Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– III (NEW) EXAMINATION – SUMMER 2022

Subject Code:3134201 Date:13-07-2022

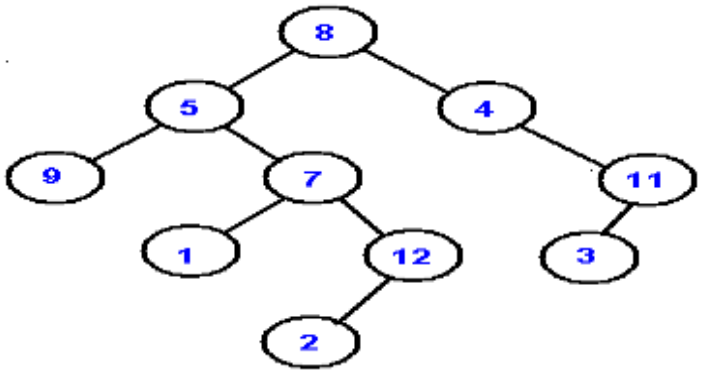
Subject Name: Data Structures and Algorithms

Time:02:30 PM TO 05:00 PM Total Marks:70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

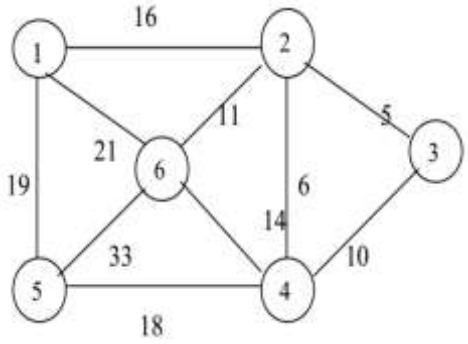
			MARKS
Q.1	**(a)**	Define Algorithm. How to write an Algorithm?	**03**
	(b)	Define Data Structure and classify it.	**04**
	(c)	Discuss Time and Space complexity with example. Also discuss average, best and worst case analysis for it.	**07**
Q.2	**(a)**	What is Stack? Write algorithm for PUSH operation in a stack.	**03**
	(b)	Write an algorithm for evaluation of postfix expression.	**04**
	(c)	Convert following infix expression into postfix format showing stack status after every step in tabular form. P * (Q - R/S * T) / (A + B * C/D + E)) + F	**07**
		OR	
	(c)	Write a pseudocode for Insert and Delete an element from Circular queue.	**07**
Q.3	**(a)**	Differentiate between Stack and Queue.	**03**
	(b)	What is Queue? Explain priority Queue in detail.	**04**
	(c)	List out graph traversal techniques & explain anyone using suitable example.	**07**
		OR	
Q.3	**(a)**	List the advantages of a doubly linked list over singly linked list.	**03**
	(b)	Differentiate between Array and Linked List.	**04**
	(c)	Write a code to count number of nodes in singly linked list.	**07**
Q.4	**(a)**	Write an algorithm for binary search technique.	**03**
	(b)	Explain Selection sort algorithm and give its best case, worst case and average case complexity.	**04**
	(c)	Explain all tree traversal method with an example.	**07**
		OR	
Q.4	**(a)**	Write down inorder traversal path for following tree.	**03**



	(b)	How Divide & Conquer approach work? List advantages and disadvantages of it.	**04**
	(c)	Explain Quick Sort Method with example. Give its Time Complexity.	**07**
Q.5	**(a)**	Explain common characteristics of Dynamic Programming	**03**
	(b)	Discuss and derive an equation for solving the 0/1 Knapsack problem using dynamic programming method.	**04**
	(c)	Solve Making Change problem using Dynamic Programming. (Denominations: d1=1, d2=4, d3=6). Give your answer for making change of Rs. 8.	**07**

OR

Q.5	**(a)**	Explain Branch and Bound Technique in brief.	**03**
	(b)	Consider Knapsack capacity W=50, w= (10, 20, 40) and v=(60, 80, 100) find the maximum profit using greedy approach.	**04**
	(c)	Generate minimum spanning tree of following graph using Prim's and Kruskal's algorithms.	**07**



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