MS – 538

VI Semester B.C.A. Degree Examination, May/June 2014
(Y2K8 Scheme)
Computer Science
BCA 601 : DESIGN AND ANALYSIS OF ALGORITHMS

Time : 3 Hours Max. Marks : 90/100

Instructions : *1) Section **A, B, C** is common to **all**.*
*2) Section **D** is applicable to the students who have taken admission in **2013-2014**.*
*3) **100** marks for fresh students of **2013-14** and onwards **90** marks for repeater students prior to **2013-2014**.*

SECTION – A

I. Answer **any ten** questions. **Each** carries **two** marks. **(10×2=20)**

1) Define algorithm. Mention the characteristics of an algorithm.
2) Define the terms :
   i) Space complexity ii) Time complexity
3) Write the time complexities of
   i) Binary search ii) Merge sort
4) Write the control abstraction of divide and conquer.
5) Define minimum cost spanning tree.
6) Mention two different ways to represent a graph.
7) What is meant by an optimal solution ?
8) Define the terms related to graphs.
   i) Cycle ii) Degree of a node
9) State the travelling salesman problem.
10) What is subset sum problem ?
11) State the N-Queens problem.
12) Define the terms :
   i) Binary tree ii) Complete Binary tree

P.T.O.

SECTION – B

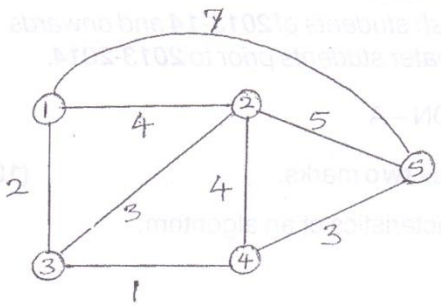
II. Answer **any 5** questions. **Each** carries **5** marks. **(5×5=25)**

13) Illustrate Asymptotic Notations with examples.

14) Write an algorithm to find maximum and minimum in a set of members using divide and conquer technique.

15) Write a recursive binary search algorithm.

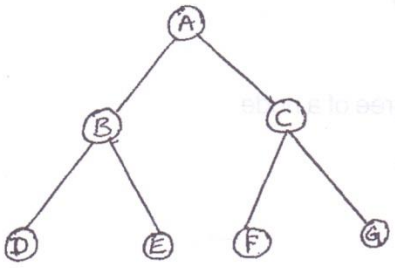
16) Find the minimum cost spanning tree by Prim's algorithm.



17) What is Dynamic programming ? Mention the differences between divide and conquer and dynamic programming.

18) Write Flyod's algorithm and find its time complexity.

19) Write recursive algorithm for pre-order traversal and apply it to the following complete binary tree.



20) Write a short note on graph coloring.

SECTION – C

III. Answer **any 3** questions. **Each** carries **15** marks. **(3×15=45)**

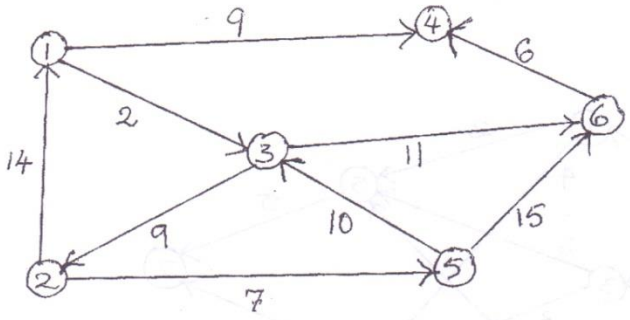
21) a) Write an algorithm to find sum of array elements. Analyze its time complexity with the help of step table. **7**

b) Explain 4 queens problem using back tracking. **8**

22) a) Write mergesort algorithm to sort a set of numbers in ascending order. Analyze its space and time complexity.

b) Trace the mergesort algorithm to sort the following elements. 41, 32, 11, 92, 66, 74, 87, 38. **(7+8)**

23) Find the shortest distance from node 1 to all other nodes using Dijkstra's algorithm.



24) Determine all pair's shortest paths for the weighted graph.