General instruction(s): Answer any three questions and each question carry 10 marks.

Answer any Three Questions			
Sl.No.	**Questions**	**Course Outcome (CO)**	**BL**
1.	What is loop invariant for Heapify() method. Develop an algorithm for Heapify() for the given array A, length n, and indices 2 till n. Check the proof of correctness of the developed algorithm.	CO1	L3
2.	It is possible to compress the text while transmitting it through the network to reduce the overload. The same can be achieved through different codes. Of which, Huffman coding is one technique that compresses the text to the possible extent. Explain the same for the given statement "go corona go". Construct the Huffman tree for the same statement and explain how much percentage of reduction has been done when compared to the traditional ASCII based approach.	CO2	L5
3.	Consider the problem of minimizing the total number of multiplications made in computing the product of n matrices $A_1.A_2.\ldots.A_n$ whose dimensions are $d_0 \times d_1, d_1 \times d_2, \ldots, d_{n-1} \times d_n$, respectively. Find an optimal parenthesization of matrix-chain product whose sequence of dimensions is 5, 10, 3, 12, 5 for the given n = 5. Apply dynamic program for the same, Also, design a dynamic programming algorithm for matrix chain multiplication.	CO2	L6