Printed Pages: 02 **Sub Code: RCS305**

Paper ID: | 1 | 0 | 0 | 4 | **Roll No.** | | | | | | | | | | |

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

Time: 3Hours ***Max. Marks: 70***

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

SECTION A

1. Attempt *all* questions in brief: 2 x 7 = 14

a. Define the term Data Structure. List some linear and non-linear data structures stating the application area where they will be used.

b. Discuss the concept of "successor" and “predecessor” in Binary Search Tree.

c. Convert the following arithmetic infix expression into its equivalent postfix expression.

Expression: A-B/C+D*E+F

d. Explain circular queue. What is the condition if circular queue is full?

e. Calculate total number of moves for Tower of Hanoi for n=10 disks.

f. List the different types of representation of graphs.

g. Explain height balanced tree. List general cases to maintain the height.

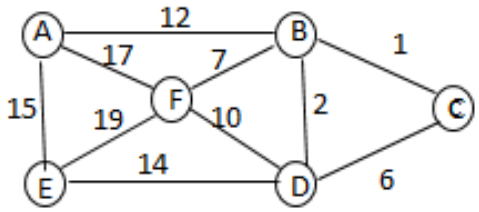
SECTION B

2. Attempt any *three* of the following: 7 x 3 = 21

a. What do you understand by time space trade off? Explain best, worst and average case analysis in this respect with an example

b. Use quick sort algorithm to sort 15,22,30,10,15,64,1,3,9,2. Is it a stable sorting algorithm? – Justify.

c. Define spanning tree. Also construct minimum spanning tree using prim’s algorithm for the given graph.



d. Define tree, binary tree, complete binary tree and full binary tree. Write algorithms or function to obtain traversals of a binary tree in preorder, postorder and inorder.

e. Construct a B-tree on following sequence of inputs.

10, 20, 30, 40, 50, 60, 70, 80, 90

Assume that the order of the B-tree is 3.

SECTION C

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

(a) What are the various asymptotic notations? Explain Big O notation.

(b) Write an algorithm to insert a node at the end in a Circular linked list.

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

(a)What is a Stack .Write a C program to reverse a string using stack.

(b)Define the recursion. Write a recursive and non recursive program to calculate the factorial of the given number.

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

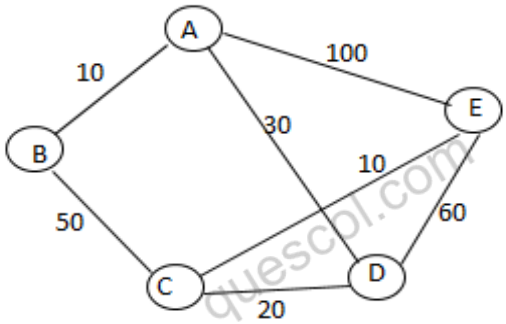
(a) Draw a binary tree with following traversals:
Inorder: B C A E G D H F I J
Preorder: A B C D E G F H I J

(b) Consider the following AVL Tree and insert 2, 12, 7and 10 as new node. Show proper rotation to maintain the tree as AVL.

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

(a)What is a Threaded Binary Tree? Explain the advantages of using a threaded binary tree.

(b)Describe Dijkstra's algorithm for finding shortest path. Describe its working for the graph given below.



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

(a)Write short notes on:

i. Hashing Technique
ii. Garbage collection

(b)Explain the following:

i. Heap Sort
ii. Radix Sort.

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