

GUJARAT TECHNOLOGICAL UNIVERSITY
M.SC(CS)- INTEGRATED – SEMESTER V- EXAMINATION –WINTER-2024

Subject Code:1350302**Date: 21/11/2024****Subject Name: Design and Analysis of Algorithm****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.
4. Use of simple calculators and non-programmable scientific calculators are permitted.

- Q.1** (a) Describe class P, NP and NP-Complete problems. **03**
 (b) Explain Asymptotic notation. **04**
 (c) Explain Multiplying large integers problem and its solution using Divide and Conquer strategy. **07**

- Q.2** (a) Write characteristics of Best case, Average case and Worst case of algorithm. **03**
 (b) State and explain Master's method to solve recurrence equation. **04**
 (c) Compare and analyze Insertion sort and Heap sort. **07**

OR

- (c) Compare and analyze Bucket sort and Radix sort. **07**
Q.3 (a) Describe Activity selection problem and find solution for given details. **03**

Id	A1	A2	A3	A4	A5	A6	A7
Start time	5	1	3	2	5	8	7
End time	8	2	4	5	7	9	8

- (b) Explain fractional knapsack problem and solution with example. **04**
 (c) Write and Explain Krushkal's algorithm with example. Show algorithmic steps in example. **07**

OR

- Q.3** (a) Describe Job scheduling algorithm and find solution for given details. **03**
 Number of jobs $N = 4$. Profits associated with Jobs : (P1, P2, P3, P4) = (80, 20, 13, 32). Deadlines associated with jobs (d1, d2, d3, d4) = (2, 1, 3, 2)
 (b) Explain Huffman code with example. **04**
 (c) Write and Explain Prim's algorithm with example. Show algorithmic steps in example. **07**

- Q.4** (a) State and describe principle of optimality. **03**
 (b) Describe the naive string matching algorithm. **04**
 (c) Explain All points shortest path using dynamic programming with example. **07**

OR

- Q.4** (a) Differentiate Greedy strategy and Dynamic programming. **03**
 (b) Describe the Rabin-Karp algorithm. **04**
 (c) Explain Longest common subsequence with example. **07**
Q.5 (a) State limitations of Divide and Conquer strategy. **03**
 (b) Describe DFS algorithm with example. **04**
 (c) Explain travelling salesman problem using branch and bound strategy with example. **07**

OR

- Q.5** (a) Describe Topological sorting in graphs. **03**
 (b) Explain BFS algorithm with example. **04**
 (c) Explain Eight queens problem using backtracking strategy with example. **07**
