(i) Printed Pages: 3 Roll No. .....

(ii) Questions : 9 Sub. Code : 3 6 0 8

Exam. Code : 0 4 5 9

M.Sc. (Information Technology) 1st Semester

(1129)

COMPUTER ALGORITHMS

Paper—MS–62

Time Allowed : Three Hours] **[Maximum Marks : 80**

Note :— There are total **9** questions in Sections A to E. All questions are compulsory in Section E. From Sections A to D select **one** question with all its Parts. Total **5** questions have to be attempted selecting **one** question from Sections A to D and Section E is compulsory.

SECTION—A

1. (a) What is a stack ? Explain the operations on stack. 8

   (b) Define Binary tree. Explain the post-order and pre-order tree traversal. 8

2. (a) Explain best case, average case and worst case performance of algorithms with example. 8

(b) What are recurrence relations ? State the masters theorem. Define time and space complexity. 8

SECTION—B

3. (a) Explain the control abstraction of divide and conquer taking example of Quick Sort. 8

(b) Explain the Strassen matrix multiplication with a 2×2 example. 8

4. What is minimum spanning tree ? Compare Prim's and Kruskal's algorithm using an example. Which of the two is better and why ? 16

SECTION—C

5. (a) Define Dynamic Programming. How it is different from divide and conquer strategy ? 8

(b) Explain the Bellman Ford algorithm using an example. 8

6. Solve the N queens problem for 4 queens. Show 2 solutions and backtracking steps. (Use sheet wisely with small diagrams). 16

SECTION—D

7. (a) Explain the Branch and Bound method for 0/1 Knapsack problem. 8

   (b) Explain the travelling salesperson problem for Branch and Bound method. 8

8. (a) Explain the concept of P, NP, NP-hard and NP-complete. 8

   (b) Explain the clique decision problem and chromatic number decision problem. 8

SECTION—E

(Compulsory)

9. (a) Discuss the time complexity of Binary Search. 4

   (b) State Cook's theorem. 4

   (c) What are implicit and explicit constraints ? 4

   (d) Define recursion. 4