

**Puu-0.3230 Paper, Board and Converting Processes and Diagnostics (5 cr)**

Teacher: J. Paltakari

EXAM 21.5.2015

Answer the following four questions:

1. Introduce the unit operations/sub-processes in papermaking and discuss under each process, what are the typical sources of disturbances. Consider these from e.g. process control and product quality viewpoints. (6 p)

2. a) Introduce the typical automation and control systems (their classes) used in pulp and papermaking processes. (3 p)

b) Discuss the process control principles and types of control loops. Consider here especially their relation to process dynamics and process stability. (3 p)

3. Describe the phases and actions in mill data processing and analysis. Give the reasons why each phase needs to be carried out. (6 p)

4. Describe the Wedge and Minitab system/programs as tools for data and process analysis. Consider and compare their strengths and possible weaknesses. (6 p)

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**COURSE GRADING**

Exam (50 %) Data analysis (50 %)

- Minimum 9.5 points needed from the exam to pass

	points	
Grade	Low	High
0	0	18,5
1	19	24
2	24,5	30
3	30,5	36
4	36,5	42
5	42,5	48