C.U.SHAH UNIVERSITY
Summer Examination-2022

Subject Name: Numerical Techniques, C-programming and MATLAB

Subject Code: 5SC03NTM1   **Branch: M.Sc. (Physics)**

Semester: 3   Date: 25/04/2022   Time: 02:30 To 05:30   Marks: 70

Instructions:
  (1) Use of Programmable calculator and any other electronic instrument is prohibited.
  (2) Instructions written on main answer book are strictly to be obeyed.
  (3) Draw neat diagrams and figures (if necessary) at right places.
  (4) Assume suitable data if needed.

SECTION – I

Q-1	**Attempt the Following questions.**	**(07)**
a.	What is Union?	**01**
b.	Give statement of Empirical law	**01**
c.	Which unitary operator used to know size of structure?	**01**
d.	Give principle of least square method.	**01**
e.	Give equation for best fitting of curve.	**01**
f.	Define Structures.	**01**
g.	What is pointer?	**01**

Q-2   Attempt all questions   (14)

a) Solve the following equation by Matrix Inversion method.   **06**
X+Y+Z=3
2X-Y-Z=3
X-Y+Z=9

b) Solve the systems of equations of   **06**
27X+6Y-Z= 85
6X+15Y+2Z= 72
X+Y+54Z= 110
By gauss-Jacobi iteration method.

c) Explain initialization of pointer variables.   **02**

OR

Q-2   Attempt all questions   (14)

a) By the method of least squares, find the straight line that best fits the following   **06**
data:

X:	1	2	3	4	5
Y:	14	27	40	55	68

b) Fit a straight line $y = a+bx$ to the following data by the method of moments. **05**

x	1	2	3	4
y	16	19	23	26

c) Explain graphical method in shorts. **03**

Q-3 **Attempt all questions** **(14)**

a) Fit a parabola of the form $y = ax^2+bx+c$ to the following data by method of group averages. **07**

X:	87.5	84	77.8	63.7	46.7	36.9
Y:	292	283	270	235	197	181

b) Investigate the value of λ and μ so that the equations $2X+3Y+5Z=9$, $7X+3Y-2Z=8$, $2X+3Y+\lambda Z=\mu$. Have solutions. **04**

c) Explain Structure initialization in details. **03**

OR

Q-3 **Attempt all questions** **(14)**

a) By the method of least squares, find the straight line that best fits the following data: **07**

X:	1	2	3	4	5
Y:	14	27	40	55	68

b) Find the positive root of $X^3+2X^2+10X-20=0$ by Newton-Raphson method. **07**

SECTION – II

Q-4 **Attempt the Following questions (1 Mark *7=7)** **(07)**
(No MCQ Questions)

a. Give command for matrices addition and subtraction and eigenvlue in MATLAB. **02**
b. Give command Taylor expansion for sinx up to tenth order in MATLAB. **02**
c. Give types of Loop command in MATLAB. **01**
d. What are M-files? **01**
e. Write program of simple X-Y plots in MATLAB. **01**

Q-5 **Attempt all questions** **(14)**
a) Write a program of Bisection methods for solving the equations in c- language programming. **07**
b) Explain in details differentiation and integration with example using MATLAB. **05**
c) Which command used for product operation in MATLAB. **02**

OR

Q-5 **Attempt all questions** **(14)**
a) Write a program of Trapezoidal method. **07**
b) How to solve algebraic equations in MATLAB? Discuss with examples. **05**
c) How to compute Taylor series of e^x about the point x=2 in MATLAB. **02**

Q-6 **Attempt all questions** **(14)**
a) Write a program of Newton Raphson method in c-language programming. **07**
b) How to use plots and Graphs function in MATLAB with examples. **05**
c) Give command for limit in MATLAB with example. **02**

OR

Q-6   **Attempt all Questions**   **(14)**

     a) How to perform matrices operation in MATLAB.   **05**

     b) Discuss Array operations with examples in MATLAB.   **05**

     c) What are M-Files? Discuss script M-files.   **04**