

Seat No.	
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ENT-74**Total No. of Pages : 14**

M.Sc. Statistic Entrance Examination, 2026
Subject Code : 58715

Day and Date : Tuesday, 21-07-2026**Total Marks : 100****Time : 10.30 a.m. to 12.00 p.m.****Instructions**

- 1) All questions are compulsory.
- 2) Each question carries 1 mark.
- 3) Answers should be marked in the given OMR 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.

Choose the correct alternative

1. A hypothesis which completely specifies the population distribution is known as
 - a) Composite hypothesis
 - b) Alternative hypothesis
 - c) Simple hypothesis
 - d) None of these
2. In the statement $P(T_1 \leq \theta \leq T_2) = 1 - \alpha$, T_1 and T_2 are called
 - a) Confidence bounds
 - b) Pivotal quantity
 - c) Both (a) and (b)
 - d) None of these
3. The choice of one-tailed or two-tailed test depends on
 - a) Null hypothesis
 - b) Alternative hypothesis
 - c) Both (a) and (b)
 - d) None of these
4. The Likelihood Ratio Test can be applied to problems involving
 - a) Only one parameter
 - b) Two parameters
 - c) Many parameters
 - d) None of these
5. In SPRT, the sample size used for acceptance or rejection of the null hypothesis is
 - a) Fixed
 - b) Infinite
 - c) Random
 - d) None of these
6. Likelihood Ratio Test for testing the population variance of a normal distribution reduces to
 - a) t -test
 - b) χ^2 -test
 - c) F -test
 - d) None of these

7. SPRT was invented by

- a) R. A. Fisher
- b) Abraham Wald
- c) Karl Pearson
- d) None of these

8. The critical region of the two-sample Run Test is

- a) Two-tailed
- b) Right-tailed
- c) Left-tailed
- d) Either (a), (b), or (c)

9. A sequence of random variables $\{X_n, n \geq 1\}$ is said to converge in distribution to X if

- a) $\lim_{n \rightarrow \infty} F_n(x) = 1$
- b) $\lim_{n \rightarrow \infty} F_n(x) = 0$
- c) $\lim_{n \rightarrow \infty} F_n(x) = \infty$
- d) None of these

10. If $X_1, X_2, \dots, X_n$ is a random sample from a population with pdf $f(x)$ and cdf $F(x)$, then the pdf of the maximum order statistic $Y = X_{(n)}$ is

- a) $n[F(y)]^n f(y)$
- b) $n f(y) [n - F(y)]$
- c) $n F(y) n f(y)$
- d) $n[F(y)]^{n-1} f(y)$

11. Convergence in probability of the sample mean to the population mean is known as

- a) Weak Law of Large Numbers
- b) Central Limit Theorem
- c) Both (a) and (b)
- d) None of these

12. Chebyshev's inequality gives

- a) Lower bound
- b) Upper bound
- c) Both lower and upper bounds
- d) Exact values

13. The reliability function of a parallel system of n independent components is

- a) $\prod_{i=1}^n P_i$
- b) $1 - \prod_{i=1}^n P_i$
- c) $\prod_{i=1}^n (1 - P_i)$
- d) $1 - \prod_{i=1}^n (1 - P_i)$

14. If $X_n \xrightarrow{P} X$, then

- a) $X_n + C \xrightarrow{P} X + C$
- b) $X_n^3 \xrightarrow{P} X$
- c) $X_n^2 \xrightarrow{P} X^2$
- d) $X_n^2 \xrightarrow{P} X$

