CODE NO: R05220502

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY-2008

II B.TECH SUPPLIMENTARY EXAMINATIONS
DESIGN AND ANALYSIS OF ALGORITHMS
(COMPUTER SCIENCE&ENGINEERING)

AUG/SEP 2008

TIME:3HOUR
MARK:80

ANSWER ANY FIVE QUESTIONS ALL QUESTIONS CARRY EQUAL MARKS.

MARK [16*5=80]

1. (a) Define omega notation. Explain the terms involved in it. Give an example.

(b) Show that f1(n)×f2(n) = o(g1(n)×g2(n) wheref1(n) = o(g1(n) and f2(n) = o(g2(n)).

2. (a) Write and explain the control abstraction for Divide and conquer.

(b) Suggest refinements to mergesort to make it in-place.

3. (a) How many comparisons of edge weights will be done by the minimum spanning tree algorithm, in total, if the input is a complete undirected graph with n vertices and vi is the start vertex.

(b) Deisgn a linear-time algorithm for solving the single source shortest path algorithm for directed a cyclic graphs represented by their adjacency linked lists.

4. (a) Explain matrix chain multiplication with an example.

(b) Solve the following 0/1 Knapsack problem using dynamic programming P=(11,21,31,33), W=(2,11,22,15), C=40, n=4.

5. (a) Write a pseudocode for finding the strongly connected components of directed graph. Also analyze its time complexity.

(b) Explain the Inorder traversal of a tree with an example.

6. (a) Apply backtracking to solve the 3-coloring problem for the graph of fig.

(b) Write an algorithm of n-queens problem.

7. (a) Explain live node, E-node and dead node with an example.

(b) Explain the method of reduction to solve TSP problem using Branch and Bound.

8. (a) Explain the classes of NP-hard and NP-complete.

(b) Describe clique decision problem and write the algorithm for the same.