Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

B.E. Sem-Vth Examination December 2010

Subject code: 151601

Subject Name: Computer Oriented Statistical Methods

Date: 13 /12 /2010 **Time: 03.00 pm - 05.30 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)** Use three iterations of Newton Raphson Method to solve the non-linear quations, $x^2 - y^2 + 7 = 0, x - xy + 9 = 0$. Take $(x_0, y_0) = (3.5, 4.5)$ as the initial approximation. **06**

(b) **(i)** Discuss the pitfalls in computing using normalize floating – point numbers. **03**

(ii) Find all roots of the equation $x^3 - 2x^2 - 5x + 6 = 0$ using Graeffe`s method squaring thrice. **05**

Q-2 **(a)** Obtain cubic spline for every subinterval from the following data **06**

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

Hence an estimate f(2.5)

(b) **(i)** The population of the town in decennial census was as given below estimate the population for the year 1895 **06**

Year :	1891	1901	1911	1921	1931
Population: (In thousand)	46	66	81	93	101

(ii) Write an algorithm for the successive approximation method to find root of non-linear equation. **02**

OR

(b) **(i)** If P is the pull required to lift a load W by means of pulley block, find a linear low of the form P= mW + c connecting P and W using following data: **06**

P :	12	15	21	2
W:	50	70	100	120

Where P and W are taken in kg-wt. compute P when W=150kg.

(ii) Write an algorithm for Lagrange's interpolation method to interpolate a value of dependent variable for given value of independent variable. **02**

Q-3 **(a)** The distance (s) covered by a car in a given time (t) is given below **06**

Time(Minutes) :	10	12	16	17	22
Distance(Km.) :	12	15	20	22	32

Find the speed of car at time t =14 minutes.

(b) **(i)** Evaluate : $\int_1^5 \log_{10} x \, dx$, taking 8 subintervals, correct to four decimal places by Trapezoidal rule. **06**

(ii) Write an algorithm for simpson`s three-eight rule to integrate a tabulated function. **02**

OR

Q-3 **(a)** The following data gives pressure and volume of superheated steam **06**

V:	2	4	6	8	10
P:	105	42.7	25.3	16.7	13

Find the rate of change of pressure w.r.t. volume when V=8

(b) **(i)** Following table shows speed in m/s and time in second of a car **06**

t :	0	12	24	36	48	60	72	84	96	108	120
v :	0	3.60	10.08	18.90	21.60	18.54	10.26	5.40	4.50	5.40	9.00

Using simpson`s one-third rule find the distance travelled by the car in 120 second

(ii) Evaluate $\int_2^4 \left(x^2+2x\right)dx$ using Gauss`s quadrature formula with n=3. **02**

Q-4 **(a)** Use three iterations of Jacobi`s method to solve the system of equations **06**
$20x+y-2z-17=0, 2x-3y+20z-25=0, 3x+20y-z+18=0$

(b) **(i)** Given that $\frac{dy}{dx}=x+y^2, y(0)=1$. Using Runge-kutta method find approximate value of $y(0.2)$,take step size 0.1 **06**

(ii) Write an algorithm for Euler`s method to solve ODE $\frac{dy}{dx}=f(x,y)$ **02**

OR

Q-4 **(a)** Use Gauss elimination method to solve the equations: **06**
$2x+y+z=10, 3x+2y+3z=18, x+4y+9z=16.$ also write pseudo code for this method.

(b) **(i)** Given that $2\frac{dy}{dx}=y^2+x^2y^2, y(0)=1, y(0.1)=1.06, y(0.2)=1.12, y(0.3)=1.21$ **06**
evaluate $y(0.4)$ by Milnes predictor-corrector method.

(ii) Write a pseudo code for Gauss –seidel method to solve linear system of equations **02**

Q-5 **(a)** The following table gives the profits(in thousand Rs.) of two companies X and Y for last 10 years. Which of two companies has greater consistency in profits: **07**

Year :	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Profits(X):	700	625	725	625	650	700	650	700	600	650
Profits(Y):	550	600	575	550	650	600	550	525	625	600.

(b) Find the first four central moments of the following distribution and comment on the nature of the distribution: **07**

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

OR

Q-5 **(a)** Calculate coefficient of correlation by spearman`s method from the following data: **07**

Sales(Lakhs):	45	56	39	54	45	40	56	60	30	36
Advert.Cost (`000Rs.) :	40	36	30	44	36	32	45	42	20	36

Comment on the result.

(b) Obtain Seasonal fluctuations from the following data using moving average method: **07**
Quarterly output (`000Tons) of Commodity

Year	I	II	III	IV
1984	65	58	56	61
1985	68	63	63	67
1986	70	59	56	52
1987	60	55	51	58

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