

MATLAB Examination Question Paper

Faculty	Engineering and Technology		
Examination	Semester End Examination 2024		
Programme	B. Tech	Department	Mathematics and Statistics
Semester / Year	3/2	Batch	2024
Course Code	MTB201A		
Course Title	Engineering Mathematics-3		

INSTRUCTIONS TO STUDENTS:

1. Answer five full questions
2. Use only SI units
3. Missing data may be appropriately assumed
4. Notations used have usual meaning

Maximum Duration: 2 Hours
Maximum Marks: 50
IMPORTANT:

Do not write anything except your register number on the question paper. Please handover the question paper to the room supervisor at the end of examination.

Q. No.	Examiner					Max. Marks
	a	b	c	d	Marks Awarded	
1						10
2						10
3						10
4						10
5						10
6						10
Total Marks						50
Signature						

Q. No.	Question	Marks	CO													
1	a. Basics of MATLAB: Use MATLAB commands for Matrix addition, subtraction, multiplication, inverse, adjoint and determinant. Given $A = \begin{bmatrix} 9 & 2 & 1 \\ 2 & 4 & 6 \\ 1 & 5 & 7 \end{bmatrix}$ Use MATLAB built-in functions to obtain: i. $A^3 - 3A$ ii. determinant of A iii. Adjoint of A iv. A^{-1}	5														
	b. Write a MATLAB script file to plot the given function: $f(x) = \sin(x)$, $0 \leq x \leq 5\pi$.	5														
2	a. Vector plotting using MATLAB commands. Plot the vector field $F(x, y, z) = \cos x \mathbf{i} + \sin y \mathbf{j} + (z - y) \mathbf{k}$ in the interval $-3 \leq x \leq 3, -3 \leq y \leq 3, -3 \leq z \leq 3$.	5														
	b. Obtain the linear polynomial that fits the given data using MATLAB built-in function. <table border="1"><tr><td>x</td><td>10</td><td>12</td><td>16</td><td>20</td><td>25</td><td>30</td></tr><tr><td>y</td><td>29</td><td>33</td><td>41</td><td>53</td><td>65</td><td>70</td></tr></table>	x	10	12	16	20	25	30	y	29	33	41	53	65	70	5
x	10	12	16	20	25	30										
y	29	33	41	53	65	70										
3	Write a MATLAB code to perform Lagrange's interpolation for the given data and compute $f(3)$. <table border="1"><tr><td>x</td><td>0</td><td>1</td><td>2</td><td>4</td></tr><tr><td>$f(x)$</td><td>-1</td><td>2</td><td>7</td><td>23</td></tr></table>	x	0	1	2	4	$f(x)$	-1	2	7	23	10				
x	0	1	2	4												
$f(x)$	-1	2	7	23												
4	Manual calculation: Obtain the solution of the equation $x^3 - 2x - 5 = 0$ by Newtons-Raphson method with the initial approximation $x_0 = 2$.	10														
5	Manual Calculation: Determine the solution of the following system of equations by using the Gauss-Seidel method by performing three iterations $\begin{aligned} 5x + 2y + z &= 12 \\ x + 4y + 5z &= 15 \\ x + 2y + 5z &= 20. \end{aligned}$	10														

6	<p>Numerical Integration: (Trapezoidal, Simpson's 1/3rd or 1/38th)</p> <p>Write a MATLAB function to evaluate following integral by using the Simpson's 1/3rd rule by dividing the intervals into 6 equal subintervals</p> $\int_0^6 \frac{1}{1+x} dx$	10	
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