Code No: 113BP **R13**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, November - 2015
DATA STRUCTURES
(Common to CSE, IT)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART –A (25 Marks)

1.a) Distinguish between Linear and Non Linear data structures. [2]
b) Write a recursive algorithm that finds all occurrences of a substring in a string. [3]
c) What is Stack? Give the declaration of all the functions used in the implementation of a stack. [2]
d) Suppose a queue is represented by a circular array of size N, F and R are used to denote front and rear positions. If F points a location before front element of queue and R points to last element of queue, how many elements are there in the queue? [3]
e) What are the ways in which a tree is represented in computer memory? [2]
f) What is the time complexity of DFS traversal as an n-vertex simple graph that is represented with adjacent matrix structure? [3]
g) Distinguish between tree and graph with an example. [2]
h) Consider an array of 100 sorted numbers. Almost how many searches are needed to search an element using Binary search. Justify your answer. [3]
i) Define Binary search tree. What are the properties of binary search tree? [2]
j) Explain the compressed trie with an example. [3]

PART-B (50 Marks)

2.a) Write a C function for insertion operation in a circular linked list.
b) What is algorithm? What are the properties of an algorithm? Explain the performance analysis of an algorithm. [5+5]

OR

3.a) Write an algorithm for deleting duplicate numbers from a linear array.
b) What is Sparse matrix? How Sparse matrices can be represented efficiently in memory? [5+5]

4.a) Write a function to convert a given singly linked list to doubly linked list.
b) Explain about the operations of Queue with an example. [5+5]

OR

5.a) Write a function to reverse elements.
b) Explain the operations of circular linked list. [5+5]

6.a) Create a Heap and sort the following list of elements
{12, 8, 10, 6, 24, 40, 6, 11, 9, 18, 14}
b) Explain the tree traversals with an example. [5+5]

OR

7.a) Explain how BFS can be used to identify the connected components in a graph with an example.

b) Write an algorithm that counts the number of nodes in a binary tree. [5+5]

8.a) Write a function double hash to resolve collisions using double hashing.

b) Explain the Radix sort with an example. [5+5]

OR

9.a) Write an algorithm of Binary search.

b) Insert the following list of elements in to the hash table by using linear probing (size of hash table is 10)

{16, 23, 43, 18, 34, 59, 30, 22} [5+5]

10.a) How a node can be deleted from the binary search tree? Explain the methods.

b) Construct the B-tree of order 4 for the following list of elements

{K, L, T, A, G, H, P, W, R, U, Z, C, Y, B, J, M, E} [5+5]

OR

11.a) Construct the AVL tree with the following keys

{35, 36, 80, 85, 67, 89, 25, 16, 10, 14, 50}

b) Write an algorithm of KMP. [5+5]

---ooOoo---