FIRST SEMESTER (CBCSS—UG) DEGREE EXAMINATION NOVEMBER 2020

B.C.A.

BCA 1C 01—MATHEMATICAL FOUNDATION FOR COMPUTER APPLICATION

(2019 Admissions)

Time : Two Hours | Maximum : 60 Marks

Section A

Answer at least **eight** *questions.*
Each question carries 3 marks.
All questions can be attended.
Overall Ceiling 24.

1. Find the length of the vector with initial point $P:(4,0,2)$ and terminal point $Q\ (6,-1,2)$.

2. If $a=[4,0,1]$ and $b=[2,-5,1/3]$. Find $a+b$.

3. Evaluate the characteristic polynomial of the matrix $\begin{bmatrix}-1 & 3\\ -2 & 4\end{bmatrix}$.

4. When two non-zero vectors are orthogonal ?

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

6. Define linear dependence of vectors.

7. Find $\frac{dy}{dx}$ if $y=\sin^{-1}\sqrt{x}$.

8. Find the derivative of $y=2\sin x+3\cos x$.

9. Find $\frac{dy}{dx}$ if $y=x\sin x\log x$.

Turn over

10. What is the value of $\int_{-a}^{a} \sin x \, dx$? Justify.

11. Evaluate $\int x^{-5/4} \, dx$.

12. Integrate $\sin^2 x$.

(8 × 3 = 24 marks)

Section B (Short Essay Type Questions)

Answer at least **five** *questions.*

Each question carries 5 *marks.*

All questions can be attended.

Overall Ceiling 25.

13. Compute the inverse of A, Where $A = \begin{bmatrix} 2 & 3 & 6 \\ 3 & -6 & 2 \\ -6 & -2 & 3 \end{bmatrix}$.

14. If $a = [1, -2, 1], b = [2, -1, 1]$ and $c = [1, 1, -2]$ then prove that $a \times (b \times c) = (a \times b) \times c$.

15. Solve the linear system :

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

16. Find $\frac{dy}{dx}$, $y = e^x \cos^3 x \sin^2 x$.

17. Find $\frac{dy}{dx}$, $y = x^{\sin x}$.

18. Integrate $\cos^7 x$ with respect to x.

19. Evaluate $\int_1^2 \frac{dx}{(x+1)(x+2)}$.

(5 × 5 = 25 marks)

Section C (Essay Type Questions)

Answer any **one** *question.*

The question carries 11 *marks.*

20. Find the eigen values and eigen vectors of the matrix $\begin{bmatrix} -5 & 2 \\ 2 & -2 \end{bmatrix}$.

21. (a) Find the derivative of $\log x$ using the first principal.

(b) Evaluate the integral $\int_0^2 \frac{dx}{x+4-x^2}$.

(1 × 11 = 11 marks)