**DHARMSINH DESAI UNIVERSITY, NADIAD**
**FACULTY OF TECHNOLOGY**
**B.TECH. SEMESTER IV [IT]**
**SUBJECT: (CT-409) DATA STRUCTURES AND ALGORITHMS**

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| **Examination** | **: Second Sessional** | **Seat No.** | **: _____** |
| **Date** | **: 15/02/2013** | **Day** | **: Friday** |
| **Time** | **: 8:45 to 10:00** | **Max. Marks** | **: 36** |

**INSTRUCTIONS:**
1. Figures to the right indicate maximum marks for that question.
2. The symbols used carry their usual meanings.
3. Assume suitable data, if required & mention them clearly.
4. Draw neat sketches wherever necessary.

**Q.1 Do as directed.**

(a) Which data structure is used to perform recursion? Why? **[2]**

(b) Draw a complete binary tree with exactly six nodes. **[2]**

(c) To represent hierarchical relationship between elements, which data structure is suitable? **[2]**

(d) If every node u in G is adjacent to every other node v in G, A graph is said to be _____ **[2]**

(e) The maximum number of nodes in complete binary tree of level 5 is _____ **[2]**

(f) Which traversal technique lists the nodes of a binary search tree in ascending order? **[2]**

**Q.2** Attempt ***Any Two*** from the following questions. **[12]**

(a) Write an algorithm to construct an Expression Tree from given postfix expression. Construct expression tree for following postfix expression. **[6]**

A B + C – D E + F * -

(b) 1) Create binary tree from given tree traversals: **[3]**

Postorder: H I D E B F G C A

Inorder: H D I B E A F C G

2) Construct the Binary Search Tree from the following set of strings: **[3]**

MAR,MAY,NOV,AUG,APR,JAN,DEC,JUL,FEB,JUN,OCT,SEP

(c) 1) Convert the tree given in fig.1 into binary tree. **[3]**

2) Perform inorder, preorder and postorder traversal on binary tree converted from the tree given in fig.1 **[3]**

**Q.3** (a) Write an algorithm for insertion and deletion in Binary Search Tree. **[6]**

(b) Write an algorithm for creation and insertion operations on threaded binary tree. **[6]**

**OR**

**Q.3** (a) Write a recursive and non-recursive algorithm to perform preorder traversal. **[6]**

(b) Write an algorithm to create a graph using adjacency matrix. Also write an algorithm for BFS and DFS traversal on graph and perform these two traversals on the graph given in fig.2 **[6]**