(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 (p1,p2.....p7) = (10,5,15,7,6,18,3), (w1,w2,.....,w7) = (2,3, 5,7,1,4,1). (10)

3. (a) What is the Longest Common Subsequence problem? Find the LCS for following strings (10)

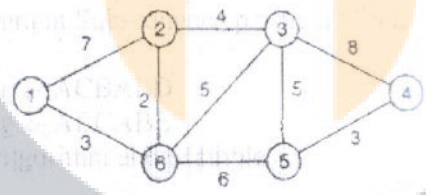
   String 1- ACBAED
   String 2- ABCABE

   (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)

$$T(n) = \begin{cases} 1, & \text{if } n=1 \\ 2\,T(n/2) + Cn, & \text{if } n>1 \end{cases}$$

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.
