QP Code: U25DRIS048

Reg. No : ....

Name : ....

ST MARY'S COLLEGE (AUTONOMOUS), THRISSUR-20

I SEMESTER (FYUGP) DEGREE EXAMINATIONS, NOVEMBER 2025

(Regular/Improvement/Supplementary)

BCA

BCA1CJ102 : Mathematical Foundation for Computer Applications

2024 Admission Onwards

(Credits: 4)

Time: 2 Hours **Maximum Marks: 70**

Section A

*Answer **all**. Each question carries **3** Marks.* ***(Ceiling: 24 Marks)***

1. Show that AI = IA where $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$
2. If $A = \begin{bmatrix} 2 & 1 \\ 1 & 7 \end{bmatrix}$ and $B = \begin{bmatrix} -2 & 5 \\ 0 & 8 \end{bmatrix}$. Find $4A - 8B$.
3. Discuss the step involved in Gauss Elimination method.
4. Find the characteristic equation and the eigen value of the matrix $A = \begin{bmatrix} 2 & 1 \\ 4 & -1 \end{bmatrix}$
5. Find the derivative of $x^2 cosx$.
6. Find the derivative of $y = 2\sin x + 3\cos x$
7. Determine $\int (1-x)\sqrt{x}dx$
8. Determine the value of $\int_0^1 x^2 dx$.
9. Determine the value of α if $A = \begin{bmatrix} 1 & -1 \\ \alpha & 3 \end{bmatrix}$ is a singular matrix.
10. Mention different types of vectors.

Section B

*Answer **all**. Each question carries **6** Marks.* ***(Ceiling: 36 Marks)***

11. If $A = \begin{bmatrix} -1 & 2 & 3 \\ 5 & 7 & 9 \\ -2 & 1 & 1 \end{bmatrix}$ $and\ B = \begin{bmatrix} -4 & 1 & -5 \\ 1 & 2 & 0 \\ 1 & 3 & 1 \end{bmatrix}$, then verify that $(A-B)^T = A^T - B^T$.

Turn Over

12. Analyze different types of matrices with example.

13. Show that the point $A(1, 2, -1),\ B(2, 5, 1) and\ C(0, -1, -3)$ are collinear.

14. Using the vector method, derive the formula to find the area of a parallelogram formed by two vectors $\vec{a}$ and $\vec{b}$. Also compute area for $\vec{a} = [2, 3, 1]$ and $\vec{b} = [1, -1, 4]$.

15. Find derivative of $y = x^5 + xcosx + e^x$.

16. Compute determinant of y where $y = e^x log(sin2x)$.

17. Solve $\int \frac{2-3\sin x}{\cos^2 x}\, dx$

18. Describe anti derivative. Find the anti derivative of the function $f(x) = 3x^2 - 5x + 3$

Section C

Answer ***any one****.* ***(1x10=10marks)***

19. (a) Prove that $\int_0^{\frac{\pi}{2}} sin^2 x dx = \frac{\pi}{4}$
    (b) Integrate $\frac{1}{9x^2-1}$

20. Solve the system of linear equations

$$x_1 - x_2 + x_3 = 4$$

$$2x_1 + x_2 - 3x_3 = 0$$

$$x_1 + x_2 + x_3 = 2$$

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