15. The structure function of a series system of two independent components is
- X_1X_2
 - $1 - (1 - X_1X_2)$
 - $1 - (1 - X_1)(1 - X_2)$
 - $X_1X_2X_3$
16. A binary system of n components is said to be a coherent system if
- The structure function is a non-decreasing function of the vector $\mathbf{X}$.
 - All the components in the system are relevant.
 - Both (a) and (b)
 - All the components in the system are irrelevant.
17. Quality is proportional to variability.
- Directly
 - Inversely
 - Both (a) and (b)
 - None of these
18. The maximum percent defective that the consumer finds definitely acceptable is called
- AQL
 - AOQL
 - LTPD
 - AOQ
19. The PDCA cycle is useful for
- Continuous improvement in the process
 - Investigating causes of faults
 - Removing defectives in the process
 - Assessing the state of the process
20. Which of the following methods is/are used for data discretization?
- Binning
 - Entropy-based method
 - Clustering
 - All of the above
21. The acronym SEMMA stands for
- Sample, Explore, Modify, Model, Assess
 - Sample, Explore, Model, Modify, Assess
 - Sample, Estimate, Modify, Model, Accept
 - Sample, Explore, Modify, Model, Assign
22. The OC curve is
- A plot of probability of rejecting a lot versus lot fraction defective.
 - A plot of probability of accepting a lot versus lot fraction defective.
 - A plot of probability of accepting a sample versus lot fraction defective.
 - A plot of sample size against lot fraction defective.

23. K-Nearest Neighbor (KNN) is useful for
- a) Clustering analysis
 - b) Classification problems
 - c) Data cleaning
 - d) Data transformation
24. Which of the following strategies is **not** used for data transformation?
- a) Smoothing
 - b) Normalization
 - c) Summarization
 - d) Filling in missing values
25. If a lot is rejected on the basis of a sampling inspection plan, then
- a) $ASN > ATI$
 - b) $ASN = ATI$
 - c) $ASN < ATI$
 - d) None of these
26. Which of the following methods is used to handle noisy data?
- a) Binning method
 - b) Regression
 - c) Standardization
 - d) Both (a) and (b)
27. If x , y , and z represent ppm defective for processes produced within specification limits of 40, 50, and 60, respectively, then
- a) $x < y < z$
 - b) $x > y > z$
 - c) $y < x < z$
 - d) $x < z < y$
28. If the producer's risk is fixed as 0.01, then the average amount of total inspection per lot of size 110 on the basis of a sample of size 10 is
- a) 100
 - b) 11
 - c) 9
 - d) 99
29. For drawing the AOQ curve, the values on the x -axis represent
- a) Incoming lot quality
 - b) Outgoing lot quality
 - c) Consumer's risk
 - d) Producer's risk
30. Which of the following is **not** related to Deming's philosophy of quality?
- a) To listen to employee suggestions
 - b) To fix the target "Zero Defects"
 - c) Rely on mass inspection for quality control
 - d) Focus on continuous improvement

31. A population is made up of groups that have wide variation within each group but little variation from group to group. The appropriate sampling method is
- Stratified sampling
 - Systematic sampling
 - Cluster sampling
 - Judgment sampling
32. Sampling is used in the situations
- Blood test of patients
 - Cooking rice in a utensil
 - Purchase of food commodity from a shopkeeper
 - All of the above
33. The finite population correction (FPC) is expressed as
- $\frac{N-n}{N}$
 - $1 - \frac{n}{N}$
 - Both (a) and (b)
 - None of these
34. If the sample size is large compared to the population size, then which error contributes less?
- Sampling error
 - Non-sampling error
 - Both (a) and (b)
 - None of these
35. Circular systematic sampling is used when
- N is a whole number
 - N is not divisible by n
 - N is a multiple of n
 - All of the above
36. For estimating the population mean T , let T_1 be the sample mean under SRSWOR and T_2 be the sample mean under SRSWR. Then
- $\text{Var}(T_1) \geq \text{Var}(T_2)$
 - $\text{Var}(T_1) > \text{Var}(T_2)$
 - $\text{Var}(T_1) \leq \text{Var}(T_2)$
 - None of these
37. The magnitude of the standard error of an estimate is an index of its
- Accuracy
 - Precision
 - Efficiency
 - None of these
38. Aggregate information on an auxiliary variable is used in
- Ratio method of estimation
 - Regression method of estimation
 - Both (a) and (b)
 - None of these

39. What will be the output of the following R program?

```
x = 0 : 8;      x[4];
```

- | | |
|------|------|
| a) 0 | c) 1 |
| b) 2 | d) 3 |

40. Which one of the following is not a basic data type in R?

- | | |
|---------------|--------------|
| a) Numeric | c) Character |
| b) Data frame | d) Integer |

