**M.Tech. 2nd Semester (CSE) CBCS Scheme
Examination, May–2017
ALGORITHM DESIGN
Paper–MTCSE22C2**

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

Note :   *Attempt any five questions, selecting **one** question from each unit and **question number one is compulsory**.*

1.   (a)   How can you modify Quick sort algorithm to search an item in a list of elements ?   5×5=20

     (b)   What are three properties of NP-Complete problem ?

     (c)   Can the master method be applied to solve recurrence :

$$T(n) = 4\,T(n/2) + n^2 \log n ?$$

Justify your answer.

     (d)   Explain Branch and Bound technique.

Unit–I

2.   (a)   What do you mean by time complexity of an algorithm ? Explain notations used to denote the time complexity of an algorithm.   10

     (b)   Write algorithm for Union and find operations for disjoint sets.   10

3. Explain Red-Black tree with suitable example. 20

Unit–II

4. What do you mean by dynamic programming ? Explain O/I Knapsack problem by using dynamic programming. 20

5. (a) What is backtracking ? Solve 8 Queen's problem with Backtracking. 10

   (b) What is sum of subset problem ? How it can be solved using backtracking. 10

Unit–III

6. (a) Explain NP-Hard problems with example. 10

   (b) Explain NP-Scheduling problems. 10

7. Explain Boyer-Moore Algorithm with example. 20

Unit–IV

8. Explain fully polynomial time approximation schemes. 20

9. Discuss the following : 10×2=20

   (a) PRAM Models

   (b) Polynomial time approximation.