Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

MCA– SEMESTER –II EXAMINATION –SUMMER-2019

Subject Code:3620002 **Date: 17-05-2019**

Subject Name: Data Structures

Time:10.30 am to 1.00 pm **Total Marks: 70**

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

Q1.	**(a)**		Do As Directed.	**07**
		(1)	Define primitive data structure.	
		(2)	Give an example of siblings.	
		(3)	What is path matrix?	
		(4)	Define graph.	
		(5)	Write the names of linear data structures & non-linear data structures.	
		(6)	Define Big O notation.	
		(7)	Which data structure is used for BFS?	
	(b)		Brief the terms.	
		(1)	Explain KWIC Indexing.	**02**
		(2)	Differentiate complete binary tree and full binary tree.	**02**
		(3)	Write the similarity & difference between tree and graph. Write the names of traversing methods of graph.	**03**
Q2.	**(a)**		Write an algorithm to convert infix string to reverse polish notation.	**07**
	(b)		Write an algorithm of Binary search & write its complexity.	**07**
			OR	
	(b)		Write an algorithm to Delete an element from singly linked list & Delete an element from doubly linked list.	**07**
Q3.	**(a)**		Compare BFS and DFS.	**06**
	(b)	(1)	Write short note on Hashing functions.	**04**
		(2)	Discuss collision resolution techniques.	**04**
			OR	
Q3.	**(a)**		Translate the infix string a + b * c – d / e * h ^ I ^ j into reverse polish expression and trace the content of stack.	**07**
	(b)		Define stack. List out the applications of stack. Write an algorithm to PUSH & POP using array representation.	**07**

Q4.	**(a)**		A binary tree T has 9 nodes. The inorder and preorder traversals of T yield the following sequence of nodes: Inorder: E A C K F H D B G Preorder: F A E K C D H G B Draw the binary tree and show its postorder traversal sequence.	**07**
	(b)		Create binary search tree for the following data and show how to delete the node which has both left and right child with the same data. 50, 25, 75, 22, 40, 60, 80, 90, 15, 30	**07**

OR

Q4.	**(a)**		Using Radix Sort, sort the following data: 42, 23, 74, 11, 65, 58, 94, 36, 99, 87	**07**
	(b)	(1)	Construct a tree for the expression (a+b)*(c+d)/(e+f)	**03**
		(2)	Write algorithm of Bubble sort.	**04**

Q5.	**(a)**		Explain Quick sort with algorithm. Sort the following data using Quick sort: 23, 11, 9, 90, 33, 76, 18, 7, 50, 88	**07**
	(b)	(1)	Describe the rate of growth of algorithm.	**04**
		(2)	Discuss Threaded binary tree.	**03**

OR

Q5.	**(a)**		Write the advantages of circular linked list. Write algorithm to insert and traverse singly circular linked list.	**07**
	(b)		Explain how height balance tree improve searching process compare to binary tree. How balance factor for height balance tree is calculated? Explain LL and RR rotation with suitable example.	**07**

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