

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-V • EXAMINATION – SUMMER • 2014****Subject Code: 151601****Date: 11-06-2014****Subject Name: Computer Oriented Statistical Methods****Time: 10:30 am - 01:00 pm****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) Define Absolute error, Relative error, Percentage error. **07**

The approximate solution of a problem is 3.436. If the absolute error in the solution is less than 0.01 then find the interval within which the exact solution lies.

(b) Show that the False Position method is linearly convergent. **07**

Q.2 (a) Find all the roots of the equation $x^4 + x^3 + 2x^2 + x + 1 = 0$ using Lin-Baird method. Start with the initial factor $x^2 + 0.9x + 0.9$ **07**

(b) Find all the roots of the equation $x^3 - 6x^2 + 11x - 6 = 0$ using Graeffe's method squaring thrice. **07**

OR

(b) Solve the non linear system of equations $xy = 1$, $x^2 + 4y^2 = 5$ using Newton Raphson method. **07**

Q.3 (a) Derive Newton's divided difference formula and use it to find the interpolating polynomial from the following table **07**

x	1	2	7	8
f(x)	1	5	5	4

(b) Show that $1 + \Delta = E = e^{hD}$ **07**

OR

Q.3 (a) Obtain the cubic spline for every subinterval from the following data **07**

x	0	1	2	3
f(x)	1	2	33	244

(b) Fit a curve of the type $y = ab^x$ to the following data **07**

x	50	450	780	1200	4400	4800	5300
y	28	30	32	36	51	58	69

Q.4 (a) Solve $\frac{dy}{dx} = x^2y - 1$ with $y(0) = 1$ for $x = 0.1, 0.2, 0.3$ by Taylor's series method. Extend the solution to $x = 0.4$ by Milne's method. **07**

(b) Solve $\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2}$ with $y(0) = 1$ for $x = 0.2, 0.4$ by Runge-Kutta method. **07**

OR

Q.4 (a) Derive the formula of Trapezoidal rule and use it to evaluate $\int_0^1 \exp(-x^2) dx$ with $n = 10$. **07**

- (b) Explain ill conditioned system of equations and solve the following system of equations using Gauss Elimination method 07

$$\begin{aligned} 2x_1 + x_2 + 2x_3 + x_4 &= 6 \\ 6x_1 - x_2 + 6x_3 + 12x_4 &= 36 \\ 4x_1 + 3x_2 + 3x_3 - 3x_4 &= 1 \\ 2x_1 + 2x_2 - x_3 + x_4 &= 10 \end{aligned}$$

- Q.5 (a) Find the first four moments of the following data about assumed mean 112.45 and actual mean. 07

Class limit	100-104.9	105-109.9	110-114.9	115-119.9	120-124.9
Frequency	7	13	25	25	30

- (b) Find the correlation coefficient from the following data 07

X	50	50	55	60	65	65	65	60	60	50
Y	11	13	14	16	16	15	15	14	13	13

OR

- Q.5 (a) Find both Regression lines for the data 07

x	1	2	3	4	5	6	7	8	9	10
y	10	12	16	28	25	36	41	49	40	50

- (b) Calculate 7-yearly moving averages for the following data showing the number of students of an engineering college clearing GATE 07

Year	Number of students	Year	Number of students
1999	23	2007	9
2000	26	2008	13
2001	28	2009	11
2002	32	2010	14
2003	20	2011	12
2004	12	2012	9
2005	12	2013	3
2006	10	2014	1
