

Code: 20ES1305

**II B.Tech - I Semester – Regular/Supplementary Examinations
DECEMBER 2022**

**DATA STRUCTURES
(Common for CSE, IT)**

Duration: 3 hours

Max. Marks: 70

Note: 1. This paper contains questions from 5 units of Syllabus. Each unit carries 14 marks and have an internal choice of Questions.

2. All parts of Question must be answered in one place.

BL – Blooms Level

CO – Course Outcome

			BL	CO	Max. Marks
UNIT-I					
1	a)	What do you mean by complexity of an algorithm? Explain the meaning of worst case analysis and best case analysis with an example.	L2	CO1	7 M
	b)	Describe insertion sort with a proper algorithm. What is the complexity of insertion sort in the worst case?	L3	CO2	7 M
OR					
2	a)	Explain recursion. Write a recursive algorithm to calculate factorial of a number.	L2	CO1	7 M
	b)	Write down the number of iterations taken for the following numbers using bubble sort: 40 20 30 10.	L3	CO2	7 M

UNIT-II					
3	a)	Write an algorithm to insert new node at the beginning, at middle position and at the end of a Singly Linked List.	L3	CO4	7 M
	b)	Write algorithms to perform the following operations on a doubly linked list. (i) Insert a node with data 'y' after a node whose data is 'x'. (ii) Delete a node whose data is 's'. (iii) Insert a node with data 'a' as the 1 st node of the list.	L3	CO4	7 M
OR					
4	a)	Compare singly and circular linked list while performing insertion and deletion operations.	L4	CO4	7 M
	b)	What are the draw backs of single linked list? Explain how to implement insert and traverse operations in circular linked list.	L2	CO3	7 M
UNIT-III					
5	a)	Write a C function or algorithm to convert the given infix expression to postfix expression and solve the following expression $a+b*c^d/e^f-g$ using stacks.	L3	CO3	7 M
	b)	Write a program to implement queue using array.	L3	CO3	7 M
OR					
6	a)	Write a program to implement stacks using array.	L3	CO3	7 M

	b)	Explain the implementation of circular queue using array. How an “empty queue” is distinguished from a “full queue”? Write necessary functions to perform all valid operations on circular queue.	L3	CO3	7 M
UNIT-IV					
7	a)	Assume a binary tree has seven nodes. Write down the Preorder and Postorder traversal of the tree with diagram. Also write its algorithms.	L3	CO3	7 M
	b)	What is a binary search tree? Write an algorithm for inserting and deleting a node in a binary search tree.	L3	CO3	7 M
OR					
8	a)	Explain the process of displaying the nodes of a binary tree at a particular level.	L4	CO4	7 M
	b)	Create binary search tree for the following elements (23, 12, 45, 36, 5, 15, 39, 2, 19). Discuss about the height of the above binary search tree.	L3	CO3	7 M
UNIT-V					
9	a)	Write an algorithm for Breadth first search with an example graph.	L3	CO3	7 M
	b)	Explain about the Prim’s algorithm with an example.	L2	CO1	7 M
OR					

10	a)	Explain about Depth First Search with suitable example.	L2	CO1	7 M
	b)	Write an algorithm for minimum cost spanning tree using Kruskal's algorithm.	L3	CO3	7 M