

Puu-19.101 Forest Products Chemistry

Exam 25.10.2007

1. How do the contents of (a) fats, (b) resin acids and (c) water in pine wood change when sapwood is converted into heartwood? Why do these changes take place?
2. There is much variation in microfibril angle in wood fibers, e.g. between (a) S1 and S2 layers, (b) between normal wood and compression wood and (c) between normal wood and tension wood. What are these variations and why do they exist?
3. The walls of wood fibers in a living tree contain ~ 30 % of water on their weight. Where is this water located, how is it bound and what is its function? How do the material properties of wood change if its water content is decreased?
4. As the word 'hemicelluloses' indicates these are polysaccharides that have certain similarities with the structure of cellulose. Analyze the similarities and differences between hemicelluloses and cellulose in (a) monomer composition, (b) degree of polymerization, (c) degree of substitution, (d) polymer chain conformation, (e) water solubility and (f) crystallinity.
5. What are the two most important functions of lignin in the supporting normal hardwood tissue? How does the structure of lignin vary depending on the function (and location)?