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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 Marge 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.)

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.

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