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Reg. No. | | | | | | | | |

II Semester M.C.A. Degree Examination November/December- 2025
COMPUTER SCIENCE
The Design and Analysis of Algorithm
(CBCS Scheme 2020-21)
Paper : 2 MCA 5

Time : 3 Hours **Maximum Marks : 70**

Instruction to Candidates:

Part - A : Answer any Five questions.

Part - B : Answer any Four questions.

PART - A

Answer any Five of the following questions. Each question carries 6 marks. **(5×6=30)**

1. What is an algorithm? Describe various asymptotic notations.
2. Write recursive algorithm to solve Tower of Hanoi problem. Find its Complexity.
3. Write algorithms for BFS and DFS.
4. Write a note on Strassen's Matrix multiplication.
5. Write merge sort algorithm using divide and conquer technique.
6. What is all pairs shortest path problem. Write Warshall's algorithm.
7. Find the number of subsets from the following set S = {1,5,15,7,20,3,8,11} for sum = 12.
8. Write a note on P and NP problems with example.

PART - B

Answer any Four of the following questions. Each question carries 10 marks. **(4×10=40)**

9. Write divide and conquer recursive algorithm for sorting numbers using quick sort. Find its worst - case complexity.

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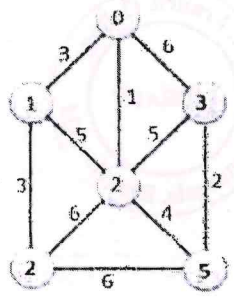
10. Write insertion sort algorithm. What is the methodology used for this sort? Prove the complexity of the algorithm as O(n2).

11. Solve the following knapsack problem using greedy method with knapsack capacity m=5.

item	1	2	3	4
weight	2	1	3	2
Profits	12	10	20	13

12. Explain Kruskal's algorithm for constructing a minimum cost spanning tree and trace the algorithm on the following graph.



13. What is backtracking? Explain the technique of finding Hamiltonian circuit using backtracking with suitable example.

14. Write short note on the following :

a) Optimal binary search trees

b) Brute Force String Matching method