

FIRST SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2021

(CBCSS - UG)

(Regular/Supplementary/Improvement)

CC19U BCA1 C01 - MATHEMATICAL FOUNDATION OF COMPUTER APPLICATION

(Mathematics - Complementary Course)

(2021 Admissions)

Time : 2.00 Hours

Maximum : 60 Marks

Credit : 3

Part A (Short answer questions)Answer *all* questions. Each question carries 2 marks.

1. If $A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$, find $2A$ and $\frac{A}{2}$
2. Define Upper triangular matrix.
3. Give a Symmetric matrix.
4. Define trivial solution of $AX = 0$
5. What are the three elementary row operations?
6. When we say that x_1, x_2, \dots, x_n are linearly independent?
7. Find the value of $\begin{vmatrix} 1 & 0 & 0 \\ 2 & 3 & 0 \\ 1 & 2 & 3 \end{vmatrix}$
8. Give the expression for A^{-1}
9. Evaluate $\lim_{x \rightarrow 2} (-x^2 + 5x - 2)$
10. Find $\frac{dy}{dx}$, if $y = x + \frac{1}{x}$
11. Evaluate $\int \frac{1}{x} dx$
12. Evaluate $\int_0^2 9x^2 dx$

(Ceiling: 20 Marks)

Part B (Short essay questions - Paragraph)

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

13. Using Cramer's rule, solve.

$$x + y + z = 9$$

$$2x + 5y + 7z = 52$$

$$2x + y - z = 0$$

14. If $A = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$ then show that $A^2 - 5A - 2I = 0$

15. Find $|\bar{a} \times \bar{b}|$, if $\bar{a} = 3\bar{i} + \bar{j} + 4\bar{k}$ and $\bar{b} = \bar{i} - \bar{j} + \bar{k}$

16. Find $\frac{dy}{dx}$ by using first principle, if $y = x^3 - x$

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

18. Evaluate $\int (\sin x + \cos x) dx$

19. Evaluate $\int \frac{dx}{(x-1)(x-3)}$

(Ceiling: 30 Marks)

Part C (Essay questions)

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

20. Find the rank of the matrix $A = \begin{pmatrix} 1 & 1 & 1 & 1 \\ 1 & 3 & -2 & 1 \\ 2 & 0 & -3 & 2 \\ 3 & 3 & -3 & 3 \end{pmatrix}$

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

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

(1 × 10 = 10 Marks)
