23U112 (Pages: 2) Name: .....

Reg.No: .....

FIRST SEMESTER B.C.A. DEGREE EXAMINATION, NOVEMBER 2023

(CBCSS - UG)

(Regular/Supplementary/Improvement)

CC19U BCA1 C01 - MATHEMATICAL FOUNDATION OF COMPUTER APPLICATION

(Computer Application - Complementary Course)

(2019 Admission onwards)

Time : 2.00 Hours Maximum : 60 Marks

Credit : 3

Part A (Short answer questions)

Answer ***all*** questions. Each question carries 2 marks.

1. If $A = \begin{bmatrix} 1 & 1 \\ 2 & 2 \end{bmatrix}$, $B = \begin{bmatrix} -1 & 1 \\ 1 & -1 \end{bmatrix}$ then prove that $AB = 0$
2. If $\begin{bmatrix} x+y & 0 \\ 0 & x-y \end{bmatrix} = \begin{bmatrix} 2 & 0 \\ 0 & 2 \end{bmatrix}$, then find x and y
3. Give a Skew Symmetric matrix
4. Check the dependency of $v_1 = [3 \quad 5]$, and $v_2 = [2 \quad 8]$
5. Define Rank of a matrix.
6. Find the value of $\begin{vmatrix} 1 & 0 & 0 \\ 2 & 3 & 0 \\ 1 & 2 & 3 \end{vmatrix}$.
7. Give the expression for A^{-1}
8. Define the 'Eigen value' of a square matrix A
9. Evaluate $\lim_{x \to -2} \left(\frac{x+2}{x^2-4} \right)$
10. Find $\frac{dy}{dx}$, if $y = 2x^3$
11. Evaluate $\int cosx dx$
12. Evaluate $\int_2^7 5 dx$

(Ceiling: 20 Marks)

Part B (Short essay questions - Paragraph)

Answer ***all*** questions. Each question carries 5 marks.

13. Using Gauss Elimination method, solve

$$\begin{aligned} x + y + z &= 4 \\ 2x + 5y - 2z &= 3 \end{aligned}$$

14. Using Crammer's rule,solve

$$\begin{aligned} x + y + z &= 9 \\ 2x + 5y + 7z &= 52 \\ 2x + y - z &= 0 \end{aligned}$$

15. Find $|\bar{a} \times \bar{b}|$, if $\bar{a} = \bar{i} - \bar{j} + 3\bar{k}$ and $\bar{b} = 2\bar{i} - 7\bar{j} + \bar{k}$

16. Find $\frac{dy}{dx}$ by using first principle,if $y = x^4$

17. Find $\frac{dy}{dx}$, if $y = (x-1)(x^2 + x + 1)$

18. Evaluate $\int \frac{x^3 + 3x + 4}{\sqrt{x}}$

19. Evaluate $\int \frac{dx}{(x-1)(x-2)}$

(Ceiling: 30 Marks)

Part C (Essay questions)

Answer any ***one*** question. The question carries 10 marks.

20. Solve the system of equations using Gauss-Jordan elimination method:

$$\begin{aligned} x + 2y + z &= 2 \\ 3x - y - 2z &= 1 \\ 4x - 3y - z &= 3 \\ 2x + 4y + 2z &= 4 \end{aligned}$$

21. (a) Find $\frac{dy}{dx}$, if $y = cos(sinx)$

    (b) Find $\frac{dy}{dx}$, if $y = sec(tan(\sqrt{x}))$

(1 × 10 = 10 Marks)

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