1587

Code : 15CS53T

Register Number

DESIGN & ANALYSIS OF ALGORITHMS

Time : 3 Hours]

[Max. Marks : 100

Note : (i) Answer any **six** questions from Part – **A**. Each carries **five** marks.

(ii) Answer any **seven** questions from Part – **B**. Each carries **ten** marks.

PART – A

1. Define Graph, Vertex, Edge, Path and Length of a path with example for each. 5

2. Explain Euclid's algorithm for computing GCD of two numbers. 5

3. Write an algorithm for finding the value of the largest element in a list of n numbers. 5

4. Write a recursive algorithm for computing the factorial of a positive integer n. 5

5. Define Brute force and explain it with example. 5

6. Explain divide and conquer technique with neat diagram. 5

7. Define binary tree, explain its traversals. 5

8. Explain decrease and conquer technique with neat diagram. 5

9. Explain greedy method with appropriate example. 5

PART – B

10. Explain the steps involved in designing and analysing of an algorithm. 10

11. (a) Discuss sorting and searching problem types. 5
    (b) Explain Graph Problems and String Processing Problems. 5

[Turn over

12. Explain Big-oh (O) notation, Big Omega (Ω) notation and Big Ttheta (θ) notation along with its graph.   10

13. Illustrate the recursive solution to the Tower of Hanoi Puzzle.   10

14. Apply bubble sort to the following array : 70, 30, 20, 50, 60, 10, 40.   10

15. Consider knapsack for the instance given below :   10

N = 3, M = 105

$[W_1, W_2, W_3] = [100, 10, 10]$

$[P_1, P_2, P_3] = [20, 15, 15]$

Find all feasible and infeasible solutions.

16. Write Depth First Search (DFS) algorithm and solve the following graph using DFS algorithm.   10
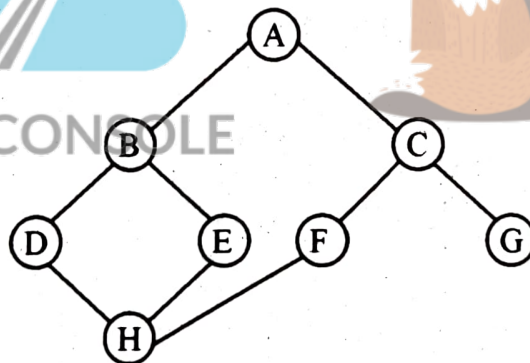
17. Trace the following set of numbers using Quick sort algorithm :   10

50, 30, 10, 90, 80, 20, 40, 70

18. Compute time complexity of insertion sort in the best, worst and average cases.   10

19. Explain Dijkstra's Algorithm for the following graph.   10