Registration No. : | | | | | | | | | | |

Total number of printed pages – 2

B. Tech

BE 2106 (New)

Second Semester (Back) Examination – 2013

DATA STRUCTURE USING C

BRANCH : ALL

QUESTION CODE : B480

Full Marks – 70

Time : 3 Hours

*Answer Question No. **1** which is compulsory and any **five** from the rest.*
The figures in the right-hand margin indicate marks.

1. Answer the following questions : 2 ×10

   (a) Define a stack.

   (b) What is a complete binary tree ?

   (c) What is two-dimensional array ? How they are stored in row major order form in memory ?

   (d) Write a short note on circular list.

   (e) Write a postfix form of a following expression : A – B/C * D – E % F.

   (f) What do you understand by sparse matrix ?

   (g) What is threaded binary tree ?

   (h) Write a short note on garbage collection.

   (i) What is minimum spanning tree ?

   (j) What is tree data structure ? What are different ways of traversing a tree ?

2. (a) What is inorder threaded binary tree ? Write an algorithm for preorder traversal of a inorder threaded binary tree. 5

   (b) What is an AVL tree ? Discuss the various kinds of rotations done for rebalancing the tree after insertion. Choose suitable example for illustration. 5

3. (a) Develop an algorithm using a heap of K elements to find the largest K numbers in a large, unsorted file of n numbers. 5

(b) Discuss Warshall's algorithm with example. 5

4. Discuss various stack operations with algorithm for each operation. 10

5. (a) What is Binary Search Tree ? Define. Draw a binary search tree when following keys are inserted in order in the initially empty binary search tree 15, 5, 12, 16, 8, 82, 19, 14, 12, 18, 55. How can a binary search tree be used for sorting of the keys ? 5

(b) Write a program in C for finding the factorial of a positive integer using recursion. 5

6. (a) Write the C program for sorting the list of integers using Bubble sort algorithm. Obtain the worst case and average case time complexity of this algorithm. Show the trace of the algorithm for following key sequence. 63, 3, 16, 26, 19, 46, 25, 43, 21, 76. 5

(b) Write an algorithm to find the number of connected components in any graph. 5

7. (a) Define stack with suitable example. Implements a stack in C in which each item on the stack is a varying number of integers. Choose a C data structure for such a stack and design a push and pop function for it. 5

(b) How two-dimensional arrays are stored in one dimensional memory ? If an array is defined as int a[10][20] in C. Device a formula to calculate the address of an any variable say a[i][j] for any valid value of i and j. 5

8. Write short notes on any **two** : 5×2

(a) Write note on B^+ tree

(b) Hashing Functions

(c) Garbage collection and Compaction

(d) Spanning Tree.
