Analysis and Design of Algorithms
(IT 506)

Time – 2 hours
Marks - 35

<u>Answer any three questions</u>
<u>TWO marks are reserved for neatness</u>

1) *(a)* What is Amortized analysis? Discuss about Aggregate method and Accounting method, needed for analyzing algorithms.
   (b) Write an algorithm for Breadth First Search (BFS) for searching an undirected and unweighted graph.
   (c) Find the complexity of the algorithm of *(b)* utilizing Aggregate method.

$$5 + 4 + 2$$

2) *(a)* What do you understand by Time Complexity (*T(n)*) of an algorithm? How is this *T(n)* found out?
   (b) Discuss about the complexity classes. What is the relation between/among the classes?
   (c) Define: Reducibility.

$$(3+2) + (4+1) + 1$$

3) *(a)* Derive the best case complexity of Merge sort.
   (b) Write an algorithm to merge two sorted lists to get a single sorted list.
   (c) What do you mean by Lower Bound of a problem? Find the lower bound of general purpose sorting problem.

$$3 + 3 + (1+4)$$

4) *(a)* Show with examples that fractional knapsack problem is solvable by Greedy method but 0-1 knapsack problem is not.
   (b) Write an algorithm for Bucket sort. Find its complexity.
   (c) What are the advantages of Hashing over traditional method of information storing and retrieval?

$$4 + 4 + 3$$