Model Question Paper-1 with effect from 2023-24 (CBCS Scheme)

USN | | | | | | | | | | |

Third Semester B.E. Degree Examination

DATA STRUCTURES AND ALGORITHMS

TIME: 03 Hours **Max. Marks: 100**

Note: 01. Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**.

		Module 1	Marks	Level	CO
Q.1	**(a)**	Define data structure. List & explain data structure operations	10	L1,L2	CO1
	(b)	Explain Dynamic memory Allocation functions with examples	10	L1,L2	CO1
		OR			
Q.2	**(a)**	Define stack. Implement push and pop operations for stack using arrays	10	L1,L2	CO1
	(b)	Write a C function to convert infix to a postfix expression. Convert the given expression: **A $ B * C – D + E / F / (G + H)**	10	L1,L3	CO5
		Module 2			
Q.3	**(a)**	What is a linked list? Explain the different types of linked list with diagram	10	L1,L2	CO1
	(b)	Give the disadvantage of ordinary queue and how it is solved in circular queue. Explain with suitable example how you would implement circular queue using array.	10	L2	CO1
		OR			
Q.4	**(a)**	With the C function to explain how the elements are inserted and deleted from a doubly linked list	10	L2	CO1
	(b)	Briefly explain linked stack and queue	10	L2	CO1
		Module 3			
Q.5	**(a)**	Define a binary tree. With example show array and linked representation of binary tree.	10	L1,L2	CO4

	(b)	Describe the binary search tree with an example. Write the iterative function to search for a key value in a binary search tree	10	L2	CO4
OR					
Q.6	**(a)**	Write the C-routines to traverse the given tree using i) Inorder ii) Pre-order iii) Post-order Explain with an example	10	L2	CO4
	(b)	Explain matrix and adjacency list representation of graphs with an example	10	L2	CO4
Module 4					
Q.7	**(a)**	What are the various basic asymptotic efficiency classes? Explain Big O, Big Omega and Big Theta asymptotic notations.	10	L1,L2	CO2
	(b)	Design an algorithm to search an element in an array using sequential search. Discuss the Best case worst case and average case efficiency of this algorithm	10	L3	CO2
OR					
Q.8	**(a)**	Explain Mathematical analysis of Recursive algorithm with an example.	10	L2	CO2
	(b)	Write Binary search Algorithm and apply the same to find 31 from given list. 12 25 31 35 45 52 64 75 83 91	10	L2,L3	CO2
Module 5					
Q.9	**(a)**	Differentiate between DFS and BFS	10	L2	CO3
	(b)	What are the major variations of Decrease and Conquer. Explain them with neat diagram.	10	L1,L2	CO3
OR					
Q.10	**(a)**	Explain dynamic programming. Write an algorithm to compute binomial coefficient.	10	L2	CO3
	(b)	Define minimum cost spanning tree. Write Prim's algorithm to find minimum cost spanning tree.	10	L1,L2	CO3