[This question paper contains 2 printed pages]

6125-A *Your Roll No*

MCA/II Sem. **J**

Paper – MCA – 201 – DATA STRUCTURES AND FILE PROCESSING

(OC)

Time 3 hours *Maximum Marks 60*

(Write your Roll No on the top immediately on receipt of this question paper)

Attempt **all** *questions Part of a Question must be answered together*

1 (a) An algorithm takes 1 5 ms for input size 100 How large a problem can be solved in 1 min if the running time is the following (assume low-order terms are negligible) ?

(i) linear (ii) quadratic (3)

(b) Order the following functions in ascending order of growth rate

N NlogN, N^3, N log^2N, N^2 log N, $NlogN^2$, N log logN, 2^N (4)

2 Describe briefly the implementation of basic file system in your own words (8)

3 (a) What are the advantages and disadvantages of the linked implementation of a stack relative to the contiguous implementation ? (3)

P T O

(b) Write routines to implement two stacks using only one array Your stack routines should not declare an overflow unless every slot in the array is used (6)

4 (a) Write efficient function that take only a pointer to the root of a binary tree T, to compute the number of nodes in T (4)

(b) Show the result of inserting 2, 1, 4, 5, 9. 3, 6, 7 into an initially empty AVL tree (5)

5. (a) Show the result of inserting 45, 2, 3, 67, 82, 34, 11 one at a time, into an initially empty binary heap (5)

(b) Show the result of performing three deleteMin operations in the same heap (5)

6. Two binary trees are similar if they are either empty or both nonempty and have similar left and right subtrees Write a function in C++ to decide whether two binary trees are similar What is the running time of your function ? (8)

7 (a) What do you understand by probing hash tables ? Distinguish between linear probing and quadratic probing (3)

(b) Show the result of inserting keys {89, 18, 49, 58, 69, 28} into a hash table using linear probing and hash function h(x) = x mod 10 (6)