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Total No. of Questions : 10]

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BC-182

B.C.A. (Part-III) DUE Ist Year Examination, 2021

FUNDAMENTAL MATHEMATICS FOR COMPUTER APPLICATION

Paper - BCA-101

Time : 1½ Hours]

[Maximum Marks : 50

Note :- Attempt *five* questions in all, selecting at least *one* question from each Unit.
All questions carry equal marks.

Unit-I

1. (a) Solve the following set of equations by Cramer's rule :

$$2x + y + z = 3$$

$$x - y - z = 0$$

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

(b) Explain inverse and transpose of a matrix.

2. (a) Find rank of the following matrix :

$$\begin{bmatrix} 2 & -1 & 4 \\ 1 & 0 & -1 \\ 0 & 2 & 1 \\ 1 & 1 & 3 \end{bmatrix}$$

(b) Explain homogenous system of equations with a suitable example.

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Unit-II

3. (a) Prove that the following function has neither maxima nor minima :

$$f(x) = 4x^3 - 18x^2 + 27x - 7$$

- (b) Explain difference between differentiability and differentiation by suitable examples.
4. (a) Prove that function f given by $f(x) = |x - 1|$, $x \in \mathbb{R}$ is not differentiable at $x = 1$.
- (b) Explain Higher derivatives of second and third order with suitable example.

Unit-III

5. (a) Integrate the following function w.r.t. x :

$$\sqrt{x^2 + 2x + 5}$$

- (b) Give a suitable example of substitution for method of integration.
6. (a) Find the integrals :

$$\int (2x^2 - 3\sin x + 6\sqrt{x}) dx$$

- (b) What is the value of :

$$\int 8x^3 dx$$

Unit-IV

7. (a) Find the center and radius of the circle of :

$$x^2 + y^2 - 6x + 10y + 9 = 0$$

- (b) Find the distance between the parallel lines $3x + 4y + 7 = 0$ and $3x + 4y + 5 = 0$.
8. (a) Explain rectangular co-ordinates in a plane with suitable example.
- (b) Find the equation of the straight line passing through the point $(-2, 5)$ and $(3, 6)$.

Unit-V

9. (a) What is the angle between vectors $a = i + j - 2k$ and $b = i + j - k$.
- (b) Find a unit vector in the direction of vector $\rightarrow a = 2 \hat{i} + 3 \hat{j} + 6 \hat{k}$.
10. (a) Why is the cross production of $i \times i = 0$? Explain in detail.
- (b) Calculate the cross product between $a = (3, -3, 1)$ and $b = (4, 9, 2)$.