

Roll No

MCA - 404**MCA IV Semester**

Examination, June 2014

Design and Analysis of Algorithms**Time : Three Hours****Maximum Marks : 70**

- Note:** i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.
 ii) All parts of each question are to be attempted at one place.
 iii) All questions carry equal marks, out of which part A and B (Max. 50 words) carry 2 marks, part C (Max. 100 words) carry 3 marks, part D (Max. 400 words) carry 7 marks.
 iv) Except numericals, Derivation, Design and Drawing etc.

Unit - I

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1. a) Calculate the time complexity $T(n) = 4T\left(\frac{n}{2}\right) + n^2$. 2
- b) Write down the time complexity of quick sort in best, worst average case? 2
- c) Explain following term in terms of Tree
 (i) Forest (ii) Siblings (iii) Depth of a Tree 3
- d) What are the asymptotic notations? Explain the purpose of various asymptotic notations? 7

OR

What do you mean by space and time complexity? 7

Unit - II

2. a) Write the recurrence relation of strassen's matrix multiplication? 2
- b) Write the recurrence relation of divide and conquer algorithm? 2
- c) What is the time complexity of Binary search algorithm in successful search and unsuccessful search? 3

PTO

- d) Write the quick sort Algorithm and explain? 7

OR

Explain BFS and DFS? 7

Unit - III

3. a) What is optimal and Feasible solution? 2
- b) Write the step for calculation of reduced cost matrix. 2
- c) What is the fundamental difference between Greedy Knapsack and 0/1 Knapsack problem. 3
- d) If the cost adjacency matrix of the traveling salesperson problem is as follows

$$\begin{bmatrix} \infty & 20 & 30 & 10 & 11 \\ 15 & \infty & 16 & 4 & 2 \\ 3 & 5 & \infty & 2 & 4 \\ 19 & 6 & 18 & \infty & 3 \\ 16 & 4 & 7 & 16 & \infty \end{bmatrix}$$

obtain the state space tree generated by branch and bound method. 7

OR

Explain minimum spanning tree with suitable example. 7

Unit - IV

4. a) Explain implicit constraints? 2
- b) Write the solution of 4 queens problem? 2
- c) What is principle of optimality? 3
- d) Explain Back Tracking with example of 8 queens problem? 7

OR

Explain shortest path in graph. 7

Unit - V

5. a) Write any four example of P type problem. 2
- b) Write any four example of NPC type problem. 2
- c) What is NP Hard problem? 3
- d) Write a short note on Algebraic Algorithms. 7

OR

Write a short note on NP complete problem. 7

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