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B022415(022)

B. Tech. (Fourth Semester) Examination, Nov.-Dec. 2021

AICTE (~~New~~ Scheme)

(Computer Science Engg. Branch)

DESIGN & ANALYSIS OF ALGORITHMS

Time Allowed : Three hours

Maximum Marks : 100

Minimum Marks : 35

Note : *Answer all questions. Part (a) of each question is compulsory and of 4 marks. Answer any two parts from part "b", "c" and "d", which is of 8 marks each.*

1. (a) What is Algorithm? Draw the flowchart of Algorithm. 4

(b) Obtain the little oh and little omega bounds for the following function. 8

$$f(n) = 10n^2 + 3n + 5$$

(c) Write short notes on : 8

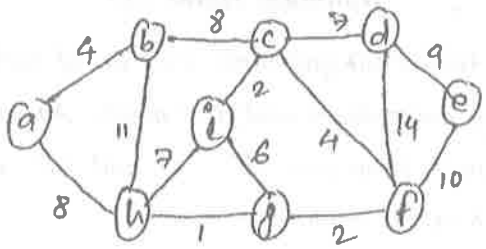
(i) Heap sort

(ii) Bubble sort

(d) Explain recursion tree methods and state master theorem. 8

2. (a) Define divide and conquer approach for solving problems. 4

(b) Find out the MST for the following graph using Kruskal's Algorithm. 8



(c) Write shorts notes on : 8

(i) Quick short

(ii) Merge sort

(d) What is greedy method? Write algorithm, application and general characteristics of greedy methods. 8

3. (a) Write short notes on AND/OR graphs. 4

(b) Explain dynamic programming approach for the algorithm. 8

(c) Find out the longest common subsequence for sequences X and Y : 8

$X = < A, B, C, D, A, B >$

$Y = < B, D, C, A, B, A >$

(d) Write an algorithm to find optimal matrix chain multiplication sequence for 'n' given matries with all assumptions stated. 8

4. (a) What is Backtracking? Write application of backtracking. 4

(b) Write algorithm for 8-queens problem. 8

(c) Write short notes on : 8

(i) Graph coloring problem

(ii) Sum of subset method

(d) Explain how to find Hamiltonian cycle by using backtracking problem. 8

5. (a) What do you mean by FIFO branch and bound algorithm. 4

(b) Write short notes on : (any **two**) 8

(i) P and NP problems

(ii) Reduction

(iii) Cook's theorem

(c) Explain the 15-puzzle problem with example. 8

(d) Write short notes on : 8

(i) Least cost search

(ii) 0/1 knapsack problem