



Avinashilingam Institute for Home Science and Higher Education for Women

Deemed to be University Estd. u/s 3 of UGC Act 1956, Category A by MHRD (now MoE)

Re-accredited with A++ Grade by NAAC. CGPA 3.65/4, Category I by UGC

Coimbatore-641043, Tamil Nadu, India

Bachelor's Degree Examination - May 2025

II Semester

Class : I UG
Major : BCA

Time : 3 Hours
Max. Marks : 100

23BCAC04 Numerical Analysis and Statistical Methods

Course Outcomes:

CO1: Work with matrices and finite differences.

CO2: Solve linear equations and apply numerical integration using various rules.

CO3: Compare measures of Central Tendency and Dispersion for a given set of data and discuss the nature of the sample.

CO4: Compute correlation and regression for given data.

CO5: Perform Time Series Analysis and Analysis of Variance for a given data.

Part A

10 x 1 = 10

Choose the Correct Answer

1. Every square matrix satisfies its _____ characteristic equation. CO1K1
a. different b. own
c. same d. none of the above
2. Lagrange's interpolation formulae used in _____ interval. CO1K2
a. unequal b. equal
c. equal and unequal d. none of the above
3. Gauss elimination is _____ method. CO2K1
a. indirect b. iterative
c. direct d. both a and b
4. The Error in the trapezoidal rule is of the order _____. CO2K2
a. h b. h² c. h³ d. h⁴
5. The empirical relation mode = _____. CO3K2
a. 3 median – mean b. 2 median – mean
c. 3 median – 2 mean d. none of the above
6. Standard deviation is the positive _____ root of variance. CO3K2
a. square b. cubic
c. fourth d. none of the above
7. Correlation coefficient is a number between _____. CO4K1
a. +1 and +2 b. -1 and +1
c. -1 and 0 d. none of the above
8. _____ is the geometric mean of the two regression coefficient. CO4K2
a. Regression b. Correlation
c. Correlation coefficient d. None of the above
9. The trend may be linear or _____. CO5K1
a. non linear b. variables
c. constant d. none of the above
10. The sum of squares due to column factor for one way analysis of variance is given by CO5K2
a. SST – SSE b. SST + SSE
c. SSE – SST d. TSS = SSE – SST

Part B

5 x 6 = 30

Answer ALL questions

Each answer should not exceed 400 words or two pages

- 11.a. Find the inverse of the matrix $\begin{bmatrix} -1 & 0 \\ -11 & 10 \end{bmatrix}$. CO1K2
(or)
 - 11.b. From the following table find $f(x)$ and when $x = 6$, using Newton's interpolation formula. CO1K3
- | | | | | |
|--------|---|---|---|---|
| X : | 1 | 2 | 7 | 8 |
| f(x) : | 1 | 5 | 5 | 4 |

- 12.a. Solve the system of equation by Gauss elimination method . CO2K3
 $x + 2y + z = 3; 2x + 3y + 3z = 10; 3x - y + 2z = 13.$
 (or)
- 12.b. Evaluate $\int_0^1 \frac{dx}{1+x^2}$ using Trapezoidal rule with $h = 0.2.$ CO2K3
- 13.a. Find the median from the following data. CO3K2
 Wage : 50 75 100 150 250
 No. of labourers : 8 14 10 5 3
 (or)
- 13.b. For the data below, calculate the standard deviation. CO3K3
 40 50 60 70 80 90 100.
- 14.a. Difference between and correlation and regression. CO4K3
 (or)
- 14.b. X : 21 36 42 37 25 Y : 47 40 37 42 43 CO4K4
 For the data given above, calculate the rank correlation coefficient.
- 15.a. Fit a straight line using method of least square. CO5K3
 X : 2 3 5 8 10
 Y : 5 6 10 18 21
 (or)
- 15.b. Difference between one way classification and two way classification. CO5K3

Part C

5 x 12 = 60

Answer ALL questions

Each answer should not exceed 800 words or four pages

- 16.a. Verify Cayley Hamilton theorem for the matrix CO1K3

$$\begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$$
 (or)
- 16.b. Using Lagrange's interpolation formula , find $y(10)$ from the following table CO1K3
 x : 5 6 9 11 y : 12 13 14 16 .
- 17.a. Solve the following system by Gauss seidel method $10x - 6y - 2z = 0; 4x - 10y + 3z = -3 ;$ CO2K2
 $x + 6y + 10z = -3.$
 (or)
- 17.b. Evaluate $\int_0^6 \frac{dx}{1+x^2}$ using Simpson's 1/3rd rule. CO2K3
- 18.a. Calculate the mode. CO3K3
 Daily Wage in Rs. : 50 – 60 60 – 70 70 – 80 80 – 90 90 – 100
 No. of Labourers : 40 62 75 100 65.
 (or)
- 18.b. Calculate the variance CO3K4
 Scored in a Match : 0 1 2 3 4 5
 No. of Matches : 1 2 4 3 0 2.
- 19.a. Find the coefficient of correlation CO4K2
 X : 10 12 18 8 13 20 22 15 5 17
 Y : 88 90 94 86 87 92 96 94 88 85
 (or)
- 19.b. Calculate the two regression equations from the following data. CO4K3
 X : 10 12 13 12 16 15 .
 Y : 40 38 43 45 37 43.
- 20.a. Explain any two components of time series. CO5K3
 (or)
- 20.b. Perform Two – way ANOVA for the given below. CO2K3

38	40	41	39
45	42	49	36
40	38	42	48