $c_{ij} - (u_i + v_j) \leq 0$

32. For normal distribution Q.D., M.D. & S.D. are in the ratio ...

A) 10:12:15
B) 15:12:10
C) 12:15:10
D) 10:15:12

33. If T_1 and T_2 are two unbiased estimators of parameter θ, then T_1 is more efficient than T_2 if ...

A) $V(T_1) = V(T_2)$
B) $V(T_1) > V(T_2)$
C) $V(T_1) < V(T_2)$
D) None Of The Above

34. If $X_1, X_2, \ldots, X_n$ is a random sample from pdf $f(x)$ and cdf $F(x)$, then the pdf of the nth order statistic Y is ...

A) $nF(y)^{n-1}f(y)$
B) $nf(y)^{n-1}F(y)$
C) $nF(y)^n f(y)$
D) $n[1 - F(y)^{n-1}]f(y)$

35. In a 2×2 factorial experiment with two replications and responses: $a_0b_0 = 16$, $a_0b_1 = 25$, $a_1b_0 = 15$, $a_1b_1 = 28$, the sum of squares for interaction AB is ...

A) 4
B) 0.5
C) 1
D) 2

36. Which function is used to combine elements into a vector?

A) C( )
B) D( )
C) E( )
D) F( )

37. The mean of $B(2, 0.5)$ left-truncated at $X = 0$ is ...

A) 3/4
B) 4/3
C) 4
D) None Of These

38. A statistical test T for testing a simple null hypothesis against a simple alternative is at least as powerful as any other test. It is known as ...

A) UMP-Test
B) MP-Test
C) LR-Test
D) None Of Them

39. If there are 5 workers and 5 jobs in an assignment problem, the number of solutions is ...

A) 9
B) 24
C) 16
D) 120

40. If $X \sim t(n)$, then X^2 follows ... distribution.

A) $t(n)$
B) $F(1, n)$
C) $F(n, 1)$
D) $F(1, 1)$

41. Analysis of variance was introduced by ...

A) Gauss In 1809
B) Markov In 1900
C) Yates In 1932
D) R.A. Fisher In 1920

42. If we have sample size n from population N units, then finite population correction is ...

A) $(N - 1)/n$
B) $(n - 1)/N$
C) $(N - n)/N$
D) $(N - n)/n$

43. Paasche's price index number uses weight as ...

A) Base Year Quantity
B) Current Year Quantity
C) Value Of Base Year
D) Value Of Current Year

44. Randomized Block Design Has ...

A) No Classification
B) One-Way Classification
C) Two-Way Classification
D) Three-Way Classification

45. Probability of an event always lies between ...

A) -1 To 1
B) 0 To 1
C) $-\infty$ To ∞
D) 0 To ∞

46. Probability of an impossible event is ...

A) 1
B) 0
C) -1
D) None Of These

47. Under proportional allocation, the size of the sample from each stratum depends on ...

A) Total Sample Size
B) Size Of The Stratum
C) Population Size
D) All The Above

48. Which of the following is added to constraints of equality type?

A) Slack Variable
B) Surplus Variable
C) Surplus And Artificial Variable
D) Artificial Variable

49. A random variable X is said to be discrete if the sample space of X has ... sample points

A) Finite
B) Countably Infinite
C) Finite Or Countably Infinite
D) Uncountably Infinite

50. Who introduced the concept of Relative Efficiency in Design of Experiments?

A) Yates
B) Fisher
C) Tippet
D) Cochran

51. If a simple random sample of size n without replacement is taken from a population of size N, then the probability that a specified unit will be selected in the sample is ...

