

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)
BSc DEGREE EXAMINATION DECEMBER 2024
(Second Semester)

Common to Branches - **INFORMATION TECHNOLOGY / COMPUTER TECHNOLOGY**
DATA STRUCTURES

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)

Answer **ALL** questions

ALL questions carry EQUAL marks

$$(10 \times 1 = 10)$$

Module No.	Question No.	Question	K Level	CO
1	1	Which of the following is the linear data structure? a) Tree b) Forest c) Stack d) Graph	K1	CO1
	2	What is the time complexity for accessing an element in an array? a) $O(n \log n)$ b) $O(1)$ c) $O(n)$ d) $O(n^2)$	K2	CO1
2	3	Which sorting algorithm uses a divide-and-conquer strategy? a) Bubble Sort b) Selection Sort c) Merge Sort d) Insertion Sort	K1	CO2
	4	What is the worst-case time complexity of linear search? a) $O(1)$ b) $O(\log N)$ c) $O(N)$ d) $O(n^2)$	K2	CO2
3	5	Which representation is suitable for implementing a stack using a linked list? a) Singly Linked List b) Doubly Linked List c) Circular Linked List d) Array-based List	K1	CO3
	6	Which data structure is more suitable to implement polynomial addition? a) Linked List b) Array c) Stack d) Tree	K2	CO3
4	7	Postfix is also known as _____. a) Polish Notation b) Reverse Polish Notation c) Exponential Notation d) Sin Notation	K1	CO4
	8	In a queue, deletions can take place only at ____. a) Pop b) Top c) Front d) Rear	K2	CO4
5	9	In a tree, the first node is called _____. a) Root b) Leaf c) Child d) Parent	K1	CO5
	10	A graph in which all nodes are of equal degree is known as _____. a) Multi graph b) Regular graph c) Complete graph d) Digraph	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.	Explain the notations used for time and space complexity of algorithm.	K6	CO1
	(OR)			
	11.b.	Discuss about the concept of sparse matrices.		
2	12.a.	Illustrate the bubble sort with example.	K2	CO2
	(OR)			
	12.b.	Summarize the process of collision resolution in hashing.		
3	13.a.	Demonstrate the algorithm of inserting the element in the linked list.	K2	CO3
	(OR)			
	13.b.	Outline the process of doubly linked list with example.		
4	14.a.	Explain how the conversion from infix to postfix simplifies expression evaluation.	K3	CO4
	(OR)			
	14.b.	Describe the concept of linked queue with example.		
5	15.a.	Examine the tree terminologies with its representation.	K4	CO5
	(OR)			
	15.b.	Discuss the representation of graph with neat sketch.		

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	Elaborate the classification of data structure with suitable example.	K6	CO1
2	17	Demonstrate the insertion sort with example.	K2	CO2
3	18	Explain the algorithm for searching a linked list.	K3	CO3
4	19	Compare linked queue with circular queue.	K6	CO4
5	20	Construct the traversing binary tree with example.	K6	CO5