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AA582

M. Tech. EXAMINATION, May 2019

(First Semester)

(B. Scheme) (Re-appear Only)

(CSE)

CSE503B

ADVANCED ALGORITHMS

Time : 3 *Hours*] [*Maximum Marks :* 75

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. (a) Give examples of functions $f(n)$ which are member of BigO(x^2) and Small o(x^2). **5**

(b) Solve $T(n) = n^2 + T(n/2)$ using recursion tree method. **5**

(c) Describe the limitations of Masters Method. Also give some examples of recurrence relations that are not solvable by Master's method. **5**

2. With the help of neat diagrams explain the Big oh, small oh, Omega, small Omega and theta notations. **15**

Unit II

3. (a) Derive an expression to find the length of longest path in a red black tree with n number of internal nodes. **7**

(b) Compare 2-3 tree with 2-3-4 tree. Also discuss deletion operation in 2-3 tree with a suitable example. **8**

4. What are various operations that can be performed on a splay tree ? Discuss amortized complexity of each. **15**

Unit III

5. Compare Binomial heaps with Fibonacci Heaps. Write algorithm to consolidate the nodes of a Fibonacci Heap. Also discuss its complexity. **7,8**

6. With the help of an example explain the application of Binomial Heap to minimum spanning tree. **15**

Unit IV

7. (a) What are cut vertices ? Explain a method to find the strongly connected component from a given graph. **7**

(b) What are the significance of information theory bound. **8**

8. Write short notes on the following :

(a) Adversary arguments

(b) Amortized analysis. **15**