

CODE: 192661
NOVEMBER 2020

TIME: 3Hrs
MAX. MARKS : 50

PART
Answer any **TEN** questions

(10 x 2=20)

1. Define Bisection method.
2. Write the significance of Newton Raphson method.
3. Write the formula for Newton Forward difference Interpolation.
4. Define Newton's Backward Difference Interpolation Formula.
5. Evaluate $f(15)$, given that $f(10) = 46, f(20) = 66$.
6. What do you know by Linear Interpolation ?
7. Find the interpolating polynomial by Newton's divided difference formula for the following table and then calculate $f(2.1)$.

x	0	1	2	4
f(x)	1	1	2	5

8. Mention the formula for Simpson's rule.
9. Find eigen values of the following matrix

$$A = \begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}.$$

10. Define the problem of numerical differentiation
11. Define Runge kutta method.
12. What do you mean by Taylor's series method ?

PART B
Answer any **TWO** questions.

(2x5=10)

13. Solve $f(x) = x^2 - 3x + 1 = 0$, by fixed point iteration method.
14. Find Lagrangian interpolation polynomial for the function f having $f(4)=1, f(6)=3, f(8)=8, f(10)=16$. Also calculate $f(7)$.
15. Obtain Newton's divided difference interpolating polynomial satisfied by $(4,1245), (-1,33), (0,5), (2,9)$ and $(5,1335)$.
16. Dividing the range into 10 equal parts, Find the approximation value of $\int_0^\pi \sin x \, dx$ by Trapezoidal rule.
17. Find the eigen values and the eigen vector corresponding to the largest eigen value of the given matrix

$$A = \begin{bmatrix} 8 & -6 & 2 \\ -6 & -1 & -4 \\ 2 & -4 & 3 \end{bmatrix}.$$

P.T.O

18. Solve the following equation using Gauss-seidel method

$$10x_1 - 2x_2 - x_3 - x_4 = 3$$

$$-2x_1 + 10x_2 - x_3 - x_4 = 15$$

$$-x_1 - x_2 + 10x_3 - 2x_4 = 27$$

$$-x_1 - x_2 - 2x_3 + 10x_4 = -9.$$

19. Find a real root of the equation $f(x) = x^3 - x - 1 = 0$.

20. Using Newton-Raphson method, find the root of the equation $x^3 - x^2 - x - 3 = 0$, correct to three decimal places

PART C
Answer any **TWO** questions.

(2x10=20)

21. Find the inverse of the matrix

$$\begin{pmatrix} 4 & 1 & 2 \\ 2 & 3 & -1 \\ 1 & -2 & 2 \end{pmatrix} \text{ by Gauss Elimination method}$$

22. Using the Newton's forward difference interpolation formula evaluate $f(2.05)$ Where $f(x) = x$, using the values:

X	.20	2.1	2.2	2.3	2.4
\sqrt{x}	1.414 214	1.449 138	1.483 240	1.516 575	1.549 193

23. Find Lagrange's interpolation polynomial fitting the points $f(1) = -3, f(3) = 0, f(4) = 30, f(6) = 132$. Hence find $f(5)$.

24. Using Trapezoidal rule solve the integral, $\int_0^1 \frac{1}{x^2+6x+10} dx$ with four subintervals.

25. Solve the following equation using Simson's one third rule.

$$\int_0^{10} \frac{1}{1+x^2} dx$$

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