Registration No: | | | | | | | | | | |

Total Number of Pages: 2 **MCA**
MCC301

3rd Semester Regular/Back Examination – 2015-16
ANALYSIS AND DESIGN OF ALGORITHMS
BRANCH(S): MCA
Time: 3 Hours Max Marks: 70
Q.CODE:T179

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1 Answer the following questions: (2 x 10)

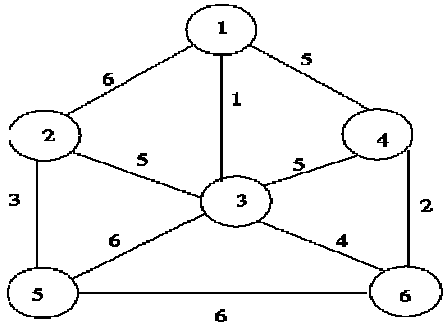
a) Write a notes on Greedy Approach?
b) What is Priority queue?
c) What is Backtracking?
d) What is efficiency of the algorithm?
e) If $f(n) = 5n^2 + 6n + 4$, then prove that $f(n) is O(n^2)$.
f) What is the need of analyzing an algorithm?
g) Ordering by asymptotic growth rates of the following sequence
$$n^2,\ 2^{lgn},\ (lgn)!, n^3, nlgn$$
h) What are the criteria used to identify the best algorithm?
i) Define NP-hard.
j) List any two properties of NP-problem

Q2 Explain the procedure used to calculate time complexity of Insertion sort. (10)

Q3 a) Why do we use asymptotic notations in the study of algorithms? Briefly describe the three commonly used asymptotic notations (5)
b) Show that Quick Sort algorithm takes $O(n^2)$ time in the worst case (5)

Q4 Discuss the steps in developing a Dynamic Programming Algorithm. Illustrate Matrix Chain Multiplication with a chain of four matrices A, B, C and D with p_0=5, p_1=4, p_2=6, p_3=2 and p_4=7. (10)

Q5 Write and discuss the Kruskal's algorithm to find out shortest path for the following graph. (10)



Q6 a) Solve Fractional knap-sack problem with example. (5)
b) Write and discuss the approximation algorithms for travelling salesman problem (5)

Q7 Apply and explain the backtracking method to solve four queen problem. (10)

Q8 Write Short Notes (Any Two) (5 x 2)

a) NP-complete problems
b) Branch and Bound techniques
c) Randomized algorithm
d) Master Theorem.