USN ☐☐☐☐☐☐☐☐☐☐

06CS43

Fourth Semester B.E. Degree Examination, June/July 2011
Analysis and Design of Algorithms

Time: 3 hrs.   Max. Marks:100

Note: *Answer any FIVE full questions,*
selecting at least TWO questions form each part.

PART – A

1 a. Explain notion of algorithm. Write Euclid's algorithm for computing gcd (m,n). (07 Marks)
   b. Write and explain the steps of algorithm problem solving using flowchart. (07 Marks)
   c. Define weighted graph. Give example and write its adjacency matrix. (06 Marks)

2 a. Explain the orders of growth and basic efficiencies classes of algorithms. (06 Marks)
   b. Write and find the worst – case, best – case and average case efficiency of sequential – search algorithm. (06 Marks)
   c. Explain the mathematical analysis of Fibonacci sequence recursive algorithms. (08 Marks)

3 a. Explain brute – force algorithm design, strategy. Design analyze bubble – sort algorithm, with example. (08 Marks)
   b. Explain the divide and conquer technique. Design and analyze quick sort algorithm, with example. (12 Marks)

4 a. Define tree traversal operations and traverse the following binary tree.
      i) in preorder
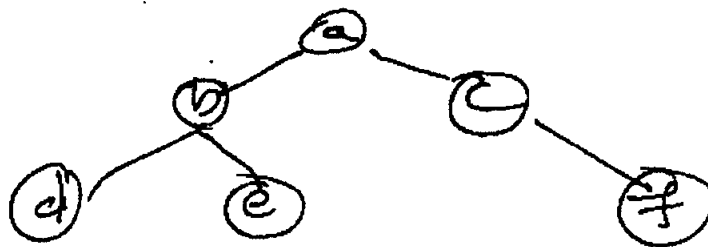   ii) in-inorder
      iii) in postorder. (06 Marks)

Fig. Q4(a)

   b. Explain the stressen's matrix multiplication, with example. (06 Marks)
   c. Write and explain DFS and BFS algorithm, with example. (08 Marks)

PART – B

5 a. Explain the transform and conquer technique. Design and analyze heap sort algorithm, with example. (12 Marks)
   b. Explain the sorting by counting. Write algorithm comparison counting sort. Sort the list {62, 31, 84, 96, 19, 47}. (08 Marks)

6 a. Explain hashing and hashing techniques. **(06 Marks)**

   b. Write and explain Floyd's algorithm for the all – pairs shortest – paths problem, with example.

   (09 Marks)

   c. Apply the dynamic programming following instance of the knapsack problem and solve.

Item	Weight	Valve
1	2	$ 12
2	1	$ 10
3	3	$ 20
4	2	$ 15

Capacity W = 5

(05 Marks)

7 a. Write and explain Prim's algorithm and apply Prim's algorithm for the following graph.
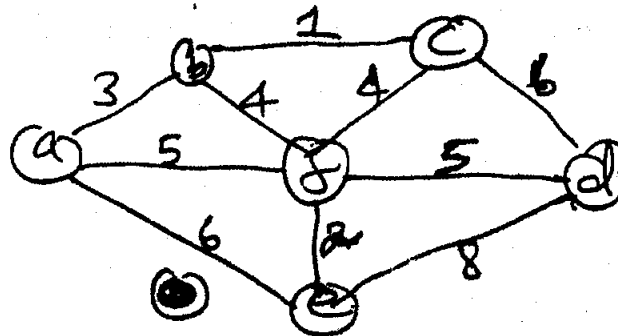

Fig. Q7(a)   **(07 Marks)**

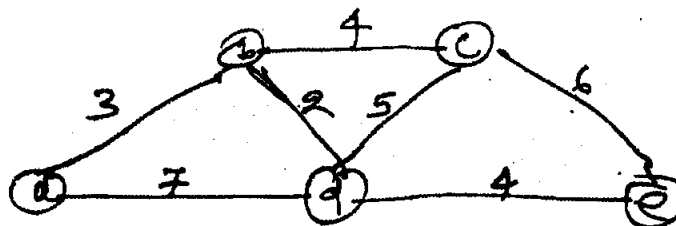   b. Write and explain Dijkstra's algorithms and apply the algorithm for the following graph.

Fig. Q7(b)   **(07 Marks)**

   c. Define decision tree. Write decision tree for finding minimum of 3 – numbers.   **(06 Marks)**

8 a. Explain P and NP problems, with examples.   **(06 Marks)**

   b. Explain the subset – sum problem, with example using backtracking method.   **(07 Marks)**

   c. Explain the traveling salesman problem with example using branch – bound method.

   (07 Marks)

* * * * *