

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**
