Academic Year **2024/2025**
Semester **Spring**
Academic Level: **Level 1**
Sheet No.: **3**

Subject: (ECT 141) Networks and Communication Technologies

Prerequisites and Required Files:

To complete this quiz, you must have completed at least 51% of the MATLAB Onramp course, available at
`https://matlabacademy.mathworks.com/details/matlab-onramp/gettingstarted`.
Required Files: The datasets and files required for this quiz (e.g., patient_data.csv, experiment.csv, patients.mat) can be downloaded from
`https://mega.nz/folder/bHRxHCCC#tZl5yFpShTOU2OIREQCDQg`.

Question 1: MATLAB Commands

You need to generate a vector of 15 evenly spaced values between 5 and 50. Write the MATLAB command to do this. Then, clear the command window and all variables in the workspace.

Question 2: Vectors and Matrices

Create a 3x3 matrix named M where:
The first row is [10, 20, 30].
The second row is the square of the first row.
The third row is the sum of the first and second rows.
Write the code.

Question 3: Importing and Cleaning Data

A CSV file patient_data.csv contains 4 columns: Age, Weight, Height, BloodPressure (with headers). Some entries in Weight are missing and labeled NaN.
Write code to import this data into MATLAB.
Replace all NaN values in Weight with the column's mean value.
Convert the BloodPressure column (e.g., '120/80') into two numeric columns: Systolic and Diastolic.

Question 4: Indexing and Modifying Arrays

Given the matrix:
A = [4, 8, 12; 6, 10, 14; 2, 5, 9];
Extract the submatrix containing rows 1-2 and columns 2-3.
Replace all values in A that are greater than 8 with -1.
Flip the order of rows in A (e.g., row 1 becomes row 3).

Question 5: Function Implementation
Use the find function to locate all indices in the vector v = [5, -3, 0, 9, -2, 7] where
values are odd integers. Replace those values with their square roots (if positive) or 0 (if
negative).

Question 6: Real-World Scenario
You have a 1000x3 matrix sensorData with columns: [Time, Voltage, Current].
Calculate the Power (Voltage × Current) and add it as a fourth column.
Find the time points where Power exceeds 1000 and log them in a new array
highPowerTimes.
Plot Power against Time using a red dashed line, and highlight the points where Power
grater than 1000 with blue circles.

Question 7: Data Visualization
Load the built-in dataset patients.mat. Plot a histogram of Age with 15 bins. Overlay a
dashed line showing the mean age. Add labels and a legend.