53 (IT 501) DAAL

2014

DESIGN AND ANALYSIS OF ALGORITHM

Paper : IT 501

Full Marks : 100

Pass Marks : 30

Time : Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

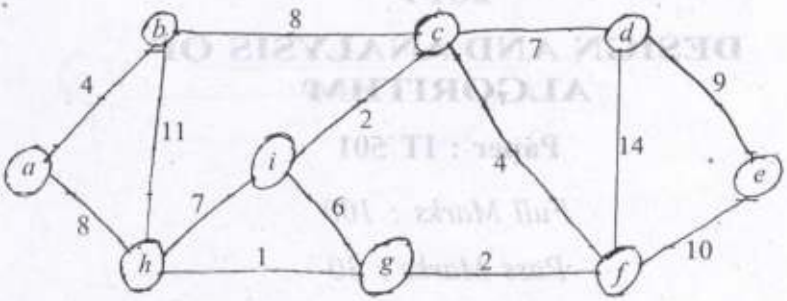
1. *(a)* Define $\theta(n)$, $O(n)$, $\Omega(n)$ and $\omega(n)$. What is asymptotic efficiency ? 8+2=10

   (b) Why shortest path can't be obtained for graph with negative weight cycle ? Explain with an example. 10

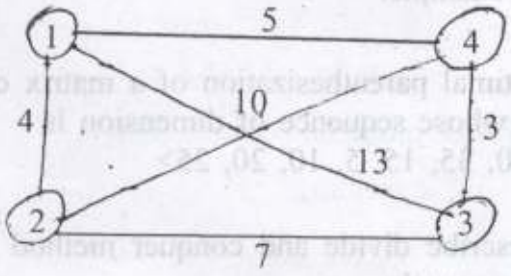
2. Find optimal parenthesization of a matrix chain product whose sequence of dimension is
   <30, 35, 15, 5, 10, 20, 25> 20

3. *(a)* Describe divide and conquer method with an example. 10

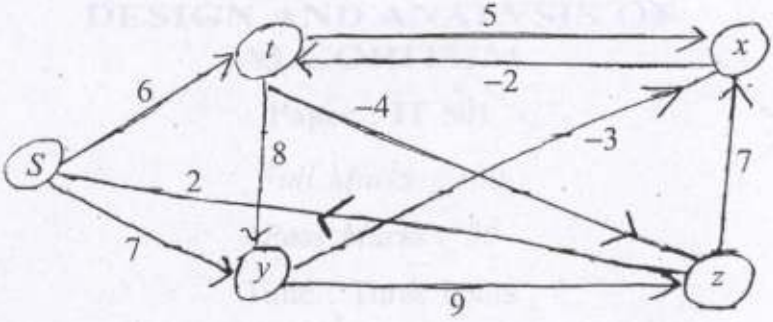
(b) Define Minimum Cost Spanning Tree. Find the Minimum Cost Spanning Tree for the following graph using Kruskal's algorithm. 2+8=10



4. (a) What is the advantage of Branch and Bound over Backtracking ? The graph below represents an instance of Travelling salesman problem where vertices correspond to cities and edge weights represent the cost along that path. Use Branch and Bound strategy to find the Optimal Travelling Salesman Tour. Use Best First search to traverse the nodes. 2+8=10



(b) Run Bellman-Ford algorithm on the directed graph shown below, using vertex z as the source. 10



5. (a) Prove that Travelling salesman problem is NP-complete. 10

(b) "If any NP-complete problem is polynomial time solvable then P = NP". Explain why. 10

6. Write short notes on : ***(any two)*** 10×2=20

(a) Graph searching

(b) 8 queen problem

(c) Sorting algorithms.
