322552(22)

B. E. (Fifth Semester) Examination, Nov.-Dec. 2021

(New Scheme)

(CSE Branch)

ANALYSIS & DESIGN of ALGORITHMS

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

*Note : Attempt all questions. Part (a) of each question is compulsory and carrying 2 marks. Attempt any **two** from parts (b), (c) and (d) and carry 7 marks each.*

Unit-I

1. (a) Define Algorithm.   2

   (b) Explain Different Asymptotic notations with the help of graphical representations and examples.   7

(c) State Master's Theorem. Explain with examples of three cases.   7

(d) Write and analyze the algorithm for insertion sort with an example.   7

Unit-II

2. (a) Define divide & conquer paradigm.   2

(b) Explain the method of Strasson's Matrix multi-plication with an example.   7

(c) Explain any one method (Prim's/Kruskal's) to find minimum spanning tree with an example.   7

(d) Write down the Dijkstra's Algorithm for finding single source shortest path and explain with an example.   7

Unit-III

3. (a) Write steps of dynamic programming.   2

(b) Define multi stage graph. Find the optimal shortest path for the following graph.   7
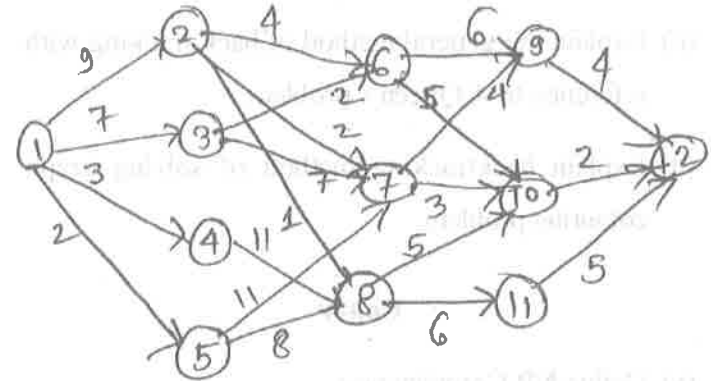
(c) Compute the optimal sequence of parenthesization for the following :

$A_1 = 15 \times 5$, $A_2 = 5 \times 10$, $A_3 = 10 \times 20$,

$A_4 = 20 \times 25$.   7

(d) Write short notes on :

(i) AND-OR Graph

(ii) Topological Sorting   7

Unit-IV

4. (a) Define Back tracking.   2

(b) Draw a state space search tree for following problem : of sum of subsets $W = \{ 5, 10, 12, 13, 15, 18 \}$ and $M = 30$.   7

(c) Explain the general method of back tracking with reference to 4-Queen's problem. 7

(d) Explain backtracking method of solving graph colouring problem. 7

Unit-V

5. (a) Define NP-Completeness. 2

(b) Explain the branch and bound method for solving 15- puzzle problem. 7

(c) Write down the differences between P & NP classes. 7

(d) Explain Branch and Bound method for solving Knapsack Problem. 7