Roll No. .....

22644

M. Tech 2nd Semester (CSE) CBCS Scheme Examination – May, 2018

ALGORITHM DESIGN

Paper :MTCSE22C2

Time : Three Hours] *[Maximum Marks : 100*

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

Note : Attempt any *five* questions in all, selecting ***one*** question from each Unit. and question No. **1** is ***compulsory***. All questions carry equal marks.

1. (a) Explain how greedy paradigm of algorithm differs from that of dynamic programming.

$5 \times 4 = 20$

(b) What do you mean by Amortized time analysis ?

(c) For a problem P, if we are given an Input 'I' and a possible answer 'A', and we find a way to verify whether or not 'A' really is a valid answer to p given '1', then that kind of problem is P ?

(d) Explain general Backtracking Method.

UNIT – I

2. (a) Write an algorithm for selection sort. Give Best case and worst case running time of selection sort. 10

(b) What is bi-connected component of a graph ? Give example and algorithm to find bi-connected component. 10

3. (a) Describe a red-black tree. Explain the concept of rotations in red-black tree. 10

(b) Write an algorithm for Quick sort and compare its time complexity with merge sort. 10

UNIT – II

4. (a) Define all pair shortest path problem. Discuss solution of this problem based on dynamic programming. 10

(b) Find the solution for the following fractional Knapsack problem using greedy method : 10

$n = 3, m = 50, w_i = (10, 20, 30), p_i = (60, 100, 120)$.

5. What is Branch and Bound method ? Solve the travelling salesperson problem with branch and bound by taking suitable example. 20

UNIT – III

6. (a) Explain Cook's theorem. 10

(b) When are NP-hard and NP-Complete problems. 10

7. Explain Knuth-Morris-Prott algorithm by taking suitable example. Also compute its complexity. 20

UNIT – IV

8. Discuss the following : $10 \times 2 = 20$

(a) PRAM Model

(b) Absolute Approximation

9. Explain Fully polynomial time approximation. 20

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