

Time: 3 hours

Max. Marks: 80

- N.B. (1) Question one is Compulsory.
 (2) Attempt any 3 questions out of the remaining.
 (3) Assume suitable data if required.

Q. 1

- Apply the Master theorem to solve recurrences. Illustrate with an example. (05)
- Explain job sequencing with deadlines with example. (05)
- Write the algorithm for Binary search with analysis. (05)
- Compare dynamic programming with greedy approach. (05)

Q. 2

- Explain 15 Puzzle problem with example. (10)
- Give the pseudo code for the KMP String Matching Algorithm. Use KMP algorithm to find pattern="ababada" in text="badbabababadaab". Show the prefix table and the valid shifts. (10)

Q. 3

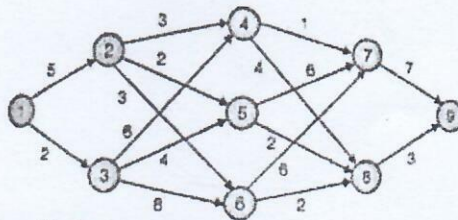
- Explain quick sort with algorithm and sort the given numbers using same.
 25 57 48 37 12 92 86 33. (10)
- Explain the greedy method. Give Dijkstra's Algorithm for single-source shortest path and analyse its complexity. (10)

Q. 4

- Write algorithm for greedy knapsack and Obtain the solution to following fractional greedy knapsack problem where $n=5, m=100, (p_1, p_2, \dots, p_5) = (10, 20, 30, 40, 50), (w_1, w_2, \dots, w_5) = (20, 30, 66, 40, 60)$. (10)
- Write LCS algorithm and solve following string 1 =babcab and string 2 =abacabb (10)

Q. 5

- Find minimum cost path from 1 to 9 for following multistage graph using dynamic programming. (10)



- Explain backtracking with 8-Queen problem. (10)

Q. 6

- Write the algorithm for insertion sort and sort the numbers 25 57 48 37 52. (10)
- Write the algorithm for 0/1 knapsack using dynamic programming. Also solve the following instance where $M=8, n=4, (p_1, p_2, p_3, p_4) = (1, 2, 5, 6), (w_1, w_2, w_3, w_4) = (2, 3, 4, 5)$ (10)