

Reg No.: \_\_\_\_\_

Name: \_\_\_\_\_

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
**THIRD SEMESTER MCA DEGREE EXAMINATION, DECEMBER 2017**

**Course Code: RLMCA207**

**Course Name: DESIGN AND ANALYSIS OF ALGORITHMS**

Max. Marks: 60

Duration: 3 Hours

**PART A**

*Answer all questions, each carries 3 marks.*

- 1 What is an algorithm? Explain its characteristics. (3)
- 2 Write down control abstraction for divide and conquer method. (3)
- 3 Explain the control abstraction for greedy strategy. (3)
- 4 What is the principle of optimality in the theory of dynamic programming? (3)
- 5 Write down DFS algorithm. (3)
- 6 State sum of subset problem. (3)
- 7 Explain the concept of branch and bound strategy. (3)
- 8 Distinguish between deterministic and non deterministic algorithm. (3)

**PART B**

*Answer six questions, one full question from each module and carries 6 marks.*

**Module I**

- 9 Explain time and space complexity with relevant examples. (6)

**OR**

- 10 What are asymptotic notations? Briefly explain their properties. (6)

**Module II**

- 11 Write down an algorithm for finding minimum and maximum element in a list of numbers. Explain the concept with an example. (6)

**OR**

- 12 Explain the concept of merge sort algorithm with example. (6)

**Module III**

- 13 a) Define minimum cost spanning tree. (2)  
b) Explain Prim's algorithm for finding MST. (4)

**OR**

- 14 Explain Knapsack problem. Find out the optimal solution for the following 3 items (P1, P2, P3) = (500, 900, 700) and (W1, W2, W3) = (1, 3, 7). Knapsack capacity is 5. Also write down the Knapsack algorithm. (6)

**Module IV**

- 15 If we are given a directed graph  $G$  with  $n$  vertices. Explain how will you find out the length of the shortest path between any pair of vertices in  $G$ . Justify your answer with an example. (6)

**OR**

- 16 What is dynamic programming? Explain how this concept is applied to solve travelling salesman problem. (6)

**Module V**

- 17 Explain how  $N$ - queen's problem is solved using the concept of backtracking. (6)

**OR**

- 18 Explain  $N^2-1$  puzzle problem in detail. (6)

**Module VI**

- 19 a) Explain NP-Hard and HP-complete classes. (3)  
b) Explain Clique problem. (3)

**OR**

- 20 Prove that the travelling sales person problem is NP-complete. (6)

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