FOURTH SEMESTER B.Sc.(CS) DEGREE EXAMINATION, 2014

Design and Analysis of Algorithm

Time : Three Hours

Maximum : 80 Marks

Instructions to Candidates:

- Answer any **Five** full questions.
- Each full question carries **sixteen** marks.

I.
  a) Explain the characteristics of an algorithm

  b) Explain the four distinct study areas of an algorithm.

                                   (6+8+2)

  c) Define time complexity.

II.
  a) Explain divide and Conquer strategy for recursive binary search. Explain with algorithm.

  b) Sort the given set of numbers using selection sort divide & conquer strategy

35 86 19 26 102 65 78

                                     (8+6+2)

  c) Define Omega (Ω) notation.

III.
  a) Find an optimal solution to Knapsack instances,

$$n = 7, m = 30, (p1 : p7) = (20,40,30,60,90,10,5)(w1 : w7) = (5,8,10,6,15,2,1)$$

  b) Explain the algorithm of Job sequencing with deadlines.

  c) If there are 4 programs of length 15, 3, 20, 4 to be stored on tape. Find the mean retrieval time for optimal ordering.

                                     (6+6+4)

IV.
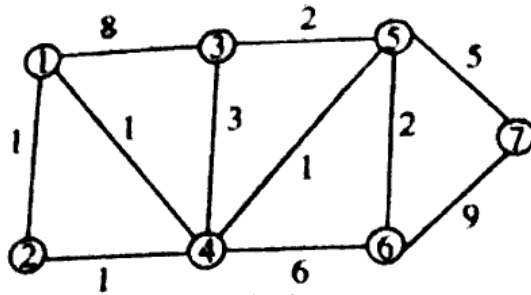 a) Find the product of two matrices using Strassen's matrix multiplication.

$$A = \begin{bmatrix} 4 & 5 \\ 6 & 2 \end{bmatrix} \& B = \begin{bmatrix} 8 & 1 \\ 3 & 5 \end{bmatrix}$$

Turn over

b) Find minimum cost spanning tree for the following graph using Prim's algorithm.

c) Define optimal solution.

(6+8+2)

V. a) What is multistage graph?

b) Write an algorithm for multistage graph with forward approach.

c) Write an algorithm for Inorder, preorder & postorder traversal of binary tree

d) What is sum of subsets?

(2+6+6+2)

VI. a) Write an algorithm for back tracking solution to the 0/1 Knapsack problem

b) Find the minimum cost tour of a travelling sales person for the following tour

$$\begin{bmatrix} 0 & 8 & 5 & 10 \\ 7 & 0 & 6 & 17 \\ 3 & 8 & 0 & 2 \\ 4 & 18 & 5 & \phi \end{bmatrix}$$

c) Give 2 difference between Dynamic & divide and conquer technique. (6+8+2)

VII. a) Explain the Graph traversal techniques with an example.

b) Write an algorithm for n-queen's algorithm. Explain with an example. (8+8)

VIII Write a short notes on the following (any **4**)

a) All pairs shortest path algorithm.

b) Two way merge tree

c) Single source shortest path.

d) Performance measurement

e) Optimal binary search tree.

(4×4=16)