53 (IT 504) DAAL

2014

DESIGN AND ANALYSIS OF ALGORITHM

Paper : IT 504

Full Marks : 100

Time : Three hours

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

*Answer **any five** questions.*

1. State and prove Cook's Theorem. 20

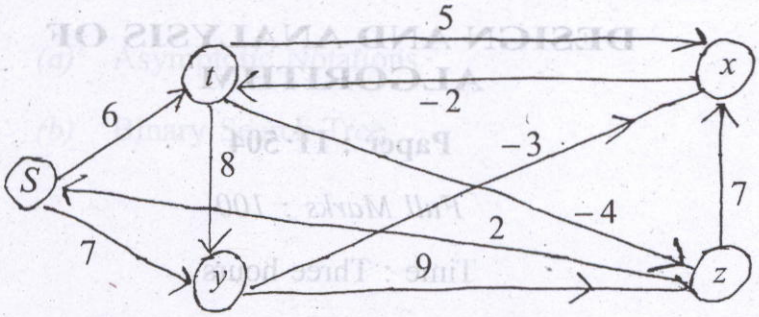
2. What is the difference between Branch and Bound and Backtracking ? Following is an instance of 0–1 Knapsack Problem. Solve the problem by using Branch and Bound strategy. 5+15=20

Item	Value	Size
1	45	3
2	20	5
3	32	8
4	14	7

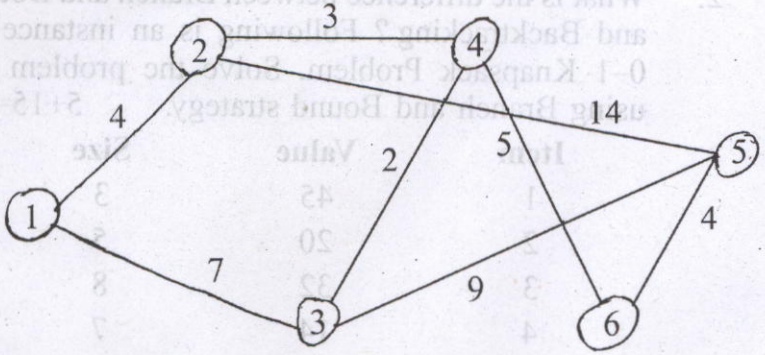
Assume size of Knapsack to be 17.

Contd.

3. *(a)* Run Bellman-Ford Algorithm on the directed graph shown below, using vertex Z as the source. 10



(b) Write *one* practical application of Minimum Cost Spanning Tree problem. Find the Minimum Cost Spanning Tree for the following graph using Kruskal algorithm. 1+9=10



4. *(a)* Explain the Greedy Approach of solving a problem. What are the advantages and disadvantages of Greedy Approach ? 3+1+1=5

(b) Solve the given instance of Travelling Salesman Problem by using Dynamic Programming. 15

	1	2	3	4	5
1	0	15	9	10	4
2	6	0	13	12	5
3	5	5	0	9	10
4	6	3	2	7	12
5	8	8	9	7	0

5. *(a)* Prove the correctness of Insertion Sort algorithm by using Loop Invariant. 10

(b) Explain Divide and Conquer strategy with the help of Quick Sort. 10

6. *(a)* Say a problem can be solved by using Divide and Conquer, Dynamic Programming and Greedy Approach. Which approach will give the best result ? Explain. 10

(b) Write Floyd-Warshall algorithm for solving all pair shortest path problem. 10

7. Write short notes on : 10×2=20

(a) Asymptotic Notations

(b) Binary Search Tree.
