

(3 Hours)

Total Marks: 80

N.B: (1) Question No. 1 is compulsory.**(2) Attempt any three from the remaining questions.****(3) Figures to the right indicate full marks.**

1. Attempt any four
 - (a) Explain Best Case, Average Case and Worst Case. (05)
 - (b) Explain Multistage graphs. (05)
 - (c) Explain Binary search algorithm. (05)
 - (d) Define NP Class, NP hard, NP complete. (05)
 - (e) What is greedy algorithm? (05)
2.
 - (a) Write and explain sum of subset algorithm for $n=5$, $W = \{2,7,8,9,15\}$, $M=17$. (10)
 - (b) Obtain the solution to the following knapsack problem using Greedy method: $n=7$, $m=15$
 $(p_1, p_2, \dots, p_7) = (10, 5, 15, 7, 6, 18, 3)$, $(w_1, w_2, \dots, w_7) = (2, 3, 5, 7, 1, 4, 1)$. (10)
3.
 - (a) What is the Longest Common Subsequence problem? Find the LCS for following strings (10)
 String 1- ACBAED
 String 2- ABCABE
 - (b) Explain quick sort with algorithm and example. (10)
4.
 - (a) What is Knuth Morris Pratt Method of Pattern Matching? Give Examples. (10)
 - (b) Solve the following Recurrence using Substitution Method. (10)
$$T(n) = \begin{cases} 1, & \text{if } n=1 \\ 2T(n/2) + Cn, & \text{if } n>1 \end{cases}$$
5.
 - (a) Find the Dijkstra's shortest path from vertex 1 to vertex 4 for the following graph. (10)
- (b) Apply Merge sort algorithm to sort the following numbers. Show each step clearly. 10, 5, 7, 6, 1, 4, 8, 3, 2, 9. (10)
6. Write notes on (any two): (20)
 - (a) Find Minimum and Maximum elements of an array $X[0 : 9] = (45, 83, 75, 17, 43, 37, 80, 53, 61, 22)$ using divide and conquer strategy.
 - (b) Naïve string matching algorithm with example.
 - (c) N-queen problem algorithm with example.