Year and Program:2018-19   **School of Technology**   **Department of SY B. Tech**

Course Code: CST207   **Course Title: Data Structures**   **Semester – III**
Day and Date: monday   **End Semester Examination**   **Time:** 3 Hrs ·   **Max Marks: 100**
10/06/2019   (ESE)   2.30 to 5.30 Pr

Instructions: 1) All questions are compulsory.
2) Assume suitable data wherever necessary.
3) Figures to the right indicate full marks.

			Marks	Bloom's Level	CO
Q.1		**Solve the following**			
	a)	Demonstrate a C program using functions to add 2 matrices and return the resultant matrix to the calling functions	07	L3	CO1
		OR			
	a)	Define a structure to store details of 10 bank customers with cust_name, acc_no , bal, city. Demonstrate the above using C program to store the details of the customer in the bank, access and print the customer details for a specified acc_no.	07	L1	CO1
	b)	Solve the following using quick sort: 2,13,45,56,27,18,24,30,87,9.	08	L3	CO2
		OR			
	b)	Develop an algorithm for merge sort and find the time complexity.	08	L3	CO2
Q.2		**Solve the following**			
	a)	Explain in detail about array implementation of Queue.	07	L2	CO3
		OR			
	a)	Develop an algorithm to convert the infix expression to postfix expression using stack	07	L3	CO3
	b)	Illustrate the operations of inserting an element at the front, middle and at the rear end of the doubly linked list.	08	L2	CO4
		OR			
	b)	Define circular linked list? State the merits and demerits of circular linked list over doubly and singly linked list. Also brief the advantages of linked list over an array.	08	L1	CO4

Q.3   **Solve any Two**

a) Develop a program using C to find the factorial of n numbers using recursion.   08   L3   CO1

b) Differentiate bubble sort and selection sort with the given set of elements:45,56,31,1,90,34   08   L4   CO2

c) Describe about priority queue with an example   08   L2   CO3

d) Analyze and design an algorithm for inserting an element at the first, deleting at the last and search an element for singly linked list.   08   L3   CO4

Q.4   **Solve any Two**

a) Define tree. Explain the tree traversal with algorithms for the given tree   09   L1   CO5

InOrder(root) visits nodes in the following order:
4, 10, 12, 15, 18, 22, 24, 25, 31, 35, 44, 50, 66, 70, 90

A Pre-order traversal visits nodes in the following order:
25, 15, 10, 4, 12, 22, 18, 24, 50, 35, 31, 44, 70, 66, 90

A Post-order traversal visits nodes in the following order:
4, 12, 10, 18, 24, 22, 15, 31, 44, 35, 66, 90, 70, 50, 25
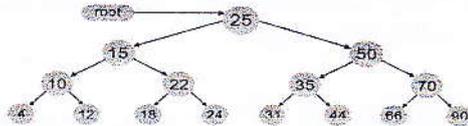
b) Implement the process of finding the minimum and maximum elements of BST.   09   L3   CO5

c) Illustrate a function to insert a node into a BST. Construct a BST for the following set of elements: 60, 12, 56, 23, 63, 1, 6.   09   L3   CO5

Q.5   **Solve any Two**

a) Examine BFS along with its algorithm and example.   09   L4   CO6

b) Describe about the graph representation using sparse matrix.   09   L2   CO6

c) Solve DFS for the given graph along with its algorithm.   09   L3   CO6
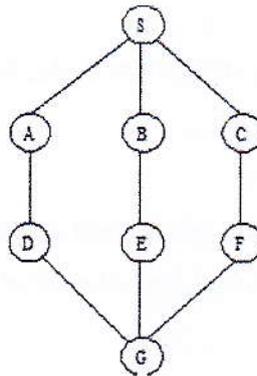
Q.6   **Solve any Three**

a) List representation of trees in detail   06   L2   CO5

b) Illustrate the basic terminologies used in tree   06   L2   CO5

c) Describe how the graph is represented with neat diagram   06   L2   CO6

d) Examine the basic concept of graph theory.   06   L4   CO6