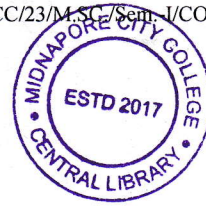


PG (CBCS)
M.Sc. Semester- I Examination, 2023
COMPUTER SCIENCE
PAPER: COS 101
(ANALYSIS OF ALGORITHM)

**Full Marks: 40****Time: 2 Hours**

The figures in the right-hand margin indicate full marks.
 Candidates are required to give their answers in their own words as far as practicable.

GROUP-A

1. Answer any FOUR of the following questions: 4×2=8

- a) What is head recursion? Give an example.
- b) Explain the situation for which back tracking technique is used.
- c) What is NP-Complete problem?
- d) Differentiate between Kruskal's algorithm and Prim's algorithm.
- e) What do you mean by dynamic programming?
- f) What is the relation between time and space complexity of an algorithm?
- g) Write down the drawback of Merge sort.
- h) What is flow chart? Describe its roles for implementation and algorithm.

GROUP-B

2. Answer any FOUR of the following questions: 4×4=16

- a) Explain Big-Oh, Big-Theta and Big-Omega notation for analysis of algorithm.
- b) Write down the Merge sort algorithm using divided and conquer strategy.
- c) Write down the Binary search algorithm using divided and conquer strategy.
- d) Explain backtracking algorithm using an example.
- e) Explain the Breadth-first search (BFS) with suitable examples for graph traversal.
- f) Prove that, clique decision problem is NP-Hard.
- g) Write down the Prim's Algorithm to find minimum spanning tree of a graph.
- h) For the given data, find the optimal job sequence and maximum profit using Greedy approach. Here n=7 Jobs

Jobs:	J1	J2	J3	J4	J5	J6	J7
Profits:	35	30	25	20	15	12	5
Deadlines:	3	4	4	2	3	1	2

(P.T.O.)



(2)

GROUP-C

3. Answer any TWO of the following questions:

2×8=16

- a) Write down the 0-1 Knapsack problem algorithm using dynamic programming strategy. Find the time complexity of this algorithm? 6+2
- b) Write down the divide and conquer algorithm. Write down the Quick sort algorithm using divide and conquer strategy. 2+6
- c) Write an algorithm for all pair shortest path using dynamic programming approach. What is Branch and Bound problem? 6+2
- d) Write an algorithm to solve to the Towers of Hanoi problem. Explain time complexity of Quick sort for different cases.
