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INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Four Year B.Tech III Semester End Examinations (Regular) - November, 2018

Regulation: IARE – R16

DESIGN AND ANALYSIS OF ALGORITHMS

Time: 3 Hours

(Common to CSE | IT)

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

1. (a) Formulate the order of growth? Compare the order of growth $n!$ and $2n$. [7M]
- (b) Write an algorithm to find mean and variance of an array perform best, worst and average case complexity, defining the notations used for each type of analysis. [7M]
2. (a) Describe briefly the notations of complexity of an algorithm. [7M]
- (b) Discuss how much the function value will change if the sequential search function's argument is increased. [7M]

UNIT – II

3. (a) Describe non recursive binary tree traversal algorithm with suitable example. [7M]
- (b) What approach would you use for Depth first Search? Find the solution for the following graph given. [7M]

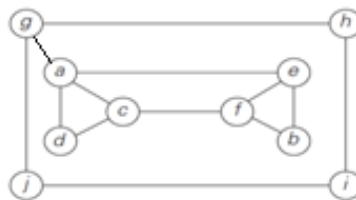


Figure 1

4. (a) Explain the algorithm for maximum and minimum numbers in an array. [7M]
- (b) Give a suitable example and explain the breadth first search and depth first search algorithm. [7M]

UNIT – III

5. (a) Consider that there are three items. Weight and Profit value of each item is as given below in Table 1. Also $W=20$ obtain the solution for the above given knapsack problem using Greedy Method. [7M]

Table 1

I	W_i	P_i
1	18	30
2	15	21
3	10	18

- (b) Elucidate the minimum spanning tree with the help of prim's algorithm and show the result for the given graph shown in Figure 2 [7M]

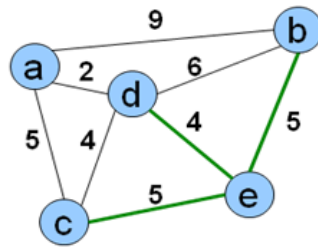


Figure 2

6. (a) Compare between Prim's and Kruskal's algorithm and identify the time complexity of those algorithms. [7M]
(b) Develop an algorithm for memory function knapsack problem. [7M]

UNIT – IV

7. (a) Generate all permutations of $A=1, 2, 3, 4$ and $d=9$ by backtracking. [7M]
(b) Explain subset-sum problem and discuss the possible solution strategies using backtracking. [7M]

8. (a) Write and explain the techniques in branch and bound method. [7M]
- (b) Assume 4 cities A, B, C, D, which are represented by a fully connected graph. The following Table 2 represent the pheromone levels on each edge of the graph and the distances between each city (assume the pheromone levels and distances are symmetric). Assume an ant started its journey at city A and has travelled to city C. Calculate the following [7M]
- What is the probability that the ant will travel to city A?
 - What is the probability that the ant will travel to city B?
 - What is the probability that the ant will travel to city D?
- Assume alpha and beta are set to 1.

Table 2

Pheromone Levels					Distances				
	A	B	C	D		A	B	C	D
A					A				
B	0.25				B	12			
C	0.11	0.98			C	10	6		
D	0.34	0.54	0.67		D	8	15	3	

UNIT – V

9. (a) Explain how to implement an algorithm for Cook’s theorem. [7M]
- (b) Using an example, design and prove that satisfiability of Boolean formula in 3-conjunctive normal form I NP- complete? [7M]
10. (a) Show that the Hamiltonian path problem reduces to the Hamiltonian circuit problem and vice versa. [7M]
- (b) Elaborate the Non Deterministic Algorithm with example. [7M]

