Name : ....

Roll No. : ....

Invigilator's Signature : ....

CS/M.Tech (MTT/MCP)/SEM-3/CS-312/2012-13

2012
NUMERICAL METHODS AND PROGRAMMING

Time Allotted : 3 Hours   *Full Marks* : 70

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words
far as practicable.

Answer any *five* questions $5 \times 14 = 70$

1. a) Find a real root of the equation $x^3 - 3x - 5 = 0$ by the

     method of bisection correct up to two significant digits.

                                                                      7

   b) Find a real root of the equation

      $x^3 + x^2 + x + 7 = 0$ by regula falsi method correct up to

      three significant digits.   7

2. a) Give the geometrical significance of Newton – Raphson

     Method.   7

   b) Compute the real root of the equation $3x^2 + 2x - 9 = 0$

     by Newton – Raphson method correct up to four

     significant digits.   7

40254   [Turn over

3. a) Solve the following system of equations by Gauss – Elimination method

$$2x + 2y + z = 12$$

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

$$5x + 10y - 8z = 10.$$ 7

   b) Solve by Jacobi's Method, the following system of equations

$$5x - y + z = 10$$

$$2x + 4y = 12$$

$$x + y + 5z = -1.$$ 7
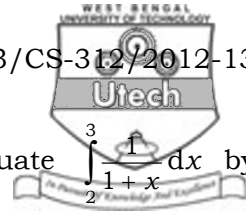
4. a) From the following table calculate $f(1.1)$

x :	0·5	1·0	1·5	2·0	2·5
$f(x)$:	0·22245	0·25031	0·27799	0·30546	0·33269

7

   b) Write an algorithon to solve α system of equations using Gauss-Seidel iterative method. 7

5. a) From the following data compute f(0·29)

x :	0·20	0·22	0·24	0·26	0·28	0.30
$f(x)$:	1·6596	1·6698	1·6804	1·6912	1·7024	1.7139

b) Write a programm in C to evaluate $\int\limits_{2}^{3} \dfrac{1}{1+x} dx$ by Simpson's $\dfrac{1}{3}$ rd rule, taking 10 intervals.

6. a) Evaluate $\int\limits_{1}^{1\cdot5} c^2\, dx$ by Trapizoidal rule taking 10 intervals and compare the results with enact value. 7

b) Write a program in C to find a simple root of $\cos x - xe^x = 0$ by using Newton Rephson method correct up to seven digits. 7

7. a) If $f_n(x)$ be a polynomial in x of degree n then show that $\Delta f(x)$ is a polynomial of degree $(n-1)$ 7

b) Estimate the missing term in the following data :

x :	0	1	2	3
$f(x)$:	1	2	–	34.

7

8. a) Compute $f(1\cdot1)$ from the following table by Lagrange's Interpolation formula :

x :	2	4	7	9
$f(x)$:	10	26	65	101

b) Solve the following system of equations by matrix inverxion method :

$$x + 3y + 3z = 1$$
$$x + 4y + 3z = 0$$
$$x + 3y + 9z = 2$$

9. a) Solve the following system of equations by Gauss – Jordon method :

$$10x + y + z = 12$$

$$x + 10y + z = 12$$

$$x + y + 10z = 12 \qquad\qquad 7$$

b) Solve the following system of equations by Gauss – Seidel method :

$$10x + 2y + z = 9$$

$$2x + 20y + 2z = -44$$

$$-2x + 3y + 10z = 22. \qquad\qquad 7$$