**(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**

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