GUJARAT TECHNOLOGICAL UNIVERSITY ME – SEMESTER-1 (NEW) EXAMINATION – WINTER 2016

Subject Code: 2710201 Subject Name: Computer Algorithm Time: 2:30 pm to 5:00 pm Instructions:

Date:04/01/2017

Total Marks: 70

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- 1. Attempt all questions.
 - 2. Make suitable assumptions wherever necessary.
 - 3. Figures to the right indicate full marks
- **Q.1** (a) Explain how recurrence relation is solved using recurrence tree method. Argue that the solution to the recurrence: T(n) = T(n/3) + T(2n/3) + cn where c is a constant, is $\Omega(nlgn)$ by appealing to recurrence tree.
 - (b) Why do we use asymptotic notations in the study of algorithms? Briefly describe 07 the commonly used asymptotic notations.
- Q.2 (a) Discuss matrix multiplication problem using divide and conquer.
 - (b) Given coins of denominations 1,3 and 4 with amount to be pay is 7. Find optimal no. of coins and sequence of coins used to pay given amount using dynamic method.

OR

- (b) Compare Rabin-Karp with KMP string matching algorithm with respect to 07 running time complexity. Justify with example
- Q.3 (a) Find the sequence of jobs in such a way it meet deadline also. Solve the following 07 example by using greedy approach. (job starts at a unit time).

i	1	2	3	4
gi(profit)	50	10	15	30
di (deadline)	2	1	2	1

(b) Explain spurious hits in Rabin-Karp string matching algorithm with example. 07 Working modulo q=13, how many spurious hits does the Rabin-Karp matcher encounter in the text T = 2359023141526739921 when looking for the pattern P = 31415?

OR

Q.3 (a) Write down bellman ford algorithm. Give its time complexity

(b) Is Selection sorting a greedy algorithm? If so, what are the functions involved. 07

Q.4 (a) Generate minimum spanning tree from the following graph using prim's 07 algorithm.



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(b) What is amortized analysis? Explain any two methods in brief.

OR

- Q.4 (a) Explain master theorm and solve the following recurrence equation with master method

 T(n)=9T(n/3) + n
 T(n)=3T(n/4) + nlgn

 (b) Sort the letters of word "EXAMPLE" in alphabetical order using insertion sort. 07
 Q.5 (a) Why travelling salesman problem is NP complete? Which heuristic is used to 07
 - solve it? (b) Write the equation for finding out shortest path using Eloyd's algorithm. Use 07
 - (b) Write the equation for finding out shortest path using Floyd's algorithm. Use 07 Floyd's method to find shortest path for below mentions all pairs.

OR

Q.5(a) Explain Huffman code algorithm with greedy approach.07(b) Explain P and NP Problems.07

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