



Puu-127.4020 Process Water Treatment (3cr / Prof. O. Dahl)

Exam 08.06.2009

**Compulsory questions (1-3)**

1. Efficient washing and water recycling within a chemical pulp process. 5p.

2. Explain the following words, abbreviations or principles. 5p (0,5p each).

- a. → TOC
- b. Light emitting bacteria test
- c. → LC50
- d. Anaerobic treatment
- e. → Sedimentation stages in a clarifier
- f. → Flotation
- g. → Vaporisation principle in waste water treatment
- h. Stripping in waste water treatment
- i. → Aerated lagoon
- j. → Spill lagoon

3. Briefly introduce the following water quality parameters and their determination methods. Answer only **two (2)** questions. 5p (2,5 p each)

- a. Determination of AOX (SFS-EN ISO 9562, *SFS-EN 1485*)
- b. Determination of suspended solids (SFS-EN 872, SFS 3008)
- c. Determination of biochemical oxygen demand ( $BOD_n$ ) - SFS-EN 1899

**Choose any two from the following questions (4 to 6). Answer only two (2) questions:**

4. Principles of membrane filtration in waste water treatment, grades and their suitability in removing various impurities. Which main factors can cause mass transfer resistance through the membrane? 5p.

5. Sludge age is 20 d and total sludge amount in an activated sludge plant 400 t. Calculate removed sludge amount (excess and escaped) t/d. Discuss further processing alternatives for industrial sludges?

6. Main reactions of ozone in an aqueous solution. 5p.