M.Sc. DEGREE EXAMINATION,NOVEMBER 2018
I Year II Semester
Core Major
COMPUTATIONAL METHODS AND C PROGRAMMING

Time : 3 Hours **Max.marks :75**

Section A $(10 \times 2 = 20)$ Marks

Answer any **TEN** questions

1. State the order of Convergence and Convergence condition for Newton Raphson method?
2. Solve the system of equation x+y = 2 and 2x+3y = 6 by Gauss elimination method.
3. Define Characteristic equation.
4. When should we use Newton's backward interpolation formula?
5. What is the order of the error in the trapezoidal rule?
6. State Simpon's 3/8 rule of numerical integration.
7. What type of Eigen value can be obtained using power method?
8. State formula for Runge-kutta method of order two.
9. What are the errors in simpson's rules of numerical integration?
10. Write the normal equation of second degree parabola.
11. What is an expression?
12. Define recursion.

Section B $(5 \times 5 = 25)$ Marks

Answer any **FIVE** questions

13. Solve $\sqrt{12}$ to four decimal places by newton raphson method.
14. Find the inverse of matrix
$$\begin{bmatrix} 2 & 2 & 3 \\ 2 & 1 & 1 \\ 1 & 3 & 5 \end{bmatrix}$$
15. Given $\log_{10}654 = 2.8156$ $\log_{10}658 = 2.8182$ $\log_{10}659 = 2189$ $\log_{10}661 = 2.8202$ find $\log_{10}656$.
16. Using Trapezoidal rule $\int_{0.6}^{2} y\,dx$ from the following table

X	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0
Y	1.23	1.58	2.03	4.32	6.25	8.36	10.23	12.45

17. Write the procedure for Jacobi method to find Eigen value.

18. Find dy/dx at x = 1.5

x	1.5	2.0	2.5	3.0	3.5	4.0
f(x)	3.375	7.0	13.625	24.0	38.875	59.0

19. Explain subroutine.

Section C $(3 \times 10 = 30)$ Marks

Answer any **THREE** questions

20. Solve the following system by Gaussian elimination method.

x_1-x_2+x_3 = 1

-3x_1+2x_2-3x_3 = -6

2x_1-5x_2+4x_3 = 5

21. Fit a straight line by the method of least squares.

Year	1960	1962	1963	1964	1965	1966	1969
Value	140	144	160	152	168	176	180

Find the trend value of the missing year 1961.

22. Evaluate dy/dx = x+y when x=0.1, 0.2 h = 0.1 given x=0 when y=1 useing Runge kutta method.

23. Solve $x^3 - x - 1 = 0$ by bisection method corrected to 4 decimal places of the equation.

24. Write a C program to find the roots of the equation by newton raphson method.

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