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2005 JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY

III B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS
DESIGN AND ANALYSIS OF ALGORITHAMS
(COMPUTER SCIENCE & SYSTEM ENGINEERING)

NOVEMBER/DECEMBER 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) = ⅈ 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. *[12+4]*

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

(b) Suggest refinements to Merge sort to make it in-place. *[8+8]*

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. *[5+5+6]*

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. . *[16]*

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. *[16]*

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? *[16]*

7. Define the following terms: state space, explicit constraints, implicit constraint s, problem state, solution states, answer states, live node, E-node, dead node, bound-ing functions. *[16]*

8. Devise a divide-and-conquer algorithm to evaluate a polynomial at a point. Analyze carefully the time complexities for your algorithm. *[16]*