

GUJARAT TECHNOLOGICAL UNIVERSITY**BE – SEMESTER V • EXAMINATION – WINTER - 2012****Subject code: 150703****Date: 17-01-2013****Subject Name: Design and Analysis of Algorithms****Time: 02:30 pm to 05:00 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** Answer the following. **14**
- (i) Explain why analysis of algorithms is important? Explain: Worst Case, Best Case & Average Case Complexity.
 - (ii) What is an algorithm? Explain characteristics of any algorithm. Define: Optimal Solution, Feasible solution, Principle of Optimality.
 - (iii) Explain in brief Breadth First Search and Depth First Search Traversal techniques of a Graph.
 - (iv)
- Q.2** (a) Give the properties of Heap Tree. Sort the following data with Heap Sort Method: 65, 75, 5, 55, 25, 30, 90, 45, 80. **07**
- (b) What is Divide and Conquer Technique? Give the use of it for Binary Searching Method. Also give its Time Complexity. **07**
- OR**
- (b) Explain Quick Sort Method with example. Give its Time Complexity. **07**
- Q.3** Answer **any TWO** of the following. **14**
- (a) Define Minimal Spanning Tree(MST). Explain Krushkal's Algorithm to find MST with example.
 - (b) Solve Making Change problem using Dynamic Programming. (denominations: d1=1,d2=4,d3=6). Give your answer for making change of Rs. 8.
 - (c) Solve the following Knapsack Problem using Dynamic Programming Method. Write the equation for solving above problem.
- n = 5, W = 100
- | | | | | | | |
|------------|---|----|----|----|----|----|
| Object | → | 1 | 2 | 3 | 4 | 5 |
| Weight (w) | → | 10 | 20 | 30 | 40 | 50 |
| Value (v) | → | 20 | 30 | 66 | 40 | 60 |
- Q.4** Answer **any TWO** of the following. **14**
- (a) Explain Backtracking Method. What is N-Queens Problem? Give solution of 4-Queens Problem using Backtracking Method.
 - (b) Find Longest Common Subsequence using Dynamic Programming Technique with illustration X={A,B,C,B,D,A,B} Y={B,D,C,A,B,A}
 - (c) Explain Chained Matrix Multiplication with example.
- Q.5** (a) Explain in Brief: **08**
- P Problem, NP Problem, Travelling Salesman Problem, Min Max Principle.
- (b) What is Finite Automata? Explain use of finite automata for string matching with suitable example. **06**
- OR**
- Q.5** (a) Explain Rabin- carp method for string matching and also give the algorithm. **08**
- (b) Explain use of Branch & Bound Technique for solving Assignment Problem. **06**