41. EWMA control charts are better than Shewhart control charts in detecting

- | | |
|--------------------------|-------------------------|
| a) Large process shifts | c) Small process shifts |
| b) Medium process shifts | d) Every process shift |

42. What is the percentage accuracy in the Six Sigma process?

- | | |
|----------|--------------|
| a) 99.8% | c) 99.05% |
| b) 99.1% | d) 99.99966% |

43. In acceptance sampling, the probability that a lot may be accepted even though its quality is not good is called

- | | |
|--------------------|--------------------|
| a) Consumer's risk | c) Operator's risk |
| b) Producer's risk | d) Owner's risk |

44. Which of the following commands is used to print an object x in R?

- | | |
|---------------------------|--------------------------|
| a) <code>printf(x)</code> | c) <code>printx</code> |
| b) <code>print(x)</code> | d) <code>print[x]</code> |

45. Which of the following is used for statistical analysis in R?

- | | |
|------------|------------|
| a) RStudio | c) Studio |
| b) Heck | d) KStudio |

46. Pareto analysis is also known as

- | | |
|-----------------------|-------------------|
| a) Benchmarking | c) 80/20 Rule |
| b) Demand forecasting | d) Job scheduling |

47. The allocation of treatments to the experimental units giving equal probability to each unit is known as

- | | |
|------------------|------------------|
| a) Replication | c) Local control |
| b) Randomization | d) None of these |

48. Local control is a technique used to
- a) Reduce experimental error
 - b) Increase efficiency of the design
 - c) Create homogeneity within blocks
 - d) All of the above
49. If the overall F -test shows a significant treatment effect, then to identify which pair(s) of treatments differ significantly, we use
- a) t -test
 - b) z -test
 - c) F -test
 - d) Paired t -test
50. In a Latin Square Design with v treatments, which of the following statements is true?
- a) Only treatment and row sum of squares have $(v - 1)$ degrees of freedom.
 - b) The error sum of squares has $(v - 1)(v - 2)$ degrees of freedom.
 - c) The number of experimental units is v^3 .
 - d) The number of experimental units is v .
51. Two types of effects measured in a factorial experiment are
- a) Main and interaction effects
 - b) Simple and complex effects
 - c) Both (a) and (b)
 - d) Neither (a) nor (b)
52. The method of confounding is a device to reduce the size of
- a) Experiments
 - b) Replications
 - c) Blocks
 - d) All of the above
53. Each contrast among k treatments has
- a) One degree of freedom
 - b) k degrees of freedom
 - c) $k - 1$ degrees of freedom
 - d) None of these
54. In a Latin Square Design, the number of rows, columns and treatments are
- a) All different
 - b) Always equal
 - c) Not necessarily equal
 - d) None of the above
55. A statistic that converges in probability to the corresponding parameter is called
- a) Unbiased estimator
 - b) Consistent estimator
 - c) Efficient estimator
 - d) Sufficient estimator
56. Let $X_1, X_2, \dots, X_n$ be i.i.d. random variables having the exponential distribution with mean θ . Then the sample mean $\bar{X}$ is
- a) Unbiased estimator
 - b) Sufficient estimator
 - c) Consistent estimator
 - d) All of the above

57. If $X_1, X_2, \dots, X_n$ is a random sample from $U(0, \theta)$, then the sufficient statistic for θ is

- | | |
|---------------------------------|---------------------------------|
| a) $\bar{X}$ | c) $2\bar{X}$ |
| b) $\min(X_1, X_2, \dots, X_n)$ | d) $\max(X_1, X_2, \dots, X_n)$ |

58. Cramér–Rao inequality is valid for

- | | |
|-------------------------|------------------------|
| a) Continuous variables | c) Both (a) and (b) |
| b) Discrete variables | d) Neither (a) nor (b) |

59. A sufficient statistic is minimal if and only if it is

- a) A consistent estimator
- b) An unbiased estimator
- c) A function of every other sufficient statistic
- d) A function of the MLE

60. The Factorization Theorem is due to

- | | |
|-----------------|-------------------|
| a) R. A. Fisher | c) Neyman |
| b) Karl Pearson | d) W. A. Shewhart |

