

Digital Logic Design and Analysis

December 17

Computer Engineering (Semester 3)

Total marks: 80

Total time: 3 Hours

INSTRUCTIONS

- (1) Question 1 is compulsory.
- (2) Attempt any **three** from the remaining questions.
- (3) Draw neat diagrams wherever necessary.

- Q.1(a) Find the maximum flow for the following network using Ford Fulkerson algorithm: (10)
(b) Show TSP is NP Complete and design an approximation algorithm **for TSP**. (10)
- Q.2 (a) What is convex hull? Explain the Graham's scan algorithm (10)
(b) In January, you buy a Ferrari from Lucky Motors, a dealer who offers you (10)
following maintenance contract: Rs.50000 each month other than March, June, September and December (this covers an oil change and general inspection), Rs.1,00,000 every March, June, and September (this covers an oil change, a minor tune-up, and a general inspection), and Rs.2,00,000 every December (this covers an oil change, a major tune-up, and a general inspection).
Obtain an upper bound on the cost of this maintenance contract as a function of the number of months, using amortized accounting method.
- Q.3(a) Explain the various methods to find complexity of recursive algorithms. (10)
Use recursive tree method to find time complexity of the following recursive Equation.
$$T(n) = 3T(n/4) + cn^2$$

(b) Create a Red Black Tree for the following elements: (10)
4, 2, 8, 10, 18, 6, 12, 14
- Q.4 (a) What is binomial heap? Draw a binomial heap for the following elements: (10)
iv .o 3, 1, 2, 9, 0, 6, 4, 8, 5, 10
After creating binomial heap, delete a node with minimum key and show resultant heap.
(b) **Explain** Traveling Salesman Problem in details. (10)
- Q.5(a) Explain with example Maximum Bipartite matching. (10)
(b) Explain closest pair of points using divide and conquer. (10)
- Q.6(a) What is the hiring problem? Discuss randomized algorithm for the same. (10)
(b) Discuss in details line segment properties. (10)



LAST MOMENT TUTIONS

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