Paper Code:EC-402	**Roll No.**									

B.Tech
(SEM IV) EVEN SEMESTER EXAMINATION, 2015-16
DATA STRUCTURE

[Time: 3 hrs.] [Max. Marks: 100]

Note: Attempt all questions.

Q. 1 Attempt any four of the following:- **[5x4=20]**

(a) How to measure the performance of an algorithm? What are the methods of its measurement?
(b) Formulate formula to find the address of 2D matrix using column major order and find address of A[5][0] of given matrix A[6][3] with base address 5302.
(c) What is sparse matrix? How to represent it?
(d) Write a "C" program for finding the sum of (i) diagonal (ii)Upper Triangle(excluding main diagonal)
(e) Write an algo to insert a new node at the end of the linked list.
(f) Write a "C" function for inserting a number at the rear of a circular list.

Q. 2 Attempt any two of the following:- **[10x2=20]**

(a) i) What is Stack? How is it implemented with linear list? Explain by algorithm.
ii) find the postfix and prefix expression for the given expression **A^B*C- D+E*F**

(b) What is recursion? Discuss Tower of Hanoi algorithm for 3 plates with algorithm.

(c) i) Discuss priority Queue and its application
ii) Write an algorithm for deletion of front node from a queue represented using circular linked list.

Q. 3 Attempt any two of the following:- **[10x2=20]**

(a) Make the Huffman tree from the given data
A: 1, B: 2, C: 3, D: 10, E: 11, F: 15, G: 16, H: 36, I: 85, J: 160
Find average number of bit to represent the number and code word for each.

(b) i) Write non recursive algorithm for post order tree traversal.
ii) Discuss various rotations in AVL tree. Create AVL tree from given data
12, 15 , 20, 5, 3, 9, 6 ,10

(c) i) What is binary search tree? Write an algo for binary search tree deletion.
ii) Prepare a complete binary tree from the following data
18, 25, 20, 23, 16, 11, 28, 22, 10, 14.

Q. 4 Attempt any two of the following:- **[10x2=20]**

(a) Discuss algo DFS and find the order of traversing using BFS of following Graph

(b) Define spanning tree. Create a minimum cost spanning tree using Prim's Algorithm from the given graph in **Fig 1**

(c) Find the shortest path using Floydd Warshall algorithm of given graph in **Fig 2**

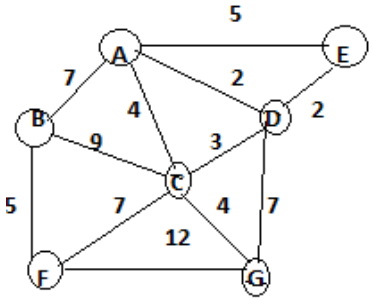

Fig 1

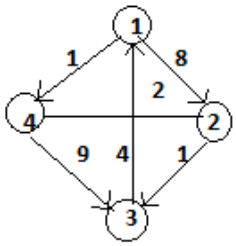

Fig2

Q. 5 Attempt any two of the following:- **[10x2=20]**

(a) i) Write the recursive function for binary search.
ii) Explain Quick sort is an application of stack.

(b) i) Write the algorithm for insertion sort. Show that the running time of insertion sort is $O(n^2)$
ii) What is hashing function? Discuss the various hash functions.

(c) What are the properties of max heap? With heap sort algorithm sort the following data
6, 2, 10, 3, 12, 55, 7, 85, 8