MCA – 42

IV Semester M.C.A. Examination, Feb./March 2010
ANALYSIS AND DESIGN OF ALGORITHMS

Time : 3 Hours Max Marks : 100

Instructions *: 1) Answer **all** questions in Part **A**, **5** out of **8** questions in Part **B** and **4** out of **6** questions in Part **C**.*
*2) Part **A:** Questions from **1** to **8** carry **1** mark **each** and **9** to **14** carry **2** marks **each.***
*3) Part **B** : **Each** question carries **8** marks.*
*4) Part **C** : **Each** question carries **10** marks.*

PART – A

1. What is the reason for studying Algorithms?
2. What do you mean by Space efficiency?
3. Define asymptotic Ω (Big omega) notation?
4. Give the applications of BFS?
5. What do you mean by Instance Simplification?
6. Define Dynamic Programming.
7. Give the efficiency of Kruskal Algorithm?
8. What is the purpose of all pair shortest path algorithm?
9. Use Euclid's algorithm for finding the gcd of the numbers 75 and 20.
10. What do you mean by Worst case efficiency?
11. Write an algorithm for Selection Sort.
12. Briefly explain the concept of Divide and Conquer with a neat diagram.
13. Describe briefly about Memory Functions.
14. What are Lower Bound arguments?

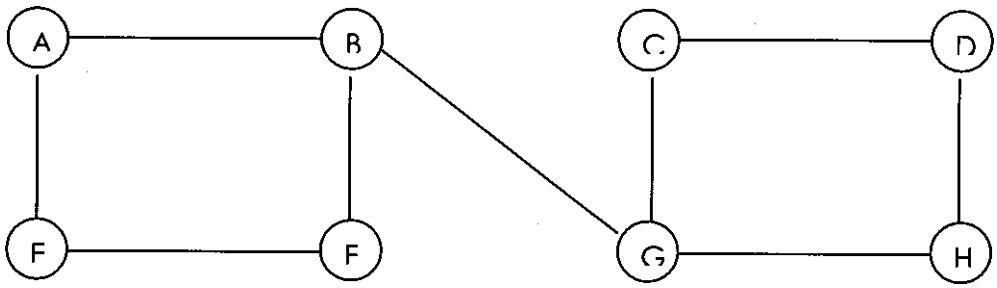
P.T.O.

PART – B

1. Explain the concept of asymptotic notations.
2. Write an algorithm for string matching technique and find the efficiency.
3. Write an algorithm for strassens matrix Multiplication.
4. Explain the concept of Topological Sorting along with techniques used for the same.
5. Write an algorithm for computing mode by Presorting. Write its efficiency?
6. What is the application of Memory Function in solving Knapsack problem? Illustrate with an example.
7. Write a note on Decision Trees.
8. Explain basic efficiency classes with graph.

PART – C

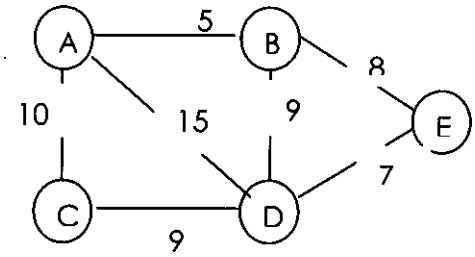
1. Explain the concept of Breadth First Search traversal. Traverse the following graph and draw BFS Forest.



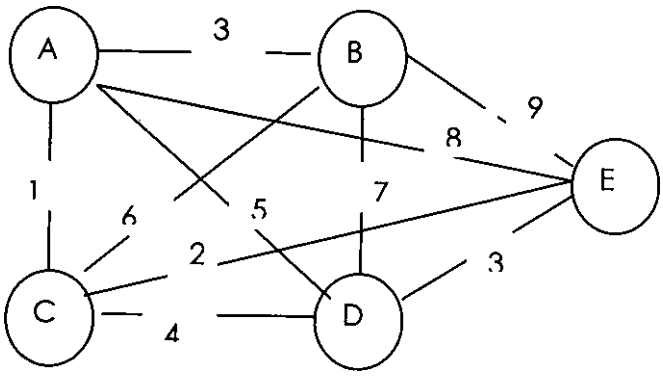
2. Write mathematical analysis for recursive algorithms. Solve Tower of Hanoi Problem and analyze it.
3. Write Merge sort algorithm and trace it to sort following numbers :

   89 2 -1 51 72 3 56

4. Write an algorithm for all pair shortest path algorithm. Find all pair shortest path matrix for the following graph:



5. Explain the concept of Backtracking. Write the rules for solving N-Queen's problem. Solve for

   N=4.

6. Solve the following Travelling Salesman problem using Branch and Bound technique.