



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

PAPER ID : 131405

Roll No.

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B.Tech

(SEM. IV) THEORY EXAMINATION 2014-15

DATA STRUCTURE

Time : 3 Hours]

[Total Marks : 100

Note: Attempt All Questions. All Questions carry equal marks:-

1 Attempt any **FOUR** of the following questions: **5x4=20**

- (a) Explain merits and demerits of static and dynamic memory allocation techniques.
- (b) What is asymptotic notation? Explain the Big 'O' notation.
- (c) What is Sparse Matrix? Discuss it's representation in term of lower triangular matrix.
- (d) What is Link list? How it is different from an array?
- (e) Write an algorithm to insert and delete an item from the circular link list.
- (f) Differentiate between overflow and underflow condition in link list.

2 Attempt any **TWO** of the following questions: **10x2=20**

- (a) Convert $E=abcde^{**+}$ postfix expression to infix and prefix using stack.
- (b) What is recursion? Write a recursive solution to solve TOWERS of HANOI problem.
- (c) How would you implement a queue of stacks? Write routines to implement the appropriate operations for this data structure.

3 Attempt any **TWO** of the following questions: **10x2=20**

- (a) Prove and explain that a strictly binary tree with 'n' leaves contains $2n-1$ nodes.
- (b) Construct a tree for the following preorder and postorder and write its inorder traversal.
Preorder: 24, 14, 13, 19, 17, 15, 10, 5, 8, 6, 7, 20.
Postorder: 13, 15, 17, 10, 19, 14, 7, 6, 20, 8, 5, 24
- (c) Explain threaded binary tree. How it would be useful and efficient in implementing the tree traversal?

4 Attempt any **TWO** of the following questions: **10x2=20**

- (a) Explain Depth First Search. Give example to support your explanation.
- (b) Explain Kruskal's algorithm to find minimum spanning tree in a weighted directed graph. Can there be two minimum spanning trees of given weighted directed graph?

(c) How can you find shortest path between two nodes in a graph by Dijkstra algorithm? Explain by suitable diagram.

5 Attempt any **TWO** of the following questions: **10x2=20**

- (a) With the help of algorithm explain the binary search and also discuss it's time complexity.
- (b) Write and explain the bubble sort algorithms for a given set of 'n' data's where 'kth' is the largest data.
- (c) Compare and contrast average case behavior of Quick Sort and Merge Sort.