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Code No. : 243 O

**VASAVI COLLEGE OF ENGINEERING (*Autonomous*), HYDERABAD**  
**M.C.A. II Year I-Semester Backlog(Old) Examinations, December-2017**

**Design and Analysis of Algorithms**

Time: 3 hours

Max. Marks: 70

*Note: Answer ALL questions in Part-A and any FIVE questions from Part-B*

**Part-A ( $10 \times 2 = 20$  Marks)**

1. Define the time complexity of an algorithm.
2. Define hashing.
3. Write the control abstraction for divide and conquer.
4. Illustrate minimum spanning tree with example.
5. Explain the biconnected components.
6. Show BFS traversal technique with example.
7. Write control abstraction for back tracking.
8. Define m-colorability optimization.
9. Define Node cover problem.
10. Explain the satisfiability problem.

**Part-B ( $5 \times 10 = 50$  Marks)**

11. a) List the different asymptotic notations used to represent the time complexity. Explain the same with examples. [5]  
b) Define Heap. Explain the Heap sort Algorithm. [5]
12. a) Write divide and conquer algorithm for quick sort. [5]  
b) Explain the krushkal's algorithm for finding the Minimum cost spanning tree with example. [5]
13. a) Demonstrate the dynamic programming method to solve the 0/1 Knapsack where the capacity  $m = 6$  and weights (2,3,4) and profits(1,2,5). [6]  
b) Explain about Multistage graph with example. [4]
14. a) Write a backtracking algorithm for graph coloring problem. [5]  
b) Explain how branch and bound applies for 0/1 Knapsack. [5]
15. a) State and explain the importance of cook's theorem. [5]  
b) Prove that CNF Satisfiability reduces to clique decision problem. [5]
16. a) Write UNION and FIND algorithms that use weighting rule and collapsing rule respectively for disjoint sets. [5]  
b) Write an algorithm for job sequencing with deadlines. [5]
17. Write short notes on any *two* of the following:
  - a) Algorithm for OBST. [5]
  - b) Backtracking for Hamiltonian cycles. [5]
  - c) NP Hard and NP complete problems. [5]

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