

Roll No.

2294038

Paper Code: TCS 302

END SEMESTER Examination 2024

B.Tech (CSE) III Sem

Data Structure with 'C' language.

Time : Three Hours

Maximum Marks :100

INSTRUCTIONS TO STUDENTS

Note:

- (i) All questions are compulsory.
- (ii) Answer any two sub questions among a, b & c in each main question.

(2X10=20 Marks) (CO1, CO3, CO4)

A. Write a C function to insert a node in a circular singly linked list. Consider all the cases.

B. Using the following traversals, constructs the corresponding binary tree.

INORDER : H K O B I L E A F C M J G

PREORDER : A B D H K E I L C F G J M

C. Write advantages of an AVL tree. Draw an AVL tree with following keys:

6,7,8,9,10,1,2,3,4,5

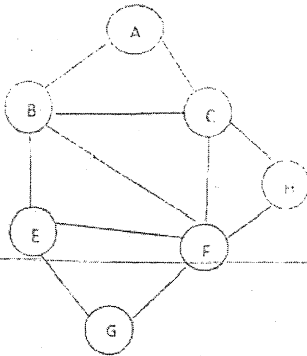
Q2.

(2X10=20 Marks) (CO2, CO3, CO5)

A. The following list is to be sorted using quick sort : 10, 40, 5, 18, 22, 36, 7, 3, 16, 48, 30, 27. Show the sorting process by indicating how the data would appear in intermediate steps (do not write code).

B. Draw an expression tree using following expression  
 $(G * H) - P / Q - (R * S) + T \wedge U$

2. Give name and apply the graph traversal technique on the given graph, to find a path from A to G with minimum number of nodes in between. (Show all steps)



13.

(2X10=20 Marks) (CO2, CO3, CO5)

- A. Apply Huffman's algorithm to find Huffman's tree and code for  $a=3, b=2, c=4, d=2, e=4, f=3, g=1$ .

Also find the minimum weighted path length.

- B. Explain hash collision with an example. Consider a hash table of size (m) 11. Using

linear probing technique insert following keys 11, 17, 19, 22, 81, 21, 92, 15, and 29 into the hash table.

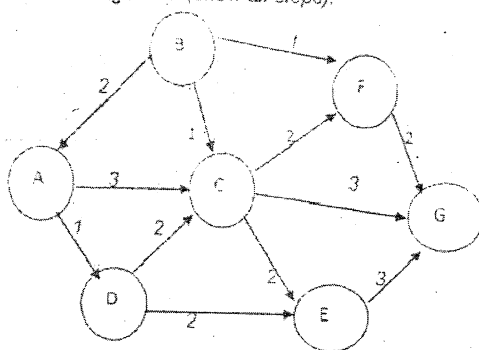
- C. Assume that you have a sorted single linked list, with a pointer P pointing the first node of the linked list. Write a C function to delete all nodes that have odd information in that linked list.

Q4.

(2X10=20 Marks) (CO1, CO3, CO5)

A. Explain sequential organization and index sequential file organization with examples

B. What do you mean by spanning tree? Find minimal spanning tree from the given graph using Kruskal's algorithm (show all steps).



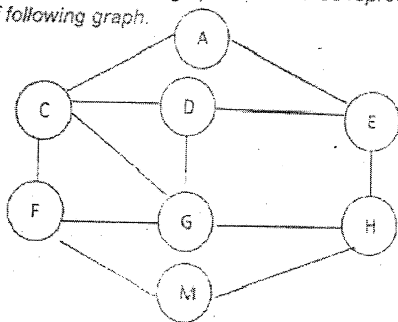
C. Consider a single linked list with a pointer pointing to its head. Write a 'C' function to insert a node to the front of the list, after the last node, in between the list.

Q5.

(2X10=20 Marks) (CO3, CO4, CO5)

A. Explain B and B<sup>+</sup> Tree. Create a B-tree of order 4, when the keys arrive in the following order a, f, g, b, k, d, m, j, e, s, i, x, r, y

B. What do you mean by a connected graph? Give linked representation and memory representation of following graph.



C. Write a function to merge two single linked lists. The input lists have their elements in sorted order, from lowest to highest. The output list should also be sorted from lowest to highest.