

Total No. of Questions : 8]

SEAT No. : 8

PA-912

[Total No. of Pages : 3

[5927]-342

**B.E. (Computer Engineering)**  
**DESIGN AND ANALYSIS OF ALGORITHMS**  
**(2019 Pattern) (Semester - VII) (410241)**

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right side indicate marks.
- 4) Assume suitable data, if necessary.

- Q1) a) Solve the matrix chain multiplication for the following 6 matrix problem using Dynamic programming. [10]

Matrix	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	A <sub>4</sub>	A <sub>5</sub>	A <sub>6</sub>
Dimensions	10×20	20×5	5×15	15×50	50×10	10×15

- b) Explain Greedy strategy: Principle, control abstraction, time analysis of control abstraction with suitable example. [8]

OR

- Q2) a) Explain the 'dynamic programming' approach for solving problems. Write a dynamic programming algorithm for creating an optimal binary search tree for a set of 'n' keys. Use the same algorithm to construct the optimal binary search tree for the following 4 keys. [10]

Key	A	B	C	D
Probability	0.1	0.2	0.4	0.3

- b) Explain Dynamic programming: Principle, control abstraction, time analysis of control abstraction with suitable example. [8]

- Q3) a) Explain the 'branch and bound' approach for solving problems. Write a branch and bound algorithm for solving the 0/1 Knapsack problem. Use the same algorithm to solve the following 0/1 Knapsack problem. The capacity of the Knapsack is 15 kg. [9]

Item	A	B	C	D
Profit (Rs.)	18	10	12	10
Weight (kg.)	9	4	6	2

- b) Explain with suitable example Backtracking: Principle, control abstraction, time analysis of control abstraction. [8]

OR

P.T.O.



Q4) a) What is Branch and Bound method? Write control abstraction for Least Cost search? [9]

b) Explain the backtracking with graph coloring problem. Find solution for following graph [8]

	$C_1$	$C_2$	$C_3$	$C_4$	$C_5$
$C_1$	0	1	0	1	0
$C_2$	1	0	1	0	0
$C_3$	0	1	0	1	1
$C_4$	1	0	1	0	1
$C_5$	0	0	1	0	0

Adjacency matrix for graph G

Q5) a) Write short notes on the following [10]

- Aggregate Analysis
- Accounting Method
- Potential Function method
- Tractable and Non-tractable Problems

b) Write short notes on with suitable example of each [8]

- Randomized algorithm
- Approximation algorithm

OR

Q6) a) What is Potential function method of amortized analysis? To illustrate Potential method, find amortized cost of PUSH, POP and MULTIPOP stack operations. [9]

b) What is embedded algorithm? Explain Embedded system scheduling using power optimized scheduling algorithm. [9]

- Q7) a) Write short notes on the following. [10]
- i) Multithreaded matrix multiplication.
  - ii) Multithreaded merge sort.
  - iii) Distributed breadth first search
  - iv) The Rabin-Karp algorithm
- b) With respect to Multithreaded Algorithms explain Analyzing multithreaded algorithms, Parallel loops, Race conditions. [7]

OR

- Q8) a) Write and explain pseudo code for Multi-threaded merge sort algorithm. How parallel merging gives a significant parallelism advantage over Merge Sort? [9]
- b) Write a pseudo code for naïve string matching algorithm and Rabin-Karp algorithm for string matching and analyze the same. [8]

