22CAU207N

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BCA DEGREE EXAMINATION MAY 2025
(Second Semester)

Branch – **COMPUTER APPLICATIONS**

DATA STRUCTURES & 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 a linear data structure? (i) Array (ii) AVL Trees (iii) Binary Tree (iv) Graph	K1	CO1
	2	Which of the following data structures can be used to implement a queue? (i) Stack (ii) Array (iii) Linked list (iv) All of the above	K2	CO1
2	3	Which of the following algorithms use recursion for sorting an array of integers? (i)Bubble sort (ii) Quick sort & Merge sort (iii) insertion sort (iv) bubble sort & Merge sort	K1	CO2
	4	What is the best-case time complexity of a linear search from the following options? (i) O(n) (ii) O(1) (iii) O(n log n) (iv) O(2n)	K2	CO2
3	5	Which of the following algorithms is not feasible to implement in a linked list? (i)Linear search (ii) Merge sort (iii) Insertion sort (iv) Binary search	K1	CO3
	6	Which of the following linked list operations can be performed in O(1) time: (i) Insert element at start of lisnked list (ii) Insert element at end of lisnked list (iii) Find length of linked list (iv) None of the above	K2	CO3
4	7	A stack and queue are also known as (i) LIFO & FIFO (ii) _FIFO&LIFO (iii) FIFI&LIFO (iv) none of the above	K1	CO4
	8	What is an ordered list where all insertions and deletions occur at one end, known as the top (i) Queue (ii) Trees (iii) Graph (iv) Stacks	K2	CO4
5	9	The post-order traversal of the binary tree is DEBFCA. Find out the pre-order traversal (i)ABDECF (ii) ABFCDE (iii) ABDEFC (iv) ABDCEF	K1	CO5
	10	The term used to describe a graph where its edges have assigned data (i)Tagged (ii) Marked (iii) Labeled (iv) sticked	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 concept of a data structure and illustrate its different types.	K2	CO1
		(OR)		
	11.b.	Outline the concept of pointers in data structures.		
2	12.a.	Develop a detailed explanation of the selection sort algorithm, including its steps and process.	K3	CO2
		(OR)		
	12.b.	Apply your understanding to explain the concept of hashing and its key features.		
3	13.a.	Solve the concept of dynamic memory allocation by detailing its processes and usage.	K3	CO3
		(OR)		
	13.b.	Develop a comprehensive explanation of a doubly linked list and outline its uses.		
4	14.a.	Analyze and categorize the various applications of stacks.	K4	CO4
		(OR)		
	14.b.	Examine and outline the key features and operations of a dequeue.		
5	15.a.	Analyze and contrast the characteristics and operations of an AVL search tree.	K4	CO5
		(OR)		
	15.b.	Examine the different approaches to representing graphs using linked lists and arrays		

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	Explain about the operations performed over an array with suitable example.	K4	CO1
2	17	Explain about binary search & Linear Search with suitable example.	K4	CO2
3	18	Discuss about traversing a linked list with example.	K4	CO3
4	19	Draw and explain the various operations in stack.	K4	CO4
5	20	Explain about Shortest path problems with suitable example.	K4	CO5

Z-Z-Z END