(3 hours) **(Marks : 80)**

N.B.: (1) Question No. 1 is compulsory.
(2) Attempt any three out of the remaining five questions.
(3) Assumptions made should be clearly stated.

Q1 Answer the following Any Four.

a) What is Complexity? Explain in detail asymptotic notations. **5**
b) Explain approximation algorithms with an example. **5**
c) Compare Greedy approach and Dynamic Programming approach for an algorithm design. **5**
d) Describe naive string matching method. Write the algorithm for the same. **5**
e) Build a max heap for the following. 45, 65, 34, 25, 78, 56, 15. **5**

Q2

a) Define B-tree. Explain insertion and deletion operations on a B tree, with an example of each. **10**
b) Differentiate between Prims and Kruskals algorithms **10**

Q3

a) Find the longest common subsequence for the following two strings, using dynamic programming. X=abcabcba, Y= babcbcab **10**
b) Which are the different methods of solving recurrences. Explain with examples **10**

Q4

a) Consider the instance of knapsack problem where n=6, M=15, profits are (P1,P2,P3,P4,P5,P6) = (1,2,4,4,7,2) and weights are (W1,W2,W3,W4,W5,W6)= (10,5,4,2,7,3). Find maximum profit using Fractional knapsack. **10**
b) Explain matrix chain multiplication in detail. **10**

Q5

a) Sort the following numbers using Quicksort algorithm. 20, 30, 14, 56, 9, 72, 45, 5. **10**
b) Describe, with the help of an example, KMP algorithm. Also, comment on complexity. **10**

Q6.

a) Explain genetic algorithms in detail. **10**
b) Write a note on optimal binary search tree. **10**