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MCS–021

M. C. A. (REVISED)/B. C. A. (REVISED)

(MCA/BCA)

Term-End Examination

December, 2023

MCS-021 : DATA AND FILE STRUCTURES

Time : 3 Hours *Maximum Marks : 100*

Weightage : 75%

Note : *(i) Question No. 1 is compulsory.*

*(ii) Attempt any **three** questions from the rest.*

(iii) All algorithms should be written near to 'C' language.

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1. (a) What is an algorithm ? What is complexity of an algorithm ? Explain trade off between space and time complexity with the help of an example. 8

   (b) Write an algorithm for the following : 10

   (i) Insert an element at the end of a linked list

   (ii) Delete an element from linked list

P. T. O.

(c) What is a circular queue ? Explain how it can be implemented using arrays. 10

(d) Write and explain Prim's algorithm for finding Minimum Cost Spanning Tree (MCST). 12

2. (a) Write an algorithm for insertion sort. Write step by step working of this algorithm for sorting the following list of data : 10

8, 10, 25, 8, 16, 27, 2, 45

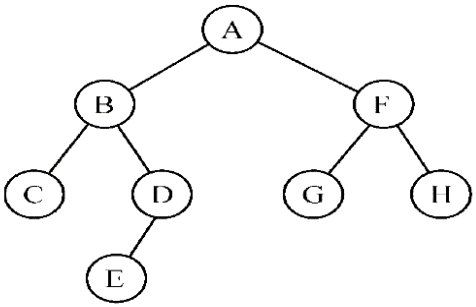
(b) Draw AVL tree by inserting the following elements one by one : 10

8, 13, 27, 9, 12, 15, 10, 35, 25

3. (a) Write an algorithm for adding two polynomials. 10

(b) Explain indexed sequential file organization with the help of an example. 10

4. (a) Traverse the following binary tree in pre-order and post-order : 10



(b) What is a Red-Black tree ? Explain the properties of Red-Black tree. Explain how a node is inserted in a Red-Black tree. 10

5. (a) Write and explain algorithm for binary search. Also, explain applications of binary search. 10

(b) What is Breadth First Search (BFS) ? Explain difference between BFS and Depth First Search (DFS). 10