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(FOR THE CANDIDATES ADMITTED

DURING THE ACADEMIC YEAR 2025 ONLY)

25PMS1E1

REG.NO. :

N.G.M.COLLEGE (AUTONOMOUS) : POLLACHI

END-OF-SEMESTER EXAMINATIONS : NOVEMBER-2025

M.Sc.-MATHEMATICS **MAXIMUM MARKS: 75**

SEMESTER: I **TIME: 3 HOURS**

MATLAB

SECTION – A (10 X 1 = 10 MARKS)

ANSWER THE FOLLOWING QUESTIONS.

MULTIPLE CHOICE QUESTIONS. (K1)

1. Which MATLAB function rounds a number towards zero?
   (a) round(x) (b) fix(x) (c) ceil(x) (d) floor(x)
2. Which MATLAB command displays the elements of a variable without showing the variable's name and can also display text?
   (a) fprintf (b) display (c) disp (d) show
3. What is the first step in creating a 3-D mesh or surface plot for the function $z = f(x, y)$ in MATLAB?
   (a) Calculate *z* values for each grid point (b) Display the plot
   (c) Label the axes (d) Create a grid in the x-y plane
4. In MATLAB's switch statement, what happens if more than one case matches the switch expression?
   (a) All matching cases are executed (b) Only the first matching case is executed
   (c) The program throws an error (d) The last matching case is executed
5. Which function is used to calculate the value of a polynomial at a given point?
   (a) polyval(p,x) (b) polycalc(p,x) (c) polyeval(p,x) (d) polyecalc(x,p)

ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES (K2)

6. How to create a row vector and a column vector from a known list of numbers?
7. What is the format for creating inline functions in MATLAB?
8. Write a command to 2-D plot for the function $y = 3.5^{-0.5x}\cos(6x)$, for $-2 \le x \le 4$.
9. In MATLAB, what is the difference between the break and continue commands when used inside a loop?
10. Which polyfit form is used for a power function $y = bx^m$?

SECTION – B (5 X 5 = 25 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS. (K3)

11. a) Define what is meant by mathematical built-in functions. List the commonly used elementary mathematical built-in functions.

(OR)

b) How can array multiplication be performed for arrays with different dimensions in MATLAB?

12.a) Write short notes on the fprintf command used to display text and data.

(OR)

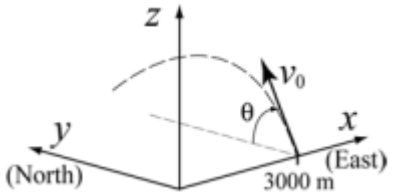
b) What is the difference between a script file and a function file in MATLAB?

(CONTD …. 2)

13.a) Write a MATLAB program to plot the function $y = 3x^3 - 26x + 10$, and its first and second derivatives, for $-2 \le x \le 4$, all in the same plot.

(OR)

b) A projectile is fired with an initial velocity of 250 m/s at an angle of $\theta = 65^\circ$, relative to the ground. The projectile is aimed directly North. Because of a strong wind blowing to the West, the projectile also moves in this direction at a constant speed of 30 m/s. Write a MATLAB program to determine and plot the trajectory of the projectile until it hits the ground. For comparison, plot also the trajectory that the projectile would have had if there was no wind.



14.a) The following were the daily maximum temperatures (in $^\circ F$) in Washington DC during the month of April, 2002: 58 73 73 53 50 48 56 73 73 66 69 63 74 82 84 91 93 89 91 80 59 69 56 64 63 66 64 74 63 69. Use relational and logical operations available in MATLAB, write the commands for the following: (i) The number of days the temperature was above 75°, (ii) The number of days the temperature was between 65° and 80°, (iii) The days of the month that the temperature was between 50° and 60°.

(OR)

b) A vector is given by: V = [5, 17, –3, 8, 0, –1, 12, 15, 20, –6, 6, 4, –7, 16]. Write a program as a script file that doubles the elements that are positive and are divisible by 3 and/or 5, and raise to the power of 3 the elements that are negative but greater than –5.

15.a) How can addition and multiplication of polynomials be performed in MATLAB. Explain with suitable examples.

(OR)

b) Illustrate the concept of one-dimensional interpolation using MATLAB.

SECTION – C (5 X 8 = 40 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS. (K4 (Or) K5)

16.a) Explain the various methods of creating a two-dimensional array (matrix) in MATLAB.

(OR)

b) Discuss the use of random number functions rand and randn in MATLAB. How can these be utilized for simulation experiments?

17.a) Describe the disp output command in MATLAB.

(OR)

b) Explain in detail the procedure of saving a function file in MATLAB. What issues may arise if the file name and the function name do not match? Support your answer with example.

18.a) Illustrate the concept of plotting multiple graphs in the same plot using (i) the hold on and hold off commands, (ii) the line command.

(OR)

b) Discuss view command in three-dimensional plotting with suitable example.

19.a) Briefly explain (i) the if-end structure and (ii) the if-else-end structure in the conditional statement with suitable examples.

(OR)

b) Demonstrate the concepts (i) for-end loops and (ii) while-end loop with an example.

(CONTD …. 3)

20.a) Develop a MATLAB program to solve the following problem: For the polynomial $f(x) = x^3 - 12.1x^4 + 40.59x^3 - 17.015x^2 - 71.95x + 35.88$, calculate (i) $f(9)$, and (ii) Plot the polynomial for $-1.5 \le x \le 6.7$.

(OR)

b) Write a MATLAB program to solve the given problem: The following data points are given. Determine a function $w = f(t)$, (t is the independent variable, w is the dependent variable)..

t	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
w	6.00	4.83	3.70	3.15	2.41	1.83	1.49	1.21	0.96	0.73	0.64

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