



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)
Re-accredited with 'A++' Grade by NAAC. Recognised by UGC Under Section 12B
Coimbatore - 641 043, Tamil Nadu, India

**Continuous Internal Assessment Test - I February 2025
SEMESTER II**

**Class: I UG
Major: Computer Applications**

**Time: 2 hours
Max. Marks: 60**

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

6x1=6

Choose the Correct Answer

- If $|A| \neq 0$, then A is _____.
a. Non-singular matrix b. singular matrix c. zero matrix d. 0 **CO1K2**
- Order of matrix $\begin{bmatrix} 2 & 4 & 8 & 5 \end{bmatrix}$ is _____.
a. 4×4 b. 1×1 c. 4×1 d. 1×4 **CO1K3**
- Gauss elimination method is also known as _____.
a. column reduction b. row reduction c. diagonal reduction d. scalar **CO2K3**
- Gauss-Seidel iterative method can be used for solving a set of _____.
a. Linear differential equations only b. Linear algebraic equations only
c. Both linear and nonlinear algebraic equation
d. Both linear and nonlinear algebraic differential equations **CO2K3**
- To calculate the median, all the items of a series have to be arranged in a/an _____.
a. descending order b. ascending order
c. ascending order or descending order d. none **CO3K3**
- What is the mode of 3,5,7,9,7,23,4,7,2,5?
a. 2 b. 5 c. 7 d. 21 **CO3K3**

Part B

3 x 6=18

ANSWER ALL THE QUESTIONS

Answer should not exceed 400 words

- 7.a. Using the property of determinants and without expanding prove that **CO1K2**

$$\begin{vmatrix} a-b & b-c & c-a \\ b-c & c-a & a-b \\ c-a & a-b & b-c \end{vmatrix} = 0$$

(or)

- 7.b. Find the adjoint of the following matrix $A = \begin{pmatrix} 6 & 2 & 3 \\ 3 & 1 & 1 \\ 10 & 3 & 4 \end{pmatrix}$ **CO1K2**

- 8.a. Solve the linear system by Gauss elimination method. **CO2K1**
 $x+y+z=3, \quad x+2y+2z=5, \quad 3x+4y+4z=11$

(or)

8.b. Evaluate using Gauss-Seidal method to approximate the solution of the following system of linear equations. CO2K2

$$\begin{aligned} 2x+10y+z &= 13 \\ 2x+2y+10z &= 14 \\ 10x+y+z &= 12 \end{aligned}$$

9.a. From the following data of the marks obtained by 60 students of a class, calculate the arithmetic mean. CO3K1

Marks:	20	30	40	50	60	70
No. of students	8	12	20	10	6	4

(or)

9.b Blood serum cholesterol levels of 10 persons are as follows: CO3K3

240	260	290	245	255	288	272	263	277	251
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Calculate standard deviation with the help of the assumed mean.

Part-C

3x12=36

ANSWER ALL THE QUESTIONS

Answer should not exceed 800 words or four pages

10.a. $A = \begin{pmatrix} 1 & 2 \\ -1 & 3 \end{pmatrix}$ Verify Cayley-Hamilton theorem and hence express $A^6 - 4A^5 + 8A^4 - 12A^3 + 14A^2$ as a linear polynomial in A. CO1K2

(or)

10.b. Form a difference table and interpolate the value of $f(x)$ when $x=4$, given CO1K3

x	3	5	7	9
f(x)	180	150	120	90

11.a. Solve the linear system by Gauss elimination method. CO2K1

$$\begin{aligned} 2x+y+4z &= 12 \\ 4x+11y-z &= 33 \\ 8x-3y+2z &= 20 \end{aligned}$$

(or)

11.b. Find the solution to the following system of equations using the Gauss-Seidal method CO2K3

$$\begin{aligned} 5x+2y+z &= 12 \\ x+4y+2z &= 15 \\ x+2y+5z &= 20 \end{aligned}$$

12.a. Calculate median for the following frequency distribution: CO3K2

Marks	45-50	40-45	35-40	30-35	25-30	20-25	15-20	10-15	5-10
No. of students	10	15	26	30	42	31	24	15	7

(or)

12.b. Calculate the variance for the following table: CO3K3

Marks	10-14	14-18	18-22	22-26	26-30	30-34	34-38	38-42	42-46	46-50	50-54	54-58
No. of students	2	4	4	8	12	16	10	8	4	6	2	4

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