A) $1/n$
B) $1/N$
C) n/N
D) $1 - n/N$

52. The experimental design that does not satisfy all three principles of experimentation is ...

A) Latin Square Design
B) Completely Randomized Design
C) Randomized Block Design
D) None Of These

53. A second decile divides the series in the ratio ...

A) 2:10
B) 2:8
C) 2:6
D) 2:4

54. In simple random sampling with replacement, the same sampling unit may be included in the sample ...

A) Only Once
B) Only Twice
C) More Than Once
D) None Of These

55. Arithmetic mean of first n natural numbers is ...

A) n
B) $n(n+1)$
C) $n(n-1)$
D) $(n+1)/2$

56. Missing observation in a CRD is to be ...

A) Estimated
B) Deleted
C) Guessed
D) None Of These

57. A complete list of sampling units which represents the population to be covered is known as ...

A) Sample Size
B) Sampling Unit
C) Sampling Frame
D) Sample Space

58. The sum of absolute deviations of observations taken from the median is always ...

A) 0
B) 1
C) Minimum
D) Maximum

59. The coefficient of variation of a frequency distribution with standard deviation 10 and mean 25 is ...

A) 10
B) 25
C) 40
D) 50

60. The first raw moment about origin is ...

A) Median
B) Mean
C) Geometric Mean
D) Variance

61. Let $X_1, X_2, \ldots, X_n$ be a sample of size n from Poisson distribution with parameter θ, then the most appropriate moment estimator of θ is ...

A) Sample Mean
B) Sample Variance
C) Any One Of A) And B)
D) None Of A) And B)

62. Quality is ... variability.

A) Opposite Of
B) Proportional To
C) Reciprocal Of
D) Synonym Of

63. P-D-C-A Stands For ...

A) Plan-Do-Check-Act
B) Plan-Do-Correct-Act
C) Proceed-Do-Check-Act
D) Proceed-Do-Correct-Act

64. If $X \sim B(n,p)$ with mean 5 and variance 2.5, then $n = \ldots$

A) 10
B) 5
C) 20
D) 25

65. How many points did Deming give to elaborate methods for quality improvement?

A) 10
B) 12
C) 23
D) 14

66. If $X \sim$ Poisson(5), then the ratio of mean to variance is ...

A) 5
B) 1
C) 100
D) 25

67. If $V(X) = V(Y) = \text{Cov}(X,Y)$, then $r(X,Y)$ is ...

A) 1
B) $V(X)$
C) -1
D) $1/V(X)$

68. If X and Y are two independent continuous r.v.s, then ...

A) Covariance$(X,Y) = 0$
B) Correlation$(X,Y) = 0$
C) $E(XY) = E(X) \cdot E(Y)$
D) All Of These

69. If X is the number of failures before kth success, then X follows ... distribution.

A) Poisson
B) Geometric
C) Negative Binomial
D) None Of These

70. Which of the following distributions can be expressed in terms of power series?

A) Binomial
B) Pareto
C) Logistic
D) None Of These

71. If X follows Weibull distribution with parameters (α, β), then X^{β} follows ...

A) Exponential
B) Lognormal
C) Cauchy
D) Normal

72. If X follows truncated Normal distribution truncated from left below at a and from right above at b, then ...

A) $P(X > a) = 0$
B) $P(X < a) = 0, P(X > b) = 0$
C) $P(X < b) = 0$
D) $P(a < X < b) = 0$

73. The probability distribution for which independence and uncorrelatedness imply each other is ...

A) Bivariate Normal
B) Exponential
C) Laplace
D) None Of These

74. A state vector X is called a cut vector if the value of the structure function is ...

A) 0
B) 1
C) Both A And B
D) Neither A Nor B

75. Structure function of a series system of 3 independent components is ...

A) $1 - (1 - X_1)(1 - X_2)(1 - X_3)$
B) $X_1X_2X_3$
C) $1 - (1 - X_1X_2X_3)$
D) X_1X_2

76. Structure function of a component of a system is ...

A) Normal Variable
B) Gamma Variable
C) Bernoulli Variable
D) Cauchy Variable

77. Customer behavior in which the customer moves from one queue to another in a multi-channel system is called ...

A) Balking
B) Reneging
C) Jockeying
D) Alternating

78. Let $X_1, X_2, \ldots, X_n$ be a sample of size n from exponential distribution with mean θ. Then the pivotal quantity for θ is ...

A) $\theta/\bar{X}$
B) $n\bar{X}/\theta$
C) $\bar{X}$
D) $\bar{X} - \theta$

79. Which of the following non-parametric tests is not applicable for two independent samples?

A) Run Test
B) K-S Test
C) Sign Test
D) Median Test

80. Which of the following statistical tests are applicable to paired data?

A) T-Test
B) Sign Test
C) Wilcoxon Signed Ranks Test
D) All The Above

81. If $X_1, X_2, \ldots, X_n$ is a random sample of size n from $P(\theta)$, which of the following is a composite hypothesis?

