

Roll No. _____

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SVS-N-338 (5C)-A-21
B.Sc. V Semester Degree Examination
MATHEMATICS
Numerical Analysis - I
Paper : DSE5C (Theory)
(New)

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates:

Answer All the sections.

SECTION - A

L Answer any Ten of the following. (10×2=20)

1. If 0.428 is an approximate value of $3/7$, find absolute, relative and percentage error.
2. Find the number of trustworthy figures in $(653)^{1/4}$ where 653 is correct to 3 significant figures.
3. State Regula - Falsi method to solve $f(x) = 0$.
4. Prove that $\Delta \left\{ \frac{f(x)}{g(x)} \right\} = \frac{g(x)\Delta f(x) - f(x)\Delta g(x)}{g(x+h).g(x)}$.
5. State Newton - Gregory forward difference interpolation formula.
6. Prove that $(1 + \Delta)(1 - \nabla) = 1$.
7. Evaluate $\Delta[x(x+1)(x+2)(x+3)]$.
8. Construct the forward difference table for the function $f(x) = x^2 + x + 1$ for the values 0(1)4.
9. Express $f(x) = 3x^2 + 9x + 4$ in factorial notation.
10. Find the interpolating polynomial for the data

$x :$	0	1	2	3	4
$f(x) :$	3	6	11	18	27

11. Construct divided difference table for the following

$x :$	1	3	4
$y :$	4	12	19

12. State Lagranges inverse interpolation formula.

SECTION - B

II. Answer any **Three** of the following :

(3×5=15)

1. Find the difference $\sqrt{6.27} - \sqrt{6.26}$ and evaluate the relative and percentage error.
2. Find the product of 137.2 and 372.5 and state how many figures of the result are trust worthy, given that the numbers are correct to 4 significant figures.
3. Find a real root of the equation $x^3 - x - 1 = 0$ by bisection method correct to 3 decimal places.
4. Using secant method find a real root of the equations $x^3 - 4x - 9 = 0$ over (2.5,3) correct to 3 decimal places.

SECTION - C

III. Answer any **Three** of the following :

(3×5=15)

1. Solve $2x + y + z = 10$, $3x + 2y + 3z = 18$, $x + 4y + 9z = 16$ by Gauss elimination method.
2. Solve $5x - y + 3z = 10$, $3x + 6y = 18$, $x + y + 5z = -10$ by Jacobi's method with (3,0,-2) as initial approximation.
3. Solve $10x + y + z = 12$, $2x + 10y + z = 13$, $2x + 2y + 10z = 14$ by Jacobi's method.
4. Using Gauss seidal method, solve the following equations. $5x - y = 9$, $x - 5y + z = 4$ and $y - 5z = 6$.

SECTION - D

IV. Answer any **Three** questions.

(3×5=15)

1. Construct the forward difference table for the function $f(x) = x^3 + x^2 - 2x + 1$ for the values $x = 0(1)5$. Find $f(6)$ by extending the table.
2. Find the 8th term of the sequence, 7,15,35,72,131,217,.....
3. Evaluate $(\nabla + \Delta)^2 (x^2 + 2x)$.

4. Express the polynomial $f(x) = 11x^4 + 5x^3 + x - 15$ and its successive differences in factorial notation.

SECTION - E

V. Answer any **Three** of the following.

(3×5=15)

1. From the following table estimate the number of students who obtained marks between 40 and 45

Marks :	30-40	40-50	50-60	60-70	70-80
No. of students :	31	42	51	35	31

2. Find the polynomial of lowest degree by using Newtons divided difference formula for the data

$x :$	-2	1	3	7	8
$f(x) :$	10	4	40	424	620

3. Find $f(0.7)$ by using Lagranges formula, given that

$x :$	0.3	0.5	0.6	0.8
$f(x) :$	-0.91	-0.75	-0.64	-0.36

4. Find x for which $y = 7$ by using Lagranges inverse interpolation formula, given that

$x :$	1	3	4
$y :$	4	12	19