

Hall Ticket Number:

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Code No. : 14163 AS (D)

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD

Accredited by NAAC with A++ Grade

B.E. IV-Semester Advanced Supplementary Examinations, Aug./Sept.-2023

Mathematical Programming for Engineers (OE-II)

Time: 3 hours

Max. Marks: 60

Note: Answer all questions from Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO	PSO
1.	Mention any two differences between relational and logical operators.	2	1	1	1	2
2.	Write the MATLAB command to create a 4x3 matrix named "A" with random integer values ranging from 1 to 10.	2	1	1	2	2
3.	What are basic conditional statements available in MATLAB?	2	1	2	2	2
4.	Given the following MATLAB code, what will be the output? x = 0:0.1:1; y = sin(2*pi*x); plot(x, y);	2	2	2	2	2
5.	Describe about MATLAB array and discuss about zeros (), ones () and eye () functions used in MATLAB program.	2	1	3	1	2
6.	Write a MATLAB code to find the eigenvalues and corresponding eigenvectors for the matrix $A = \begin{bmatrix} 3 & 1 \\ 1 & 3 \end{bmatrix}$	2	1	3	2	2
7.	Write a MATLAB code to find the roots of the polynomial equation $f(x) = 2x^3 - 3x^2 - 11x + 6$ using MATLAB's roots function	2	2	4	1	2
8.	Give the advantage of Newton-Raphson Method	2	1	4	2	2
9.	Explain the advantages and limitations of using numerical methods like the 4th order Runge-Kutta method and MATLAB's ODE solvers for solving ODEs.	2	1	4	1	2
10.	Discuss different types of dialog boxes	2	1	5	2	2
Part-B (5 × 8 = 40 Marks)						
11. a)	A savings account has an initial balance of \$5000. The account earns an annual interest rate of 5%. Write a MATLAB code to calculate the balance in the account after 5 years.	4	3	1	1	2
b)	Write a MATLAB code to calculate the sum of all odd numbers from 1 to 100 and stores the result in a variable named "total".	4	2	1	1	2
12. a)	Write a MATLAB function called "average" that takes in an array of numbers and returns the average value. Include the code for the function and call the function to plot average value and input array by using subplots	4	2	1	1	2

	b)	Write a MATLAB code to plot the functions $f(x) = \sin(x)$ and $g(x) = \cos(x)$ on the same graph over the interval $[-2\pi, 2\pi]$. Include proper axis labels and a legend.	4	2	2	2	2
13.	a)	Solve the given equations by using Gauss Elimination Method $2x_1 + 3x_2 - x_3 = 1$ $x_1 + 2x_2 - x_3 = 4$ $-2x_1 - x_2 + x_3 = -3$	4	3	3	2	2
	b)	Write a MATLAB program to solve the set of linear system equations using the matrix method: $x + 2y + 3z = 9$ $2x - y + 3z = 8$ $3x + 0y - z = 3$	4	3	3	2	2
14.	a)	Consider a set of data points representing the temperature (in degrees Celsius) and pressure (in kilopascals) measurements for a gas. The data points are as follows: Temperature (T): [100, 150, 200, 250, 300] Pressure (P): [50, 75, 100, 125, 150] Perform a two-dimensional interpolation on the given data points to estimate the pressure at a temperature of 275°C. Use MATLAB's built-in function and specify the interpolation method.	4	2	4	1	2
	b)	Explain about polyfit and polyval ?	4	2	4	1	2
15.	a)	Apply Runge kutta Method to find out the approximation of y at $x=0.1$ if $dy/dx = x + y^2$ given that $y=1$ for $x=0$ with step size=0.1	4	4	4	2	2
	b)	Write the MATLAB code to solve the ordinary differential equation (ODE) $dy/dx = x^2 - y$, with the initial condition $y(0) = 1$, over the interval [0, 5].	4	3	4	2	2
16.	a)	Discuss in detail about the various relational and logical operators available in MATLAB with suitable examples .	4	2	1	1	2
	b)	Write a MATLAB code to plot the function $f(x) = e^{-(0.2x)} * \sin(2\pi x)$ over the interval [0, 10]. Use a dashed line and include proper axis labels.	4	4	2	2	2
17.		Answer any <i>two</i> of the following:					
	a)	Using Simson's 1/3 rule solve the integration $\int_0^3 x/(1+x^3) dx$ for N=10	4	3	3	1	2
	b)	Find the root of the equation $f(x) = x^3 - 2x^2 + 4x - 5$ using the Newton-Raphson method. Start with an initial guess of $x = 1$.	4	4	4	1	2
	c)	Outline the steps involved in creating a GUI in MATLAB. Explain the process of designing the GUI layout, adding components, and connecting callbacks.	4	2	5	1	2

M : Marks; L: Bloom's Taxonomy Level; CO; Course Outcome; PO: Programme Outcome

i)	Blooms Taxonomy Level - 1	20%
ii)	Blooms Taxonomy Level - 2	40%
iii)	Blooms Taxonomy Level - 3 & 4	40%
