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DCMT602

VI Semester B.Sc. Degree Examination, June/July - 2026
(NEP Scheme)
MATHEMATICS
Numerical Analysis
Paper - MATDSCT-6.2

Time : 2½ Hours **Maximum Marks : 60**

Instructions:

Answer All Parts.

PART - A

I. Answer any Six of the following. **(6×2=12)**

1. Define absolute and percentage errors.
2. Find a positive real root of the equation $x^3 - x - 1 = 0$ which lies between 1 and 2 using bisection method (in two approximations)
3. Solve $x - 2y = 3$

   $3x - y = 4$ by using Gauss-Elimination method.
4. Solve $10x + y + z = 12$

   $2x + 10y + z = 13$

   $2x + 2y + 10z = 14$

   by Gauss-Jacobi method do one iteration.
5. Prove that $\nabla = 1 - E$
6. Evaluate $\Delta^{10}\left[(1-ax)(1-bx^2)(1-cx^3)(1-dx^4)\right]$ by taking h =1
7. Write Newton-Gregory Forward interpolation formula.
8. Write the formula of Trapezoidal rule.

PART - B

II. Answer any Three of the following. **(3×4=12)**

1. Find the percentage error if 625.483 is approximated to three significant figures.
2. Obtain the approximation of log(1+x) in the form of second degree polynomial and hence evaluate log(1.2).
3. Find a real root of the equation $x^4 - x - 10 = 0$ correct to three decimal places that lies between (1.8) and 2 using Regula-Falsi method.

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4. Using Newton-Raphson method find a real root of the equation $x^3 - 2x - 5 = 0$ correct to three decimal places.

5. Using Secant method find a real root of the equation $x^3 - 5x + 1 = 0$ which lies in the interval (0,1). Perform four iterations.

PART - C

III. Answer any Three of the following. **(3×4=12)**

1. Solve the system of equations

$$x + y + z = 3$$
$$2x + 3y + 7z = 0$$
$$x + 3y - 2z = 17$$ by Gauss-Elimination method.

2. Solve the system of equations

$$x + y + z = 4$$
$$2x - 3y + z = 2$$
$$-x + 2y - z = -1$$ by Gauss-Jordan method.

3. Solve the system of equations

$$x + y + z = 1$$
$$4x + 3y - z = 6$$
$$3x + 5y + 3z = 4$$ by Crout's Lu-decomposition method.

4. Solve the system of equations

$$30x - 2y + 3z = 75$$
$$3x + 17y - 2z = 48$$
$$2x + 2y + 18z = 30$$ by Gauss-Jacobi method.

5. Solve the system of equations

$$27x + 6y - z = 85$$
$$6x + 15y + 2z = 72$$
$$x + y + 54z = 110$$ by Gauss-Seidel method.

PART - D

IV. Answer any Three of the following. **(3×4=12)**

1. Evaluate

   a) $\Delta \log x$

   b) $\Delta \tan^{-1} x$

2. From the following data find f(1.4)

x	1	2	3	4	5
$y=f(x)$	10	26	58	112	194

3. Find a polynomial of degree two which takes the values

x	0	1	2	3	4	5	6	7
y	1	2	4	7	11	16	22	29

4. Using Lagrange's interpolation formula find f(10) from the following data

x	5	6	9	11
f(x)	12	13	14	16

5. Using Newton divided difference formula, find f(9) from the following data

x	5	7	11	13	17
$f(x)$	150	392	1452	2366	5202

PART - E

V. Answer any Three of the following. **(3×4=12)**

1. Find $\frac{dy}{dx}$ at $x = 1$ from the following data.

x	1.0	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

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2. Find $f'(0.5)$ from the following data

x	0	1	2	3	4
f(x)	1	1	15	40	85

3. Evaluate $\int_0^6 \frac{dx}{1+x^2}$ by using Trapezoidal rule by taking n = 6.

4. Evaluate $\int_0^1 \frac{dx}{1+x}$ by using Simpson's $\frac{1}{3}^{rd}$ rule by taking n= 6

5. Evaluate $\int_0^3 \frac{dx}{(1+x)^2}$ by usingSimpson's $\frac{3}{8}^{th}$ rule taking n = 3

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