Roll No .....

MCTA-102

M.E/M.Tech., I Semester

Examination, June-2013

Programming System

Time : Three Hours

Maximum Marks : 70

Note: Attempt one question from each unit. All questions carry equal marks.

UNIT -I

1. a) What is heap? How does it differ from binary tree? Brief out various operation on a heap.
   b) Explain the various collision techniques used for hashing with example.

OR

2. a) Convert the following infix expression to postfix

   $A + (B * C - (D/E \uparrow F) * G) * 4$

   b) Explain stack, queue, and Huffman codes.

UNIT-II

3. a) Prove that

   $T(n) = 3\,T(n/4) + cn^2$ is $0(n^2)$

   Using recursion tree method.

   b) Explain Asymptotic notation with example

OR

4. Find out best case and worst case time complexity of the following algorithm.

   Sorting (n)

   a) for J ← 2 to length (n)
   b) do key ← A [J]
   c) // insert A [J] into the sorted order A [1, ... J-1]
   d) i ← J-1

   e) While i>0 and A [i] ← key
   f) do A [i+1] ← A[i]
   g) i ← i -1
   h) A [i+1] ← key

UNIT-III

5. a) Apply branch and bound method to solve the "Travelling salesperson problem" whose cost matrix is

$$\begin{bmatrix} \infty & 18 & 26 & 8 & 11 \\ 14 & \infty & 12 & 7 & 6 \\ 2 & 3 & \infty & 5 & 8 \\ 18 & 4 & 14 & \infty & 7 \\ 15 & 2 & 3 & 19 & \infty \end{bmatrix}$$

   b) Compare Greedy, divide and conquer and dynamic programming?

OR

6. a) Write the explicit and implicit constraints of the 8 queue problem and discuss its solution?
   b) Write a algorithm for the optimal solution of the Knapsack problem, using dynamic programming techniques.

UNIT-IV

7. Write a short notes on
   a) Algebraic algorithms
   b) Combinatorial algorithms
   c) Approximation ratio and approximation scheme
   d) Polynomial time approximation and full polynomial time approximation scheme
   e) Set algorithms

UNIT-V

8. a) Explain the classes of Ni-Hard and NP complete.
   b) Prove that P = NP

OR

9. a) Explain in detail deterministic and non deterministic polynomial time algorithms.
   b) Explain Cook's theorem.