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Code No. : 14144 F

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD

Accredited by NAAC with A++ Grade

B.E. IV-Semester Main & Backlog Examinations, June-2022

Mathematical Programming for Numerical Computation (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
1.	Write down MATLAB script for the solution of algebraic equation $2s^2 + 10s + 12 = 0$	2	3	3	1
2.	Consider a matrix $x = \begin{bmatrix} 0.1 & 0.2 & 0.5 \\ 0.6 & 2 & 0.3 \end{bmatrix}$. Write down the code to form $x_1 = [0.1 \ 0.2 \ 0.5]$ and $x_2 = \begin{bmatrix} 0.1 & 0.2 \\ 0.6 & 2 \end{bmatrix}$ from the given matrix x .	2	2	1	1
3.	Create a function file and write down the code to plot the contour of $z = x^2 + y^2$	2	3	3	2
4.	Draw the plot of the below MATLAB code. $x = -\pi:\frac{\pi}{20}:\pi$; $plot(x, \sin(x), 'r-', x, \cos(x), 'b')$	2	3	2	1
5.	Write down a MATLAB code to find the eigen values of the matrix $A = \begin{bmatrix} 1 & 0 & 0 & 1 & -1 \\ 0 & 2 & 3 & 5 & 0 \\ -1 & 0 & 0 & 0 & 1 \\ 6 & 8 & 1 & 2 & -2 \\ 1 & 1 & 1 & 1 & 1 \end{bmatrix}$	2	3	1	2
6.	Write down the syntax for multiplication and division of two matrix.	2	3	1	2
7.	Explain "fsolver" is used? Write down its syntax.	2	1	1	2
8.	Explain least square method?	2	2	2	2
9.	Write down the MATLAB syntax of ODE23 and ODE45.	2	2	3	1
10.	Explain GUI? What are the ways one can build MATLAB GUI.	2	2	5	5
Part-B (5 × 8 = 40 Marks)					
11. a)	Write down the syntax of following loop structure i) if else ii) for loop iii) while loop iv) switch case statement.	5	1	1	1
b)	Write down the MATLAB code to calculate 6! (six factorial) by using for loop.	3	3	1	1
12. a)	Explain the script file and function file? What is the important difference between these two? What are the common mistakes needed to avoid while saving script file and function file?	5	1	3	1

	b)	Write down the code to plot the quadratic equation $x^2 + 7x - 3$ from x equals -3 to +3 in steps of 0.3. Also give the x-axis and y-axis label and make the grid on.	3	3	2	2
13.	a)	Discuss trapezoidal rule and Simpson's 1/3 rule for numerical integration	5	1	3	1
	b)	Write down the MATLAB code to solve $\int_0^1 \sin x^2 dx$.	3	2	3	2
14.	a)	Discuss in detail the procedure for the Interpolation method with suitable example.	4	1	3	4
	b)	Discuss in detail the steps for curve fitting method with relevant example with the code.	4	2	4	4
15.	a)	Write down the basic steps involve in runge-kutta method for solving ordinary differential equation.	3	1	4	4
	b)	Explain the procedure for creating and saving GUI with relevant example.	5	2	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 column present in the matrix, (iii) transpose. Also write down the syntax for null matrix and unit matrix.	4	2	1	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	2	2
17.		Answer any <i>two</i> of the following:				
	a)	Solve the linear equation $3x_1 + 2x_2 - x_3 = 10$, $-x_1 + 3x_2 + 2x_3 = 5$, $x_1 - x_2 - x_3 = -1$. Also, write down the MATLAB code that can be used to solve these equations.	4	3	3	2
	b)	Write down the code to find out the roots of the polynomial $P(s) = s^3 - 2s^2 - 3s + 10$. How to verify the accuracy of these roots by MATLAB code. Also write down the code to construct polynomial from the roots.	4	2	4	2
	c)	Write down the MATLAB code by using ode45 solver to solve $\frac{dy}{dt} = \sin t + \sin y$, subject to $y(0) = 0$, t varies from 0 to 10π .	4	3	1	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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