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IV Semester B.C.A. Degree Examination, June/July - 2025

COMPUTER SCIENCE

**Design and Analysis of Algorithms
(NEP Scheme)**

Time : 2½ Hours

Maximum Marks : 60

Instructions to Candidates:

Attempt all the Sections.

P.G. Library
SRN Adarsh College
Channarayana,
Bengaluru-560018

SECTION - A

I. Answer any Four questions. Each question carries 2 marks.

(4×2=8)

1. What is design and analysis of an algorithm?
2. Define time and space complexity.
3. What is brute force method?
4. What is dynamic programming?
5. What is minimum cost spanning tree? Give an example.
6. Define Huffman codes.

SECTION - B

II. Answer any Four questions. Each question carries 5 marks.

(4×5=20)

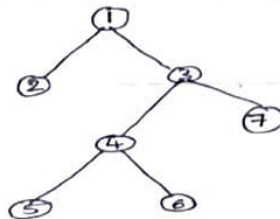
7. Explain the Asymptotic notations used to describe the running time of an algorithm.
8. Explain general plan for analysis of recursive algorithm.
9. Write a program to implement linear search algorithm.
10. What is topological sorting? Explain with an example.
11. Write Prim's algorithm to find minimum cost spanning tree.
12. Construct a solution space tree for set $S = \{11, 13, 24, 7\}$ and $M = 31$.

SECTION - C

III. Answer any Four questions. Each question carries 8 marks.

(4×8=32)

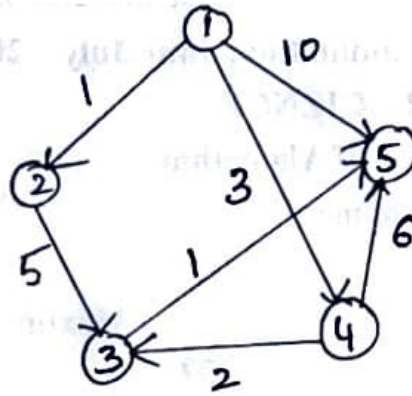
13. Write BFS and DFS traversal for the given graph.



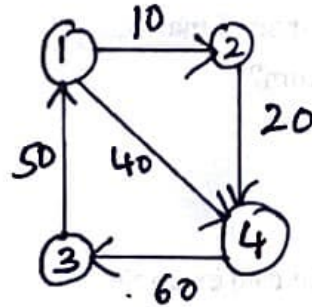
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14. Apply Dijkstra algorithm for the given graph.



15. Apply Floyd's algorithm for the given graph.



16. Trace the selection sort algorithm for the following numbers. 38, 47, 28, 45, 15.
17. Using dynamic programming solve the following Knapsack problem $n = 4$ and $w = 5$.
Knapsack capacity = 5
- $$\{w_1, w_2, w_3, w_4\} = \{2, 1, 3, 2\}$$
- $$\{v_1, v_2, v_3, v_4\} = \{8, 6, 16, 11\}$$
18. Write a short note on:
- Binary tree traversal
 - Hamilton circuit problem.