FIRST SEMESTER B.C.A. DEGREE EXAMINATION, NOVEMBER 2020

(CBCSS - UG)

(Regular/Supplementary/Improvement)

CC19U BCA1 C01 - MATHEMATICAL FOUNDATION OF COMPUTER APPLICATION

(Mathematics - Complementary Course)

(2019 Admission onwards)

Time : 2.00 Hours   Maximum : 60 Marks

Credit : 3

Part A (Short answer questions)

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

1. If $A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$, find $2A$ and $\dfrac{A}{2}$

2. Find order of the matrices $A = \begin{bmatrix} 1 & 2 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$

3. If $A = \begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix}$, then prove that $(A^T)^T = A$

4. What are the three elementary row operations

5. Find the rank of the matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 6 \end{bmatrix}$

6. Find the value of $\begin{vmatrix} 1 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 3 \end{vmatrix}$

7. Give the expression for A^{-1}

8. Find $|\bar{a}|$, if $\bar{a} = 2\bar{i} - 3\bar{j} + 5\bar{k}$

9. Evaluate $\lim_{x \to 5} \left(\dfrac{x - 5}{x^2 - 25} \right)$

10. $\dfrac{d}{dx}(x^n) = \ldots \ldots$

11. Evaluate $\displaystyle\int 3x^2 \, dx$

12. Evaluate $\int_0^2 x^2\,dx$

(Ceiling: 20 Marks)

Part B (Short essay questions)

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

13. Find the inverse of the matrix $A = \begin{pmatrix} 1 & 1 & 1 \\ 1 & 2 & -3 \\ 2 & -1 & 3 \end{pmatrix}$

14. Check the dependency of $v_1 = \begin{bmatrix} 1 & 9 & 9 & 8 \end{bmatrix}$, $v_2 = \begin{bmatrix} 2 & 0 & 0 & 3 \end{bmatrix}$ and $v_3 = \begin{bmatrix} 2 & 0 & 0 & 8 \end{bmatrix}$

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

16. Using first principle find $\dfrac{dy}{dx}$ if $y = \dfrac{1}{x}$

17. Find $\dfrac{dy}{dx}$ if $y = \dfrac{2x+5}{3x-2}$

18. Evaluate $\int \dfrac{x^3-1}{x^2}\,dx$

19. Evaluate $\int \dfrac{dx}{(x-2)(x-3)}$

(Ceiling: 30 Marks)

Part C (Essay questions)

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

20. (a) Show that the matrix $A = \begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix}$ satisfies the equation $A^2 - 4A + I = 0$.

    (b) Solve using Crammers Rule
$$\begin{aligned} x + 2y + 3z &= 14 \\ 2x - y + 5z &= 15 \\ 3x - 2y - 4z &= -13 \end{aligned}$$

21. Find $\dfrac{dy}{dx}$ if,

    (a) $y = cos(sinx)$

    (b) $y = sec(tan(\sqrt{x}))$

(1 × 10 = 10 Marks)

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