



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 - 641 043, Tamil Nadu, India

Continuous Internal Assessment Test I – August 2025

Semester – I

Class: I UG

Time: 2 Hrs

Major: Computer Science

Max. Marks: 60

23BMAGE3 – Mathematics for Computer Science

Course Outcomes:

CO1: formulate problems in sets and apply set operations.

CO2: compute the inverse of a matrix.

CO3: construct numerical solutions of simultaneous linear equations.

CO4: apply the knowledge of interpolation in analyzing the data.

CO5: evaluate definite integrals using various rules.

PART-A

6 x 1 = 6

Circle the correct answer

- The Cartesian product of $A = \{1, 2\}$ and $B = \{a, b\}$ is: CO1K2
 - $\{(1, a), (2, b)\}$
 - $\{(1, a), (1, b), (2, a), (2, b)\}$
 - $\{(a, 1), (b, 2)\}$
 - $\{(a, 1), (a, 2), (b, 1), (b, 2)\}$
- If $f(x) = x + 2$ and $g(x) = 2x$, then what is $(f \circ g)(x)$? CO1K3
 - $2x + 2$
 - $2x + 4$
 - $4x$
 - $x + 4$
- What is the transpose of a matrix? CO2K2
 - A matrix with the same elements in the same order.
 - A matrix obtained by changing the rows to columns and columns to rows.
 - A matrix obtained by changing the sign of each element.
 - A matrix obtained by inverting each element.
- If A is a square matrix then AA^T is CO2K4
 - symmetric
 - skew symmetric
 - scalar matrix
 - unit matrix
- When the value of the determinant is zero, then the matrix inverse.... CO3K2
 - exist
 - does not exist
 - may or may not exist
 - none of the above
- Which of the following requires back substitution method CO3K2
 - Gauss Jordan
 - Gaussian Inverse
 - Gauss Elimination
 - Newtons Backward

PART – B

3 x 6 = 18

Answer all the questions

- a. Define with example (i) Set (ii) Representation of a set (iii) Singleton set CO1K3
(or)
- b. If $f: \mathbb{R} \rightarrow \mathbb{R}$ and $g: \mathbb{R} \rightarrow \mathbb{R}$ are defined by $f(x) = x^2$ and $g(x) = \sin x$ find $f \circ g$ and $g \circ f$. CO1K4

8.a. Find AB and BA where $A = \begin{bmatrix} 2 & 3 & 4 \\ 1 & 2 & 3 \\ -1 & 1 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 3 & 0 \\ -1 & 2 & 1 \\ 0 & 0 & 2 \end{bmatrix}$ CO2K2
 (or)

8.b. If $A = \begin{bmatrix} 1 & 0 & -2 \\ 2 & 2 & 4 \\ 0 & 0 & 4 \end{bmatrix}$ show that A satisfies the equation $A^2 - 3A + 2I = 0$. CO2K4

9.a. State and prove Cayley Hamilton theorem. CO2K2
 (or)

9. b. Solve the system of equations by Gauss Elimination Method $x + 2y + z = 3$;
 $2x + 3y + 3z = 10$; $3x - y + 2z = 13$. CO3K5

PART – C

3 x 12 = 36

Answer all the questions

10.a. (i) Show that the relation \leq is a totally ordered relation on the set of all real numbers.
 (ii) Explain function and its types. CO1K5
 (or)

10. b. State and prove De Morgan's law. CO1K2

11.a. Find the characteristic equation of the matrix and obtain its inverse $\begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$. CO2K4
 (or)

11.b. Find transpose, adjoint and inverse matrix of $\begin{bmatrix} 4 & 1 & 2 \\ 2 & 3 & -1 \\ 1 & -2 & 2 \end{bmatrix}$ CO2K5

12.a. Find the inverse of the following matrix by using Gaussian Elimination, $A = \begin{pmatrix} 3 & -3 & 4 \\ 2 & -3 & 4 \\ 0 & -1 & 1 \end{pmatrix}$
 (or)

12.b. (i) Find values for a,b,c and d that satisfy the matrix relationship

$$\begin{pmatrix} a+2 & 2b+4 \\ a+3 & 4a+4 \\ d-3 & 3d \end{pmatrix} = \begin{pmatrix} 0 & -6 \\ -3 & 2a \\ 2d+5 & -21 \end{pmatrix}$$

(ii) Solve the equation for the matrix X, $3X + \begin{pmatrix} 4 & -1 \\ -2 & 1 \end{pmatrix} = \begin{pmatrix} -2 & 2 \\ 1 & 4 \end{pmatrix}$ CO3K2