Reg. No. : | | | | | | | | | | |

Question Paper Code: 34204

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2019

Fourth Semester

Computer Science and Engineering

01UCS404 - DESIGN AND ANALYSIS OF ALGORITHMS

(Regulation 2013)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions.

PART A - (10 x 2 = 20 Marks)

1. What is an algorithm?
2. Differentiate recursive and non-recursive algorithms.
3. List the strength and weakness of brute force algorithm.
4. How divide and conquer technique can be applied to binary trees?
5. Define dynamic programming.
6. State the uses of memory functions to solve knapsack problem.
7. Show the Mathematical formulation to solve a max flow problem.
8. Summarizethe steps to print all edges of minimum cut.
9. Define NP Hard and NP Completeness.
10. Draw a graph with cycle but with no Hamiltonian cycle.

PART - B (5 x 16 = 80 Marks)

11. (a) Briefly explain the steps in mathematical analysis of recursive algorithms. (16)

Or

(b) Solve the following recurrence relations (16)

a) $x(n)=x(n-1)+5$ for $n > 1$ $x(1)=0$

b) $x(n)=3x(n-1)$ for $n > 1$ $x(1)=4$

c) $x(n)=x(n-1)+n$ for $n > 0$ $x(0)=0$

d) $x(n)=x(n/2)+n$ for $n > 1$ $x(1)=1$ (solve for $n=2^k$)

e) $x(n)=x(n/3)+1$ for $n >1$ $x(1)=1$ (solve for $n=3^k$)

12. (a) Write an algorithm for Quicksort and sort the list 5, 3, 1, 9, 8, 2, 4, 7. Also find its time complexity. (16)

Or

(b) Discriminate the following solutions based on the time complexity with necessary justification

(i) Strassen's matrix multiplication (8)

(ii) Multiplication of largest integer (8)

13. (a) What is optimal binary search tree? Write the algorithm to find the optimal binary search tree by dynamic programming. (16)

Or

(b) Write the Floyd's algorithm for solving all pair shortest path. (16)

14. (a) Briefly explain the stable marriage problem. Find the best and worst case time complexity. (16)

Or

(b) Explain briefly about the maximum-flow problem with an example. (16)

15. (a) Explain in detail about assignment problem. (16)

Or

(b) Draw the State-space tree of solving the four queens problem by backtracking. (16)