No. of Printed Pages : 3

MCS-021

MCA (Revised) / BCA (Revised)

Term-End Examination

June, 2022

MCS-021 : DATA AND FILE STRUCTURES

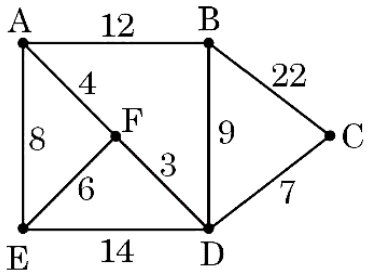
Time : 3 hours *Maximum Marks : 100*

(Weightage : 75%)

Note : *Question number **1** is **compulsory**. Attempt any **three** questions from the rest. All algorithms should be written near to 'C' language.*

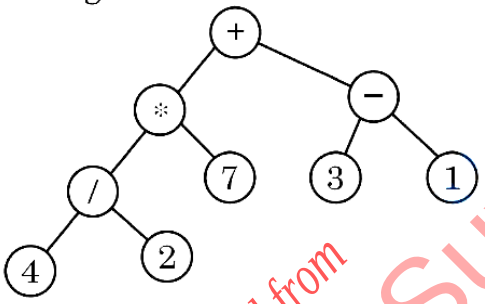
1. (a) What is an Algorithm ? Explain properties of an algorithm. Explain time complexity and space complexity of an algorithm, with the help of a suitable example. *10*

(b) Write Kruskal's algorithm. For the graph given below, show the various steps involved in construction of Minimum Cost Spanning Tree using Kruskal's algorithm. *10*



(c) Write a 'C' program for insertion and deletion of node in a link list. *10*

(d) Write Preorder and Postorder traversal of the tree given below : *10*



2. (a) What is Circular Queue ? Write an algorithm to add an element and delete an element in a circular queue. *10*

(b) Write Breadth-first search algorithm. *5*

(c) Explain Direct File Organisation. *5*

3. (a) Write an algorithm to check whether stack is empty or not. *5*

(b) Describe Big 'O' and 'Ω' notations. *5*

(c) What is Red-Black Tree ? Explain the properties of Red-Black Tree. *10*

4. (a) Define AVL Tree. Write the algorithm to insert a node into an AVL tree and delete a node from an AVL tree. *10*

(b) Write Pseudo code for Bubble Sort Algorithm. Sort the following list using bubble sort in ascending order :

35, 39, 10, 8, 78, 92, 20, 50

Also, write the steps involved. *10*

5. (a) Write a program that accepts a matrix as input and prints the 3-tuple representation of it. *6*

(b) Explain the Index sequential file organization. *4*

(c) What is Hashing ? Explain its use. Also, explain the concept of hashing functions, with an example. *10*