University Institute of Engineering and Technology, Panjab University Chandigarh

CSE 3rd Semester (Section-I)

Subject: Data Structures **Minor-II** **Time:** 1.5 hrs **Max Marks:** 30

Q1. **a.** What are the maximum and minimum number of nodes in a binary tree if height of the tree is given?
b. What is the maximum and minimum height of a binary tree if number of nodes of the tree are given? **8**
c. What are the maximum and minimum number of nodes in an AVL tree if height of the tree is given?
d. What is a threaded binary tree and its application?

Q2. Write a program in C/C++ to create and visit every node of the binary search tree and then has had its data increased by one. At the end it should also return the largest value in the tree. **8**
(Assumption: Tree is already created and illustrate the same)

Q3. **a.** What are drawbacks of AVL trees?
b. What are the properties of a B-Tree?
c. The following nodes are inserted into the empty tree in the following order:
5, 12, 62, 25, 29, 30, 18, 34, 42, 12, 19
Construct: **8**
a) AVL tree
b) B-Tree

Q4. Explain in detail (*with proper justification*) the comparative analysis in terms of minimum and maximum time required for implementation of Insertion Sort and Selection sort. **6**