Enroll. No._____

MARWADI UNIVERSITY
FACULTY OF TECHNOLOGY
COMPUTER ENGINEERING / INFORMATION TECHNOLOGY
B.TECH. SEM: 3 Winter 2018

Subject: Data Structure (01CE0301) **Date: October 29, 2018**
Total Marks: 100 **Time: 03:00 Hrs**
Instructions:

1. **All questions are compulsory.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Que 1 **(A)** Answer below given MCQs. **[10]**

1) In a stack, insertion is done at
   A) Top B) Front
   C) Rear D) Mid
2) Which of the following is linear data structure?
   A) Array B) Stack
   C) Linked list D) All of the above
3) Which of the following data structure allows operations at only one end?
   A) Stack B) Queue
   C) Both A and B D) None of the above
4) Deleting a node from the beginning of the singly linked list needs to modify _____ pointers
   A) One B) Two
   C) Three D) None
5) The address field in the node of singly linked list
   A) stores address of next node B) can be NULL
   C) Both A and B D) None of the above
6) All the nodes in a left subtree of a binary search tree contains keys _____
   A) less than root B) greater than root
   C) Random D) None of the above
7) Which of the following does not store NULL in pointer field of any of its nodes?
   A) Singly linked list B) Doubly linked list
   C) Circular linked list D) All of the above
8) What is the height of the full binary tree if it has 15 nodes?
   A) 2 B) 3
   C) 4 D) 5
9) The search ends in binary search tree, when _____
   A) Node is found B) A leaf node is reached
   C) Either of A or B D) None of the above
10) Nodes at the same level that share the same parent are called _____
   A) Child B) Parent
   C) Siblings D) leaf

(B) Define following terms: **[10]**

1) Stack
2) Queue
3) Link List
4) Binary Search Tree
5) Minimum Spanning Tree

Que 2	**(A)**	The Preorder traversal of the tree is: 10, 8, 6, 3, 7, 9, 12, 11, 14, 13, 18 The Inorder traversal of the tree is: 3, 6, 7, 8, 9, 10, 11, 12, 13, 14, 18 What is the Postorder traversal?	**[8]**
	(B)	Consider a problem of inserting a node into a doubly linked linear list after a specified node which contains value V. Give details of algorithm.	**[8]**
		OR	
	(B)	Consider a problem of inserting a node into a doubly linked linear list after a specified node whose address is given by variable M. Give details of algorithm.	**[8]**
Que 3	**(A)**	Apply insertion sort on following data and give trace of all passes: 74 25 53 40 57 48 31 62	**[8]**
	(B)	Explain working of priority queue?	**[4]**
	(C)	Write a C function to calculate square of the number for all the prime numbers ranging between 1 to n.	**[4]**
		OR	
Que 3	**(A)**	Apply merge sort on following data: 74 25 53 40 57 48 31 62	**[8]**
	(B)	Explain double ended queue.	**[4]**
	(C)	Write recursive solution for computing factorial.	**[4]**
Que 4	**(A)**	Construct AVL tree for sequence of number given below. 10, 11, 12, 13, 14, 15, 9, 8, 7, 6, 5	**[8]**
	(B)	What is height balanced tree? Explain with example.	**[4]**
	(C)	Explain Mid Square Method for Hash.	**[4]**
		OR	
Que 4	**(A)**	Construct 5-way B-tree for sequence of number given below. 1, 2, 3, 4, 5, 10, 21, 22, 33, 34, 15, 32, 31, 48, 49, 50	**[8]**
	(B)	What is weight balanced tree? Explain with example.	**[4]**
	(C)	Explain Multiplication Method for Hash.	**[4]**
Que 5	**(A)**	Apply BFS on the graph given in Figure1.	**[8]**
	(B)	Give algorithms for below listed Stack operations: Push and Pop	**[4]**
	(C)	Convert the following string into postfix: (A+B)*C/(D-E)+F-G*H	**[4]**
		OR	
Que 5	**(A)**	Apply DFS on the graph given in Figure1.	**[8]**
	(B)	Give algorithms for below listed Queue operations: Insert and Delete	**[4]**
	(C)	Convert the following string into prefix: (A+B)*C/(D-E)+F-G*H	**[4]**
Que 6	**(A)**	Write algorithm of Delete operation on Binary Search Tree.	**[8]**
	(B)	Given a Singly linked list whose typical node consists of an INFO and LINK field. Formulate an algorithm which will count the number of nodes in the list.	**[4]**
	(C)	State applications of stack.	**[4]**
		OR	

Que 6	**(A)**	Hash function map several keys into same address called collision. Explain any two collision resolution techniques?	**[8]**
	(B)	Given a Singly linked list whose typical node consists of an INFO and LINK field. Formulate an algorithm which will search the nodes in the list.	**[4]**
	(C)	State applications of link list.	**[4]**

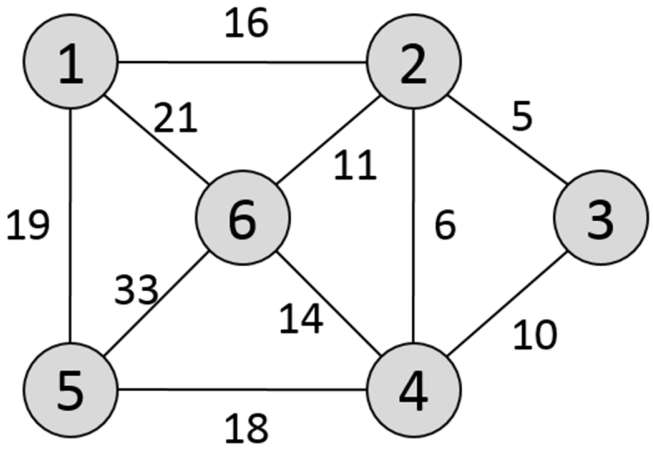

Figure 1

---Best of Luck---

Que. Paper weight-age as per Bloom's Taxonomy

No.	Que. Level	% of weight-age	
		% of weight-age	Que. No.
1	Remember/Knowledge	26	1b,4c,5b,6a
2	Understand	30	1a,2b,3b,3c,4b
3	Apply	36	2a,3a,4a,5a,5c
4	Analyze	8	6b,6c
5	Evaluate	0	
6	Higher order Thinking	0	

GRAPH: