

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-III(New) • EXAMINATION – WINTER 2016

Subject Code:2130702

Date:02/01/2017

Subject Name:Data Structure

Time:10:30 AM to 01:00 PM

Total Marks: 70

Instructions:

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

		MARKS
Q.1	Explain the following terms in brief	14
	1 Primitive data structure	
	2 Non-primitive data structure	
	3 Linear data structure	
	4 Non-linear data structure	
	5 Recursion	
	6 Time complexity of an algorithm	
	7 Double-ended queue	
	8 Priority queue	
	9 Circular linked list	
	10 Complete binary tree	
	11 2-3 tree	
	12 Minimum spanning tree	
	13 Degree of vertex	
	14 Hash collision	
Q.2	(a) Write a pseudo-code for PUSH and POP operations of stack.	03
	(b) What is prefix notation? Convert the following infix expression into prefix. $A + B - C * D * E \$ F \$ G$	04
	(c) Write an algorithm to perform various operations (insert, delete and display) for simple queue.	07
	OR	
	(c) Write differences between simple queue and circular queue. Write an algorithm for insert and delete operations for circular queue.	07
Q.3	(a) Convert the following infix expression into postfix. $A + B - C * D * E \$ F \$ G$	03
	(b) Write algorithm(s) to perform INSERT_FIRST (to insert a node at the first position) and REVERSE_TRAVERSE (to display the data in nodes in reverse order) operations in doubly linked list.	04
	(c) Write a 'C' program to implement stack using linked list.	07
	OR	
Q.3	(a) Enlist and briefly explain various applications of stack.	03
	(b) Discuss various rehashing techniques.	04
	(c) Write 'C' functions to implement INSERT_FIRST (to insert a node at the first position), DELETE_FIRST (to delete a node from the first position), DELETE_LAST (delete a node from the last position) and TRAVERSE (to display the data in nodes) operations in circular linked list.	07

Q.4	(a)	Write an algorithm for Binary search method.	03
	(b)	Write a 'C' program for Bubble sort.	04
	(c)	Sort the following numbers using (i) Selection sort (ii) Quick sort: 10 50 0 20 30 10	07
OR			
Q.4	(a)	Write a 'C' function for Selection sort.	03
	(b)	Write an algorithm for Quick sort.	04
	(c)	Explain Depth First Search and Breadth First Search in graphs with an example.	07
Q.5	(a)	Draw a binary expression tree for the following and perform preorder traversal for the same: (A + B \$ C) + (D + E * F)	03
	(b)	Construct a binary search tree for the following and perform inorder and postorder traversals: 5 9 4 8 2 1 3 7 6	04
	(c)	Write 'C' functions for: inserting a node, postorder traversal and counting total number of nodes for binary search tree.	07
OR			
Q.5	(a)	Explain AVL trees.	03
	(b)	Construct a binary search tree from the following traversals: Inorder: 3 4 5 6 7 9 17 20 22 Preorder: 9 4 3 6 5 7 17 22 20	04
	(c)	Write Kruskal's algorithm for minimum spanning tree with an example.	07
