

--	--	--	--	--	--	--	--	--	--



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

B.Tech III Semester End Examinations (Supplementary) - January/February, 2018

Regulation: IARE – R16

DESIGN AND ANALYSIS OF ALGORITHMS

(Common to CSE|IT)

Time: 3 Hours

Max Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

UNIT – I

- Define Ω , θ and O asymptotic notations and discuss their significance. [7M]
 - Write the Quick sort algorithm Apply the algorithm to sort the list 5,3,1,9,8,2,4,7. [7M]
- Explain about the Probabilistic analysis with an example. [7M]
 - Describe Strassen's matrix multiplication and derive the time complexity of it. [7M]

UNIT – II

- Explain about FIND operation Using Collapsing Rule. [7M]
 - Write the algorithm to find the depth first search and breadth first search of a graph. [7M]
- Explain UNION and FIND Operations of Disjoint sets with suitable examples and write the algorithms. [7M]
 - Define biconnected component? Explain how to identify a biconnected component in a given graph. [7M]

UNIT – III

- Write Kruskal's algorithm and determine the minimum cost spanning tree for the graph as shown in figure 1. [7M]

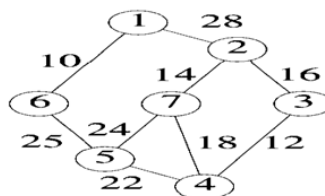


Figure 1

- Discuss the difference between greedy approach and dynamic programming with suitable examples. [7M]

6. (a) Write Dijkstra's algorithm to find single source shortest path. Apply the same to find the shortest path from vertex 'a' in the following graph as shown in figure 2. [7M]

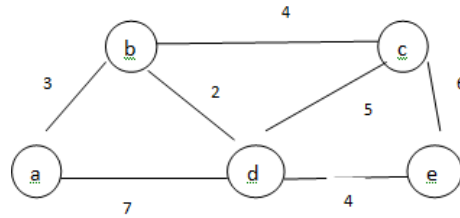


Figure 2

- (b) Apply Floyd's algorithm to solve all pair shortest path problem. [7M]

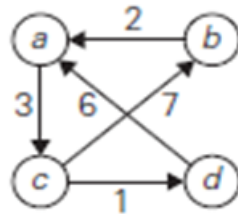


Figure 3

UNIT – IV

7. (a) Illustrate graph coloring problem and draw the state space tree for n=3 and m=3. [7M]
 (b) What is backtracking? Illustrate the n queen problem with state space tree. [7M]
8. (a) Draw and explain the portion of the state space tree for n-queens problem that is generating backtracking. [7M]
 (b) Solve the problem for travelling salesperson instance defined by cost adjacency matrix. [7M]

$$\begin{pmatrix} \infty & 7 & 3 & 12 & 8 \\ 3 & \infty & 6 & 14 & 9 \\ 5 & 8 & \infty & 6 & 18 \\ 9 & 3 & 5 & \infty & 11 \\ 18 & 14 & 9 & 8 & \infty \end{pmatrix}$$

UNIT – V

9. (a) Explain nondeterministic algorithm for sorting. [7M]
 (b) Define and explain briefly [7M]
 i. P Problem
 ii. NP hard problem
 iii. NP complete problem
10. (a) Discuss in detail the different problems in NP-Hard and NP-Complete. [7M]
 (b) Explain about chromatic number decision problem. [7M]