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.(Statistics) END SEMESTER EXAMINATIONS NOVEMBER -2023
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 $\Delta^n = \nabla^n \, y_{n+r}$
2. Use Lagrange's interpolation method to find the unique polynomial p(x) which agree with the data y(0) = 1, y(1) = 0 and y(3) = 10. Also find the value of y(2).
3. Derive Gauss forward interpolation formula.
4. Find a real root of the equation f (x) = x^3 - x -1 = 0, using Bisection method.
5. Use Simpson's 1/3 rule to integrate f(x)= 0.2 + 25x + $3x^2$ + $2x^4$ from a=0 to b=2
6. The distance of x from a runner from a fixed point is measured (in meters) at internals of half a second. The data obtained are

t	0.0	0.5	1.0	1.5	2.0
x	0.00	3.65	6.80	9.90	12.15

   Use central differences to approximate the runner's velocity at times t=0.5s and t=1.25s.
7. Solve x^4 -x -7 = 0 correct to two significant figures by Newton-Raphson's method correct upto 6 significant digits.
8. Use the trapezoid rule to estimate $\int_0^1 x^2 dx$ using four subintervals.

Section C

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

9. Using Newton's backward difference formula find the number of factories earning less than Rs.65,000 as profits from the following data are given below:

Profit (Rs.000)	30-40	40-50	50-60	60-70	70-80
No.of factories	34	43	56	39	29

Contd...

10. Using Newton's divided difference formula, find the solution to x=5 using the given data

x	2	4	9	10
f(x)	4	56	711	980

11. Use Stirling's formula to find y_{28} given that y_{20}=49225, y_{25}=48316, y_{30}=47236, y_{35}=45926, y_{40}=44306.

12. Solve Equations 2x+y=8,x+2y=1 using Gauss Seidel method

13. Find the solution using Simpson's 3/8 rule

x	1.4	1.6	1.8	2.0	2.2
f(x)	4.0552	4.9530	6.0436	7.3891	9.025

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