ALCCS

Code: CS41 **Subject: NUMERICAL COMPUTING**
Time: 3 Hours **Max. Marks: 100**

NOTE:

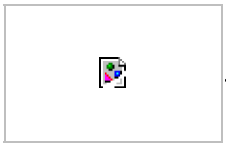
- **Question 1 is compulsory and carries 28 marks. Answer any FOUR questions from the rest. Marks are indicated against each question.**
- **Parts of a question should be answered at the same place.**
- **All calculations should be up to three places of decimals.**

Q.1 a. Find the number of terms of the exponential series such that their sum gives the value of e^x correct to six decimal places at x = 1.

b. Find a real root of the equation  , by the method of False Position using the two iterations.

c. Factorize the matrix  using LU decomposition.

d. Evaluate  .

e. Using Givens Method, reduce the following matrix to the tri-diagonal form:  .

f. Determine f(x) as a polynomial in x for the following data:

x	- 4	- 1	0	2	5
f(x)	1245	33	5	9	1335

g. Estimate approximately the distance covered in 20 minutes using Simpson's  rule. The velocity v (km/min.) of a moped which starts from rest, is given at fixed intervals of time t(min) as follows: **(7 □ 4)**

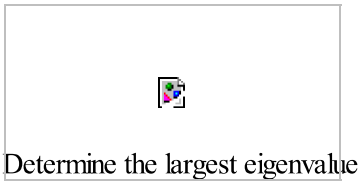
t	2	4	6	8	10	12	14	16	18	20
v	10	18	25	29	32	20	11	5	2	0

Q.2 a. Find a real root of  using Iteration Method.

b. If a, b, c, d are the arguments of  , show that  . **(9+9)**

Q.3 a. Solve by Gauss-Seidel method, the following system of equations:

b. Solve the following system of equations by Crout's method:



(9+9)

Q.4 a. Determine the largest eigenvalue and its corresponding eigenvector of the matrix

b. Using inverse interpolation, find the real root of the equation  which is close to 1.2. **(9+9)**

Q.**5** a. The following are data from the steam table:

tempC^0(t)	140	150	160	170	180
Pressure kgf/cm^2 (P)	3.685	4.854	6.302	8.076	10.225

Using Newton's divided difference interpolation formula, find the pressure of steam for temperature 142^0 and 175^0.

b. Assuming that the following values of (x, y) and y(x) a polynomial of degree four given, compute the two missing values. **(9+9)**

x	2	4	6	8	10	12	14
y	2	3	5	8	9	----	---

Q.6 a. From the given data, find the maximum value of y:

x	-1	1	2	3
y	-21	15	12	3

b. A curve is drawn to pass through the following points:

x	1	1.5	2	2.5	3	3.5	4
y	2	2.4	2.7	2.8	3	2.6	2.1

Estimate the area bounded by the curve, x-axis and lines x = 1, x = 4. Also find the volume of solid generated by revolving this area using Simpson's 3/8 rule. **(9+9)**

Q.7 a. Using Runge-Kutta method of fourth order, solve for y(0.2), y(0.4) given that  .

b. Using Taylor's series method, find the values of y(0.1) and y(0.2) where  . **(12+6)**