Seat No.: _____   *Enrolment N.5o._____*

GUJARAT TECHNOLOGICAL UNIVERSITY
MCA. Sem-II Remedial Examination December 2010

Subject code: 620005
Subject Name: Computer Oriented Numerical Methods

Date: 20 /12 /2010   **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.**
4. **Assume data where ever necessary.**

Q.1 **(a)** Describe the Newton-Raphson method and derive its formula analytically. One of **07**
the root of the equation sin x - x – 2 =0 lies near x=2.5. Find the root with tolerance
0.001.

(b) Solve the following system of equations using Guass elimination method **07**
   2x + y + z =10
   3x +2y+3z=18
   x + 4y +9z=16

Q.2 **(a)** Discuss different type of difference table in detail with an assumed suitable **07**
example.

(b) Derive the formula to find the root using Bisection method also write algorithm for **07**
it.

OR

(b) Write a well commented program for Secant method. Also explain it in detail. **07**

Q.3 **(a)** Given a function in the form of a table as **07**

x	2.0	3.0	4.0
Y(x)	6.6	9.2	8.6

Interpolate the value if y(x) using Langrangian polynomial at
   a. x = 2.8
   b. x = 3.1

(b) Give the table of values for function as **07**

x:	1.0	1.5	2.0	2.5	3.0	3.5
y:	6.2	7.5	9.0	10.00	11.5	12.0

Determine both the regression lines and also prove that the intersect at $(\sum x/n, \sum y/n)$

OR

Q.3 **(a)** Given the following data find the cubic spline equations for the 4 intervals **07**

x	1	2	3	4	5
F(x)	6	-3	6	2	-6

Find the value of f(x) at x = 3.8

(b) From the Taylor series for y(x) ,find y(0.1) correct to four decimal places if y(x) satisfies : **07**
$y^| = x - y^2$ and y(0)=1

Q.4 **(a)** Evaluate $\int_{-2}^{2} \frac{3x}{(4+x)^2} \, dx$ using Trapezoidal and Simpson's $1/3^{rd}$ rule with six **07**
intervals.

(b) Find the solution of the following differential equation $\frac{dy}{dx} = x^2 + y$ using Runge – **07**
Kutta second order method for x=0.1 and 0.2 .Given that y = 1 when x = 0.

1

OR

Q.4 **(a)** Find the eigen value of the matrix   **07**
$$A = \begin{matrix} 1 & 2 & 3 \\ 2 & 3 & 1 \\ 5 & 1 & 6 \end{matrix}$$

(b) Give $\frac{dy}{dx}$ =1/(x+y) ,y(0)=2,y(0.2)=2.0933,y(0.4)=2.1755,y(0.6)=2.2493.Find y(0.8) **07**
using Milne's Predictor Corrector formula.

Q.5 **(a)** Write a well commented program for Gauss – elimination method.   **07**
(b) Solve by Gauss-Seidal method, the following system of Equations.   **07**
   28x + 4y – z = 32
   x + 3y +10z = 24
   2x + 17y + 4z= 35

OR

Q.5 **(a)** Discuss different types of errors and error propagation in detai; with example **07**
(b) Write an algorithm for false position method and explain the method in detail.   **07**

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