Hall Ticket Number:

Code No. : 16147 (K) N/O

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD
Accredited by NAAC with A-+ Grade

B.E. VI-Semester Main & Backlog Examinations, May/June-2023

Mathematical Programming for Numerical Computation (OE-IV)

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
1.	Consider the system of equations: $x + 2y + 3z = 1$ $3x + 3y + 4z = 1$ $2x + 3y + 3z = 2$ Write a code to find the solution x to the system of equations.	2	3	3	1
2.	Consider a matrix $A = [1 \ 3 \ 6 \ 9 \ 2 \ 5]$. Write down the MATLAB code to get the transpose for the given matrix A.	2	2	4	1
3.	Write the MATLAB script that produces a simple plot for the waveform defined as $y = f(t) = 3e^{-4t}$ in the 0<t<5 seconds interval.	2	3	3	2
4.	Plot the following cosine functions, y1 = 2 cos(x), y2 = cos(x), and y3 = 0.5 * cos(x), in the interval $0 \le x \le 2\pi$.	2	3	2	1
5.	Write down a MATLAB code to find the rank, inverse and determinant values of the random matrix.	2	3	4	2
6.	Write down the syntax for interchanging rows and columns and identity matrix of a random matrix.	2	2	4	2
7.	Explain where "polyval" and "polyfit" are used?	2	1	1	2
8.	Explain curve fitting method?	2	2	2	2
9.	Write down the MATLAB syntax of ODE23 and ODE45.	2	1	3	1
10.	Explain few components of GUI.	2	2	5	5

Part-B (5 × 8 = 40 Marks)

11. a)	Write down the steps to create, save and execute a script file and function file with relevant diagrams.	5	1	1	1
b)	Write down the MATLAB code to calculate fibonacci series by using a for loop.	3	3	1	1
12. a)	Explain the Debugging method in MATLAB.	3	1	3	1

		M	L	CO	PO
		5	3	2	2
b)	Plot the functions $y = sin^2x$, $z = cos^2x$, $w = sin^2x cos^2x$, $v = \dfrac{sin^2x}{cos^2x}$ in the interval $0 \le x \le 2\pi$ using 100 data points. Use the **subplot** command to display these functions on four windows on the same graph.	5	3	2	2
13. a)	Discuss in detail the steps for simpsons $\frac{1}{3}$ rule for numerical integration method with relevant example with the code.	4	2	3	1
b)	Use the Gaussian elimination method to find the unknown variables for the given set of equations using MATLAB. $2v_1 + v_2 + 3v_3 = 5$ $4v_1 - 3v_2 - 2v_3 = 8$ $3v_1 + v_2 - v_3 = 4$	4	2	3	2
14. a)	Discuss in detail the procedure for the Interpolation method with suitable example.	4	1	2	4
b)	Use Newton's method to approximate the positive root of f(x)=2x+3 to four decimal places.	4	2	3	4
15. a)	Write down the basic steps involved in the runge-kutta method for solving ordinary differential equation.	3	1	3	4
b)	Explain the procedure for creating and saving GUI with relevant example.	5	1	5	5
16. a)	For a given matrix, write down MATLAB syntax to know the following information: (i) dimension of the matrix, (ii) number of rows and columns present in the matrix, (iii) transpose. Also write down the syntax for null matrix and unit matrix.	4	2	4	1
b)	Write down the code to plot two different functions in one plot $f_1 = x^2 - 3x + 2$ and $f_2 = 2x^2 + x - 3$. Also write the code to plot the two functions in one plot with separate y-axis.	4	2	3	2
17.	Answer any **two** of the following:				
a)	Write down the MATLAB code to calculate eigen values and eigen vector for an identity matrix.	4	3	4	2
b)	Discuss in detail the steps for least square method with relevant example with the code.	4	2	3	2
c)	Write down the MATLAB code by using ODE45 solver to solve $\dfrac{dy}{dt} = sin\ t + sin\ y$, subject to $y(0) = 0$, t varies from 0 to 4π.	4	3	3	2

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

i)	Blooms Taxonomy Level – 1	30%
ii)	Blooms Taxonomy Level – 2	40%
iii)	Blooms Taxonomy Level – 3 & 4	30%

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