Code: EE3T6

II B.Tech - I Semester – Regular Examinations – December 2014

NUMERICAL METHODS WITH C PROGRAMMING
(ELECTRICAL & ELECTRONICS ENGINEERING)

Duration: 3 hours   Marks: 5x14=70

Answer any FIVE questions.   All questions carry equal marks

1 a) Solve the following equations by Gauss-Seidal method
   $28x + 4y - z = 32$, $x + 3y + 10z = 24$, $2x + 17y + 4z = 35$

   7 M

   b) Write an algorithm for Jacobi's iterative method.   7 M

2 Find the eigen value of the largest modulus and the associated
   eigen vector of matrix   14 M
   $$\begin{pmatrix} 2 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & 2 \end{pmatrix} \text{ by power method.}$$

3 a) Evaluate the sum S = $\sqrt{3} + \sqrt{5} + \sqrt{7}$ to four significant
   digits and find its absolute and relative errors.   7 M

   b) Solve for positive root of the equation $x^4 - x - 10 = 0$
   using Newton-Rapson's method.   7 M

4 a) The population of a town is follows.   7 M

Year	1921	1931	1941	1951	1961	1971
Population (In Lakhs)	20	24	29	36	46	51

Estimate population increase during the period 1946 to 1976

b) Find y(12) using Newton' forward interpolation formula given   7 M

$$x : 10 \quad 20 \quad 30 \quad 40 \quad 50$$
$$y : 46 \quad 66 \quad 81 \quad 93 \quad 101$$

5. Evaluate $\int_0^6 \dfrac{dx}{1+x^2}$ by using

14 M

    i)   Simpson's one third rule
    ii) Simpson three eighth rule
    iii) Trapezoidal rule.

6 a) If $\dfrac{dy}{dx} = \dfrac{y-x}{y+x}$, find the value of y at x = 0.1 using
Picard's method.   7 M

b) Solve the equation $\dfrac{dy}{dx} = 1 - y$ with initial condition x = 0,
y = 0 using Euler's algorithm and tabulate the solutions at
x = 0.1 and x = 0.2 and x = 0.3.   7 M

7 By the method of least squares, find the straight line that best
   fits the following data: 14 M
       x: 1   2   3   4   5
       y: 14 27 40 55 68.

8 Use the finite difference algorithm to solve the boundary
   value problem
       $u_{xx} = u^2$, $u(0) = 0$, $u(1) = 1$ 14 M