Høgskolen i Telemark

EKSAMEN

4308/9004 ØKOTOKSIKOLOGI

10.04.2015

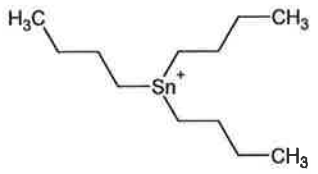
Tid:	09:00-13:00
Målform:	Bokmål
Sidetal:	4 (inkludert forsiden)
Hjelpemiddel:	Ingen
Merknader:	Ingen
Vedlegg:	Ingen

Eksamensresultatene blir offentliggjort på studentweb.

OPPGAVE 1

Oppg. 1a Skriv fullstendige kjemiske navn på de ulike miljøgiftene som er angitt nedenfor, og angi akronymer (forkortelser) for komponentene A, C, F, G and H.

A)



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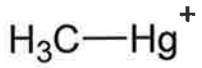

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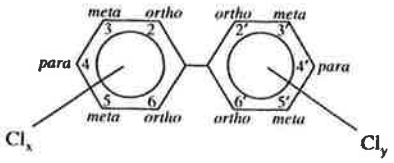

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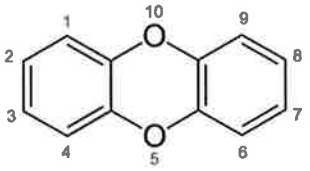

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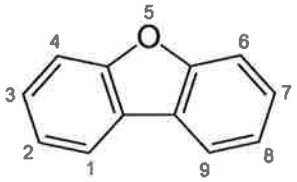

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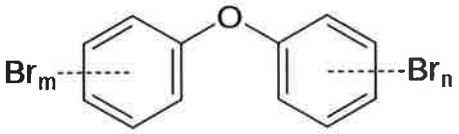

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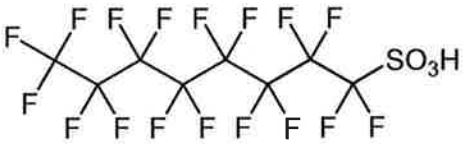

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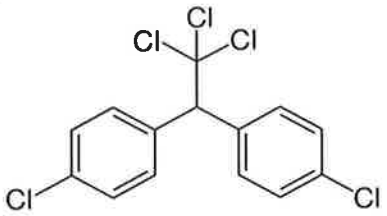

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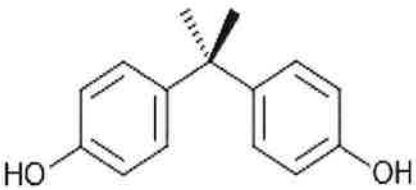

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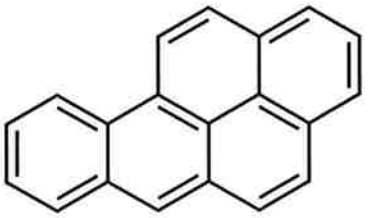


Oppg. 1b Tegn de kjemiske strukturene for de nedenfor angitte kjemiske stoffer:

A) 3-Etyl-2-metylpentan
B) 2,3,7,8-Tetraklordibenzodioxin
C) 3,3`,5,5` Tetraklordifenyl.
D) 1,2,3,4,5,6-Hexabromsykloheksan
E) Naftalen

Oppg. 1c Hva menes med $K_{oktanol\text{-}vann}$ fordelingskoeffisienten for organiske stoffer, og hvorfor er denne parameteren ofte brukt til karakterisering av organiske miljøgifter?

Oppg. 1d Nevn noen viktige strukturelle kjemiske faktorer som er viktige for variasjoner i K_{ow} for organiske substanser.

Oppg. 1e Angi de viktigste langtransport mekanismer for global transport/fordeling av miljøgifter.

OPPGAVE 2

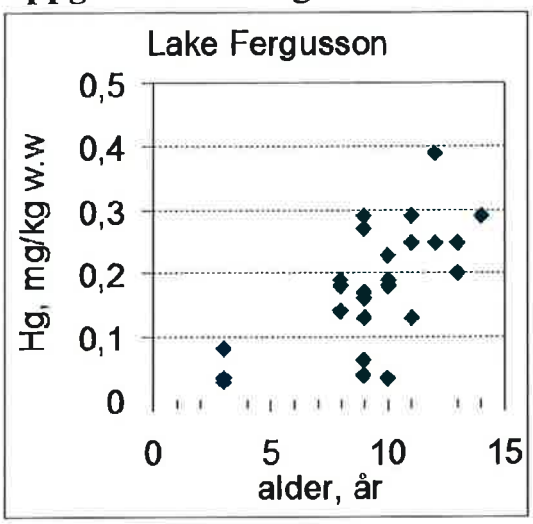
Oppg. 2a Hvorfor vil en total konsentrasjon av et metall ofte ikke være godt korrelert med metallets giftighet, og hvilke fysisk-kjemiske faktorer i vann er normalt viktigst m.h.t. giftigheten til et metal i vann?

