Roll No .....

MCSE/MSE - 102

M.E./M. Tech., I Semester

Examination, December 2015

Advanced Data Structure and Algorithm

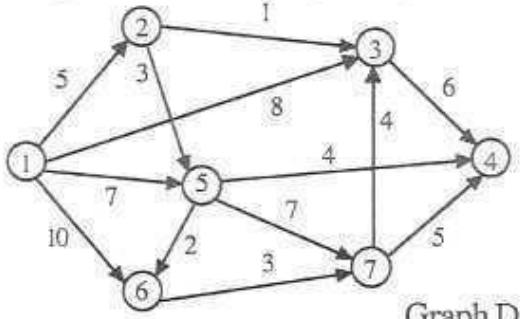
Time : Three Hours

Maximum Marks : 70

Note: Total number of questions Eight. Attempt any five questions (including all parts). Assume missing data, if any suitably.

1. a) Write an algorithm to find the maximum and minimum elements from the circular linked list? Also gives the time and space required to find the elements. 7
   b) What is recursion? Explain its type and differentiate between iteration and recursion? Explain how to remove recursion. 7

2 a) For the given Graph, give adjacency list, storage representation for adjacency list and edge list. 5



Graph D

   b) Describe and write a procedure which can perform (n – 1) UNION operations on disjoint sets in O (n log n). 5
   c) Write the name of factors which affects the running time of algorithms. 4

3. a) Explain with example the following: 9
      i) 2-3-tree
      ii) D-queue
      iii) ADT
   b) Prove by induction that minimum number of nodes in an AVL tree of height h is $N_h = F_{h+2} - 1$, h>=0. 5

4. a) Write an algorithm which combine (A) that accepts an array A in which the subtrees rooted at A[1] and A[2] are heaps and that modified the array A so that it represents a single heap? 8
   b) Show how to implement a FIFO queue with priority queue and how to implement stack with p-queue. 6

5. a) What does it mean by Garbage collection? Discuss marking phase and compaction phase of Garbage collection procedure. 8
   b) Write the differences between internal sorting and external sorting. 6

6. a) Prove that when an algorithm DFS and BFS is applied to a connected graph the edges of T form a tree. 7
   b) What is hashing? Explain in detail open addressing technique to resolve hash clashes. 7

7. a) What is backtracking? Give recursive and non-recursive form of backtracking. 7
   b) Explain polyphase sorting with its running time. 7

8. Write the notes on any three: 14
   a) Multi-way Merge sort
   b) Expression search
   c) Shortest path problem
   d) Buddy system

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