M.Tech. 1st Semester (Computer Engg.) Examination, December–2017

ANALYSIS AND DESIGN OF ALGORITHMS

Paper–MTCE–605–A

Time allowed : 3 hours] *[Maximum marks : 100*

Note : *Attempt any five questions. All questions carry equal marks.*

1. (a) Define space and time complexity of algorithms. Also discuss the various asymptotic notations. 10

(b) Explain Master's method for solving recurrence relation. 10

2. (a) State the process of decomposition of directed graph into its strongly connected components using depth First Search. 10

(b) Define a Red-Black Tree. Explain the concept of rotations in a Red-Black tree along with its complexity analysis. 10

3. (a) Differentiate between Greedy and Dynamic approaches of solving algorithm. Hence differentiate Fractional and 0-1 Knapsack Problem. 12

(b) Explain the greedy approach for algorithm design. 8

4. What is 8-Queen Problem ? How it can be solved using backtracking ? Explain in detail. 20

5. (a) State and prove Cook's theorem. 10

(b) Explain LC branch and bound technique. 10

6. Write short note on : 20

(a) PRAM Model

(b) Sorting Network.

7. (a) Explain Fully Polynomial time approximation schemes. 10

(b) Explain Knuth-Morris-Pratt algorithm of string Matching. 10

8. Write short note on the following : 20

(i) Approximation algorithms

(ii) Clique Decision Problem.

(iii) Stack and queue.