

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)
MCA DEGREE EXAMINATION MAY 2026
(Second Semester)
Branch – **COMPUTER APPLICATION**
DATA STRUCTURES AND ALGORITHMS

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** marks

(10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	Which of the following traversals would print the elements in ascending order in a Binary Search Tree (BST)? (i) Level-order traversal (ii) Pre-order traversal (iii) Post-order traversal (iv) In-order traversal	K1	CO1
	2	What are splay trees? (i) self adjusting binary search trees (ii) self adjusting binary trees (iii) a tree with strings (iv) a tree with probability distributions	K2	CO1
2	3	What is the time complexity of an insertion operation in a d-heap with n elements? (i) O(n) (ii) O(log n) (iii) O(log d n) (iv) O(d log d n)	K1	CO2
	4	What is the fundamental operation performed in skew heaps? (i) Deletion (ii) Insertion (iii) Merging (iv) Sorting	K2	CO2
3	5	Which algorithm is used to solve the single source shortest path problem in a graph with non-negative edge weights? (i) Bellman-Ford Algorithm (ii) Floyd-Warshall Algorithm (iii) Prim's Algorithm (iv) Dijkstra's Algorithm	K1	CO3
	6	What are Prim's algorithm? (i) Divide and conquer algorithm (ii) Greedy algorithm (iii) Dynamic Programming (iv) Approximation algorithm	K2	CO3
4	7	Which data structure is typically used to implement the Priority Scheduling algorithm? (i) Queue (ii) Stack (iii) Min-Heap/Priority Queue (iv) Hash Table	K1	CO4
	8	Which of the following is NOT a Divide and Conquer algorithm? (i) Merge Sort (ii) Quick Sort (iii) Kruskal's Algorithm (iv) Binary Search	K2	CO4
5	9	Which is an internal operation used to merge two clusters in a top tree? (i) Link (ii) Cut (iii) Merge (iv) Expose	K1	CO5
	10	In a pairing heap, which node typically contains a pointer to its parent? (i) root node (ii) right most child (iii) left most child (iv) left sibling	K2	CO5

Cont...

SECTION - B (35 Marks)Answer **ALL** questions**ALL** questions carry **EQUAL** Marks

(5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Classify the Abstract Datatype.	K2	CO1
		(OR)		
	11.b.	Outline the Binary tree.		
2	12.a.	Make use of Binary Heap.	K3	CO2
		(OR)		
	12.b.	Apply the Leftist Heaps.		
3	13.a.	Analyze about Topological sort.	K4	CO3
		(OR)		
	13.b.	Categorize the Kruskal's Algorithm.		
4	14.a.	Determine the Scheduling problem.	K5	CO4
		(OR)		
	14.b.	Prioritize the Closest points problem.		
5	15.a.	Develop the Topdown trees.	K6	CO5
		(OR)		
	15.b.	Compose the Treaps.		

SECTION - C (30 Marks)Answer **ANY THREE** questions**ALL** questions carry **EQUAL** Marks

(3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Demonstrate the Splay Trees.	K2	CO1
2	17	Examine about the Binomial Queues.	K4	CO2
3	18	Build the Dijkstra's Algorithm.	K3	CO3
4	19	Justify the Divide and Conquer.	K5	CO4
5	20	Construct the Red-Black Trees.	K6	CO5

Z-Z-Z

END