Printed Pages: 02 **Sub Code: NCS301**

Paper ID: | 1 | 0 | 3 | 3 | **Roll No.** | | | | | | | | | | |

B TECH
(SEM III) THEORY EXAMINATION 2017-18
DATA STRUCTURES USING C

Time: 3Hours ***Max. Marks: 100***

Note: Attempt all Sections. Assume missing data, if any.

SECTION A

1. Attempt *all* questions in brief. 10x2=20

a. List out the areas in which data structures are applied extensively?
b. What data structure is used to perform recursion?
c. What are the methods available in storing sequential files?
d. What are the advantages of B^+ tree over B- tree?
e. Define graph. How a graph is different from a tree?
f. Define space complexity and time complexity.
g. How a pointer to a function is declared in C?
h. Define priority queue.
i. What is binary tree? Explain.
j. Define garbage collection.

SECTION B

2. Attempt any *three* of the following: 10 x 3 = 30

a. Write a program in C for implementation of a queue. Your program should at least contain ADD, CREATE. DELETE, FULL and EMPTY functions.
b. If an array is defined as int a[10] [20] in C, devise a formula to calculate the address of an any variable say a[i] [j], for any valid value of i and j.
c. Write a program to implement STACK using linked list.
d. Write an algorithm to multiply two matrices and determine complexity of the algorithm.
e. What is binary search tree? Write the important applications of binary search tree. Write algorithm to delete a node from a binary search tree.

SECTION C

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

(a) What do you mean by hashing and collision? Discuss the advantages and disadvantages of hashing over other searching techniques.
(b) Write short notes on following
i.) B-Tree
ii.) Minimum cost spanning tree

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

(a) Write a program to implement tree traversals using linked list.
(b) Describe a procedure to convert a recursive algorithm to a non recursive Algorithm.

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

(a) What is a doubly linked list? How is it different from the single linked list?

(b) What is a sparse matrix? How sparse matrix can be represented efficiently in memory?

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

(a) Discuss Huffman algorithm and its significance.

(b) Write Dijkastra algorithm for finding the shortest path from a source vertex.

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

(a) What are the various asymptotic notations? Explain with example.

(b) If the Tower of Hanoi is operated on n=10 disks, calculate the total number of moves.

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