

Subject Code:- 

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## TECNIA INSTITUTE OF ADVANCED STUDIES

MCA

Class Test (2025-26)

Sem: I

Shift: M

Division: A

Set-1

Date: 

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Time: -1:00 Hours

Max. Marks: 30

**General Instructions:**

- All Questions are compulsory. Answers should be brief and to the point.
- It comprises three sections, A, B, and C. you are to attempt all the sections.
- **Section A** – Question No -1 is Very Short Answers type carrying 2 marks each. You are required to answer ALL.
- **Section B**- Question No-3 is Short Answers type question carrying 5 marks each. You are required to attempt any TWO out of THREE questions given.
- **Section C**- Question No -4 is Long Answer type question carrying 10 marks each. You need to attempt any one.
- Students are instructed to cross the blank sheets before handing over the answer sheet to the invigilator.
- No sheet should be left blank. Any written material after a blank sheet will not be evaluated /checked.

		CO	BT	M
<b>SECTION –A</b>				<b>(10)</b>
<b>1.</b>	<b>Attempt All of the following.</b>			<b>(5*2=10)</b>
<b>a.</b>	Differentiate between big oh (O) and little oh (o) asymptotic functions..	CO1	L1,L2	
<b>b.</b>	Define the terms best case, worst case, and average case time complexity	CO1	L1,L3	
<b>c.</b>	Illustrate randomized algorithm with an example.	CO1	L1,L3	
<b>d.</b>	Differentiate between algorithm and program with help of an example.	CO3	L1,L2,L3	
<b>e.</b>	Elaborate the concept of merge sort algorithm.	CO3	L1,L2,L3	
<b>SECTION –B</b>				
<b>2.</b>	<b>Answer any <u>Two</u> of the following.</b>			<b>(2*5=10)</b>
<b>a.</b>	Solve the recurrence $T(n) = 4T(n/2) + n^3$	CO1	L2,L3	
<b>b.</b>	Explain the substitution method with help of an example.	CO1	L1,L2	
<b>c.</b>	Explain Divide and conquer strategy	CO2	L1,L2,L3	
<b>SECTION –C</b>				
<b>3.</b>	<b>Answer any <u>One</u> of the following.</b>			<b>(1*10=10)</b>
<b>a.</b>	Solve the following recurrence using Master Theorem: 1. $T(n) = 3T(n/2) + n^2$ 2. $T(n) = 5T(n/6) + n^{1/3}$	CO2	L1,L2,L3	
<b>b.</b>	Compute the prefix function $\pi$ for the pattern ababbabbabbababbabb.	CO3	L1,L2,L3	