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Total Pages : 4

Roll No. -----

MCS-405/DCA-105/MIT (CS)-401

Data Structures & Program

Methodology/Data Structure

(MSCIT/DCA/MSCCS)

2nd/4th Semester Examination 2024(Dec.)

Time: 2:00 hrs

Max. Marks: 70

Note : This paper is of Seventy (70) marks divided into Two (02) Section A and B. Attempt the questions contained in these sections according to the detailed instructions given therein. Candidates should limit their answers to the questions on the given answer sheet. No additional (B) answer sheet will be issued.

P.T.O.

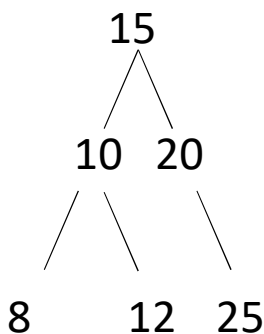
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Section-A (Long-Answer-Type Questions)

Note : Section 'A' contains Five (05) long-answer-type questions of Nineteen (19) marks each. Learners are required to answer any Two (02) questions only.

[2x19=38]

- Q.1. What is an algorithm? How the complexity of an algorithm is calculated? Explain with suitable example.
- Q.2. Describe the insertion and deletion operations in a circular linked list with examples. Implement a priority queue using a linked list and write functions for insertion and deletion.
- Q.3. Explain the difference a B-tree and a binary tree? For the following binary tree, perform and write the output of Preorder Traversal, Inorder Traversal, and Postorder Traversal.



- Q.4. Describe the working of Radix Sort with a step-by-step example. Sort the following numbers using Radix Sort: 170, 45, 75, 90, 802, 24, 2, 66, 53.
- Q.5. Discuss the advantages and disadvantages of linear search over binary search. For the given array [10, 20, 30, 40, 50, 60, 70] find the position of element 50 using Linear Search. Count the number of comparisons.

Section-B (Short-Answer-Type Questions)

Note : Section 'B' contains Eight (08) short-answer-type questions of Eight (08) marks each. Learners are required to answer any Four (04) questions only.

[4x8=32]

- Q.1. Define data structure and its types. Explain the concept of bit setting in data representation.
- Q.2. What is the Konigsberg Bridge Problem? State one real-world application of the Konigsberg Bridge Problem.

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- Q.3. Write the algorithm for Quick Sort and explain its working with an example.
- Q.4. Discuss the principal concept of linear search. Write down the best, worst and average case time complexity of linear search.
- Q.5. What is an AVL tree, and why is it used?
- Q.6. Explain the working of hashing techniques. Explain any two methods of collision resolution.
- Q.7. Sort the given array using Selection Sort and write the steps: Array: [64, 25, 12, 22, 11].
- Q.8. Explain how Minimum Spanning Tree (MST) is constructed using Kruskal's algorithm.
