

TKK Laboratory of Wood Technology
Puu-28.5000: Introduction to Wood Properties and Wood Products

Examination 6th November 2007

Total Marks 50

1. Explain briefly (1-2 lines), using diagrams or illustrations where appropriate, the following: **(10 marks)**

- i. "Rays"
- ii. "Annual growth ring"
- iii. "Middle lamella"
- iv. "Fibre saturation point"
- v. "Movement"
- vi. "Hardwood" / "Softwood"
- vii. "Conifer"
- viii. "OSB"
- ix. "Heartwood" / "sapwood"
- x. "Equilibrium moisture content"

2. Give examples of three softwood and three hardwood species **(2 marks)**

3. Describe, with the aid of a diagram, the "longitudinal", "radial" and "tangential" orientations in wood **(2 marks)**

4. Explain what is meant by "creep" **(2 marks)**

5. With the aid of a diagram, describe the structure of the cell wall **(4 marks)**

6. Answer **all** of the following: **(10 marks)**

- i. Name four wood products and give one example where each may be used
- ii. Name the cell types found in softwoods and hardwoods and describe their functions
- iii. Wood is considered to be an anisotropic material. What is meant by this?
- iv. What are "extractives" and where would you find them?
- v. What is meant by the microfibril angle and how does this affect the properties of wood?

7. Answer **one** of the following: **(10 marks)**

- i. Explain the terms "free" water and "bound" water and describe how the presence of moisture in wood affects its properties
- ii. Wood swells and shrinks more in the transverse direction than it does in the longitudinal direction. Explain why.

- iii. List the main structural polymers found in wood, describe their function and explain, using a diagram, their arrangement in the microfibril

8. Write a short essay (1-2 pages), describing the main process steps in the manufacture of one of the following products: sawnwood, OSB, LVL or MDF and explain its properties and applications *(10 marks)*