

FACULTY OF ENGINEERING

B.E. VI – Semester (CSE) (AICTE) (Main) Examination, October 2021

Subject: Design & Analysis of Algorithms

Time: 2 Hours

Max. Marks: 70

(Missing data, if any, may be suitably assumed)

PART – A

(5x2 = 10 Marks)

Note: Answer any five questions.

1. Define Time Complexity and Space Complexity.
2. Give difference between union and Weighted Union, find and Collapsing Find.
3. Write the Control Abstraction for Divide and Conquer.
4. Define feasible solution, optimal solution.
5. Give difference between Greedy Method and Dynamic Programming.
6. Define live node and Dead Node.
7. Define DFS with example.
8. What is Search Engine Indexing?
9. What is Satisfiability Problem?
10. What is Parallel algorithm? How to achieve Parallelism?

PART – B

(4x15 = 60 Marks)

Note: Answer any four questions.

11. (a) Define Binary Search Tree and write Algorithm for inserting an element in BST.
(b) Discuss different Graph representations with examples.
12. (a) Estimate the average case time complexity of Quick sort.
(b) Find an optimal solution to the knapsack instance $n=7$, $m=15$,
 $(p_1, p_2, p_3, \dots, p_7) = (10, 5, 15, 7, 6, 18, 3)$ and $(w_1, w_2, w_3, \dots, w_7) = (2, 3, 5, 7, 1, 4, 1)$.

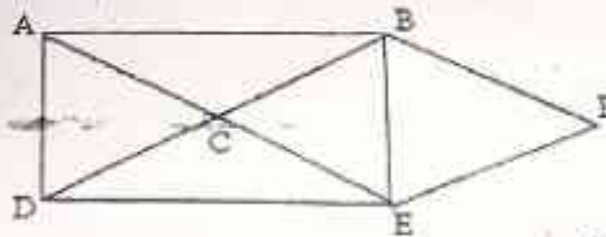
13. Explain Travelling Salesman Problem using Dynamic Programming solve the following problem.

0	10	15	20
5	0	9	10
6	13	0	12
8	8	9	0

14. Construct B-Tree of order 3 for the given keys:
9, 12, 8, 6, 21, 18, 14, 7, 4, 13, 19, 11, 1, 5, 2, 16

15. State and prove Cook's theorem

16. (a) Compare and contrast between Brute force approach and Backtracking.
(b) Define Hamiltonian circuit and draw state space tree for the following graph by using Backtracking.



17. Write short notes on any two:
(a) Control abstraction for dynamic programming
(b) Node cover decision problem
(c) Graph coloring