DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE – RAIGAD -402 103

Winter Semester Examination - Nov - 2019

54

Branch: Computer Science & Engineering

Sem.:- IV

Subject:- Design and Analysis of Algorithms (BTCOC401) Marks: 60

Date: - 26/11/2019

Time:- 3 Hrs.

Instructions to the Students

- 1. Each Question carries 12 marks.
- 2. Attempt any Five Questions of the following.

- 3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
- 4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly
- Q.1)a)Solve the following recurrence relation using master method.

(i)
$$T(n) = 4T(n/2) + n$$

(ii)
$$T(n) = 4T(n/2) + n^2$$

(iii)
$$T(n) = 4T(n/2) + n^3$$

- Q.1)b) Explain different asymptotic notations.
- Q.2)a)Write Strassen's algorithm to multiply two 2X2 matrices. Apply Strassen's algorithm to multiply following matrices.

orly following indifferes:

$$\begin{cases}
1 & 1 \\
A = \begin{cases}
1 & 1
\end{cases}$$

$$B = \begin{cases}
2 & 2
\end{cases}$$

- Q.2) b) Write an algorithm for merge sort. Apply merge sort on following array A=5 1 2 6 3 7 9 4
- Q.3) a) Write Huffman Coding algorithm. Obtain Huffman tree for following data.

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- Q.3) b) What are the different elements of greedy strategy? Explain the steps to solve the problem by greedy strategy.
- Q.4) a) Compute Longest Common Subsequence using Dynamic Programming approach for sequences X and Y if X = A, B, C, B, D, A, B and Y = B, D, C, A, B, A. What is the

length of LCS.

- b) Compare Greedy Strategy, Dynamic Programming and Divide and Conquer approach.
- Q.5)a) What is state space tree ?Using state space tree show that there exist an solution to 4-Queens problem .
 - b) Given n=6 weights, w={5,10,12,13,15,18} and M=30 .Find all possible subsets for which sum=M using sum of subsets algorithm.
- Q.6) a) What is P class and NP class? Show relationship between them.