Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII EXAMINATION – WINTER 2015

Subject Code: 173205 **Date: 04/12/2015**

Subject Name: Design & Analysis of Algorithm

Time: 10:30am to 1:00pm **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)** What is equivalence relation and transitivity property? Explain the following terms with example. **07**

1. Set
2. Relation
3. Function

(b) What is recurrence relation? Solve the following recursive equations with use of master's theorem. **07**

1. $T(n)=2T(n/5)+2\log n$
2. $T(n)=2T(n/3)+\log^2 n$

Q.2 **(a)** Is Merge Sort Stable Algorithm? Explain Merge Sort Algorithm and Derive its time complexity for any of the case.(either best case or worst case) **07**

(b) Write and explain Quick sort Algorithm? Derive its Time Complexity? **07**

OR

(b) What is the largest number of key comparisons made by the binary search in searching for a key in the following array? **07**

3	14	27	31	39	42	55	70	74	81	85	93	98

Write and explain the Binary Search Algorithm.

Q.3 **(a)** Mention the applications of Spanning trees. Explain Prim's Algorithm. **07**

(b) Explain Asymptotic notations in brief. **07**

OR

Q.3 **(a)** Explain Kruskal's Algorithm and Derive its Time Complexity. **07**

(b) Explain Fractional Knapsack Algorithm using Greedy approach. **07**

Q.4 **(a)** What is an algorithm? Define: Principle of Optimality. Enlist and Explain the Properties of Greedy Algorithm. **07**

(b) Find the Longest Common Subsequence using Dynamic Programming with illustration X={A,B,C,B,D,A,B} Y={B,D,C,A,B,A}. **07**

OR

Q.4 **(a)** Discuss Change Making Problem using Dynamic Programming with example. **07**

(b) Generate equation for Matrix chain multiplication using Dynamic Programming. Find out minimum number of multiplications required for multiplying: **07**

A [1x2], **B** [2x5], **C** [5x3], **D** [3x1].

Q.5 **(a)** Explain Rabin Karp Method for string matching and also give the algorithm. **07**

(b) What is Backtracking Technique? Discuss 8-Queen's Problem using Backtracking technique. **07**

OR

Q.5 **(a)** Write and Explain Neive string matching algorithm with example. **07**

(b) Explain P Class and NP Class. Explain Any NP Complete Problem. **07**

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