(PAGES: 2)

D1BCA2202 (S2) **Reg. No.....**

Name: .....

FIRST SEMESTER UG DEGREE EXAMINATION, NOVEMBER 2024

(Improvement/Supplementary)

BCA

GBCA1C01T: MATHEMATICAL FOUNDATION OF COMPUTER APPLICATIONS

Time: 2 Hours **Maximum Marks: 60**

SECTION A: Answer the following questions. Each carries *two* marks.
(Ceiling 20 marks)

1. $Solve \int secx(secx + tanx)dx$
2. $Find \int \frac{1-x}{x^2} dx$
3. Construct a 2×2 matrix, A=[aij], whose elements are given by: $a_{ij} = (i+j)^2$
4. Find the transpose of a matrix $\begin{bmatrix} 2 & -3 & 7 \\ 4 & 9 & 0 \\ -1 & 8 & 5 \end{bmatrix}$
5. Find the eigen values of the matrix $\begin{bmatrix} 4 & 0 \\ -1 & 1 \end{bmatrix}$
6. What is the dot product of $3\hat{\imath} - 2\hat{\jmath} + 4\hat{k}$ and $\hat{\imath} + \hat{\jmath} - 2\hat{k}$?
7. Find $\frac{dy}{dx}$ if 3x + 2y = sin x
8. Find the derivative of the function given by f(x) = sin (x^3).
9. Find the derivative of $(2x - 6)^{10}$.
10. Find $\int (sinx + cosx)dx$.
11. What is the first fundamental theorem of integral?
12. Define square matrix.

SECTION B: Answer the following questions. Each carries *five* marks
(Ceiling 30 marks)

13. Find $\int (1 + 2x - 4x^3 + cosx)dx$.
14. Find $\int x.cosxdx$.
15. Differentiate the function: sin x^2, cos x^3.

(PTO)

16. Solve equations $2x + 5y = 21$, $x + 2y = 8$ using Gauss-Jordan Elimination method.

17. Find the derivative of the function $f(x) = x^3$ by using first principle.

18. i. Find $\frac{dy}{dx}$ if $y = x \cdot \log x$.

    ii. Find $\int_0^7 (x+1)\,dx$.

19. Show that the matrix $A = \begin{bmatrix} 0 & 4 & -4 \\ -4 & 0 & 4 \\ 4 & -4 & 0 \end{bmatrix}$ is a skew symmetric matrix.

SECTION C: Answer any *one* question. The question carries *ten* marks.

20. i. Find matrices X and Y if: $X + Y = \begin{bmatrix} 4 & 3 \\ 1 & 8 \end{bmatrix}$ $X - Y = \begin{bmatrix} 6 & 5 \\ -1 & 2 \end{bmatrix}$.

    ii. Solve by using matrix inversion method $2x - y + 3z = 9$, $x + y + z = 6$, $x - y + z = 2$.

21. Integrate the functions.

    i. $\int \frac{dx}{(x+3)(x+2)}$

    ii. $\int \frac{2x\,dx}{(1+x^2)}$

(1 × 10 = 10 Marks)