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| **UNIT - III** | | | | |
| 1 | Define spanning tree. Compute a minimum cost spanning tree for the graph of figure using prim’s algorithm. | L1 | CO3 | 6M |
| 2 | Define spanning tree. Compute a minimum cost spanning tree for the graph of figure using prim’s algorithm.  ANd9GcQKzBsFaVfqhXhotJJrJ3hBS9RyclqWAgxxr9PZ9qtP31txrHjC | L1 | CO3 | 6M |
| 3 | Summarize the working of Optimal Randomized alogirithm for the minimum-cost spanning tree with the help of the following input graph. | L2 | CO3 | 6M |
| 4 | Discuss about optimal merge pattern problem and its solution approach using greedy technique. | L3 | CO3 | 6M |
| 5 | What is optimal merge pattern? Find optimal merge pattern for ten files whoserecord lengths are 28, 32, 12, 5, 84, 53, 91, 35, 3, and 11. | L2 | CO3 | 6M |
| 6 | Obtain Shortest paths from root 1 to all other vertices using greedy approach for the given input graph. | L2 | CO3 | 6M |
| 7 | Discuss the Dijkstra’s single source shortest path algorithm and derive thetime complexity of this algorithm. | L3 | CO3 | 6M |
| 8 | Obtain Shortest paths from city Boston to all the remaining cities using Dijkstra’s algorithm for the given input graph. | L2 | CO3 | 6M |

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| **Unit - IV** | | | | | |
| 1 | a) | Find the all pairs shortest path solution for the graph represented by below adjacency matrix: | L3 | CO4 | 8M |
| b) | Define merging and purging rules in 0/1 knapsack problem and explain with an example. | L1 | CO4 | 4M |
| 2 | a) | Write and explain an algorithm to compute the all pairs shortest path using dynamic programming and prove that it is optimal. | L1 | CO4 | 6M |
| b) | Solve the following instance of 0/1 KNAPSACK problem using Dynamic programming n = 3, (W1, W2, W3) = (2, 3, 4), (P1, P2, P3) = (1, 2, 5), and m = 6. | L2 | CO4 | 6M |
| 3 | a) | Differentiate between Divide &Conquer and Dynamic Programming. | L1 | CO4 | 4M |
| b) | Design a three stage system with device types D1, D2, D3. The costs are $30, $15, $20 respectively. The cost of the system is to be not more than $105 and the reliability of each device type is 00.9, 0.8 and 0.5 respectively. | L3 | CO4 | 8M |
| 4 | a) | Write Bellman and Ford algorithm to compute shortest paths and derive its time complexity. | L2 | CO4 | 6M |
| b) | Let X = a,a,b,a,a,b,a,b,a,a and Y = b,a,b,a,a,b,a,b. Find a minimum-cost edit sequence that transforms X and Y. | L3 | CO4 | 6M |
| 5 | a) | State String Editing problem and devise a solution for it using Dynamic Programming approach | L3 | CO4 | 6M |
| b) | Describe the Dynamic 0/1 Knapsack Problem. Find an optimal solution for thedynamic programming 0/1 knapsack instance for n=3, m=6, profits are (p1, p2,  p3 ) = (1,2,5), weights are (w1,w2,w3)=(2,3,4). | L2 | CO4 | 6M |
| 6 | a) | Differentiate between Greedy technique and Dynamic Programming. | L1 | CO4 | 4M |
| b) | Find the shortest paths from node 1 to every other node in the below graph using the Bellman and Ford algorithm. | L3 | CO4 | 8M |
| 7 | a) | Explain the methodology of Dynamic programming. List the applications of Dynamicprogramming. | L1 | CO4 | 6M |
| b) | Present the dynamic programming solution for single sources shortest path problem. Analyse its time complexity. | L3 | CO4 | 6M |
| 8 | a) | State the String Editing Problem and explain the solution approach to the problem using Dynamic Programming approach. | L2 | CO4 | 8M |
| b) | Define principle of optimality | L1 | CO4 | 4M |

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| **Unit - V** | | | | | |
| 1 | a) | Write and explain the general method for the iterative backtracking method. | L1 | CO5 | 6M |
| b) | Write an algorithm for finding m-coloring of a graph and explain with an example. | L2 | CO5 | 6M |
| 2 | a) | Write and explain general method of recursive backtracking algorithm. | L1 | CO5 | 6M |
| b) | Explain the Graph–Coloring problem and draw the state space tree for m= 3 colors and n=4 vertices graph. Discuss the time and space complexity. | L2 | CO5 | 6M |
| 3 | a) | State the N-Queens Problem and Devise an algorithm for N-Queens problem. | L1 | CO5 | 6M |
| b) | Find all possible subsets of w that sum to m. Let w={5,7,10,12,15,18,20}and m=35 and draw the portion of the state space tree that is generated using backtracking. | L3 | CO5 | 6M |
| 4 | a) | Discuss the 4 – queen’s problem. Draw the portion of the state space tree for n= 4 queens using backtracking algorithm. | L2 | CO5 | 6M |
| b) | Give the statement of sum –of subsets problem. Find all sum of subsets forn=4, (w1, w2, w3, w4) = (11, 13, 24, 7) and M=31.Draw the portion of thestate space tree using fixed – tuple sized approach. | L3 | CO5 | 6M |
| 5 | a) | Explain FIFO Branch and Bound solution with the help of 4-queens problem. | L1 | CO5 | 6M |
| b) | Draw the portion of the state space tree generated by LC branch and bound of knapsack problem for an instance n=4, (P1, P2, P3, P4) = (10, 10, 12, 18), (w1, w2, w3, w4)=(2, 4, 6, 9), and m=15. | L3 | CO5 | 6M |
| 6 | a) | What is LC–Search? Discuss LC–Search algorithm. | L2 | CO5 | 6M |
| b) | Generate FIFO branch and bound solution for the given knapsack problem, m = 15, n = 3, (P1, P2, P3) = (10, 6, 8) and (w1, w2, w3) = (10, 12, 3). | L3 | CO5 | 6M |