2017

M.Sc.

1st Semester Examination

COMPUTER SCIENCE

PAPER—COS-101

Subject Code—26

Full Marks : 50

Time : 2 Hours

The figures in the right-hand margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

(Design and Analysis of Algorithm)

Answer Q. No. *1* and any *two* from the rest.

1. (a) Explain time complexity and space complexity of an algorithm.

(b) Explain Big-Oh, Big-Theta and Big-Omega notation used in analysis of algorithm.

(c) Define recurrence relation. What is amortized analysis ? 2+4+(2+2)

2. (a) Write down the Merge sort algorithm using divide and conquer strategy.

(b) Explain time complexity of Quick sort for different cases.

(c) Explain tail recursion in detail. What is the advantage of using tail recursive function over non-tail recursive function? 6+4+(3+2)

3. (a) Write down the 0-1 Knapsack problem algorithm using dynamic programming strategy. What is the time complexity of this algorithm ?

(b) Explain matrix chain multiplication problem in detail.

(c) Explain the difference between dynamic programming approach and greedy approach. (6+2)+4+3

4. (a) Write an algorithm for all pair shortest path using dynamic programming approach.

(b) Explain backtracking algorithm using an example.

(c) Explain the BFS and DFS algorithm for graph traversal. 6+5(2+2)

5. (a) What is the class P and class NP problem ? When a problem is called NP Complete ?

(b) Write down Kruskal's algorithm to find minimum spanning tree of a graph.

(c) What is randomized algorithm ? Explain approximation algorithm in detail. (2+1)+6+(3+3)

[Internal Assessment — 10 Marks]

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