Or

Describe travelling salesman problem. Give its solution using dynamic programming design technique. **12**

13. Explain graph coloring problem with the help of suitable example. Discuss the significance of 4-colour conjecture.

Or

(a) Wrie recursive backtracking algorithm for the sum of subsets problem.

(b) Discuss branch and bound problem solving technique. **7+4**

Subject Code—0421

M.C.A. (Fourth Year) EXAMINATION

(5 Years Integrated Course)

(Batch 2009 Onwards)

ANALYSIS AND DESIGN OF COMPUTER ALGORITHMS

MCA-403

Time : 3 *Hours* *Maximum Marks :* 70

Section A

Note : Attempt any *Seven* questions. **7×5=35**

1. Define and explain various types of algorithms.

2. Discuss and explain the general method of Divide and Conquer Algorithm Design Technique.

3. Define and discuss various asymptotic notations.

4. Define data structure and its various types.

5. How is graph represented in memory ?

6. What is a Minimum Spanning Tree ? Explain Kruskal's algorithm to obtain a spanning tree.

7. State and explain the principle of optimality.

8. Consider the recurrence

$T(n) = 3T(n/2) + n$, $N \geq 1$, with initial $T(0) = 0$

Obtain the solution for above recurrence.

9. Discuss and explain 8-queens problem and write backtracking algorithm for solving 8-queens problem.

10. Write short note on NP-hard and NP-complete problems.

Section B

Note : Attempt all the questions.

11. Explain divide and conquer algorithm design technique. Write an algorithm for Merge Soft and determine its complexity. Give examples wherever necessary.

Or

With a suitable algorithm, explain the problem of finding the maximum and minimum items in a set of '*n*' elements. **12**

12. (a) What do you understand by Single Source Shortest Path ? Explain the greedy way to generate shortest path.

(b) Suppose your have 6 containers whose weights are 50, 10, 30, 20, 60, 5 and a ship whose capacity is 100. Using greedy approach find an optimal solution to this instance of container loading problem.

8+4