61. If $X_1, X_2, \dots, X_n$ are observations from $N(\mu, \sigma^2)$, then the unbiased estimator of σ^2 is

- | | |
|---|---|
| a) $\frac{1}{n+1} \sum_{i=1}^n (X_i - \bar{X})^2$ | c) $\frac{1}{n} \sum_{i=1}^n (X_i - \bar{X})^2$ |
| b) $\frac{1}{n-1} \sum_{i=1}^n (X_i - \bar{X})^2$ | d) None of these |

62. MVUE is unique in the sense that if T_1 and T_2 are MVUEs of $\phi(\theta)$, then

- | | |
|----------------|------------------------------|
| a) $T_1 > T_2$ | c) $T_1 = T_2$ almost surely |
| b) $T_1 < T_2$ | d) None of these |

63. The median of the Laplace distribution with parameters (μ, λ) is

- | | |
|--------------|--------------------|
| a) λ | c) $\mu + \lambda$ |
| b) μ | d) $\mu - \lambda$ |

64. The quartile deviation of the Cauchy distribution with parameters (μ, λ) is

- | | |
|--------------|--------------------|
| a) λ | c) $\mu + \lambda$ |
| b) μ | d) $\mu - \lambda$ |

65. If X and Y are independent standard normal random variables, then the distribution of $\frac{X}{Y}$ is

- a) Normal
- b) Bivariate Normal
- c) Standard Cauchy
- d) Standard Exponential

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

- a) Binomial
- b) Pareto
- c) Logistic
- d) None of these

67. If $(X, Y) \sim BN(0, 0, \sigma_1^2, \sigma_2^2, \rho)$, then the distribution of $Z = \frac{X}{Y}$ is

- a) Normal
- b) Standard Exponential
- c) Cauchy
- d) Pareto

68. The mean of the Logistic distribution with parameters (μ, σ) is

- a) μ
- b) $\mu + \sigma$
- c) $\mu\sigma$
- d) σ

69. If X follows the Weibull distribution with parameters (α, β) , then X^β follows

- a) Exponential distribution
- b) Lognormal distribution
- c) Cauchy distribution
- d) Normal distribution

70. The pmf of the left truncated Poisson distribution at $x = 0$ is

$$P(X = x) = C \frac{e^{-\lambda} \lambda^x}{x!}, \quad x = 1, 2, \dots$$

The value of C is

- a) $1 - e^\lambda$
- b) $1 - e^{-\lambda}$
- c) $\frac{1}{1 - e^{-\lambda}}$
- d) $\frac{1}{1 - e^\lambda}$

71. Which of the following is not a particular case of the power series distribution?

- a) Binomial
- b) Poisson
- c) Normal
- d) Geometric

72. If X follows a Normal distribution truncated to the left below a , 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. A continuous random variable is associated with which type of sample space?
- Finite
 - Countably infinite
 - Infinite
 - All of the above
74. Bernoulli distribution is a special case of
- Uniform distribution
 - Hypergeometric distribution
 - Binomial distribution
 - Two-point distribution
75. With usual notation, what is the interpretation of N in the Hypergeometric distribution?
- Lot size
 - Random variable
 - Sample size
 - None of the above
76. If $E(XY) = E(X)E(Y)$, then the relationship between X and Y is
- Independent
 - Correlated
 - Uncorrelated
 - Dependent
77. The interpretation of $V(X) = 0$ is
- X has a one-point distribution
 - X takes a single value
 - X takes only two values -1 and 1
 - Both (a) and (b)
78. Select the appropriate relation between $E(X)$ and $V(X)$ for a Binomial distribution.
- $E(X) = V(X)$
 - $E(X) < V(X)$
 - $E(X) > V(X)$
 - None of the above
79. Identify the value of K for the following pmf: $p(x) = \begin{cases} K, & x = 0, 1, 2, 3, \\ 0, & \text{otherwise.} \end{cases}$
- $\frac{1}{4}$
 - $\frac{1}{3}$
 - $\frac{1}{2}$
 - 1
80. If X and Y are independent, then
- $P(X = x | Y = y) = P(X = x)$
 - $P(Y = y | X = x) = P(Y = y)$
 - $E(XY) = E(X)E(Y)$
 - All of the above
81. If $X \sim H(N, M, n)$, then the mean of X is
- $\frac{M}{N}$
 - $\frac{n}{N}$
 - $\frac{nM}{N}$
 - $\frac{nN}{M}$

