

Code No: 156AN

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**B. Tech III Year II Semester Examinations, February/March - 2022****DESIGN AND ANALYSIS OF ALGORITHMS****(Computer Science and Engineering)****Time: 3 Hours****Max. Marks: 75**

Answer any five questions
All questions carry equal marks

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- 1.a) Discuss in detail various notations used for expressing the time complexity of algorithms, with examples.
b) What is Performance Analysis? Explain Space Complexity and Time Complexity with examples. [7+8]
- 2.a) Explain the process of merge sort by a list of any 11 integers (distributed randomly). Write the algorithm and analyze its time complexity.
b) Write an algorithm to find matrix multiplication using Strassen's. [8+7]
- 3.a) Describe the Backtracking technique to the m-coloring graph. Explain with an example.
b) Write an algorithm of weighted union and also compute the time complexity of the same. [8+7]
- 4.a) Draw the state space tree for 'm' coloring when $n=3$ and $m=3$.
b) Write an algorithm for the 8-queens problem using backtracking. [8+7]
- 5.a) Solve the solution for 0/1 knapsack problem using dynamic programming:
(p_1, p_2, p_3, p_4) = (11, 21, 31, 33), (w_1, w_2, w_3, w_4) = (2, 11, 22, 15), $M=40$, $n=4$.
b) State the principle of optimality in dynamic programming. How to apply this to the shortest path problem? [8+7]
- 6.a) Explain about OBST.
b) Write an algorithm of all pairs shortest path problem. [8+7]
7. Explain the problem of job sequencing with deadlines by taking an example. Write the algorithm to solve the problem using the Greedy Method. Show how the algorithm solves the following job sequencing with deadlines problem.
 $n = 4$, (p_1, p_2, p_3, p_4) = (100, 10, 15, 27) and (d_1, d_2, d_3, d_4) = (2, 1, 2, 1) [15]
- 8.a) Explain Cook's theorem with an example.
b) Discuss the FIFO branch and bound. [8+7]