

Questionnaire to the Lecture

Puu-23.4000 "Pulp Mill Fibre Line Processes"

for those who have not chosen to provide an oral and written report (if you have, answer every second question starting from question 1).

Chapter 1, "From Fossil to Biomass"

1. Biorefinery Definition?
2. Describe the Schöller Process?
3. Vanillin is produced from which wood component?

Chapter 2, "Classification of Biorefinery Systems"

4. Definition of an "Advanced Biorefinery System". Give an example?
5. List the most important principles of "Green Chemistry"?
6. What are "gas-expanded liquids". Give an example?

Chapter 3, "Feedstock: Lignocellulosics"

7. What are LCCs?
8. Current view of the fibre wall structure as proposed by Lawoko?
9. Describe the hierarchical structure of wood?

Chapter 4, "Pre-treatment of Lignocellulosic Material"

10. Describe the Steam explosion process and the major products made thereof?
11. Difference between Organosolv and Dilute acid processes?
12. How are chip length and fibre length associated?
13. Explain the barking theory and list the wood species which are difficult to debark?
14. What are "Cambium" and "Inner Bark"?
15. Describe the different chippers?
16. Pros- and cons of chip storage in piles or silos?
17. Describe the cooking liquor penetration on a microscopic scale?
18. Definition and determination of ECCSA (capillary cross sectional area)?
19. Definition of the downward velocity in a continuous digester (formula)?
20. Describe the two stages of liquor impregnation?
21. Explain Ergun's equation verbally?

Chapter 5, "Fractionation Technologies"

22. Side chains of GGM which are cleaved during pulping?
23. Why is Soda cooking less selective than kraft cooking?
24. List the most important alternative fractionation techniques in the view of biorefineries (not yet commercialized)?
25. What is the difference between CBC and Superbatch?
26. Description of Compact Cooking?

Chapter 8, "Products from Biorefinery"

27. Definition of man-made fibers?
- ✓ 28. What are the most important steps of the Tencel process?
29. Calculate the diameter of a 1.0 dtex fiber?
30. List the applications of cellulose acetate?

$$11,3 \cdot \sqrt{\frac{1,0 \cdot 10^{-4}}{1,3 \cdot 10^{-6}}}$$

Evaluation criteria:

Each question will be graded as 0 (wrong answer), 0.5 (partially correct) and 1 (totally correct). The grade is determined according to the sum of points as follows:

- 26...30 points = 5,
- 22.5... < 26 points =4,
- 18.5... < 22.5 points =3,
- 15... < 18.5 points =2,
- 12.... < 15 points =1
- 0.... < 12 points =0 (fail)

For those who have provided the oral and written report, the grade from exam is determined according half of the points criteria mentioned above.