

Roll.No.

25UDSGT1001

SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN
(AUTONOMOUS)
(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)
Chromepet, Chennai - 600 044.
B.Sc Cs with DS- END SEMESTER EXAMINATIONS - NOVEMBER 2025
SEMESTER - I
25UDSGT1001 - Mathematics for Data Science

Total Duration : 2 Hrs.30 Mins.

Total Marks : 60

Section B

Answer any **SIX** questions ($6 \times 5 = 30$ Marks)

1. Prove that the three points (x_i, y_j) , $i = 1,2,3$ are collinear if and only if the rank of the matrix $\begin{bmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{bmatrix}$ is less than 3
2. Test for consistency and solve if consistent $x + 2y - z = 3$; $3x - y + 2z = 1$; $x + 2y + 3z = 2$; $x - y + z = -1$
3. Define vector space and subspace. Give example.
4. Obtain the n^{th} derivatives of $\log(ax+b)$.
5. Use the method of iteration to find the real root lying between 1 and 2 of the equation $x^3 - 3x + 1 = 0$.
6. Solve the system of equations using Gauss elimination method $x + y + z = 9$; $2x - 3y + 4z = 13$; $3x + 4y + 5z = 40$
7. A function $y = f(x)$ is given by the following table. Find $f(0.2)$ by a suitable formula

X	0	1	2	3	4	5	6
Y	176	185	194	203	212	220	229

8. If $f(x) = 1/x^2$, find the first divided differences i) $[a, b]$ ii) $[a, b, c]$

Section C

Answer any **THREE** questions ($3 \times 10 = 30$ Marks)

9. Find the Eigenvalues and Eigenvectors of the matrix $\begin{bmatrix} 11 & -4 & -7 \\ 7 & -2 & -5 \\ 10 & -4 & -6 \end{bmatrix}$

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10. Show that the vectors $X_1 = [1, 2, 3]$; $X_2 = [2, -2, 0]$ form a linearly Independent set.
11. Find the maximum or minimum values of the function $f(x, y) = 2(x^2 - y^2) - x^4 + y^4$.
12. Solve the following system by Gauss – Jordan method $x + y + z = 9$;
 $2x - 3y + 4z = 13$; $3x + 4y + 5z = 40$
13. Use Lagrange's formula to find the value of y at $x = 6$ from the following data

X	3	7	9	10
Y	168	120	72	63
