

Roll No .....

**MCA-404****M.C.A. IV Semester**

Examination, May 2019

**Design and Analysis of Algorithms***Time : Three Hours**Maximum Marks : 70*

- Note:** i) Attempt any five questions.  
 ii) All questions carry equal marks.  
 iii) Assume suitable data if missing.

1. a) Write a pseudo code for recursive binary search and explain its time complexity? 7  
 b) What is an algorithm? Write the characteristics of an algorithms? 7
2. a) Explain different tree traversal methods with example? 7  
 b) What are the asymptotic Notations? Define each of them with explanation? 7
3. a) Solve the instance of Knapsack problem: 7  
 Capacity  $W = 5$

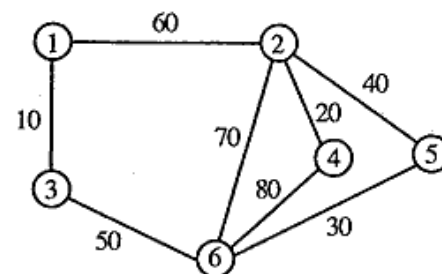
Item	Weight	Value
1	2	12
2	1	10
3	3	20
4	2	15

- b) Explain the Strassen matrix multiplication algorithm with its time complexity? 7

4. a) Apply quick sort algorithm to sort following set of elements? Show the result after each iteration. Also give its time complexity in all cases. 7  
 70, 50, 90, 30, 40, 80, 10, 20, 60  
 b) Explain with the help of suitable example, how branch and bound technique is used to solve Knapsack problem? http://www.rgpvonline.com 7
5. a) Using Floyd's algorithm solve the all pair shortest problem for the graph whose weight matrix is given by: 7

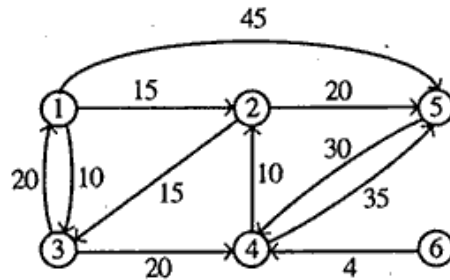
$$\begin{bmatrix} 0 & \infty & 3 & \infty \\ 2 & 0 & \infty & \infty \\ \infty & 7 & 0 & 1 \\ 6 & \infty & \infty & 0 \end{bmatrix}$$

- b) Explain the concept of greedy technique for prim's algorithm. Obtain minimum cost spanning tree for the below graph using Prim's algorithm. 7



6. a) What is back tracking? Apply back tracking problem to solve the instance of the sum of subset problem  
 $S = \{3, 5, 6, 7\}$  and  $d = 15$ . 7  
 b) Define Longest common subsequence problem? Give the solution of this problem using dynamic programming. 7

7. a) Solve the following single shortest path problem assuming vertex 5 as the source: 7



- b) Distinguish among P, NP and NP-complete problems. Give examples for each category? 7

8. Define in short: 14

- a) Algebraic algorithm
- b) Travelling sales person problem
- c) Combinatorial algorithm

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