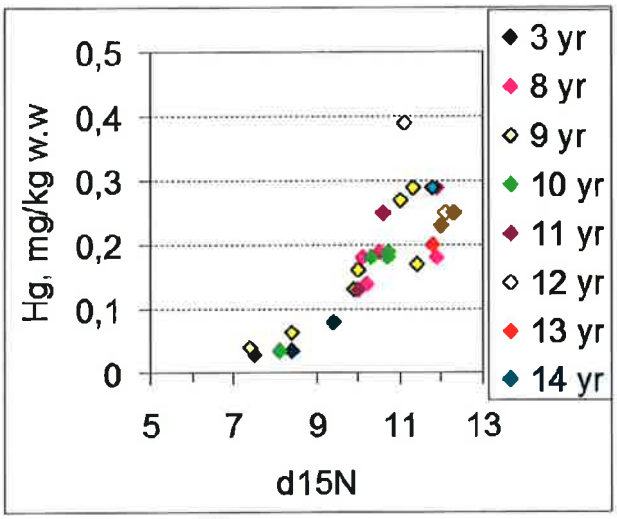
Oppg. 2b Også for organiske komponenter vil en total-konsentrasjon av et stoff ikke nødvendigvis gi et korrekt bilde av giftighet eller bio-tilgjengelighet. Med bakgrunn i dette faktum, forklar hvorfor en petrogen (i olje) PAH-forbindelse, eksempelvis pyren, er mer bio-tilgjengelig (mer giftig) enn pyren i pyrogent (dannet under ufullstendig forbrenning i fm brann etc.) materiale?

Oppg. 2c Hva er den mest bio-akkumulerende form av kvikksølv (Hg), og hvilke organismer er det som primært danner denne Hg-forbindelsen, og hvorfor finnes de høyeste konsentrasjonene av denne Hg-formen i fisk som lever i humus-rike vann med lite siktedyp?

Oppg. 2d Forklar hvorfor det er faglige grunner for å anta at økte Hg-konsentrasjoner i fisk i den senere år, spesielt i humssjøer, kan være en indirekte effekt av den store nedgangen i sur nedbør som har funnet sted i samme periode.

Oppg. 2e Forklar figurene under.





Oppgave 3

Oppg. 3a Hva er mikroplast, og nevn de viktigste miljøbekymringene knyttet opp mot denne forurensingen i marine miljøer/økosystemer.

Oppg. 3b Nevn noen viktige tiltak som kan gjennomføres for å hindre/redusere utlekking av miljøgifter fra sterkt kontaminerte sedimenter i havneområder.

Høgskolen i Telemark

Telemark University College

EXAM

4308/9004 ECOTOXICOLOGY

10.04.2015

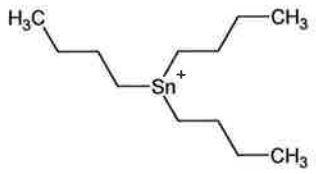
Time:	09:00-13:00
Language:	English
Pages:	4 (including front page)
Aids:	Non
Remarks:	Non
Appendix:	Non

Exam results will be made public at the studentweb.

TASK 1

Task 1a Write the full chemical names of the following environmental pollutants, and the acronyms for the chemical compounds A, C, F, G and H.

A)



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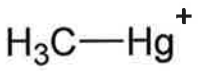

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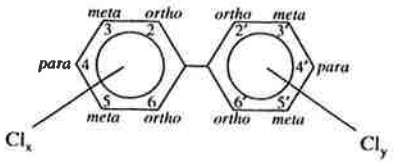

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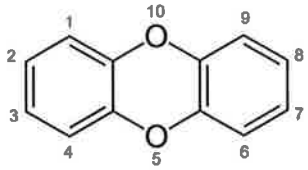

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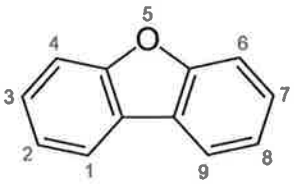

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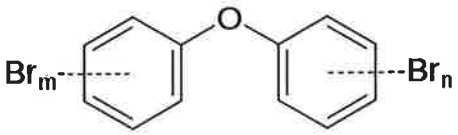

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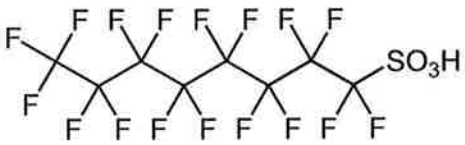

