

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**MCA – SEMESTER V - EXAMINATION –SUMMER-2021**

**Subject Code: 3650001****Date: 03-08-2021****Subject Name: Design & Analysis of Algorithms (DAA)****Time: 02:30 PM to 05:00 PM****Total Marks: 70****Instructions:**

- 1. Attempt all questions.**
- 2. Make Suitable assumptions wherever necessary.**
- 3. Figures to the right indicate full marks.**

- Q.1 (a)** Do as directed. **07**
- 1) Define Space complexity.
  - 2) What do you mean by pruning?
  - 3) Define amortized analysis.
  - 4) What is the worst case time complexity of Binary Search?
  - 5) What do you mean by feasible solution?
  - 6) What are the basic steps involved for Divide and Conquer strategy of solving algorithms?
  - 7) What do you understand by Residual Capacity in Network flow problems?
- (b)** Write a short note on Asymptotic notations. **07**
- Q.2 (a)** Write a note on algorithm used to multiply two big numbers using Divide and conquer strategy. **07**
- (b)** Write a short note on Binary Search algorithm. Compare and contrast the Recursive and the Iterative approach for solving Binary Search. **07**
- OR**
- (b)** Give the difference between Greedy approach and Dynamic approach for solving algorithms. Also explain job Scheduling algorithm. Solve the following. Number of Jobs = 5. Deadlines = {2,1,3,2,1} and Profit = {60,100,20,40,20}. **07**
- Q.3 (a)** Write a short not on Rod cutting problem. Explain it using proper example. **07**
- (b)** Write a note on Prims algorithm to find MST. Also give the difference between prims and kruskal's algorithm. **07**
- OR**
- Q.3 (a)** **07**
- 1) Solve the following coin change problem **04**  
 Amount to be made = 9 and coins available {2,6,4,1,3}. Find the minimum number of coins required to make the given amount.
  - 2) Write a note on M coloring problem. **03**
- (b)** Write a note on Knapsack algorithm using greedy strategy. **07**
- Q.4 (a)** Discuss Longest common subsequence algorithm (LCS). **07**
- (b)** What is n – queens problem? Explain it giving the example of 4-queens problem. **07**

**OR**

- Q.4** (a) Write a note on 2-way merge sort algorithm. **07**  
(b) Write a note on 16 puzzle problem. Explain it giving the example of 8 -puzzle. **07**
- Q.5** (a) Give the algorithm for bubble sort. Also explain how it can be made more efficient when the data which is given is already in sorted fashion. **07**  
(b) Explain the concept of Sieve of Eratosthenes. **07**
- OR**
- Q.5** (a) Write a note on P, NP, NP hard and NP complete algorithms. Explain how the algorithms are categorized in the above-mentioned categories. **07**  
(b) Explain how the efficiency of Iterative algorithms can be improved? **07**

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