

**PRAGATI ENGINEERING COLLEGE: SURAMPALEM
(AUTONOMOUS)**

I B.Tech II Semester Regular Examinations, June-2024

DATA STRUCTURES

(Common to CSE, IT, CSE(AI&ML), CSE(AI), CSE(DS) and CSE(CS))

Time: 3 hours

Max. Marks: 70

Note:

- i. Question No. 1 shall contain 10 compulsory short answer questions (2 questions from each unit) for a total of 20 marks such that each question carries 2 marks.
- ii. In each of the questions from 2 to the last question, there shall be either/or type questions of 10 marks each.

Q. No.	Questions	K	CO	Marks
1.	a) Mention the features of ADT.	K1	CO1	2M
	b) List some common data structures.	K1	CO1	2M
	c) What are the types of linked lists?	K1	CO2	2M
	d) How the singly linked lists can be represented?	K1	CO2	2M
	e) What are the applications of the stack?	K1	CO3	2M
	f) Write the routine to push an element into a stack.	K2	CO3	2M
	g) What are the operations of a queue?	K1	CO4	2M
	h) Define double-ended queue.	K1	CO4	2M
	i) Define tree– traversal and mention the type of traversal.	K1	CO5	2M
	j) Define the term Degree of a vertex.	K1	CO5	2M
UNIT-I				
2.	a) Explain Linear Data structure with examples.	K2	CO1	5M
	b) Explain components of Space Complexity.	K2	CO1	5M
OR				
3.	a) Explain the Linear search algorithm with an example.	K2	CO1	5M
	b) Discuss the Algorithm of merge sort with an example.	K4	CO1	5M
UNIT-II				
4.	a) Explain how to implement the traverse operation in the circular linked list.	K2	CO2	5M

	b)	Write the algorithm for creating a node in a doubly linked list with an example.	K3	CO2	5M
OR					
5.	a)	Explain the node structure of a singly linked list. Mention the advantages of linked list over arrays.	K2	CO2	5M
	b)	Write an algorithm to insert a node in the Circular linked list.	K3	CO2	5M
UNIT-III					
6.	a)	What is a stack? Write an algorithm for operations of the stack with examples.	K3	CO3	5M
	b)	Explain the linked list implementation of stacks.	K3	CO3	5M
OR					
7.	a)	What is the stack application of reversing the list in the data structure?	K3	CO3	5M
	b)	Write the algorithm for converting infix expression to postfix (polish) expression.	K3	CO3	5M
UNIT-IV					
8.	a)	What are queues? Write down the algorithm for inserting elements into a queue implemented using arrays.	K3	CO4	5M
	b)	Explain the applications of dequeues.	K3	CO4	5M
OR					
9.	a)	Explain double-ended queue and its operations.	K2	CO4	5M
	b)	Explain the linked list implementation of queues.	K2	CO4	5M
UNIT-V					
10.	a)	The following values are to be stored in a hash table: 25,42,96,101,102,162,197. Describe how the values are hashed by using the division method of hashing with a table size of 7. Use chaining as the method of collision resolution.	K3	CO5	5M
	b)	Explain the adjacency matrix and adjacency list with suitable examples.	K2	CO5	5M
OR					
11.	a)	Write a breadth-first-search algorithm with an example.	K3	CO5	5M
	b)	Create a binary search tree for the following numbers starting from an empty binary search tree. 45,26,10,60,70,30,40	K3	CO5	5M