



(Following Paper ID and Roll No. to be filled in your Answer Book)

**PAPER ID : 131652**

Roll No.

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## B. Tech.

(SEM. VI) THEORY EXAMINATION, 2014-15

### DATA STRUCTURE

Time : 2 Hours]

[Total Marks : 50

- Note :
- (1) Attempt all questions.
  - (2) All questions carry equal marks.

1 Attempt any two parts : **5x2=10**

- (a) Explain the time and space trade-off of algorithm with an example. What do you understand by the efficiency of an algorithm?
- (b) The preorder and inorder traversal of binary tree is given below, construct the tree  
preorder : A B F C D E inorder : B F A D C E
- (c) Draw a graph with five vertices each of degree 4.

Define the terms :

- (i) Complete graph
- (ii) Leaf and non-leaf nodes
- (iii) Adjacency matrix.

2 Attempt any two parts :

5x2=10

- (a) What are the various tree traversal techniques?  
Write the recursive C function/algorithm for any two traversal techniques.
- (b) Define Digraph. Draw the weighted directed graph which is represented by the adjacency matrix below.

	A	B	C	D	E
A	0	5	8	0	0
B	3	0	6	0	0
C	0	3	4	1	0
D	0	6	7	0	0
E	0	0	0	0	0

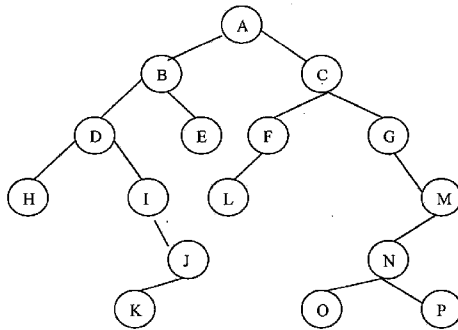
- (c) Construct an AVL tree with the following keys:  
35, 36, 80, 85, 67, 89, 25, 16, 10, 14, 14.

3 Attempt any two parts :

5x2=10

- (a) Sort the following numbers using HEAP SORT  
on the given array  
A=<9, 17, 4, 26, 3, 12, 22, 8, 15>

- (b) For the given tree, find the following :
- (i) Name the ancestors of node J
  - (ii) Name the descendants of node C
  - (iii) Height of the entire tree
  - (iv) Inorder of the tree
  - (v) Make tree for algebraic expression  $a*b/(c+d)*e+f-g/h+x-k$



- (c) Define minimum cost spanning tree. Differentiate between Prim's algorithm and Kruskal's Algorithm.

4 Attempt any two parts : **5×2=10**

- (a) Write an algorithm/C function for sorting a set of integers using quick sort. What is its best case complexity?
- (b) Construct the BST for following insertion in order: 13,25,16,78,56,67,45,44,22,13,50,20,18,7,90. Show the steps.
- (c) Write short notes on any two :
  - (i) Expression Trees.
  - (ii) B Trees.
  - (iii) Activity Network.

**5** Attempt any two parts :

**5x2=10**

- (a) Compare the advantages and disadvantages of using array and linked list.
  - (b) Define a queue. How does it differ from a stack? Write two applications of a queue.
  - (c) Write the steps of Warshall's Shortest path algorithm.
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