

Code No: **R32053**

R10

Set No. 1

III B.Tech II Semester Supplementary Examinations, April - 2017

DESIGN AND ANALYSIS OF ALGORITHMS

(Common to Computer Science Engineering and Information Technology)

Time: 3 hours**Max. Marks: 75**

Answer any FIVE Questions

All Questions carry equal marks

- 1 Solve the following recurrence relations and give a Ω bound for each of them:
 - a) $T(n) = 2 T(n/3) + 1$
 - b) $T(n) = 5 T(n/4) + n$
 - c) $T(n) = 9 T(n/3) + n^2$
 - d) $T(n) = 49 T(n/25) + n^{3/2} \log n$
 - e) $T(n) = T(n-1) + n^c$, where $c \geq 1$, a constant
- 2 a) Explain the usefulness of the following functional operations on sets.
I. MIN II. DELETE III. FIND IV. UNION V. INSERT
 - b) Write the procedures for Union and Find Algorithms.
- 3 a) Briefly explain the Quick Sort Algorithm with suitable example.
 - b) Derive all its worst case, best case and average case time complexities.
- 4 a) Describe the Knapsack problem using greedy method.
 - b) Explain about Single source shortest path problem.
- 5 a) Define dynamic programming. What is matrix chain multiplication protocol? Give the solution for the problem of matrix chain multiplication and derive its time complexity.
 - b) Explain about optimal binary search trees.
- 6 a) Define Back Tracking. Describe the 4-queens problem using backtracking.
 - b) Briefly explain graph coloring using backtracking.
- 7 a) Illustrate LCBB solution to solve the knapsack problem.
 - b) What do you mean by bounding? Explain how these bound are useful in branch and bound methods?
- 8 a) Compare and contrasts between NP-HARD and NP-COMPLETE.
 - b) Briefly explain Cooks-theorem.

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