Roll.No. | **20USTAT4004**

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 Mathematics- END SEMESTER EXAMINATIONS - NOVEMBER 2025
SEMESTER - IV
20USTAT4004 - Numerical Methods

Total Duration : 2 Hrs.30 Mins. Total Marks : 60

Section B

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

1. Show that E=1+ $\triangle$.
2. If $y_1 = 4, y_3 = 12, y_4 = 19$ and $y_x = 7$ compute the value of x ?
3. Prepare the divided difference table for the following table

X	-1	0	2	4	5
Y	0	1	9	65	126

4. Apply Gauss backward interpolation formula to solve y(25) for the following table.

X	20	24	28	32
Y	2854	3162	3544	3992

5. Derive Bessel's formula.
6. Find the real root of the equation $f(x) = x^3 - x - 1 = 0$ by bisection method up to x_5.
7. Solve the equations x+y=2 and $2x + 3y = 5$ by Gauss elimination method.
8. Find, from the following table, the area bounded by the curve and the x – axis from x = 7.47 to x = 7.52

X	7.47	7.48	7.49	7.50	7.51	7.52
F(x)	1.93	1.95	1.98	2.01	2.03	2.06

Section C

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

9. Find the cubic polynomial which takes the following values:
y(1) = 24, y(3) = 120, y(5) = 336, and y(7) = 720. Hence or otherwise, obtain the value of y(8).

Contd..

10. Using the following table find f(x) as a polynomial in x

X	-1	0	3	6	7
F(x)	3	-6	39	822	1611

11. Using Stirling's formula compute y_{35} given that $y_{10} = 600, y_{20} = 512$, $y_{30} = 439, y_{40} = 346, y_{50} = 243$.

12. Use the Newton – Raphson method to find a root of the equation $x^3 - 2x - 5 = 0$ correct to three places of decimals.

13. Evaluate I$= \int_0^1 \frac{1}{1+x} dx$ correct to three decimal places.Solve this by both the Trapezoidal and Simpson's rules with h $= 0.5$ and h $= 0.25$.

*****