CODE NO : RA 312501 RA

2005 JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY

III B.TECH I SEMESTER REGULAR EXAMINATIONS

DESIGN AND ANALYSIS OF ALGORITHMS

(COMPUTER SCIENCE ENGINEERING)

NOVEMBER 2005

TIME: 3 HOUR
MARK: 80

ANSWER ANY FIVE QUESTIONS ALL QUESTIONS CARRY EQUAL MARKS

1. (a) Solve the recurrence relation of formula
T (n) = g (n) , n is small
2T (n/2) + F (n) , otherwise
when
i. g(n) = O(1) and f(n) =O(n);
ii. g(n) = O(1) and f(n) = O(1).

(b) Write a recursive binary search program.

2. (a) Write an algorithm of Quick sort and explain in detail.

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

3. (a) Explain the control at straction of Greedy method compare this with Dynamic programming.

(b) Applying the Greedy stentegy find the solution for optimal storage on tapes problem instance n = 3, (l1, l2, l3) = (5, 10, 3).

(c) Explain the 0/1 knap sack problem algorithm with Greedy concept.

4. Use an AVL tree as the basis of an algorithm to execute MIN, UNION, and DELETE on sets consisting of integers 1 through n, using O(log n) steps per operation. .

5. Using a dynamic programming approach coupled with the set generation approach, show how to obtain an 0(2n/2)algorithm for the 0/1 knapsack problem.

6. Write and explain a non-recursive algorithm for inorder traversal of a binary tree with an example. What is the time & space complexity of your algorithm?

7. Define the following terms: state space, explicit constraints, implicit constraints, problem state, solution states, answer states, live node, E-node, dead node, bound- ing functions.

8. Devise a divide-and-conquer algorithm to evaluate a polynomial at a point. Analyze carefully the time complexities for your algorithm.