

GUJARAT TECHNOLOGICAL UNIVERSITY**MCA – SEMESTER-V EXAMINATION –SUMMER-2020****Subject Code: 3650001****Date:04-11-2020****Subject Name: Design & Analysis of Algorithms (DAA)****Time: 10:30 AM to 01:00 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)** Define the following terms: **07**
1. Optimum solution
 2. Greedy method for problem solving
 3. Dynamic programming
 4. Spanning tree
 5. Recursion
 6. Time complexity
 7. Branch and Bound

- (b)** What is divide and conquer technique? Explain in context of binary search method. Also give its time complexity. **07**

- Q.2 (a)** Explain the characteristics of greedy algorithms. Differentiate between greedy algorithms and dynamic programming methods. **07**

- (b)** Write a brief note on NP complete and the classes P, NP and NPC. **07**

OR

- (b)** Differentiate between DFS and BFS with suitable examples. **07**

- Q.3 (a)** Explain the knapsack problem. Consider the following: $n = 3$, $M = 20$, $P = [25, 24, 15]$, $W = [18, 15, 10]$. Find the optimal solution in terms of maximized profit. **07**

- (b)** Define Order notation. Explain the use of it. List the various order notations and explain Big-Oh and small-oh notations in detail. **07**

OR

- Q.3 (a)** What are minimum spanning trees? Explain with a suitable example Kruskal's method to find minimum spanning tree. **07**

- (b)** Explain rod cutting problem using a suitable example. **07**

- Q.4 (a)** What is recurrence relation? Solve the recurrence equation $T(n) = T(n-1) + n$ using forward substitution and backward substitution method. **07**

- (b)** Explain Multistage graph problem using Dynamic programming. **07**

OR

- Q.4 (a)** Explain Maximum flow problem using Dynamic programming. **07**
- (b)** Discuss assembly line scheduling problem using dynamic programming with suitable example. **07**
- Q.5 (a)** Explain backtracking method of problem solving. What is 8-Queen's problem? Solve the 4-Queen's problem using the backtracking method. **07**
- (b)** Sort the following data using insertion sort: **07**
A, L, G, O, R, I, T, H, M
- OR
- Q.5. (a)** Write notes on the following: **07**
1. Branch and Bound
 2. Hamiltonian cycles
 3. M-colouring problem
- (b)** Sort the following data using bubble sort: **07**
Mon, Tues, Wed, Thur, Fri, Sat, Sun
