B.Tech ECE 4th Semester 2019 May

University Institute of Engineering & Technology

(Recognised Under Section 2(f) and 12B of UGC)

Kurukshetra University, Kurukshetra

Roll No. -

THEORY EXAMINATION – MAY 2019		TIME – 3 Hrs.
B.TECH - ECE	SEMESTER - IV	M.M. - 75

COURSE NO. - AS-206	COURSE TITLE - Numerical Analysis

Note: All questions in part A and Part B are compulsory. Attempt any four from part C selecting at least one from each unit

PART A (15 Marks)

Q.No.1 Answer the following questions $15 \times 1 = 15$

(i) What is the rate (order) of convergence of Regula Falsimthod

(ii) State Gauss Backward interpolation formula

(iii) Define algebraic and transcendental equation

(iv) Write Newton Rapson formula to find the value of $\sqrt{N}$

(v) State Simpson's $\frac{3}{8}$ rule of integration

(vi) Write Lagrange's Interpolation formula

(vii) Write Euler modified formula

(viii) Evaluate $\Delta(x^2 + \sin x)$, the interval of differencing being α

(ix) Evaluate $\int_0^6 \frac{1}{1+x^2} dx$ by using Trapezoidal rule

(x) Write the formula for RungeKutta method of fourth order

(xi) Define Eigen values and Eigen vectors of a matrix.

(xii) Write the formula for $\frac{dy}{dx}$ using Newton forward formula

(xiii) Define lower and upper triangular matrix

(xiv) Write general formula for Regula-Falsi method.

(xv) Find the third divided difference using the following data

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

PART B (20 Marks)

Q.No.2 Find the value of $\frac{1}{\sqrt{15}}$, using Newton Rapson method **5**

Q.No.3 Solve the following equations by Relaxation method **5**

$9x-2y+z=50, \quad x+5y-3z=18 \quad -2x+2y+7z=19$

Q.No.4 Evaluate $\int_0^1 \frac{dx}{x+1}$ taking 7 ordinates by applying Simpson's $\frac{3}{8}$ rule **5**

Q.No. 5 Using Taylor series method, find y at $x=0.1$ given $\frac{dy}{dx}=2y+3e^x$, $y(0)=0$ **5**

PART C (40 Marks)

UNIT-I

Q.No. 6: Find a real root of the equation $x^3-2x-5=0$ by the method of Regula Falsi method, correct to four decimal places. **10**

Q.No. 7 : Using Jacobi's method, find all Eigen values and the Eigen vectors of the matrix

$$\begin{bmatrix} 2 & 3 & \frac{1}{\sqrt{2}} \\ 3 & 2 & \frac{1}{\sqrt{2}} \\ \frac{1}{\sqrt{2}} & \frac{1}{\sqrt{2}} & 5 \end{bmatrix}$$ **10**

UNIT-II

Q.No. 8: Using Crout's method, find the inverse of the matrix $\begin{bmatrix} 1 & 2 & 1 \\ 2 & 3 & 2 \\ 3 & 2 & 2 \end{bmatrix}$ **10**

Q.No. 9 Solve the following system of equations by Gauss-Seidal method **10**

$5x-2y+7z=4; \quad 7x+y-5z=8; \quad 3x+7y+4z=10.$

Unit-III

Q.No. 10 Use Bessel formula; find the value of $f(25)$ from the following data

x	20	24	28	32
f(x)	2854	3162	3544	3992

10

Q.No.11 From the following table, find the values of $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at 2.03 **10**

x	1.96	1.98	2	2.02	2.04
y	0.7825	0.7739	0.7651	0.7563	0.7473

Unit-IV

Q. No. 12 Using Runge'sKutta method of fourth order, find y for $x = 0.1, 0.2, 0.3$ given that

$\frac{dy}{dx} = xy + y^2$, $y(0) = 1$ **10**

Q. No. 13 Fit a straight line to the following data

x:	1	2	3	4	5
y:	14	27	40	55	68

10