Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER V • EXAMINATION – WINTER - 2012

Subject code: 151601 Date: 11-01-2013

Subject Name: Computer Oriented Statistical Methods

Time: 02:30 pm to 05:00 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 error, relative error and percentage error. **07**

If the approximate solution of a problem is $x_0 = 35.25$ with relative error of at the most 2 % .Find the range of values correct upto four decimal digits in which the exact value of the solution lie.

(b) Evaluate $\int_2^3 \frac{\cos 2x}{1+\sin x}\,dx$ using Gaussian two point and three point formulae. **07**

Q.2 **(a)** Explain Descarte's rule of signs. **07**

Solve $x^3 - 8x^2 + 17x - 10 = 0$ using Graeffe's method by squaring the roots thrice.

(b) State Budan's theorem and apply it to find the number of roots of the equation $x^5 + x^4 - 4x^3 - 3x^2 + 3x + 1$ in the interval [-2, -1] , [0, 1] and [1, 2]. **07**

OR

(b) Solve $x^3 - 5x^2 - 2x + 24 = 0$ using Bairstow method. **07**

Q.3 **(a)** Derive the formula of False Position Method and using it solve **07**

$x \log x - 1.2 = 0$ correct to four decimal places.

(b) Show that the rate of convergence of Newton Raphson method is 2. **07**

OR

Q.3 **(a)** Solve the non linear equations $x^2 - y^2 + 7 = 0$ and $x - xy + 9 = 0$ using Newton Raphson method. Take $x_0 = 3.5$ and $y_0 = 4.5$ **07**

(b) Describe the method of successive approximation and using it solve **07**

$2x - \log x = 7$ correct to four decimal places.

Q.4 **(a)** Using Taylor's series method compute the approximate values of y at **07**

x = 0.2, 0.4 and 0.6 for the differential equation $\frac{dy}{dx} = x - y^2$ with the initial condition y(0) = 0.Now apply Milne's Predictor Corrector method to find y at x = 0.8.

(b) Solve the following system of equations by Gauss– Jacobi method correct to five decimal places **07**

$27x + 6y - z = 85$, $6x + 5y + 2z = 72$, $x + y + 54z = 110$

OR

Q.4 **(a)** Obtain Cubic splines for every subinterval of the data **07**

x :	1	2	3	4
y :	1	2	5	11

(b) Fit a curve of the form $y = ab^x$ to the following data by the method of least squares **07**

x :	1	2	3	4	5	6	7
y :	87	97	113	129	202	195	193

Q.5 **(a)** Compute the correlation coefficient between X and Y **07**

X	2	4	5	6	8	11
Y	18	12	10	8	7	5

(b) Calculate 5-yearly moving averages of the number of students passing from a college **07**

Year	Number of students	Year	Number of students
2003	332	2008	405
2004	317	2009	410
2005	357	2010	427
2006	392	2011	405
2007	402	2012	438

OR

Q.5 **(a)** Show that $1 + \Delta = E = e^{hD}$ **07**

(b) Derive the Recurrence relation for Chebyshev polynomials and using it define $T_2(x)$, $T_3(x)$ and $T_4(x)$. **07**

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