



DOON UNIVERSITY, DEHRADUN UTTARAKHAND, INDIA
End-term Examination, Academic Year: 2022-2023(Even Semester),
Department of Mathematics, School of Physical Sciences,
Academic Programme: Integrated M.Sc. 1st Year , 2nd semester
Course code and Paper title: MAS-151 MATLAB.

Time Allowed: 3Hours

Maximum Marks: 50

Note: Attempt all six questions in Section (Fill in the gaps). Each question carries 2 marks.

Attempt any four questions in Section B. Each question carries 6 marks.

Attempt any two questions in Section C. Each question carries 12 marks.

SECTION: A

(Very Short Answer Type Questions)

(Marks:6X2=12)

1. Create the following symbolic variables, using either the sym or syms command:
x, a, b, c, d
2. Define the following Symbolic Differentiation
diff(f) , diff(f,'t',n).
3. Define sparse matrix and explain it by example.
4. In command window, command prompt is and to clear the contents of the command window, we type.....
5. In MATLAB, we can perform calculations in the command..... (ans-window) in a manner similar to the way you perform calculations on a scientific....(ans- calculator).
6. MATLAB ® is short for.....excels at computations involving

SECTION: B

(Short Answer Type Questions)

(Marks: 4X6=24)

7. Create and test MATLAB ® syntax to evaluate the following expressions, then check your answers with a handheld calculator.
(i). $5^{2+1}/(4-1)$.
(ii). Define the matrices $a = [2.3 \ 5 \ 9]$ and $b = [5.2 \ 3 \ 2]$ as a MATLAB ® variables and add together each element in matrix a^2 and in matrix b.
8. (i).Define multidimensional arrays and explain it by example.
(ii). Define character arrays and explain it by example
9. Define the following Functions Used to Manipulate Expressions and Equations
expand(S) , factor(S) , collect(S) .
10. Write Matlab program to solve following: Find the first derivative with respect to x of the following expression; use ezplot to plot it, name the title, axis, y axis and name to the curve :
 $x^2 + x + 1$.

11. We can exit MATLAB[®] by typing quit or exit at the MATLAB[®] ... (ans- prompt.) MATLAB[®] also uses the standard Windows menu bar, so you can exit the program by choosing EXIT MATLAB from the File... (ans- menu) or by selecting the close icon ... (ans- x) at the upper right-hand corner of the screen.

SECTION: C
(Long Answer Type Questions)

(Marks: 2X12=24)

12. (i). Create a matrix named d of evenly spaced values from 0 to 10, with an increment of 2. And use the linspace function to create a matrix of six evenly spaced values from 10 to 20.
(ii) Write syntax for the following matrices in MATLAB and for their sum and find that's

transpose :

$$A = \begin{bmatrix} 1 & 2 & 4 \\ 3 & 6 & 2 \\ 5 & 1 & 3 \end{bmatrix}, B = \begin{bmatrix} 1 & 3 & 5 \\ 2 & 6 & 4 \\ 3 & 2 & 1 \end{bmatrix}$$

13. (i). Create the following symbolic equations, using the syms function:

$$\text{ex4} = a*x^2 + b*x + c$$

$$\text{EX4} = A*X^2 + B*X + C$$

$$\text{eq4} = a*x^2 + b*x + c = 0$$

$$\text{EQ4} = A*X^2 + B*X + C = 0$$

- (ii) Using the subs function, substitute 4 into each expression/equation for x (or X), and also substitute the following values into all four versions of expression/ equation 4— ex4, EX4, eq4, and EQ4 (this is a two-step process because x is a vector):

$$a = 3 \quad \quad \quad A = 3$$

$$b = 4 \quad \quad \quad \text{or} \quad B = 4$$

$$c = 5 \quad \quad \quad C = 5$$

$$x = 1:0.5:5 \quad \quad \quad X = 1:0.5:5$$

14. Explain Matlab program for the following : Consider the following nonlinear system of equations :

$$3x^2 + 5y - 3z^3 = 15, 4x + y^2 - z = 10, x + y + z = 15.$$

Solve the nonlinear system with the solve function. Use the double function on your results to simplify the answer.