H.T.No. | | | | | | | | | | |

**Code No: CT1515** **GEC-R14**

# III B. Tech II Semester Regular Examinations, April 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

**6 × 2 = 12M**

1. Calculate the time complexity for the following program segment:

```
Algorithm Add(a, b, c, m, n)
{
    for i := 1 to m do
        for j := 1 to n do
            c[i, j] := a[i, j] + b[i, j];
}
```

2. Define Binary Search.
3. Define minimum cost spanning tree.
4. What is matrix chain multiplication?
5. Define sum of subsets problem.
6. Define (i)Live node (ii) Dead node.

## PART-B

**4 × 12 = 48M**

1. Develop an algorithm for **selection sort** to sort given integers. Also analyze its time and space complexity. (12M)
2. a) Describe tree and array representations of disjoint sets. (6M)
   b) Design algorithms for simple union and find operations. Also discuss problems associated with these algorithms. (6M)
3. a) Solve the following instances of the Job Sequencing with Deadlines using Greedymethod. (6M)

   n=4,(p1,p2,p3,p4)=(100,10,15,27),

   (d1,d2,d3,d4)=(2,1,2,1).

   b) Develop an algorithm for Job sequencing with deadlines. (6M)

4. a) Find the minimum number of operations required for the following matrix chain multiplication using dynamic programming. (8M)

   A (5, 3) * B (3, 4) * C (4, 2) * D (2, 6)

   b) Compare and contrast dynamic programming with greedy approach. (4M)

5. a) Write a recursive backtracking algorithm for **N Queens** problem. (6M)

   b) Draw the state space tree to color the graph with the three colors: red, green and blue, and three nodes (n=3). (6M)

6. a) Explain the general method of Branch and Bound. (6M)

   b) Write the Control Abstractions for LC – search. (6M)

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