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## Code No: CT1515

GEC-R14

## III B. Tech II Semester Supplementary Examinations, November 2017 DESIGN AND ANALYSIS OF ALGORITHMS

(Computer Science and Engineering)

## Time: 3 Hours

Max. Marks: 60
Note: All Questions from PART-A are to be answered at one place.
Answer any FOUR questions from Part-B. All Questions carry equal Marks.

## PART-A

1. Define algorithm and write it`s properties.
2. Give the recurrence equation for time complexity of merge sort.
3. List the advantages of greedy algorithm.
4. Write about travelling sales person problem according to dynamic programming.
5. Define Implicit Constraints.
6. What is branch and bound?

## PART-B

$$
4 \times 12=48 M
$$

1. a) What is a recursive algorithm? Explain with an example.
b) Describe the performance analysis of an algorithm in detail.
2. a) Prove that the Worst Case time complexity of Quicksort is $\mathrm{O}\left(\mathrm{n}^{2}\right)$.
b) Sort the following elements using Merge sort. $45,22,88,23,78,46,84,44,21,34$.
3. a) Are the Minimum spanning tree of any graph unique? Apply PRIM's algorithm to find a minimum cost spanning tree for the following. ( $a$ is a starting vertex).

b) Explain job sequencing with deadline. Solve the following instance:
$\mathrm{n}=5$. $(\mathrm{P} 1, \mathrm{P} 2, \mathrm{P} 3, \mathrm{P} 4, \mathrm{P} 5)=(25,20,15,10,5)$ and
Deadlines (d1, d2, d3, d4, d5) $=(2,2,1,3,3)$
4. Which is a more efficient way to determine the optimal number of multiplications in a matrix chain multiplication problem enumerating all the ways of parenthesizing the product and computing the number of multiplication for each or running MATRIX-CHAIN-ORDER? Justify your answer. Find an optimal parenthesization of a matrix-chain product whose sequence of dimensions are $\left(p_{0}, p_{1}, p_{2}, p_{3}, p_{4}\right)=(5,4,3,6,7)$.
5. Define N queen's problem. Draw the tree organization of the 4 -queens solution space. Find out the possible solutions for 4 queens problem by using back tracking approach.
6. Find the optimal solution using LCBB to the knapsack instance $\mathrm{n}=5, \mathrm{~m}=10$. ( $\mathrm{P} 1, \mathrm{P} 2, \ldots$., $P 5)=(12,32,40,30,50),(w 1, w 2, \ldots, w 5)=(4,8,2,6,1)$. Draw the portion of the state space tree.
