

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER- IV(NEW) EXAMINATION – SUMMER 2015

Subject Code: 2140706**Date:30/05/2015**

**Subject Name: Numerical and Statistical methods for Computer
 Engineering**

Time:10:30am-1.30pm**Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

Q.1 (a) (i) Discuss briefly the various types of errors in performing numerical calculations. **04**

(ii) Define ill-conditional and well conditional of linear equations. **03**

(b) The population of the town is given below. Estimate the population for the year 1895 and 1930 using suitable interpolation. **07**

year	1891	1901	1911	1921	1931
Population in thousand	46	66	81	93	101

Q.2 (a) Derive Newton- Raphson method in brief. **07**

(b) Find positive root of an equation $x^3 + x^2 - 1 = 0$ by iteration method correct to four decimal places. **07**

OR

(b) Find smallest positive root of an equation $x - e^{-x} = 0$ using Regula Falsi method correct to four significant digits. **07**

Q.3 (a) By Gauss Seidel method solve the following system **07**

$$2x + y + 6z = 9$$

$$8x + 3y + 2z = 13$$

$$x + 5y + z = 7$$

(b) Fit a second degree polynomial using least square method to data given below **07**

x	0	1	2	3	4
Y	1	1.8	1.3	2.5	6.3

OR

Q.3 (a) Solve the following equations using Gauss Elimination **07**

$$x + y + 2z = 4$$

$$3x + y - 3z = -4$$

$$2x - 3y - 5z = -5$$

(b) Obtain the cubic splines for the first two subinterval to following data **07**

x	1	2	3	4
y	1	2	5	11

Q.4 (a) (i) Write an algorithm for simpson's 3/8 rule to integrate the tabulated function. **04**

(ii) Evaluate $\int_0^1 \frac{1}{1+x^2} dx$ using Trapezoidal rule. **03**

(b) Solve initial value problem $\frac{dy}{dx} = x\sqrt{y}$, $y(1) = 1$ and hence find $y(1.5)$ by taking $h = 0.1$ using Euler's method. **07**

OR

Q.4 (a) (i) Write an algorithm for Lagrange's interpolation method to find functional value. **04**

(ii) Construct Divided difference table for the data given below **03**

x	-4	-1	0	2	5
f(x)	1245	33	5	9	1335

(b) Solve boundary value problem $\frac{d^2y}{dx^2} = \frac{dy}{dx}$, $y(0) = 0$ and $y(1) = 1.17$ **07**

Q.5 (a) Develop a C program of Runge-Kutta second order method to solve ordinary differential equation. **07**

(b) Obtain the two regression lines from the following data and hence find the correlation coefficient. **07**

x	6	2	10	4	8
y	9	11	5	8	7

OR

Q.5 (a) Develop a C program to fit regression line x on y through set of points using method of least squares. **07**

(b) Assume a four yearly cycle and calculate trend by method of moving averages from the following data relating to the production in pen drives in India. **07**

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Production (million kgs)	464	515	518	467	502	540	557	571	586	612
