

1. Explain the following with appropriate diagrams & examples wherever required
  - a) Involution
  - b) Micro and Macro Analysis
  - c) DFS Vs BFS
  - d) Circular Doubly Linked List
  - e) Optimal Merge Pattern
  - f) Greedy Programming
2. Write Brief notes on the following
  - a) Random number testing
  - b) Multiplication using divide and conquer strategy
  - c) Internal Sorting Methods
  - d) Enqueue and dequeue using two stacks
3. You have  $n$  coins that all are supposed to be gold coins of the same weight but you know that one coin is fake & weighs less than the others. You have a balance scale. You can put any number of coins on each side of the scale at one time and it will tell you if the two sides weigh the same, or which side is lighter. Outline an algorithm to find out the fake coin in minimum number of weighing.
4. Design an algorithm to check whether two given words are anagrams, i.e. whether one word can be obtained by permuting the letters of the other. For example Sunday, daysun, dusyan etc. are anagrams. Algorithm should not take more than  $n \log n$  time where  $n$  is the length of the string.