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. END SEMESTER EXAMINATIONS APRIL-2022
SEMESTER - IV
20USTAT4004 - Numerical Methods

Total Duration : 3 Hrs. **Total Marks : 60**

Section A

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

1. Derive Gregory-Newton's backward interpolation formula.
2. Derive Newton's divided difference formula .
3. Derive Gauss's forward formula.
4. Find by Newton Raphson's method a real root of 3x - $\cos$x - 1 = 0
5. Evaluate $\int_0^{\frac{\pi}{3}} \sqrt{\sin dx}$ with n = 6 using Simpson's method.
6. Find root of equation x^3 - 4x - 9 = 0 .
7. Construct a forward differences table for the following values of x and y

x	35	36	37	38	39	40	41
y	14.298	14.144	13.986	13.825	13.661	13.495	13.328

8. Apply Bessel's formula to obtain f(32) given that f(25)=0.2707, f(30)=0.3027, f(35)=0.3388, f(40)=0.3794.

Section B

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

9. Find the interpolating polynomial f(x) satisfying f(0)=0, f(2)=4, f(4)=56, f(6)=204, f(8)=496 and f(10)=980 and hence find f(3), f(5).
10. Apply Lagrange's formula to find f(5) and f(6) gives that f(1)=2, f(2) =4, f(3)=8, f(4)=16 and f(7)=128.
11. Derive Stirling's Central difference formula.
12. Solve the following system of equation Gauss-Seidel method correct to three decimal places.x+y+54z=110;27x+6y-z=85;6x+15y+2z=72.
13. Evaluate the integral $I = \int_0^1 \frac{dx}{\sqrt{1+x^2}}$ by trapezoidal rule dividing the integral [0,1] into 5 equal parts. Compute up to 3 decimals.

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