SRM Institute of Science and Technology
Faculty of Engineering and Technology
DEPARTMENT OF CSE
Vadapalani Campus, Chennai 600026, Tamilnadu

Mode of Exam
OFFLINE
SET-A

Academic Year: 2024-25 Semester: ODD

Test: CLAT-2 **Date: 21.11.2024**
Course Code & Title: 21CSC551J Advanced Data Structures & Algorithms **Duration:** 110 mins.
Year & Sem: I MTech / 1 SEM **Max. Marks:** 60

Course Articulation Matrix:

	PROGRAM OUTCOME(POs)			
CO	**COURSE OUTCOME (COs)**	**PO1**	**PO2**	**PO3**
1	Analyze the complexity of algorithm and if needed improve its efficiency	*3*	-	-
2	Apply self balancing tree structures for developing search algorithms	*3*	-	-
3	Identify and Use appropriate data structure for multi-dimensional search solution	*3*	-	-
4	Implement the Graph structure and use heaps for applications of graph algorithms	*3*	-	-
5	Understand the complexity classes of algorithms and conversion to another class.	*3*	-	-

Part – A (03 x 20 = 60 Marks)
Instruction: Answer Any 3 Questions

Q. No.	Question	Marks	BL	CO	PO
1	(i) Construct a 3-way B-Tree by inserting the following data elements, 10, 11, 12, 13, 14, 20, 24, 5, 3, 27, and 35. (12 marks) (ii) Delete elements 24, and 5 in the above constructed tree. Show the resultant tree after the deletion (8 marks)	20	3	3	1
2	(i) Illustrate the formation of Quad trees and its properties. (10 marks) (ii) Discuss the leftist heap with an example and state its advantages (10 marks)	20	2	4	1
3	(i) State the properties of a treap data structure and the significance of it (5 marks) (ii) Form a treap with the input <key, priority> pairs, (50, 15), (30, 5), (40, 4), (20, 2), (70, 10), (80, 12). Delete the key 50. Show the treap at each insertion and deletion (15 marks)	20	3	4	1
4	(i) Prove CLIQUE is NP-complete (10 marks)	20	2	5	2

	(ii)What are complexity classes and compare and contrast two different classes (10 marks)				

Course Outcome (CO) and Bloom's level (BL) Coverage in Questions