23SSP207

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc(SS) DEGREE EXAMINATION MAY 2025
(Second Semester)

Branch – **SOFTWARE SYSTEMS (Five Year Integrated)**

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 is not a type of array? a) One-dimensional array b) Two-dimensional array c) multi-dimensional array d) Circular array	K1	CO1
	2	Which of the following is a linear data structure? a) Graph b) Queue c) Tree d) Hash table	K2	CO1
2	3	Which data structure uses LIFO (Last In, First Out) principle? a) Queue b) Stack c) Array d) Binary tree	K1	CO2
	4	In a circular queue, how is the queue full condition defined? a) Front = Rear + 1 b) Rear = Front + 1 c) Rear + 1 = Front d) Rear = Front	K2	CO2
3	5	Which of the following is true for a doubly linked list? a) It has two pointers, one pointing to the next node and one to the previous node b) It has only one pointer pointing to the previous node c) It does not support backward traversal d) It requires less memory compared to a singly linked list.	K1	CO3
	6	Which of the following data structures is suitable for hierarchical data? a) Array b) Stack c) Queue d) Tree	K2	CO3
4	7	Which traversal technique is used to process the nodes of a tree in ascending order in a binary search tree? a) Pre-order traversal b) Post-order traversal c) In-order traversal d) Level-order traversal	K1	CO4
	8	Which of the following is a non-linear data structure? a) Array b) Linked list c) Stack d) Graph	K2	CO4
5	9	Identify the time complexity to access an element in a hash table is: a) O(n) b) O(log n) c) O(1) d) O(n log n)	K1	CO5
	10	What is the worst-case time complexity of merge sort? a) O(n) b) O(n log n) c) $O(n^2)$ d) O(log n)	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.	Describe the abstract data types.	K3	CO1
		(OR)		
	11.b.	Outline the sparse matrices.		
2	12.a.	Summarise the primitive operations of stack.	K3	CO2
		(OR)		
	12.b.	State the priority queue.		
3	13.a.	Analyze the singly linked list.	K4	CO3
		(OR)		
	13.b.	Compare the sequential and linked representation of trees.		
4	14.a.	Analyze insertion and deletion of elements in binary search trees.	K4	CO4
		(OR)		
	14.b.	State the representations using adjacency matrix.		
5	15.a.	Summarise the collusion resolution techniques.	K4	CO5
		(OR)		
	15.b.	Explain the selection sort with example.		

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	Analyze the implementation of one, two, three and multi-dimensional arrays.	K4	CO1
2	17	Analyze the sequential implementation of stack.	K4	CO2
3	18	Classify the binary tree traversal.	K4	CO3
4	19	Compare the breadth first and depth first algorithm.	K5	CO4
5	20	Discuss the heap sort with suitable illustration.	K5	CO5

Z-Z-Z END