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Course Code

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Second Semester MCA Degree Examinations, September 2025

DATA STRUCTURE AND ALGORITHMS

Duration: 3 hrs

Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Missing data, if any, may be suitably assumed

<u>Q. No</u>	<u>Question</u>	<u>Marks</u>	<u>(RBTL:CO: PI)</u>
<u>MODULE – 1</u>			
1. a.	What is abstract data structures? Describe briefly with its structure and characteristics.	10	(1.2.1:1:1)
b.	Define recursion. Illustrate Towers of Honai using recursion functions.	10	(1.2.1:1:2)
(OR)			
2. a.	What are multi-dimensional arrays? Describe the applications of arrays.	10	(1.2.1:1:1)
b.	What is an array? Demonstrate insertion and traversing operations of an array with an algorithm.	10	(1.2.1:1:2)
<u>MODULE – 2</u>			
3. a.	Define queues. Elaborate its types and applications.	10	(2.2.1:2:2)
b.	Define linked list. Explain the operations of linked list.	10	(2.2.1:2:1)
(OR)			
4. a.	Define stacks. Describe the operations along with algorithms.	10	(2.3.1:2:2)
b.	Demonstrate the working of function calls using stack data structure.	10	(3.2.1:2:3)
<u>MODULE – 3</u>			
5. a.	Define BST. Demonstrate its operations with an algorithm.	10	(4.2.1:3:1)
b.	Illustrate the Dijkstra's algorithm.	10	(5.3.1:3:2)
(OR)			
6. a.	Write short notes on AVL and B-Trees.	10	(5.2.2:3:2)
b.	Demonstrate the working of DFS algorithm with an example.	10	(6.2.1:3:3)
<u>MODULE – 4</u>			
7. a.	What is comparison sort? Demonstrate insertion sort for the following elements: 38, 47, 24, 32, 89	10	(6.2.1:4:1)
b.	Describe briefly about Hashing technique.	10	(5.2.1:4:2)
(OR)			
8. a.	Design the program to sort the elements using radix sort.	10	(4.2.1:4:3)
b.	Design the program for finding an element using linear search.	10	(5.2.2:4:1)
<u>MODULE – 5</u>			
9. a.	Define heap. Design a program of a heap sort.	10	(5.3.1:5:2)
b.	What is the principle of divide and conquer? Describe it briefly.	10	(4.2.1:5:1)
(OR)			
10. a.	Define tree. Describe its operations and applications.	10	(5.2.1:5:2)
b.	Briefly explain real world applications of data structures and algorithms.	10	(5.2.1:5:1)

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