LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **MATHEMATICS**

FIFTH SEMESTER – **NOVEMBER 2022**

UMT 5504 – MATHEMATICAL TOOLS FOR ANALYTICS

Date: 02-12-2022   Dept. No.   Max. : 100 Marks

Time: 09:00 AM - 12:00 NOON

PART – A

Answer ALL questions   (10 x 2 = 20 Marks)

1   Differentiate between clc and clear command in MATLAB.

2   Create the following matrix by typing one command. Do not type individual elements explicit

$$D = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 2 & 4 & 6 \end{bmatrix}$$

3   Write any four commands used for formatting a plot.

4   Write the command to plot the given data in MATLAB.

Year	1988	1989	1990	1991	1992	1993	1994
Sales	8	12	20	22	18	24	27

5   Explain the following commands

   i.) polyfit   ii.) interpl

6   Write the form of the function definition line.

7   Write a MATLAB command to find the roots of the polynomial $f(x) = x^6 - 2x^5 - 39x^4 + 20x^3 + 404x^2 + 192x - 576$.

8   Write the use and the syntax of the **view** command.

9   Write a command to sort the vector [7 5 9 6 1 0]?

10   What is Tables?

PART – B

Answer any FIVE questions   (5 x 8 = 40 Marks)

11   What is the use of $rand, randi$ and $randn$ command? Write the difference   **(8)**
     between each of them and give examples.

12   Explain the following with by giving examples: **(4 +2+2)**

   a) Adding elements to a vector
   b) Adding elements to a matrix
   c) Deleting elements in a vector and a matrix.

13   a) Write the various ways by which input can be given to a script file   **(4+4)**
     b) Differentiate between disp and fprintf commands

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14 Write a script file to draw the following four graphs in a single figure window. **(8)**

    a. $y = 2^{-0.2x+10}$ for $x = [0.1, 60]$ with both the axis taking linear scale

    b. $y = 2^{-0.2x+10}$ for $x = [0.1, 60$ with x-axis taking linear scale and y-axis in log scale

    c. $y = 2^{-0.2x+10}$ for $x = [0.1, 60$ with y-axis in linear scale and x-axis in log scale

    d. $y = 2^{-0.2x+10}$ for $x = [0.1, 60$ with both the axis log scale

15 a Explain in detail about anonymous function. **(4)**

  b What are the similarities and differences between script and function files. **(4)**

16 Explain in detail about the mesh and surface plots **(8)**

17 How will you create symbolic objects and symbolic expressions in MATLAB. **(8)**

18 Explain the following data structure in MATLAB. **(8)**

   i) Categorical arrays

   ii) table array.

PART – C

Answer any TWO question   **(2 x 20 = 40 Marks)**

19 a How will you create one dimensional and two-dimensional array in MATLAB? **(10)**

  b Describe the types of conditional statements using an example each. **(10)**

20 With an example write the MATLAB commands to perform the following: **(2+2+2+2+2+2+2+2+4**

   a) Find the value of a polynomial

   b) Finding the roots of a polynomial

   c) Add two polynomials

   d) Multiply two polynomials

   e) Divide two polynomials

   f) Derivative of a single polynomial

   g) Derivative of a product of two polynomial

   h) Derivative of a quotient of two polynomial

   Determine the polynomial that has roots at $x = -0.7, x = 0.5, x = 1.4 \ and \ x = 5.8$ and plot in the domain $-1 < x < 6$

21 Explain the following commands with examples. **(4+4+4+4+4)**

   a.) collect

   b.) expand

   c.) factor

   d.) simplify

   e.) pretty

22 What are structures? How to create and modify them? What is vector of **(20)**

structures and nested structures?