

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

MCA – SEMESTER-V EXAMINATION –SUMMER-2020

Subject Code:4659301

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. List down the areas in the study of algorithm.
2. What do you mean by "Efficiency of algorithm".
3. Explain Big-Oh Notation.

Q.1.(b) What do you understand by sorting? List various sorting algorithms. Give the comparison of various sorting algorithms in terms of best case, average case and worst case time complexity. 07

Q.2. (a) Compare Greedy method vs Dynamic programming 07

Q.2. (b) What is divide and conquer approach? Give the algorithm for binary search method. 07

OR

Q.2. (b) Sort the following data using heap sort. Also give its complexity. 07
A, L, G, O, R, I, T, H, M

Q.3. (a) Solve the following knapsack problem using greedy method. Given $n=3$, $M=50$ 07
 $W = [10, 20, 30]$, $P = [60, 100, 120]$

Q.3. (b) Write short notes on the following: 07
1. 4-Queen's problem
2. Scale balancing problem

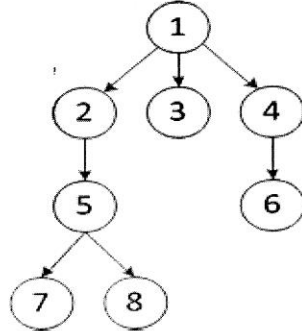
OR

Q.3. (a) Solve the following job sequencing problem for the given details of jobs and deadlines. Consider single machine is available for the jobs to be done. 07
 $N = 4$, $P = \{30, 35, 20, 25\}$ $D = \{2, 1, 2, 1\}$

Q.3. (b) Briefly explain the following: 07
1. Hamiltonian circuits
2. 8 puzzle problem

Q.4. (a) Write an algorithm to implement DFS. Given the graph below, give its DFS sequence.

07



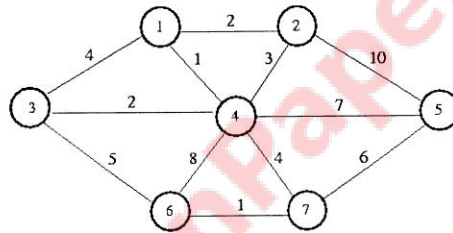
Q.4. (b) Explain matrix chain multiplication briefly using dynamic programming algorithm.

07

OR

Q.4. (a) What are spanning trees? Solve the following graph using Kruskal's algorithm.

07



Q.4. (b) Develop an algorithm for Rod-cutting problem using Dynamic Programming algorithm using an example.

07

Q.5. (a) Write down Dynamic Programming algorithm for Coin Change problem. Using it, solve the following problem: Given: $d_1 = 1$, $d_2 = 3$, $d_3 = 5$, $d_4 = 6$; find the minimum number of coins required to provide the change of Rs. 8.

07

Q.5. (b) Write a short note on NP-Completeness and NP-Hard Problem.

07

OR

Q.5. (a) Explain P-type Problem. Write short note on NPC and NP problem.

07

Q.5. (b) Elaborate Longest Common Subsequence problem with the help of dynamic programming. Support your answer with illustration.

07