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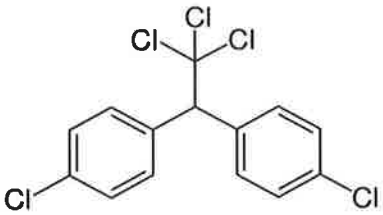

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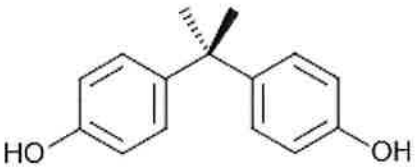

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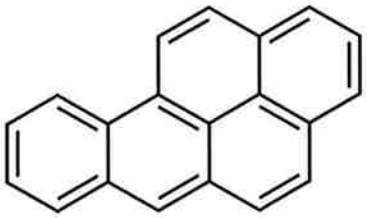


Task 1b Draw the structure of the following chemical compounds:

A) 3-Ethyl-2-methylpentane
B) 2,3,7,8-Tetrachlordibenzodioxin
C) 3,3`,5,5` Tetraclordiphenyl.
D) 1,2,3,4,5,6-Hexabromocyclohexane
E) Naphthalene

Task 1c What is the $K_{ochtanol\text{-}water}$ partition coefficient of organic pollutants, and why is this parameter often used for characterization of organic pollutants?

Task 1d Mentioned some essential structural-chemical factors of importance for the variations in K_{ow} of organic substances.

Task 1e Mention the most important long range transporting mechanisms (routes) for global transport/distribution of pollutants.

TASK 2

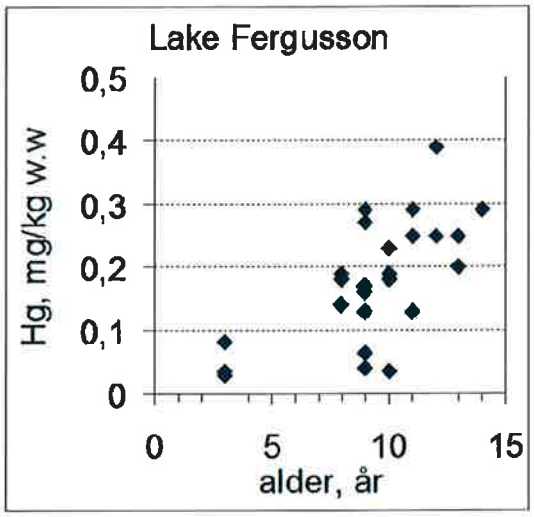
Task 2a Why is a total concentration of metal often not well correlated with toxicity, and which major physical-chemical factors in water are essential for the toxicity of metals in aquatic systems?

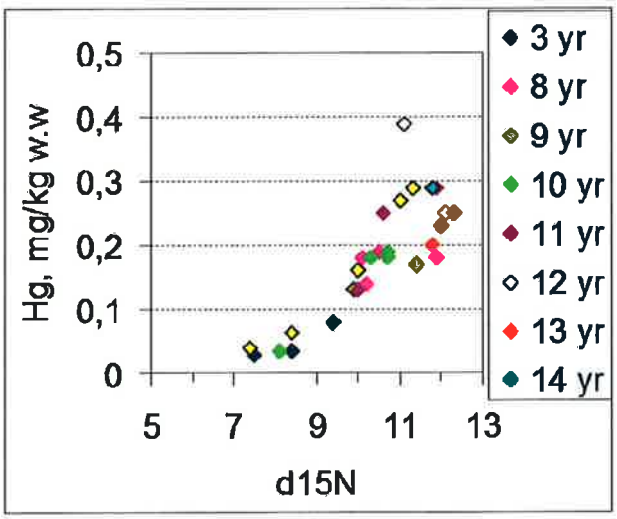
Task 2b Also for organic compounds, bioavailability of a compound may differ depending on physic chemical factors in their surrounding environments. Based on this fact, explain why a petrogenic PAH-compound (present in oil) like pyrene, is more bioavailable than pyrene in pyrogenic material (present in ash after a fire)?

Task 2c What is the most bioaccumulating form of Hg in aquatic environments, which organisms are primarily responsible for formation of this Hg-form, and why is the highest Hg concentration in fish primarily found in brown water with low sight depths?

Task 2d Explain why it is scientific reasons to assume that the increase in Hg in fish documented in humic rich lakes during the last years, likely is an indirect effect of the significant decline in acid rain occurred during the same time period.

Task 2e. Explain the two figures below.





TASK 3

Task 3a. What is microplastic, and mention the most important environmental factors of concern regarding microplastic in marine ecosystems.

Task 3b. Mentioned some alternative measures to prevent/reduce leakage of pollutants from heavily contaminated harbor sediments.