

**D 33367**

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**Name.....**

**Reg. No.....**

**FIRST SEMESTER M.Sc. DEGREE EXAMINATION, FEBRUARY 2013**

**(CUCSS)**

Computer Science

CSC 1C 02—ADVANCED DATA STRUCTURES

(2010 Admissions)

Time : Three Hours

Maximum : 36 weightage

**Part A**

*Answer all.*

*Each question carries a weightage of 1.*

1. Define a doubly linked list. Explain its use.
2. Give all possible representations of a binary tree having 4 nodes.
3. What is a height balanced tree ? Give an example.
4. What is the upper bound of a B tree ?
5. Write a recurrence relation for computing Fibonacci series.
6. Give an example of a binary tree defined in an array.
7. Compare B-tree with B+ and B\* trees.
8. What is an AA tree ?
9. Give an example of a treap.
10. What is double hashing ? Give an example.
11. What is splaying in a splay tree ?
12. What is a binomial queue ?

(12 x 1 = 12 weightage)

**Part B**

*Answer any six.*

*Each question carries a weightage of 2.*

13. Write a routine to swap two adjacent elements of a linked list by interchanging elements.
14. Given a circular linked list, write an algorithm to reverse the direction of the links.
15. Explain linked list representation of a priority queue.
16. Construct a binary tree from the following traversals :

Inorder : **D B H E A I F J C G**

Preorder : **A B D E H C F I J G**

**Turn over**

17. Build a max heap from the following set starting from an empty heap :  
19, 55, 44, 98, 67, 48, 95, 66, 70, 69, 30, 24, 99, 82
18. Show how a double ended queue can be implemented using two stacks.
19. Give a comparison of collision resolution techniques.
20. Prove that maximum number of nodes possible in a binary tree of height  $h$  is  $(2^h - 1)$ .
21. How is a recursive algorithm complexity computed ? Explain with the help of an example.  
(6 x 2 = 12 weigh

### Part C

Answer any **three**.

*Each question carries a weightage of 4.*

22. Write an algorithm to display elements of a binary tree in level order.
23. Outline Tower of Hanoi problem. Give a recursive solution to the problem.
24. Construct a heap of first 10 natural numbers starting from 1. Illustrate heap sorting.
25. Why height balancing is required in a search tree ? Explain any height balanced search tn..
26. What is a 2-3 tree ? Explain the properties and operations defined on it.
27. With the help of an example, explain how searching is done in a digital search tree.  
(3 x 4 = 12 weight