

Hall Ticket Number:

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Code No. : 13165 N (C)

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD**

Accredited by NAAC with A++ Grade

**B.E. III-Semester Main Examinations, Jan./Feb.-2024****Mathematical Programming for Engineers (OE-I)**

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.	Illustrate the terms <i>format short</i> and <i>format long</i> MATLAB commands with suitable examples.	2	1	1	2/3
2.	Write the application of <i>whos</i> and <i>clear x y z</i> commands in MATLAB.	2	1	4	3/2
3.	Describe the use of subplot command used in MATLAB.	2	1	2	2/3
4.	With an example explain the procedure to create a function file in MATLAB.	2	1	4	2/2
5.	Write the MATLAB syntax to Differentiate $\sin(x)$ with reference to $x = 0$ to $\pi/2$ .	2	2	3	2/3
6.	Give the syntax for the evaluation of Numerical Integration using <i>quad</i> and <i>quadl</i> commands.	2	1	4	2/2
7.	What is the Syntax of <i>fzero</i> command? Give an example.	2	1	2	2/3
8.	Mention the use and syntax of command <i>ode23</i> and explain each parameter.	2	1	4	2/2
9.	If $A=[1\ 2\ 3\ 4\ 5; 2\ 3\ 4\ 5\ 6; 3\ 4\ 5\ 6\ 7; 4\ 5\ 6\ 7\ 8]$ , then what is the of output $A(2:3,3:5)$ and $A(:,1:2:5)=[\ ]$ in MATLAB?	1	2	3	2,5/3
10.	Compare plot and stem commands with appropriated examples.	2	1	1	2/3
<b>Part-B (5×8 = 40 Marks)</b>					
11. a)	Assume that array <i>array1</i> is defined as shown and determine the contents of the following sub-arrays: $\text{array1} = \begin{bmatrix} 1.1 & 0.0 & 2.1 & -3.5 & 6.0 \\ 0.0 & 1.1 & -6.6 & 2.8 & 3.4 \\ 2.1 & 0.1 & 0.3 & -0.4 & 1.3 \\ -1.4 & 5.1 & 0.0 & 1.1 & 0.0 \end{bmatrix}$ <ul style="list-style-type: none"> <li>i) <i>array1(3,:)</i></li> <li>ii) <i>array1([1 1],:)</i></li> <li>iii) <i>array1(1:2:3,[3 3 4])</i></li> <li>iv) <i>Array(:,3:4)=[\ ]</i></li> </ul>	4	3	1	2,5/2
b)	Discuss if, if-else, nested if structures with an examples in MATLAB.	4	2	3	4,5/2
12. a)	Explain the functionality of the following commands with examples: <ul style="list-style-type: none"> <li>i) <i>fplot</i> ii) <i>loglog</i> iii) <i>bar</i> iv) <i>plotyy</i> v) <i>plot3</i> vi) <i>surfc</i> vii) <i>title</i> viii) <i>stem</i></li> </ul>	4	2	2	2,5/2

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b)	Write a MATLAB Program to plot the following graphs in a continuous way,	4	4	3	3,4,5/3												
	i) $e^{-at}(\cos bt + \cos bt^2)$ ; $0 \leq t \leq 5$ , increment as 0.001																
	ii) $e^{-at} \sin bt$ ; $0 \leq t \leq 2$ , increment as 0.001																
	A provision is to be given to take the values of a and b as inputs during runtime.																
13. a)	Find Solution using Simpson's 1/3 rd rule 3/8 rule	4	2	4	2,3/3												
	<table border="1"> <tr> <td>x</td> <td>1.4</td> <td>1.6</td> <td>1.8</td> <td>2</td> <td>2.2</td> </tr> <tr> <td>y</td> <td>4.0552</td> <td>4.953</td> <td>6.0436</td> <td>7.3891</td> <td>9.025</td> </tr> </table>	x	1.4	1.6	1.8	2	2.2	y	4.0552	4.953	6.0436	7.3891	9.025				
x	1.4	1.6	1.8	2	2.2												
y	4.0552	4.953	6.0436	7.3891	9.025												
b)	Write short notes on Newton's cotes Rules.		3	1	1,2/3												
14. a)	Write a MATLAB program to solve the set of linear system equations using solve and linsolve.	4	2	3	2,3,5/2												
	$2x_1 + 3x_2 - x_3 = 1$																
	$x_1 + 2x_2 - x_3 = 4$																
	$-2x_1 - x_2 + x_3 = -3$																
b)	Write a MATLAB program using interp1 for finding linear and spline Interpolation of Coarsely Sampled Sine Function, ie $f(x) = \sin(x)$ with $x = 0:\pi/4:2*\pi$ ;	3	3	4	2,5/3												
15. a)	Write a MATLAB program for generation of Fibonacci series using <i>for</i> and <i>while</i> loops. Assume the necessary data required.	3	2		2,5/3												
b)	What are the debugging methods available in MATLAB and explain them with examples.	4	2	2	2,5/3												
16. a)	Solve the given equation $2x^3 - 4x + 1$ using Trapezoidal rule with $a=2$ and $b=4$ , and Step value $(h) = 0.5$ .	4	2	4	2,5/3												
b)	Consider the following set of first order, coupled, nonlinear ODEs.	4	3	3	2,3/3												
	$x' = x + y - x(x^2 + y^2)$																
	$y' = -x + y - y(x^2 + y^2)$																
	Solve this set of equations with the initial conditions $x(0) = 2$ and $y(0) = 2$ over the time interval $0 \leq t \leq 20$ . Plot $x$ vs $t$ and $y$ vs $t$ in two different figures. Use hold on to keep the plots and graph subsequent solutions as overlay plots.																
17.	Answer any <i>two</i> of the following:																
a)	Discuss about the applications of MATLAB.	4	3	1	1,2/2												
b)	Write a script file named sineseries.m that computes the value of $\sin(x)$ at a given $x$ using $n$ terms of the series expansion of sine function:	4	3	3	1,3,5/3												
	$\sin(x) = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \dots = \sum_{k=1}^n (-1)^{k-1} \frac{x^{2k-1}}{(2k-1)!}$																
c)	Write a MATLAB program to solve the set of linear system equations using solve and linsolve.	4	2	3	2,4,5/3												
	$2x_1 + 3x_2 - x_3 = 1$																
	$x_1 + 2x_2 - x_3 = 4$																
	$-2x_1 - x_2 + x_3 = -3$																

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%

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