Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
MCA– SEMESTER –V EXAMINATION –SUMMER-2019

Subject Code:3650001 **Date: 02-05-2019**

Subject Name: Design & Analysis of Algorithms (DAA)

Time:10.30 am to 1.00 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)** i. Worst case running time for Radix Sort is _____. **07**
ii. Average case running time for Bubble Sort is _____.
iii. To denote two string ab and ac RE will be _____.
iv. Prims and Kruskal Algorithms are used for _____ tree.
v. _____ Algorithm is used to find the shortest path.
vi. NPT stands for _____.
vii. ET stands for _____.

(b) Explain Big O, Omega and Theta Notation. **07**

Q.2 **(a)** Solve the Traveling salesman problem using dynamic programming for given connection matrix for 4-nodes graph. **07**

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

(b) What is Top Down design method? Explain with example of gcd. **07**

OR

(b) i. Discuss some of ways to improve the efficiency of algorithm. **05**
ii. Explain where D&C fails. **02**

Q.3 **(a)** Explain Multiplication of N-Digit integers using Divide and Conquer. Consider 2345 and 6789 as two numbers for example. **07**

(b) Explain Binary Search? Write an iterative algorithm for binary search and explain the best, average and worst case in O notation. **07**

OR

Q.3 **(a)** Discuss Strassen Matrix Multiplication with example. **07**

(b) What is Merge Sort? Write a recursive algorithm for merge sort and discuss time complexity of merge sort. **07**

Q.4 **(a)** Explain Greedy Strategy. Discuss Knapsack problem for n=3, M=20, P = {25,24,15} and W={18,15,10} **07**

(b) Explain Dynamic programming. Explain how it is used for coin exchange problem if we have coin with denomination 1, 4 and 6 units and we want to make change of 8 units. **07**

OR

Q.4 **(a)** List and explain four steps in dynamic programming solution. **07**

(b) Discuss union and find data structure with example. **07**

Q.5 **(a)** Give simplified definition of 'O'. Explain Transitivity Rule, Sum Rule, Polynomial Rule, Constant absorption rule and Multiplication Rule of 'O' Notation. **07**

	(b)	Explain execution time of straight line programs, programs loops and recursive programs.	**07**

OR

Q.5	**(a)**	Discuss Backtracking Strategy. Explain how it can be used to solve the 4-queen problem	**07**
	(b)	Explain DFS and BFS. Write an algorithm for BFS and discuss the total running time of BFS.	**07**

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