A–0828

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MCS-507

DESIGN AND ANALYSIS OF ALGORITHM

(MCA/MSCIT)

Examination, June 2025

Time : 2:00 Hrs. Max. Marks : 70

Note* :–** This paper is of Seventy (70) marks divided into Two (02) Sections '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.

Section–A

Long Answer Type Questions 2×19=38

***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.

1. Explain eight queen's problem and apply back tracking to solve this problem.

2. Explain Prim's algorithm with an example.

3. Discuss the Bellman-Ford's algorithm for single-source shortest path problem.

4. (a) What is Master's theorem ? Explain with suitable example.

   (b) What is divide and conquer method ? Sort the following sequence using merge sort method.

   5, 2, 4, 7, 1, 3, 2, 6

5. (a) Explain the minimum spanning tree and knapsack problem with an example.

   (b) What is the difference between Divide & Conquer and Dynamic Programming method ? Explain with an example.

Section–B

Short Answer Type Questions 4×8=32

***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.

1. Define Algorithm ? What are the Characteristics of an Algorithm ?

2. Define greedy algorithm. Explain the characteristics of greedy algorithms.

3. Compare and contrast BFS vs DFS.

4. What is Binary Search Tree ? How an element is searched in binary search tree ?

5. What is NP-Hard problem ? Explain with an example.

6. Explain the following with an example.

   (i) Branch and Bound Technique

   (ii) Assignment Problem

7. What is Randomized Algorithms ? What are the advantages of randomized algorithms ?

8. Define the following terms with an example.

   (i) Recursion

   (ii) Analysis of Algorithm

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