

Roll No. ....

Total Pages : 03

BT-6/M-19

36017

## ANALYSIS AND DESIGN OF ALGORITHM

IT-352

Time : Three Hours]

[Maximum Marks : 100

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

## Unit I

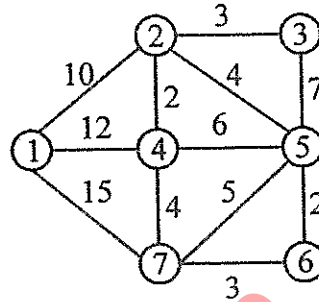
1. (a) Write an algorithm for binary search and analyse the algorithm for its time complexity. 10
- (b) Elaborate on Asymptotic Notations with examples. 10
2. (a) What is divide and conquer strategy and analyse quick sort algorithm for best, average and worst case. 10
- (b) Briefly explain the steps in mathematical analysis of recursive algorithms. 10

## Unit II

3. (a) Explain how dynamic programming is applied to solve travelling salesman problem. Explain with sample graph. 10

- (b) List the characteristics of greedy algorithm. Solve knapsack problem where :  
 $m = 10$ ,  $n = 4$ ,  $p = (40, 42, 25, 12)$ ,  
 $w = (4, 7, 5, 3)$

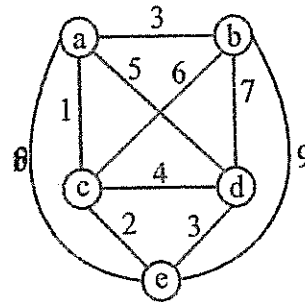
4. (a) Compute minimum cost spanning tree for following graph : 10



- (b) Explain chain matrix multiplication with example. 10

### Unit III

5. (a) Solve the travelling salesman problem of following figure using branch and bound algorithm. 10



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- (b) Explain back tracking concept. Illustrate N queens problem using back tracking to solve 8-queens problem. 10
6. (a) Explain LC Branch and bound and FIFO branch and bound. 10
- (b) Let  $n = 4$  and  $m = 15$ . The profits for instances are  $(p_1, p_2, p_3, p_4) = (10, 10, 12, 18)$  and the weights are  $(w_1, w_2, w_3, w_4) = (2, 4, 6, 9)$ . Explain 0/1 knapsack problem using LC branch and bound technique on above example. 10

#### Unit IV

7. (a) Explain in detail the graph traversals. 10
- (b) What is Binary search tree ? Write algorithm for insertion in BST. 10
8. (a) Explain the need for approximation algorithms and show they can be used for MP hard problems. 10
- (b) Explain various basic operations on B-Trees. 10