A) $H : \theta = 0.5$
B) $H : \theta = 0.65$
C) $H : \theta = 20.5$
D) None Of The Above

82. GMA stands for ...

A) Geometric Moved Average
B) Geometric Moving Average
C) Geometrically Moved Average
D) Geocentric Moving Average

83. Which of the following methods is used to obtain the initial solution to a transportation problem?

A) Simplex Method
B) MODI Method
C) North-West Corner Method
D) Hungarian Method

84. In Chebyshev's theorem, the "K" represents ...

A) Standard Deviation
B) Variance
C) Multiple Of Standard Deviations distance from the mean
D) Multiple Of Standard Deviations on distance from the median

85. Consider the statements: (i) Mutually exclusive events are independent. (ii) A standard normal distribution is platykurtic. Then ...

A) Only (i) Is True
B) Only (ii) Is True
C) Both Are True
D) Both Are False

86. Which of the following is not an advantage of sampling?

A) Reduces The Sampling And Non-Sampling Errors
B) It Reduces The Cost Of Survey
C) Some Situations Sampling Is Only Way To Study
D) It Reduces The Time Of Survey

87. If respondents do not provide required information to the researcher, it is ...

A) Non-Sampling Error
B) Problem Of Non-Response
C) Both A) And B)
D) None

88. The sampling fraction is expressed as ...

A) n/N
B) N/n
C) $1 - n/N$
D) None

89. For estimating population mean T, let T_1 be the sample mean under SRSWOR and T_2 under SRSWR. Which is true?

A) $\text{Var}(T_1) < \text{Var}(T_2)$
B) $\text{Var}(T_1) > \text{Var}(T_2)$
C) $\text{Var}(T_1) \leq \text{Var}(T_2)$
D) None

90. A parallel system of three components works if ...

A) All Three Components Work
B) At Least One Component Works
C) At Least Two Components Work
D) None Of These

91. Which of the following statements about SPRT are true?
I) Sample size (n) is fixed
II) $P(\text{Type I error}) = \alpha$ and $P(\text{Type II error}) = \beta$ are fixed
III) $P(\text{Type II error}) = \beta$ is minimized for fixed α

A) Only Statement (I) Is True
B) Only Statement (II) Is True
C) Only Statement (III) Is True
D) All Three Statements Are True

92. If random variable $X \sim N(\mu, \sigma^2)$, then which of the following is a simple null hypothesis?

A) $|\mu| = 0$
B) $\mu = 10$
C) $\sigma^2 = 16$
D) $\mu = 10, \sigma^2 = 16$

93. Which of the following statements is/are true?
I) NP-Lemma provides MP-test.
II) Non-parametric tests are often less powerful.
III) Size of test is desired to be less than or equal to power of the test.

A) Statement I
B) Statement II
C) Statement I And III
D) All Of Them

94. If $X \sim \text{Cauchy}(\mu, \lambda)$, then Q.D. is ...

A) $\mu - \lambda$
B) $\mu + \lambda$
C) μ
D) λ

95. If $(X, Y) \sim BN(2, 4, 1, 9, 0.5)$, then the distribution of $X - Y$ is ...

A) $N(-2, 7)$
B) $N(-2, 2)$
C) $N(0, 1)$
D) $N(7, 3)$

96. A sequence of r.v.s $\{X_n\}_{n \geq 1}$ is said to converge to X in distribution function if ...

A) $F(x) = 1$
B) $F(x) = 0$
C) $F_n(x) < 1$
D) None Of These

97. Which of the following distributions has constant hazard rate?

A) Normal
B) Gamma
C) Exponential
D) Uniform

98. If each and every unit in a population has equal chance of selection, it is called ...

A) Restricted Sampling
B) Unrestricted Sampling
C) Purposive Sampling
D) Subjective Sampling

99. Problem of non-response has ...

A) No Solution
B) Can Be Solved
C) No Meaning
D) None

100. Index numbers are expressed in ...

A) Percentages
B) Ratios
C) Term Of Absolute Value
D) All Of These