Exam.Code:0999
Sub. Code: 7613

1128
M.E. (Computer Science and Engineering)
First Semester
CS-8101: Advance Algorithms

Time allowed: 3 Hours

Max. Marks: 50

NOTE: *Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Unit.*

x-x-x

I. Attempt the following:-

a) Explain the asymptotic analysis of algorithms and growth of functions.

b) Solve the following recurrence relation using recursive tree method:

$$T(n)=T(n/3)+T(2n/3)+n$$

c) What do you mean by optimal substructure and overlapping substructure?

d) Discuss the limitation of Floyd-Warshall algorithm.

e) Differentiate between deterministic and non-deterministic algorithms.   (5x2)

UNIT – I

II. a) Define the greedy choice property. Apply the same to find the minimum cost spanning tree for the following graph and discuss the complexity of the algorithm.
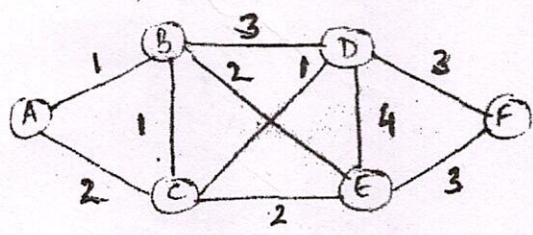
b) Analyze the best, average and work case complexity of quick sort algorithm using suitable examples.   (5,5)

III. a) What is a state space tree? Write the algorithm to solve the 8-queens problem and discuss its complexity.

b) Illustrate the procedure of multiplying large matrices using Strassen's matrix multiplication algorithm.   (5,5)

IV. Explain the branch and bound approach. Apply the branch and bound algorithm design strategy to solve the 0/1 knapsack problem. (10)

UNIT – II

V. Illustrate the forward approach to solve the multistage graph problem. In addition to determining the minimum cost path from source and sink, use it to trace the whole path by storing the intermediate member nodes. (10)

VI. Compare and contrast the Robin-Karp and Knoth-Morris-Pratt algorithm for string matching using a suitable example. (10)

VII. a) Discuss the computational models suitable for parallel computing. Also explain the solution to the maximal selection problem in a parallel computing architecture.

b) What are approximation algorithms? Give an example of absolute approximation and polynomial time approximation. (5,5)

x-x-x