

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

Paper ID : 214220

Roll No.

M.C.A.

Theory Examination (Semester-II) 2015-16

DATA STRUCTURE USING 'C'

Time : 3 Hours

Max. Marks : 100

Note: Attempt questions from all Sections as per directions.

Section-A

Attempt *all parts* of this section. Answer in brief. (2×10=20)

- Q1. (a) What are the data structures used to perform recursion?
- (b) State the advantages of using infix/postfix notations.
- (c) Difference between Abstract Data Type, Data Type and Data Structure.
- (d) What is the need for Priority queue?
- (e) What do you mean by structure property in a heap?

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- (f) What do you mean by the term "Percolate down"?
- (g) What are the objectives of studying data structures?
- (h) State the difference between stacks and linked lists
- (i) What are the advantages of modularity?
- (j) State the difference between primitive and non-primitive data types.

### Section-B

**Q2. Attempt any five questions from this section. (10×5=50)**

- (a) Evaluate the following prefix expression "++ 26 + - 1324".
- (b) Construct an expression tree for the expression  $A+(B-C)*D+(E*F)$
- (c) How many null nodes will a binary tree with 20 nodes have?
- (d) Write and explain weighted and unweighted shortest path algorithm.
- (e) Explain the minimum spanning tree algorithms with an example.

- (f) Write a C program to perform Merge sort and analyze time complexity of the algorithm.
- (g) Write an algorithm INSERT that takes a pointer to a sorted list and a pointer to a node and inserts the node into its correct position in the list.
- (h) What do you mean by Base case, Recursive case, Binding Time, Run-Time Stack and Tail Recursion?

### Section-C

Attempt *any two questions* from this section. (15×2=30)

- Q3. Write a program to allocate memory dynamically for strings, and store their addresses in array of pointers to strings.
- Q4. How memory is freed using Boundary tag method in the context of Dynamic memory management?
- Q5. What are expression trees? Represent the following expression using a tree. Comment on the result that you get when this tree is traversed in Preorder, Inorder and postorder  $(a-b) / ((c*d)+e)$ .