Printed Pages : **CA401**

(Following Paper ID and Roll No. to be filled in your Answer Books)										
[redacted]	**Roll No.**									

MCA

Theory Examination (Semester-IV) 2015-16

DESIGN AND ANALYSIS OF ALGORITHMS

Time : 3 Hours ***Max. Marks : 100***

SECTION-A

1.Attempt all parts. All parts carry **equal** marks. Write answer of each part in short**. (2 x 10 =20)**

a. What are greedy Algorithms?

b) What is called Substitution Method?

a. What is the drawback of greedy algorithm?

b. What is the time complexity of binary search?

c. What do you mean by multistage graphs?

d. Differentiate greedy method and dynamic programming.

e. What is the difference between explicit and implicit constraints?

f. What is NP Completenes?.

g. What is an articulation point in a graph?

h. What is a FIFO branch-and-bound algorithm?

SECTION-B

2. Attempt any **five** questions from this section. **(10 x 5 = 50)**

a) Define Asymptotic notations. Distinguish between Asymptotic notation and conditional asymptotic notation.

b) Explain how analysis of linear search is done with a suitable illustration.

c) Distinguish between Quick sort and Merge sort, and arrange the following numbers in increasing order using merge sort.

(18, 29, 68, 32, 43,37, 87, 24, 47, 50)

d) (i) Write an algorithm for DFS, discussing its time complexity.

(ii) Write and explain Dijkstra's algorithm with the help of suitable example.

e) Write a Pseudocode for Binomial Heap Union (H_1, H_2).

f) Define a knapsack problem and describe its formation. Find the optimal solution to the Knapsack instance n=5, W =[20, 30, 40, 10, 7], P=[7, 8, 9, 1, 6] and C =80 using Greedy method.

g) Discuss RSA public key cryptography algorithm.

h) (i) Find the time complexity of reccurence relation $T(n) = 2T(\sqrt{n}) + 1$.

(ii) Write an algorithm for inserting a node into Fibonacci Heap.

SECTION - C

Attempt any **two** questions from this section. **(15 x 2 = 30)**

3. Describe binary search tree with three traversal patterns? Give suitable example with neat diagram for all three traversal of binary search.
4. Prove that any algorithm that works by comparing keys to find the second largest from a set of n keys must do at least n+log n-2 comparisons in the worst case.
5. Describe the backtracking solution to solve 8 –Queens problem.