Code No: F-13498/N/BL/AICTE

FACULTY OF ENGINEERING

B.E. (CSE (AI&ML) / IoT) IV - Semester (AICTE) (Main & Backlog) (New) Examination, August / September 2024

Subject: Design Analysis and Algorithm

Time: 3 Hours **Max. Marks: 70**

Note: (i) First question is compulsory and answer any four questions from the remaining six questions. Each question carries 14 Marks.
(ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.
(iii) Missing data, if any, may be suitably assumed.

1. a) Write about algorithm specification.
   b) What is a tree?
   c) Explain the control abstraction of divide and conquer method.
   d) Define the greedy knapsack problem.
   e) What is implicit and explicit constraint in backtracking?
   f) What is topological ordering?
   g) List out various parallel computing models.

2. a) Differentiate between time complexity and space complexity.
   b) Explain in detail about the disjoint set operations with examples.

3. a) Explain about prim's algorithm of minimum cost spanning tree with example.
   b) Find the optimal solution for given instance of knapsack problem.
   n=3,m=20, (p1,p2,p3)=(25,24,15) and (w1,w2,w3)=(18,15,10).
   Find the (1) Maximum Profit (2) Minimum Weight (3)Maximum Profit per unit weight.

4. a) Compare between Dynamic Programming and Divide and Conquer.
   b) Explain about 8-queen problem using backtracking and state space tree.

5. a) Explain about different types of tries.
   b) Write short notes on:
   (i) Search Engine (ii) DAG.

6. a) Explain about NP-Hard and NP-Complete Problems.
   b) Explain in detail about node cover/ vertex cover decision problem.

7. a) What is Hamiltonian Cycle? How it is different from the tour of travelling salesperson problem? Explain.
   b) Discuss about worst, best and average case of merge sort.

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