Enrollment No: _____ Exam Seat No:_____

C.U.SHAH UNIVERSITY

Winter Examination-2021

Subject Name: Numerical Techniques, C-Programming and MATLAB

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

Semester: 3 **Date: 15/12/2021** **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. Give statement of Empirical law **01**
b. What are the different data types available in 'C'? **01**
c. What are * and & operators means? **01**
d. What is the use of sizeof() operator in C. **01**
e. Give principle of least square method. **01**
f. What are the uses of Pointers? **01**
g. What is meant by Union in C.? **01**

Q-2 **Attempt all questions** **(14)**

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

b) Fit a parabola of the form $y= ax^2+bx+c$ to the following data by method of group averages. **06**

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

c) Give different conditions to check consistency of homogeneous system of linear equations. **02**

OR

Q-2 **Attempt all questions** **(14)**

a) Find by Newton Raphson method a root of equation $X^3-3X-5=0$ **05**

b) Show that the only real value of λ for which the following equations have non-zero solution is 6. **05**

$X+2Y+3Z= \lambda X$, $3X+Y+2Z= \lambda Y$ $2X+3Y+Z= \lambda Z$

c) What is a Pointer? How a variable is declared to the pointer? **04**

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

a) Apply factorization method to solve the equations **06**
$3X+2Y+7Z=42$ $X_+3Y+Z=53X+4Y+Z=7$

b) Explain file fopen() and fclose() function in C with example. **04**

c) Explain graphical method in shorts. **04**

OR

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

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

X:	0	5	10	15	20	25
Y:	12	15	17	22	24	30

b) Solve the following equation by Matrix Inversion method. **05**
X+Y+Z=32X-Y-Z=3X-Y+Z=9

c) What you meant by structure definition? Explain with example. **03**

SECTION – II

Q-4 **Attempt the Following questions** **(07)**

a. Give full form of MATLAB. **01**
b. Write the command for integration in MATLAB. **01**
c. Write a command for sum operation in MATLAB. **01**
d. What are M-files? **01**
e. Give command Taylor expansion for sinx up to tenth order in MATLAB. **01**
f. Describe commonly used commands for plotting graphs. **01**
g. Give command for limit in MATLAB with example. **01**

Q-5 **Attempt all questions** **(14)**

a) Write a program of Newton Raphson method. **07**
b) Discuss" loop" command in MATLAB. **05**
c) Write steps for solve algebraic equation X^2-2X-4=0 in MATLAB. **02**

OR

Q-5 **Attempt all questions** **(14)**

a) Write a program to find integration by using Simpson 1/3 method. **06**
b) How to use plots and Graphs function in MATLAB with examples. **04**
c) What are M-Files? Discuss script M-files. **04**

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

a) Write a program of Trapezoidal method. **07**
b) Explain in details matrices operation in MATLAB with example. **05**
c) How to compute Taylor series of e^x about the point x=2 in MATLAB. **02**

OR

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

a) Explain in details differentiation and integration with example using MATLAB. **05**
b) Discuss Array operations with examples in MATLAB. **05**
c) Explain sums and products with example in MATLAB. **04**