Seat No.: _____ Enrolment No._____

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 Breif: **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**

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