Q3 Given a problem of finding Longest Palindrome Subsequence. Find the optimal sub-structure to obtain the same, explain with the help of example. Also show graphically, with an example, how recursive implementation of this optimal sub-structure will lead to overlapping sub problems. (A sequence is a palindrome if it reads the same whether we read it left to right or right to left. For example A, C, G, G, G, G, A. Longest Palindrome Subsequence example: consider the string A, G, C, T, C, B, M, A, A, C, T, G, G, A, M has many palindrome as subsequence, for instance: A, G, T, C, M, C, T, G, A has length 9). [2.5 + 2.5]

Q4 Explain in detail Strassen's method of matrix multiplication. Write down the Algorithm and the equations involved in algorithm, explain its complexity. [5]

Total No. of Page: 2

IV TH SEMESTER

MID SEMESTER EXAMINATION

Roll No. 16CO166

B.TECH. [CO/IT]

(March - 2019)

CO/IT 208 ALGORITHM DESIGN AND ANALYSIS

Time: 1:30 Hours

Max. Marks: 25

Note: Answer all questions

Assume suitable missing data, if any

Q1 Solve the following:

a) Apply master method to find the complexity of the following: [2 x2 = 4]

i) $T(n) = 4T\left(\frac{n}{2}\right) + n^3$

ii) $T(n) = 4T\left(\frac{n}{2}\right) + n^2$

b) For the recurrence equation $T(n) = T\left(\frac{n}{3}\right) + T\left(\frac{2n}{3}\right) + n$ [3 x 2 =6]

i) Apply recurrence tree method to find complexity. Show each and every step involved in calculation.

ii) For the complexity calculated in the previous part, use the same to prove with the help of substitution method. Use $\log_2 3$ and $\log_2(\frac{3}{2})$ as 3/2 and ½ respectively. Also write the minimum value of constant c for which the proof holds.

Q2 Given a sorted array of non-repeated integers A [1…n], check whether there is an index i for which A[i] = i. Modify the divide and conquer algorithm/ pseudo code for binary search to do the needful. Give an example to justify your implementation. Analyze the complexity for the same? [2+2+1]

P.T.O.