Roll No.

Paper Code: TMC 203

END SEMESTER Examination

MCA II

Data Structure

Time : Three Hours

Maximum Marks :100

NSTRUCTIONS TO STUDENTS

Note:

(i) All questions are compulsory.

(ii) Answer any two sub questions among a, b & c in each main question.

Q1) (2X10=20 Marks) (CO2, CO3, CO5)

A. Assume that you have a single linked list, first node of the list is pointed by pointer P, write a C function to insert a new node after the node having highest information in the list.

B. Apply Huffman's algorithm to find Huffman's tree and code, for a=1,b=2,c=3,d=2,e=3,f=2. Also find the minimum weighted path length. *(show all steps).*

C. Write a 'C' function to create a binary search tree and write another function to count the nodes having left child only in the BST.

Q 2) (2X10=20 Marks) ((CO2, CO4, CO5)

A. Explain hash collision with an example. Consider a hash table of size 12, using linear probing ,insert the following keys into the hash table 12,13,20,26,89,90,39,45,60. *(show all steps).*

B. Explain balance factors in an AVL tree. Draw an AVL tree with following keys: 15,10,12,9,8,16,2018,17,22. *(show all steps).*

C. Assume that we have single linked list, First node of the linked list is pointed by a pointer Ptr. Write a C function to reverse the linked list.(Do not print in the reverse order)

Q3)

(2X10=20 Marks) (CO2, CO4, CO3)

A. Convert the following infix expression into postfix expression using stack (Show all steps).
(A+B/C*D)%E+F^G%H-I *(show all steps).*

B. Write an algorithm to delete a node from a binary search tree. Discuss algorithm with an example.

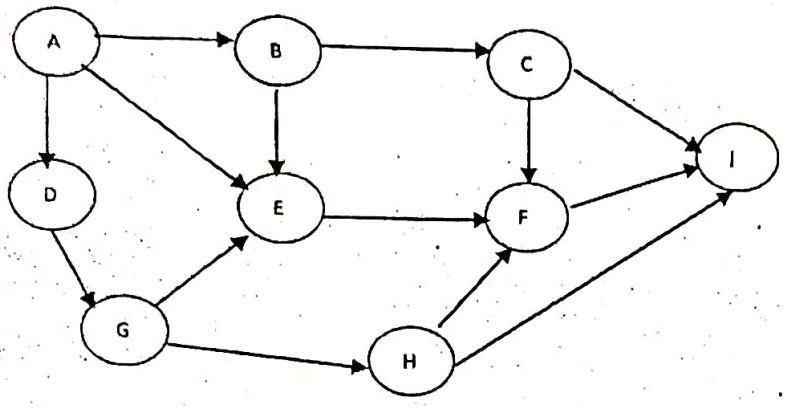
C. Write applications of B + tree. Draw a B - tree of order 3 with following keys:

10,2,1,20,30,9,15,35,16,40. *(show all steps).*

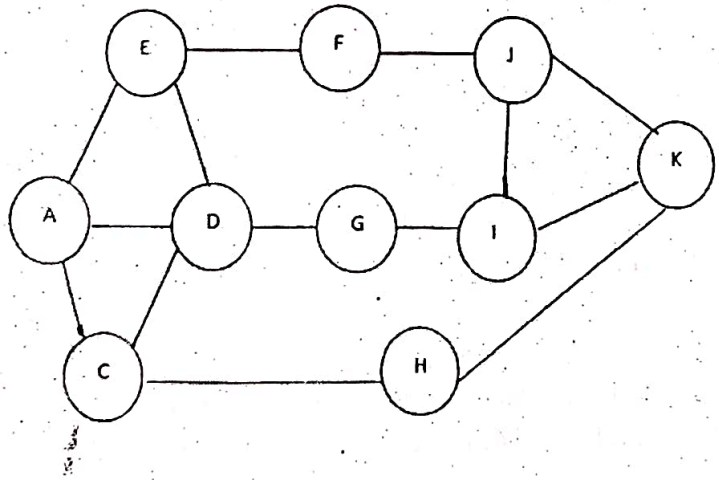
Q4.)

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

A. Give linked representation and memory representation of following graph:



B. Give name and apply a graph traversal technique on the given graph, such that the number of nodes between A to K, are minimum. *(show all steps).*

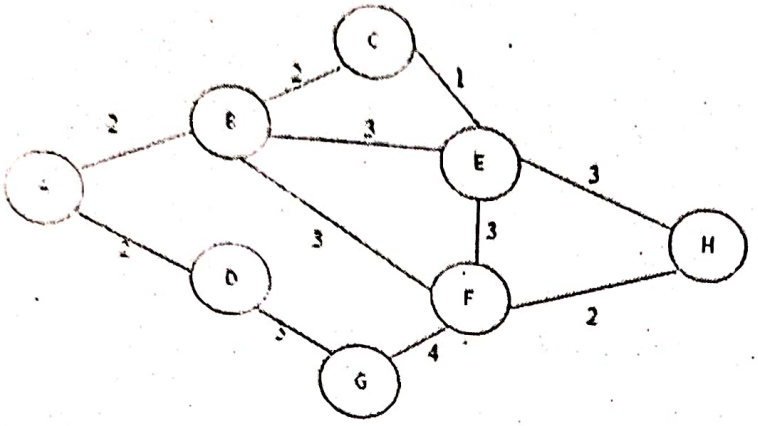


C. Explain sequential file organization and index sequential file organization with suitable examples.

Q5

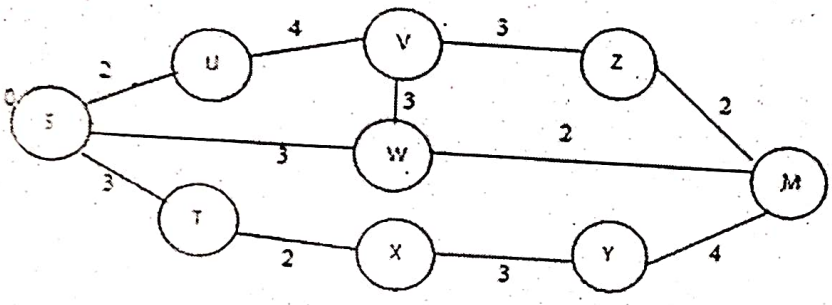
A. Explain minimal spanning tree. Find minimal spanning tree of following graph, using Kurskal's algorithm. (2X10=20 Marks) (CO3, CO4, CO5)

(show all steps).



B. Using Dijkstra's algorithm, find the shortest distance from source vertex 'S' to remaining vertices in the following graph-

(show all steps).



C. Apply merge sort technique to sort the following sequences of elements 60, 12, 34,15,30,70,55,66,10 (Do not write the code)

(show all steps).