



NP – 818

29

VI Semester B.Sc. Examination, June/July 2025
(NEP Scheme) (F + R)

MATHEMATICS

DSC 6.2 : Numerical Analysis

Time : 2½ Hours

Max. Marks : 60

Instruction : Answer all the Parts.

PART – A

I. Answer **any ten** questions.

(10×2=20)

- 1) Find a positive real root of $x^3 - 2x + 5 = 0$ which lies between 2 and 3 using bisection method in two approximations.
- 2) Write Regular-Falsi method formula to find the real root of the equation $f(x) = 0$.
- 3) Define absolute error and percentage error.
- 4) Apply Gauss-elimination method to solve the system of equation $x + 2y = 3; 2x + 3y = 5$.
- 5) Explain Gauss-Seidel method briefly.
- 6) Discuss SOR method.
- 7) Prove that $E = (I - \nabla)^{-1}$.
- 8) Write the Newton's Gregory forward interpolation formula.
- 9) Construct difference table for the following data.

x	30°	35°	40°	45°
y = sinx	0.5000	0.5736	0.6428	0.7071

- 10) State Newton's formula to find $f'(x)$ and $f''(x)$ using forward differences.
- 11) Write Trapezoidal formula.
- 12) Write the general quadrature formula.

P.T.O.



PS
PART – B

II. Answer **any two** questions.

(2×5=10)

- 13) Using Taylor's series method to find y at $x = 1.1$ considering terms upto third degree given that $\frac{dy}{dx} = x + y$ and $y(1) = 0$.
- 14) Find the real root of the equation $f(x) = x^3 - 4x + 1 = 0$ by Regular-Falsi method upto 4 decimal places.
- 15) Find a real root of the equation $xe^x - 2 = 0$ correct to three decimal places using Newton – Raphson method.
- 16) Use secant method to find a real root of the equation $x^3 - x + 5 = 0$ correct to the four decimal places.

PART – C

III. Answer **any two** questions.

(2×5=10)

- 17) Solve by Gauss-elimination method $2x + y + z = 10$; $3x + 2y + 3z = 18$; $x + 4y + 9z = 16$.
- 18) Solve by Jacobi iteration method $5x - y = 9$; $-x + 5y - z = 4$; $y - 5z = 6$.
- 19) Using Gauss – Seidal iteration method. Solve the system of equation $27x + 6y - z = 85$; $6x + 15y + 2z = 72$; $x + y + 54z = 110$.
- 20) Solve the following system of equation by LU decomposition method $2x_1 + x_2 + 4x_3 = 12$; $4x_1 + 11x_2 - x_3 = 33$; $8x_1 - 3x_2 + 2x_3 = 20$.

PART – D

IV. Answer **any two** questions.

(2×5=10)

- 21) Evaluate $y = e^{2x}$ for $x = 0.05$ from the following table.

x	0.00	0.10	0.20	0.30	0.40
y = e^{2x}	1.0000	1.2214	1.4918	1.8221	2.2550

- 22) Using Lagrange's formula of interpolation to find $f(6)$ from the following data.

x	3	7	9	10
f(x)	168	120	72	63



23) Find $f(8)$ by using Newton's divided difference formula for the following data.

x	4	5	7	10	11	13
f(x)	48	100	294	900	1260	2028

24) Find the polynomial which satisfies the following data.

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

PART – E

V. Answer **any two** questions.

(2×5=10)

25) From the table of values below, compute $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at $x = 1$.

x	1	1.1	1.2	1.3	1.4	1.5	1.6
y	7.989	8.403	8.781	9.129	9.451	9.750	10.031

26) The population of a certain town is given below. Find the rate of growth of population in 1976.

x Year	1931	1941	1951	1961	1971
y Population in thousand	40.62	60.80	79.95	103.56	132.65

27) Evaluate $\int_0^6 \frac{1}{1+x^2} dx$ by using

- i) Simpson's 1/3rd rule and
- ii) Simpson's 3/8th rule.

Correct to four decimal places by dividing $[0, 6]$ into 6 equal parts.

28) Find the approximate value of $\int_0^{\pi/2} \sqrt{\cos\theta} d\theta$ by Weddle's rule by dividing $[0, \pi/2]$ into 6 equal parts.
