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| **University College of Southeast Norway** | |

**EXAM**

**4308/9004 ECOTOXICOLOGY**

**7.04.2017**

Time: 09:00-13:00

Language: English

Pages: 4 (including front page)

Aids: Non

Remarks: Non

Appendix: Non

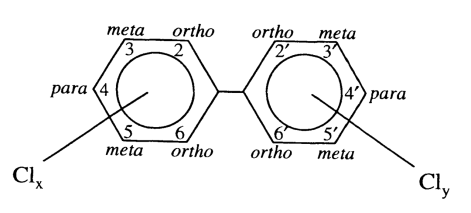
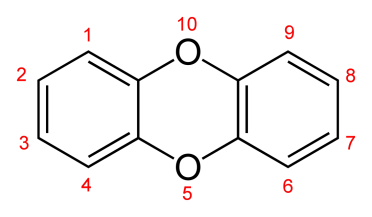
**Exam results will be made public at the studentweb.**

**Task 1a.** Write the full chemical names of the compounds presented below, and also the acronyms for the compounds A, C, F and H.

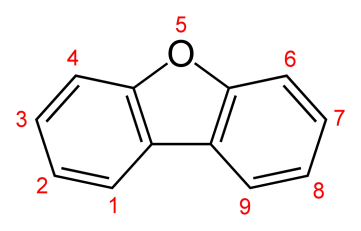
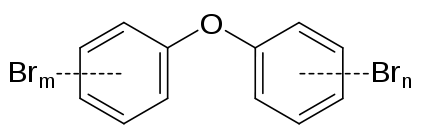
**A) B)**



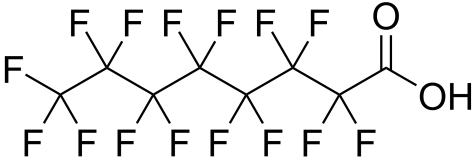
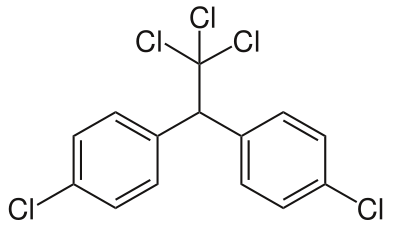
**C) D)**

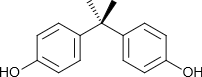
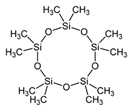
**E) F)**

 [](http://upload.wikimedia.org/wikipedia/commons/f/fb/Polybrominated_diphenyl_ether.svg)

**G)** **H)**

 [](http://upload.wikimedia.org/wikipedia/commons/0/0b/P,p'-dichlorodiphenyltrichloroethane.svg)

**I)**  **J)**

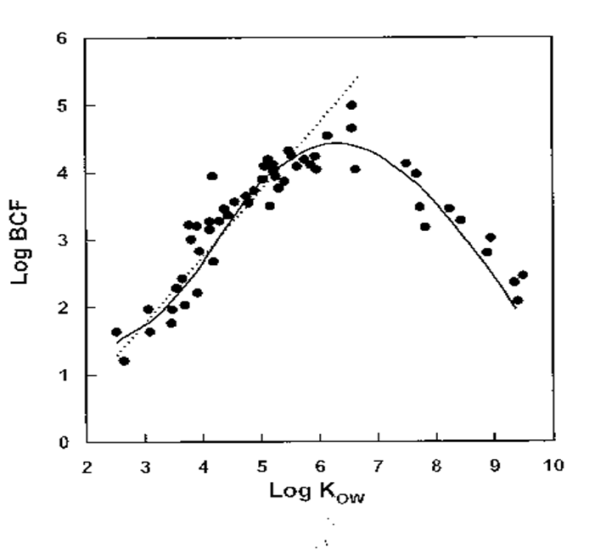
**Task 1b.** Explain the international term toxic equivalents (TEQ)

**Task 1c.** What does non-ortho PCB mean, and why do we normally incorporate them in the TEQ estimates for dioxins and furans.

**Task 1d.** PCB represents a group of 209 congeners. What does that mean?

**Task 2a**. Figure 1 (under) shows the relationship between Kow (octanol-water partition coefficient) and BCF (bio-concentration factor) for different organic contaminants. Explain what BCF means and how Kow is determined for different organic compounds.

**Task 2b.** Explain the relationship between Kow and BCF in Figure 1.



***Figure 1****. Relationship between Log Kow and Log BCF.*

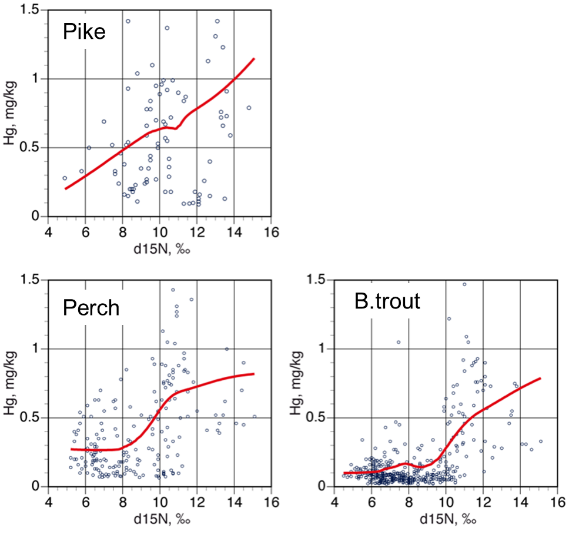
**Task 2c.** Mention some of the most important chemical structure factors of importance for the Kow partition coefficient of organic compounds, and thereby their BCF in organisms.

**Task 2d.** Mention the most important long range transporting mechanisms (routes) for global transport/distribution of pollutants.

**Task 3a.** Why is a total concentration of metal often not well correlated with toxicity, and which major physical-chemical factors in water are essential for the toxicity of metals in aquatic systems?

**Task 3b**. In the laboratory course, you fractionated aluminium in fresh water samples. Explain the main principles of this fractionation, and why this is important regarding biological effects on aquatic organisms?

**Task 3c.** Explain why we have different relation patterns between 15N and Hg in the three fish species pike, perch and trout as shown in Fig. 2. Hint: Pike is piscivorous (fish eater) throughout the entire life.

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***Figure 2.*** *Relationship between 15N and i Hg in fish from three different fish species, pike, perch and brown trout (trout).*

**Task 3d**. In a perch population in a lake in Telemark, the following correlation were found between fish length (x-axis: in cm) and Hg concentration in fish (y-axis: in ppm):

y = 0.005x + 0.35

Estimate at which length (cm) the perch in this lake theoretically reach the Norwegian dietary advice limit of 0.5 ppm Hg.