Printed Pages:2 **Sub Code: RCS 405**

Paper Id: 110258 **Roll No.**

B TECH
(SEM IV) THEORY EXAMINATION 2018-19
DATA STRUCTURES

Time: 3 Hours ***Total Marks: 70***

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

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

a. What is asymptotic notation? Explain Big **Oh** notation?

b. Given a 2D array **A [-100:100,-5:50].** Find the address of element **A [99, 49]** considering base address **10** and each element requires **4** bytes for storage. Follow row major order?

c. If the in order traversal of a binary tree is **D, J, G, B, A, E, H, C, F, I** and its pre order traversal is **A, B, D, G, J, C, E, H, F, I** Determine the binary tree?

d. Evaluate postfix expression **8 2 – 4 + 5 6 7 - + ×**

e. Explain collision resolution strategies used in hashing?

f. Write a recursive solution to solve Tower of Hanoi problem.

g. Define complete binary tree and full binary tree.

SECTION B

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

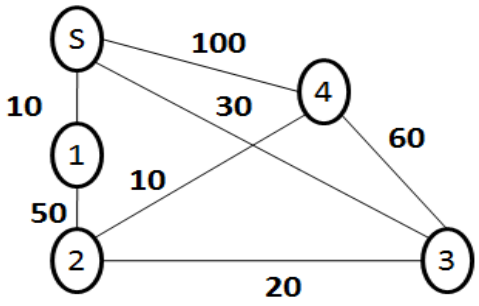
a. Consider the following infix expression and convert it into postfix using stack

A + (B * C – (D/E-F) * G) * H

b. What is doubly linked list? Write an algorithm to insert a node at begin in single linked list.

c. Construct a Huffman tree for given characters **A, B, C, D, E, F, G, H** having frequencies **22, 5, 11, 19, 2, 11, 25, 5** respectively. What will be the code of **HEAD** in binary?

d. Find the shortest path from S to all remaining vertices of graph using Dijikstra Algorithm



e. Use Heap sort algorithm to sort the following sequence {**8, 5, 45, 24, 36, 11, 43, and 21**}.

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SECTION C

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

a. What do you understand by time space trade off? How to analysis the time complexity of the algorithm in three different cases.

b. What is circular linked list? Write an algorithm to delete a node from begin in single linked list.

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

a. What do you mean by priority queue? Explain the types to maintain the priority queue in memory?

b. Write an algorithm for conversion of an infix expression into prefix expression using stack?

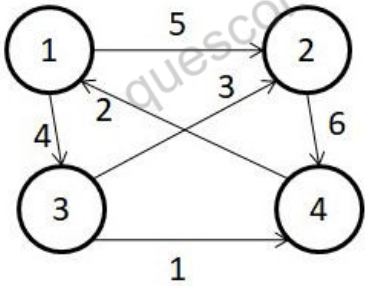
5. Attempt any *one* part of the following: 7 x 1 = 7

a. Draw a binary tree with following traversals:
Preorder: **A B C D E F G H I J K L**
Postorder: **C F E G D B K J L I H A**

b. What is threaded binary tree? Explain two-way in order threading with suitable example?

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

a. Implement Floyd Warshall algorithm on the following graph.



b. What is transitive closure? What are the steps to obtain the transitive closure of a Graph?

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

a. Describe an AVL tree. Construct an AVL tree by inserting the following elements in the order of their occurrence **{60, 2, 15, 20, 12, 115, 90 and 88}.**

b. Show the results of inserting the keys **F, S, Q, K ,C, L, H, T, V, W, M, R, N, P, A, B** in order into a empty B-Tree of order **5.**

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