

**COL 702 Advanced Data Structures and Algorithms**

Sem I 2018-19, Max 20, Time 20 mins

Name \_\_\_\_\_ Entry No. \_\_\_\_\_

Your description should be in a pseudo-language - not a code. Mention clearly any data structures that you use including how the input and output is stored.

Write only in the space provided below each question.

1. Write down a recurrence relation for an AVL tree to show that the height  $h$  is logarithmic in the number of nodes  $n$  in the tree.

Even if you cannot solve the recurrence, indicate the kind of solution that would imply the required relation. **(10 marks)**

- The *mode* of a set  $S$  is an element  $x \in S$  such that  $f(x)$  is maximum where  $f(x)$  is the number of times  $x$  is repeated. The mode may not be unique. Design an efficient algorithm to find the mode of  $n$  elements.

More credit for faster algorithms. **(10 marks)**