8. a. Describe the following   8M
   i) m-way search trees
   ii) Hash Functions

   b. Explain the Merge Sort algorithm. Sort the given array of elements
   E = {311, 286, 178, 650, 353, 419, 861, 254, 450, 515} using
   Merge Sort.   7M

   * * *

II/IV B.Tech. DEGREE EXAMINATION, JUNE, 2015

Third Semester

DATA STRUCTURES

Time: 3hours   Max. Marks: 70

Part-A is compulsory

Answer One Question from each unit of Part-B

PART-A

10 x 1 = 10M

a. What is space complexity?

b. List applications of a Stack Data Structure.

c. Define Graph.

d. Write an equivalent postfix expression for the expression a+b*c.

e. Compare Full and Complete Binary Trees.

f. What is a Spanning Tree?

g. What is an Average Time Complexity of a Binary Search?

h. Which Data Structure is used in DFS traversal?

i. What is the Time Complexity of the Quick Sort algorithm?

j. List any two collision resolution strategies.

PART-B

4 x 15 = 60M

UNIT-I

1. a. State an algorithm. Explain the performance analysis of an algorithm.   **6M**

    b. List the advantages of a Circular Queue. Explain the insertion and deletion operations of a Circular Queue through a C program. **9M**

(or)

2. a. What is recursion? Explain the Towers of Hanoi problem with a suitable example.   **6M**

    b. Write a C code to implement the following singly linked list operations   **9M**
        i) Insertion at beginning of the linked list
        ii) Deletion at end of the linked list
        iii) Displaying the linked list

UNIT-II

3. a. What is a Tree Data Structure? Explain the linked representation of trees. Describe various Binary tree traversal techniques.   **8M**

    b. Describe Binary Search Tree. Construct a BST with the given set of nodes s = {416, 879, 455, 764, 112, 654, 346, 256, 345}   **7M**

(or)

4. a. Write a C program to perform non recursive inorder Binary Tree traversal.   **7M**

    b. Explain the insertion, deletion and search operations of BST with a suitable example.   **8M**

UNIT-III

5. a. What is a Graph? Explain the BFS and DFS traversals with an algorithm.   **8M**

    b. Describe the construction of Minimum Cost Spanning Tree using Kruskal's algorithm.   **7M**

(or)

6. a. Describe the various Graph representations. Explain Dijkstra's algorithm to find the shortest path.   **8M**

    b. Explain Prim's algorithm to construct the Minimum Cost Spanning Tree of a weighted graph.   **7M**

UNIT-IV

7. a. List the advantages of AVL Trees. Describe its rotation operations to balance AVL Trees.   **8M**

    b. Write an algorithm for the following: **7M**
        i) Binary Search   ii) Heap Sort