**53 (IT 304) DTST**

**2016**

# DATA STRUCTURE

Paper : IT 304

*Full Marks : 100*

Time : Three hours

***The figures in the margin indicate full marks for the questions.***

*Answer **any five** questions.*

1. *(a)* Evaluate the following postfix expression : 10

   1 2 + 3 * 4 – 1 2 6 2 1 + / ^ * +

   *(b)* Sort the following sequence of elements using Quick sort Algorithm and clearly show each steps : 10

   9, 19, 13, 5, 12, 8, 7, 4, 21, 2, 6, 11

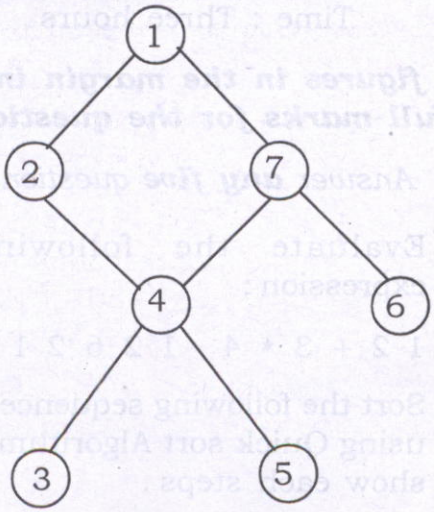
2. *(a)* What is the best case and worst case complexity of Quick Sort Algorithm ? Explain with example. 10

(b) How are graphs represented inside computer's memory? Which method do you prefer and why? 10

3. (a) Form a binary max-heap from the following sequence of data: 10

9, 6, 5, 0, 8, 2, 1, 3

(b) Consider the graph given below. Find out the depth-first search traversal of the graph. 10




4. (a) Write a program to merge two sorted linked lists into a single sorted list. 10

(b) What is abstract data type? Explain with example. 10

5. *(a)* How is circular queue implemented? Give example. 10

*(b)* Which of the following sorting algorithm in its typical implementation gives best performance when applied on an array which is sorted or almost sorted (maximum one or two elements are misplaced) 10

*(A)* Bubble sort

*(B)* Selection sort

*(C)* Insertion sort

*(D)* Quick sort

Justify your answer.

6. Write a program to create a circular linked list and perform insertions and deletions at the beginning and end of the list. 20

7. Write short notes on : 20

*(a)* Hashing

*(b)* Doubly linked list

*(c)* BST (Binary Search Tree)

*(d)* Binary Search algorithm

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