



(Following Paper ID and Roll No. to be filled in your Answer Book)

**PAPER ID : 110302**

Roll No.

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**B.Tech.**

(SEM. III) (ODD SEM.) THEORY  
EXAMINATION, 2014-15  
**DATA STRUCTURE USING 'C'**

Time : 3 Hours]

[Total Marks : 100

**Note:** Attempt questions from each Section as per instructions.

**SECTION – A**

1. Attempt all parts: **2x10=20**
- (a) Differentiate data structure and data type .
  - (b) Write is basic concept of Prim's algorithms.
  - (c) What is tail recursion?
  - (d) What is compaction?
  - (e) Distinguish between internal sorting and external sorting?
  - (f) How many maximum comparisons required in searching an element in a binary search tree?
  - (g) What will happen if a binary tree is left oriented or right oriented?
  - (h) Write over flow conditions for circular queue.

(J) What is complexity of an algorithm?

### SECTION - B

2. Attempt any three parts: **10x3=30**

(a) What is the Tower of Hanoi problem? Give the solution in terms of disk move sequence on pegs A, B, C for 4 disks.

(b) Write an algorithm for inserting a node in binary search tree. A binary tree T has 9 nodes. The inorder and preorder traversals of T yield the following sequence:

Inorder : E, A, C, K, F, H, D, B, G

Preorder : F, A, E, K, C, D, H, G, B

Draw the tree T.

(c) Write an algorithm to convert Infix notation into Postfix notation of an expression.

(d) What is complete graph? What is minimum spanning tree? Write Prim's algorithm for minimum spanning tree.

(e) Write an function in C for insertion sort. Trace your algorithm on the following data to sort the list: 77, 33, 44, 11, 88, 22, 66, 55

### SECTION - C

Attempt all questions: **10x5=50**

3. Attempt any one part: **10x1=10**

(a) Differentiate Breadth First Search (BFS) and depth First Search (DFS) algorithm of graph traversal.

(c) Write an algorithm for inserting a node in Binary Search Tree. Suppose the following 10 members are inserted in order into an empty binary search tree T: 50, 48, 35, 44, 80, 70, 10, 55, 11, 85.

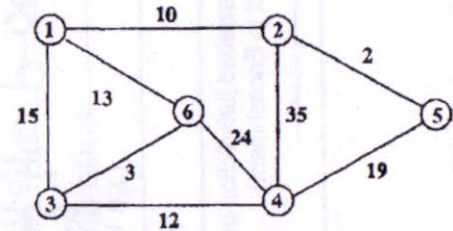
Draw the tree T.

4. Attempt any two parts: **5x2=10**

(a) Explain why simple array implementation of queue is not practically useful.

(b) Write an algorithm to insert an element in a queue.

(c) Find MST of the following graph-using Krushal's algorithm.



5. Attempt any one part: **10x1=10**

(a) What is m-way search tree? Construct the B-Tree form the following elements

65, 71, 70, 66, 75, 68, 72, 77, 74, 69, 83, 73, 82, 88, 67, 76, 78, 84, 85, 80

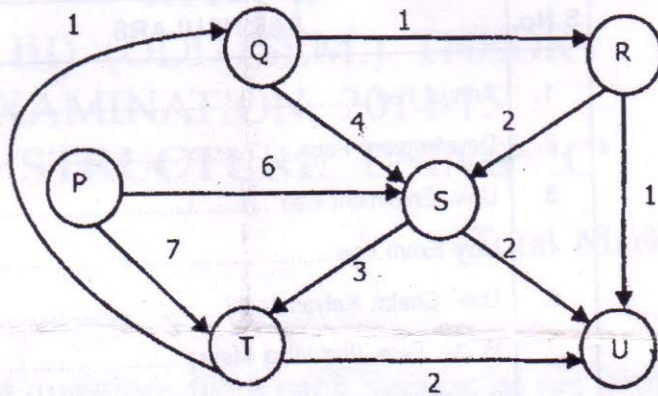
(b) Define hash function. What do you mean by perfect hash function? Discuss various methods used for resolving hash collisions.

6. Attempt any one part:

10x1=10

(a) Write an algorithm for sorting a set of integers using quick sort. What is the case average time complexity of the procedure?

(b) Find the single source shortest path from the following graph using Dijkstra's algorithm



7. Write short note on any Two the following:

5x2=10

(a) Data and Information

(b) Storage device

(c) File organization

oriented?

(h) Write over flow conditions for circular queue.