

Sub. Code /Sub. Title: CS6402 Design and Analysis of Algorithm  
Branch: Computer Science and Engg  
SEMESTER/YEAR: IV/II

Date: 29.01.2015  
Duration 3 HOURS  
Max. Marks : 100

**Answer all the Questions**  
**PART A - (10 x 2 = 20)**

1. Define Algorithm.
2. Establish the relationship between Big oh and Big omega.
3. What do you mean by linear search?
4. What is Time and Space complexity?
5. What is average case analysis
6. Define group forces?
7. What is bubble sort?
8. What is closest pair problem?
9. What is Hamiltonian circuit?
10. What is divide and conquer?

**PART B – (5X16=80)**

11(a) Explain the fundamentals of algorithmic problem solving? (16)

Or

- (b) (i) Explain Towers of Hanoi problem and solve it using recursion. (8)  
(ii). Prove that for any two functions  $f(n)$  and  $g(n)$ , we have  $f(n)=\text{Big theta}(g(n))$  iff  $f(n)=O(g(n))$  and  $f(n)=\text{Big omega}(g(n))$ . (8)

12(a) What is an Algorithm? Explain how efficiency is measured. (16)

Or

(b) Explain about Asymptotic Notations. (16)

13 (a) Explain about analysis of non-recursive algorithm

Or

(b) Implement Quick Sort for the following list and explain it with an algorithm.  
18,29,68,32,43,37,87,24,47,50.

14(a) What is divide and conquer strategy and explain the binary search with an example? (16)

Or

(b) Distinguish between quick sort and merge sort and implement merge sort for  
18,29,68,32,43,37,87,24,47,50. (16)

15(a) Solve the instance of 0/1 Knapsack problem given with Knapsack capacity  $W=5$  and explain with an algorithm. (16)

Items	Weight	Value
1	2	12
2	1	10
3	3	20
4	2	15

Or

(b) Implement the shortest path for the following matrix and explain it with an algorithm. (16)

0	$\infty$	3	$\infty$
2	0	$\infty$	$\infty$
$\infty$	7	0	1
6	$\infty$	$\infty$	0