Exam.Code:0999
Sub. Code: 7613

1129

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 Section.*

x-x-x

I. Write short answers of the following: **(10 marks)**

a. Define time complexity and space complexity.

b. Using substitution method, solve the recurrence relation: $T(1) = 1$ and for all $n \geq 2$, $T(n) = 3T(n-1) + 2$.

c. Can the master method be applied to solve the recurrence relation $T(n) = 2T\left(\frac{n}{2}\right) + nlgn$? Why or why not?

d. Define tour.

e. What are parallel random access machine algorithms?

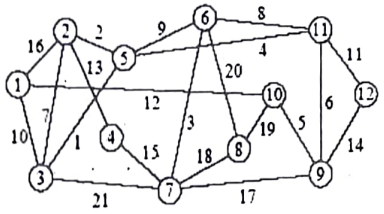
Section-A

II.

a. Describe quick sort algorithm. Show how quick sort sorts the following sequence of keys 310, 285, 179, 652, 351, 423, 861, 254, 450, 520. Analyze the time complexity of the algorithm.

b. Using substitution method, solve the recurrence relation $T(n) = T(\sqrt{n}) + c$ for $n > 4$ and $T(n) = 1$ for $n \leq 4$. **(6,4)**

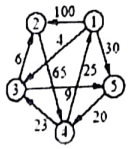
III. Define spanning tree. Write Prim's algorithm for finding minimum spanning tree. Using Prim's algorithm, find minimum spanning tree for the graph given below: **(10)**



IV. Describe a LC Branch and Bound solution to knapsack problem. Consider the knapsack instance n=4, (p_1,p_2,p_3,p_4)=(10,10,12,18), (w_1,w_2,w_3,w_4)=(2,4,6,9) and m=15. Trace the working of LC Branch and Bound on the given instance of knapsack problem. **(10)**

Section-B

V. Write a dynamic programming-based algorithm to solve all-pairs shortest path problem. Solve all-pairs shortest path problem for the given graph. **(10)**



VI.

a. What is n-queen's problem? Write a backtracking algorithm to solve n-queen's problem.

b. Describe Rabin-Karp string matching algorithm. **(5,5)**

VII. Write short notes on:

a. NP-complete and NP-hard classes

b. Approximate algorithms **(5,5)**

x-x-x