Enrollment No.	

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B.E.4th Semester
MID SEMESTER EXAMINATION

Date : 3/3/2015 **Branch : Computer Engineering**
Subject Code: CE 404/ IT 404 **Subject Name : Design and Analysis of Algorithms**
Time : 12.00 PM to 1:30 PM **Max. Marks : 30**

Instructions:
1) All questions are **compulsory**.
2) Figures to the **right** indicate full marks.
3) Use of scientific calculator is permitted.
4) Indicate **clearly**, the options you attempt along with its respective question number.
5) Use the last page of main supplementary for **rough work**.

Q.1 **(a)** What is algorithm? Explain properties of good algorithm. **[5]**

(b) Explain amortized analysis **[2]**

Prove the following **[3]**

a. $7n^2\log n+2500n = O(n^2\log n)$

b. $2^{n+1}=O(2^n)$

OR

(b) Write a short note on asymptotic notations **[5]**

Q.2 **(a)** Explain use of Devide & Conquer technique for merge sort. Find complexity for merge sort. **[5]**

(b) Solve given recurrence equation using recursion tree method **[5]**

$T(n) = 3T(n/4) + cn^2$

OR

Q.2 **(a)** Find best, average and worst case complexity for quick sort. **[5]**

(b) Solve following recurrence equations **[5]**

1. $T(n) = 4T(n/2) + n\log n$ where n is power of 2
2. $tn=0$ if $n=0$

   $t_n = 2t_{n-1}+n+2^n$ otherwise

Q.3 **(a)** Write the quick sort algorithm. Trace the same on data set 4,3,1,9,6,7,2,5,0 **[5]**

(b) Explain binary search for divide and conquer approach and discuss its complexity **[5]**

OR

Q.3 **(a)** Write an algorithm for insertion sort and discuss its coplexity **[5]**

(b) Solve following recurrence equations using master theorem **[3]**

1. $T(n)= 3T(n/2)+n^2$
2. $T(n)=16T(n/4)+n$

(c) Order the following terms by growth rate **[2]**

$N, N^{1/2}, N^{1.5}, N^2, N\log N, N\log\log N, N\log^2 N, N\log(N)^2, 2/N, 2^N, 2^{N/2}, N^2\log N, N^3$

BEST OF LUCK