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B TECH
(SEM-III) THEORY EXAMINATION 2017-18
DATA STRUCTURE**Time: 3Hours****Max. Marks: 100****Note:** Attempt all Sections.**SECTION A**

- 1. Attempt *all* questions in brief. **2 x 10 = 20****
- a. What is Data structure?
 - b. Explain different types of data structures in brief
 - c. Explain the use of calloc () and realloc () functions with example
 - d. Write algorithms for insertion in circular queue
 - e. Explain single ended priority queue
 - f. What is a leftist tree?
 - g. What is the need for using circular array to implement queues
 - h. Discuss the timing analysis of the heap-sort algorithm.
 - i. What are the two broad classes of collision resolution techniques? Explain.
 - j. Define a binary tree.

SECTION B

- 2. Attempt any *three* of the following: **10 x 3 = 30****
- a. Design an algorithm which trims off all the trailing blanks of a character string
 - b. Give a procedure that uses a stack in order to reverse the elements of a circular queue which is stored in an array.
 - c. Give an algorithm to reverse the elements of a single linked lists without using temporary List.
 - d. Write an algorithm to count the number of nodes in a given singly linked list.
 - e. Write any one external sorting algorithm in detail.

SECTION C

- 3. Attempt any *one* part of the following: **10 x 1 = 10****
- (a) Write insertion algorithm for AVL tree. Write suitable rotation algorithms.
 - (b) Write ADT operations for heap sort. Using the above algorithm sort the following:
35 45 25 11 6 85 17 35.
- 4. Attempt any *one* part of the following: **10 x 1 = 10****
- (a) Explain the topological sort algorithm
 - (b) Develop an algorithm for binary search. Validate the algorithm with a suitable data set.

5. Attempt any *one* part of the following: 10 x 1 = 10

- (a) Explain insertion and deletion to double ended priority queue
- (b) Explain recursion tree method and Substitution method for solving recurrence with suitable examples.

6. Attempt any *one* part of the following: 10 x 1 = 10

- (a) Explain insertion and deletion algorithms on threaded binary trees
- (b)
 - Make a binary tree using:
INORDER → Q B K C F A G P E D H R
POSTORDER → G B Q A C K F P D E R H

7. Attempt any *one* part of the following: 10 x 1 = 10

- (a) What is AVL tree? Make an AVL tree for the given sequence
50 33 44 77 35 60 40
- (b) What is string? What is the first character of string? How can we access individual elements of a string?