

Advance Algorithm DEC 2018

(3 Hours) Total Marks: 80

- (1) Question No. 1 is compulsory.
- (2) Attempt any three questions out of remaining five question.
- (3) Make suitable assumptions wherever necessary but justify Your assumptions.

Q. 1 (a) Find the maximum flow for the following network using Ford Fulkerson algorithm: [10]

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Figure for Q.1 (a)

- (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 M
 - (b) In January, you buy a Ferrari from Lucky Motors, 8 dealer who offers you the 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) = 3 T (n/4) + cn²
 - (b) Create a Red Black Tree for the following elements: [10] 4, 2, 8, 10, 18, 6, 12, 14
- **Q4 (a)** What is binomial heap?? Draw a binomial heap for the following elements: [10]

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3, 1, 2, 9, 0, 6, 4, 8, S, 10 After creating binomial heap, delete a node with minimum key and show resultant heap.

(b) Explain Travelling Salesman Problem in details.	[10]
Q.5 (a) Explain with example Maximum Bipartite matching.(b) Explain closest pair of points using divide and conquer.	[10] [10]
Q.6(a) What is the hiring problem? Discuss randomized algorithm for the same.(b) Discuss in details line segment properties.	[10] [10]

