

Code No: 54016

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B.Tech II Year II Semester Examinations, May - 2016****DESIGN AND ANALYSIS OF ALGORITHMS****(Common to CSE, IT)****Time: 3 hours****Max. Marks: 75****Answer any five questions  
All questions carry equal marks**

- 1.a) Discuss various asymptotic notations used for best case, average case and worst case analysis of algorithms.
- b) Differentiate between priori analysis and posteriori analysis. [8+7]
- 2.a) Write and explain union and find algorithms.
- b) What is articulation point and explain with suitable example. [7+8]
- 3.a) Illustrate merge sort algorithm and discuss time complexity.
- b) Explain quick sort algorithm and simulate it for the following data: 20, 35, 10, 16, 54, 21, 25. [7+8]
- 4.a) Write a Greedy algorithm to job sequencing with deadlines.
- b) Explain Kruskal's algorithm to find the min cost spanning tree with an example. [7+8]
5. Solve the following 0/1 Knapsack problem by using Dynamic Programming approach.  
 $N=4, (w_1, w_2, w_3, w_4)=(10, 15, 6, 9), (p_1, p_2, p_3, p_4)=(2, 5, 8, 1)$  and  $m= 30$ . [15]
- 6.a) Apply the backtracking algorithm to solve the following instance of the sum of subsets problem  $S = \{5, 10, 12, 13, 15, 18\}$  and  $d=30$ .
- b) Generate all Hamiltonian path sequences in complete graph ( $K_4$ ) with 4 nodes: A, B, C, D with starting with node A? [8+7]
7. Draw the portion of state space tree generated by LCBB by the following knapsack problem  $n = 5, (p_1, p_2, p_3, p_4, p_5) = (10, 15, 6, 8, 4), (w_1, w_2, w_3, w_4, w_5) = (4, 6, 3, 4, 2)$  and  $m = 12$ . [15]
- 8.a) Compare NP-hard and NP-completeness. Explain deterministic and Non-deterministic Algorithms.
- b) Explain optimization problem. Write non deterministic algorithm for sorting and searching.
- c) Discuss about Cook's theorem. [5+5+5]