Exam.Code:0934
Sub. Code: 6976

1079

B.E. (Electrical and Electronics Engineering)
Fourth Semester
AS-401: Numerical Analysis

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Part. Use of non-programmable calculator is allowed.

x-x-x

1. (a) Find the relative error if a number is correct to n significant digits.
   (b) What is the difference between Transcendental and polynomial equation? Give examples also.
   (c) What is the differenc between direct and iterative methods of solving simultaneous linear equations?
   (d) If λ is an eigen value of an orthogonal matrix A, then show that $1/\lambda$ is also its eigen value.
   (e) What is the difference between Newton interpolation and Hermite interpolation?

   $(5 \times 2 = 10)$

PART A

2. (a) Find the relative error if the number $x = 0.004997$ is
   (i) Truncated to three decimal digits
   (ii) rounded off to three decimal digits. (4)
   (b) Find a real root of the equation using bisection method correct to four decimal places: (6)

$$x^4 - x - 10 = 0$$

3. (a) Using Bairstow's method, obtain the quadratic factors of the following polynomial equation (upto third iteration) starting with $p_0 = 1$. $q_0 = 0$: (5)

$$x^4 - 8x^3 + 39x^2 - 62x + 50 = 0$$

   (b) Find a root of the equation $x^3 - 2x - 5 = 0$ using secant method correct to four decimal places.

4. (a) Apply Lagrange's formula inversely to obtain the root of the equation $f(x) = 0$, given that $f(30) = -30, f(34) = -13, f(38) = 3$ and $f(42) = 18$. (5)
   (b) Using Newton's forward interpolation formula, show that (5)

$$\sum n^3 = \left\{\frac{n(n+1)}{2}\right\}^2$$

P.T.O.

PART B

5. (a) Using Gauss- Jordan method, find the inverse of the matrix (5)

$$\begin{bmatrix} 2 & 2 & 3 \\ 2 & 1 & 1 \\ 1 & 3 & 5 \end{bmatrix}$$

(b) Find the largest eigen-value and the corresponding eigen-vector of the matrix using power method: (5)

$$\begin{bmatrix} 1 & 3 & -1 \\ 3 & 2 & 4 \\ -1 & 4 & 10 \end{bmatrix}$$

6. Evaluate $\int_0^1 \frac{dx}{1+x}$ applying (10)

(i) Trapezoidal rule
(ii) Simpson's 1/3 rule
(iii) Simpson's 3/8th rule.

7. (a) Using Euler's method, find approximate value of y when $x = 0.6$ of $\frac{dy}{dx} = 1 - 2xy$. given that $y(0) = 0$ (take $h = 0.2$). (5)

(b) Find the best value of a and b such that $y = a + bx$ fits the given data in the table: (5)

x	0	1	2	3	4
y	1.0	2.9	4.8.	6.7	8.6

x-x-x