53 (IT 504) DAAL

2019

DESIGN AND ANALYSIS OF ALGORITHM

Paper : IT 504

Full Marks : 100

Time : Three hours

The questions are of equal value.

*Answer **any five** questions.*

1. (a) Define and differentiate asymptotic notations (O, Θ, Ω) with suitable examples.

   (b) State master's theorem and find the time complexity for the following recurrence :

   (i) $T(n) = 2T(n/2) + \log n$

   (ii) $T(n) = T(2n/3) + 1$

Contd.

(c) Solve the recurrence relation :

$$T(n) = T(n/2) + T(n/4) + T(n/8) + n$$

for $n > 1$ and $T(1) = 1$

2. (a) What is Heap property?

(b) Write an algorithm to make a max-heap containing the following elements.

1, 2, 3, 7, 17, 19, 25, 36, 100.

(c) Write the algorithm of Heap Sort and find the running time of this algorithm.

3. Write the algorithm of Quick sort. Write the efficient algorithm to find the kth largest value among n numbers.

4. (a) How are graphs represented in computer?

(b) Write an algorithm of DFS. Explain the algorithm with an example.

5. Find out the minimum cost spanning tree using Prim's and Kruskal's algorithm.
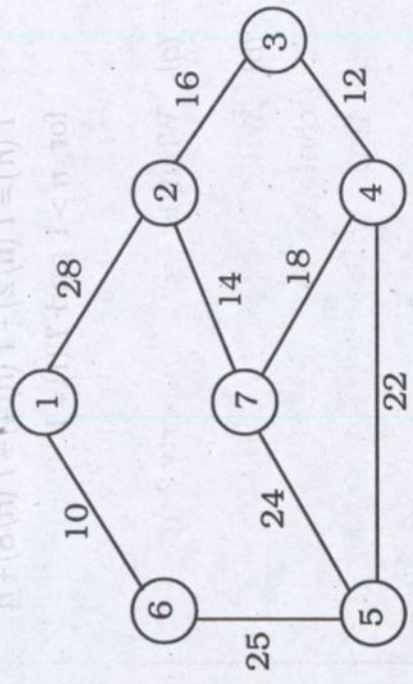
6. Write the algorithm of matrix chain multiplication. Analyze its complexity.

7. Write notes on : *(any four)*

(a) Basic concept of a divide-and-conquer algorithm

(b) Recursion tree

(c) Basic characteristic of greedy algorithm

(d) Minimum spanning tree of a graph

(e) 4-Queens problem by backtracking

(f) Backtracking technique.

———