Total No. of Questions-8] [Total No. of Printed Pages-3

B.E. VI Semester Examination

BE-VI/6(A)

213674

COMP. / IT.ENGG.

ANALYSIS & DESIGN OF ALGORITHMS

Course No COM -602

Tu ed-3Hours *Maximum Marks-10*

Note: Attempt **five** questions in all selecting at least **TWO** Questions from **each** section. All questions carry **Equal** marks.

SECTION-A

1. a) Define the following terms: **(10)**

(i) Big Oh Notation

(ii) Big Theta Notation

(iv) Big Omega Notation

(v) Little Oh Notation

(vi) Little Omega Notation

b) What is the difference between Best Case, Average case and Worst Case Complexity. **(10)**

2. a) Write Short notes on **(10)**

(i) Double hashing

(ii) Rehashing

b) Illustrate the operation of HeapSort on the array A=(5,13,2,25,7,17,20,8,4) **(10)**

3. a) How comparison trees can be used from deriving lower bounds on searching and sorting ?Explain in detail. Also Draw comparison tree for sorting four elements. **(20)**

4. a) Explain the relationship between P, NP, NP-complete and NP-Hard Problems with suitable example of each class. **(10)**

(b) Write Short notes on **(10)**

(i) Cook's Theorem

(ii) Oracle and Adversary Arguments

SECTION - B

5. a) Explain how Divide and conquer technique can be used to MergeSort a list of *n* elements. Sort the given list using Mergesort. 70, 80, 40, 50, 60, 11, 35, 85, 2 **(10)**

b) Explain Strassen's matrix multiplication with its limitations. **(10)**

6. a) Write down the Prim's algorithm for Minimum-Cost Spanning Tree by Greedy programming **(10)**

b) Find the optimal solution to the knapsack instance n=3, m=5 $(w_1, w_2, w_3)=(2,3,4)$ and $(p_1,p_2,p_3) = (1,2.5)$ **(10)**

7. Write a backtracking algorithm for sum of subsets problem using the state space tree corresponding to the fixed tuple size formulation. Let W = (5, 7, 10, 12, 15, 18, 20) and M = 35. Find all possible subsets of W which sum to M, using the above algorithm. Also draw the portion of the state space tree which is generated. **(20)**

8. a) Explain Branch and bound technique considering travelling salesperson problem. **(10)**

b) What are multistage graphs? Explain how Dynamic Programming helps in determining the minimum cost path from node 's' to 'T' in a graph. **(10)**

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