2022

1st Semester Examination
COMPUTER SCIENCE
Paper : COS 101
(Analysis of Algorithm)

Full Marks : 40

Time : Two Hours

The figures in the margin indicate full marks.
Candidates are required to give their answers
in their own words as far as practicable.

Group - A

Answer any *four* questions :   2×4=8

1. What do you mean by time complexity and space complexity?

2. Define tail recursion.

3. When quick sort exhibits worst case?

4. What do you mean by secure hash algorithm?

5. How are problems solved using backtracking?

6. What do you mean by asymptotic tight bound?

P.T.O.

Group - B

Answer any *four* questions :   4×4=16

7. Write down the Merge sort algorithm using divide and conquer strategy.   4

8. Derive the minimum number of multiplications required to solve the following A, B, C, D matrices using dynamic programming approach :   4

$$A_{2\times3} \ B_{3\times4} \ C_{4\times2} \ D_{2\times3}$$

9. Briefly explain the branch and bound algorithm using an example.   4

10. Why Floyd-Warshall algorithm is chosen over Dijkstra's algorithm for all pair shortest path problems?   4

11. What do you mean by greedy approach? What are the differences between greedy approach and dynamic programming?   2+2

12. Briefly explain the RSA algorithm using an example.   4

Group - C

Answer any *two* questions :   8×2=16

13. What is the need of approximation algorithm? What do you mean by performance guarantee of an approximation algorithm?   4+4

14. What is the class P and Class NP problem? When a problem is called NP Complete?   4+4

15. Using a suitable example, explain how Prim's and Kruskal's algorithm are used to find the minimum spanning tree of a graph. 8

16. Why disjoint set data structure is important? Briefly explain Union-Find algorithm using a suitable example.

2+6