82. If X and Y are two random variables, then $\text{Cov}(aX + b, cY + d)$ is equal to
- $\text{Cov}(X, Y)$
 - $ac \text{Cov}(X, Y)$
 - $abcd \text{Cov}(X, Y)$
 - $ac \text{Cov}(X, Y) + cd$
83. If X and Y are two independent Poisson random variables with parameters 1 and 1, respectively, then the distribution of $X + Y$ is
- Poisson with parameter 2
 - Poisson with parameter 3
 - Poisson with parameter 1
 - None of these
84. Which of the following distributions has the lack of memory property?
- Poisson distribution
 - Geometric distribution
 - Binomial distribution
 - None of these
85. If $X \sim \text{NBD}(k, p)$, it reduces to the Geometric distribution when
- $k = 1$
 - $k = 0$
 - $p = 1$
 - $p = 0$
86. The mgf of a random variable X is $M_X(t) = (1 - 2t)^{-1}$. Then $E(X)$ is
- 2
 - 5
 - 4
 - $\frac{1}{2}$
87. If X is a continuous random variable with pdf $f(x)$, then $\int_{-\infty}^{\infty} f(x) dx =$
- $\frac{1}{2}$
 - 0
 - ∞
 - 1
88. If $F(x, y)$ is the joint cumulative distribution function (cdf) of X and Y , then it lies in the interval
- $(0, 1]$
 - $[0, 1]$
 - $[-1, 1]$
 - $[-1, 0]$
89. If X and Y are two independent continuous random variables, then
- $\text{Cov}(X, Y) = 0$
 - $\text{Corr}(X, Y) = 0$
 - $E(XY) = E(X)E(Y)$
 - All of the above

90. If $\text{Var}(X) = 1$, $\text{Var}(Y) = 9$, and $\text{Cov}(X, Y) = 1$, then the correlation coefficient is
 - a) $\frac{1}{3}$
 - b) 0
 - c) -1
 - d) $-\frac{1}{3}$
91. If X and Y are independent continuous random variables, then
 - a) $E(Y | X) = E(X)$
 - b) $E(X | Y) = E(Y)$
 - c) $V(Y | X) = V(X)$
 - d) $E(Y | X) = E(Y)$
92. If the pdf of X is $f(x) = 3x^2$, $0 < x < 1$, then the range of the random variable $Y = 2X + 3$ is
 - a) (0, 2)
 - b) (2, 3)
 - c) (3, 5)
 - d) (0, 1)
93. The probability of not selecting a specified unit in SRSWOR of 8 units from a population of 88 units is
 - a) $\frac{1}{8}$
 - b) $1 - \frac{1}{8}$
 - c) $\frac{8}{88}$
 - d) $1 - \frac{8}{88}$
94. Which of the following statements is not true?
 - a) Standard error cannot be zero.
 - b) Standard error cannot be one.
 - c) Standard error can be negative.
 - d) All of the above.
95. If the population size is not an integral multiple of the sample size, the systematic sampling is called
 - a) Simple systematic sampling
 - b) Circular systematic sampling
 - c) Linear systematic sampling
 - d) None of these
96. Which one of the following non-parametric tests is applicable for testing randomness of a sample?
 - a) Median test
 - b) Sign test
 - c) Kolmogorov-Smirnov test
 - d) Run test

97. Which of the following statements about SPRT is 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.
98. An assignment problem in which 4 jobs are to be assigned to 4 persons can have
- a) 25 solutions
 - b) 16 solutions
 - c) 24 solutions
 - d) 120 solutions
99. A variable used to convert a " $\leq$ " inequality into an equation is called
- a) Basic variable
 - b) Slack variable
 - c) Surplus variable
 - d) Artificial variable
100. A maximization transportation problem is transformed into a minimization problem by
- a) Adding each entry in a column to the maximum value of that column.
 - b) Subtracting each entry in a column from the maximum value of that column.
 - c) Subtracting each entry in the table from the maximum value in the table.
 - d) None of the above.



- Rough -