CIVE 3331 - ENVIRONMENTAL ENGINEERING
Spring 2003

Document Name: CIVE3331_Exercises_005.doc

Purpose: Exercises related to Lecture # 5. These exercises develop skills in selected environmental chemistry problems. Critical thinking is exercised in determination of analogies between lecture examples and the problems in this exercise set. Direct relationships to various accreditation objectives are highlighted in **Bold** type in the following sections. The exercises start on the next page.

Relevant ABET EC 2000 Criteria: Criterion 3 Program Outcomes and Assessment

(3-a) an ability to **apply knowledge of** mathematics**, science,** and engineering.
(3-e) an ability to identify, formulate, and solve engineering problems.
(3-k) **an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.**

Relevant CEE Educational Objectives:

(3) Emphasize problem-identification, problem-formulation and communication skills, problem-solving techniques and the many facets of engineering design throughout the curriculum.

(5) **Prepare every student to develop the skills for critical thinking and lifelong learning.**

Relevant CEE Program Outcomes:

ii. **Students should acquire the ability to solve practical civil engineering problems by applying the knowledge of** mathematics**, science**, engineering, modern techniques, **skills and practical tools** they **gained in their courses.**

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Exercise_005-1

Draw the Lewis structure and more conventional structural formulas for the following organic chemicals:

a) Ethylene, C_2H_4
b) 2-Chloropropane, $CH_3CHClCH_3$
c) Methanol, CH_3OH

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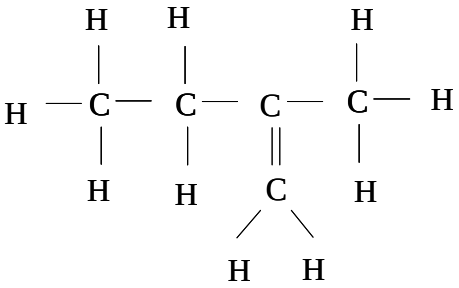
Exercise_005-2

Draw “kinky” diagrams for the following organic chemicals.

a) $CH_3CH_2CH_2CH_2CH_3$

b) $CH_3CH_2CHCH_2$

c)



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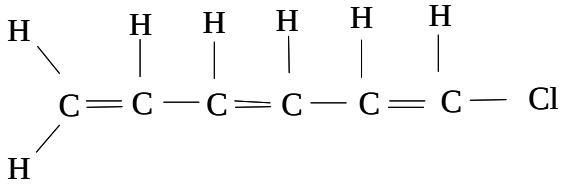

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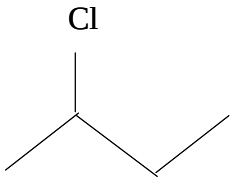
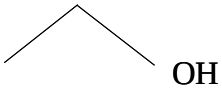
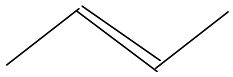
Exercise_005-3

Write the chemical structures (conventional structural diagrams) from the following “kinky” diagrams.

a) 

b) 

c) 

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Exercise_005-4

Write the chemical structures for the following organic compounds:

a) Dichloromethane
b) Trichloromethane (chloroform)
c) 1,1-Dichloroethylene
d) Trichlorofluoromethane (CFC-11)
e) 1,1,2,2-Tetrachloroethane
f) o-Dichlorobenzene
g) Tetrachloroethene (PCE)
h) Dichlorofluoromethane (CFC-12)

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Exercise_005-5

What values of a and b would complete each of the following decay links?

a) $^{266}_{88}X \rightarrow a + ^{a}_{b}Y$

b) $^{a}_{15}X \rightarrow b + ^{32}_{b}Y$

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Exercise_005-6

The half life of iodine-125 is about 60 days. If one started with 64g of I^{125} how much would remain in the sample after one year?

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Document History:

Author	**Action**	**Date**	**Archive File Name**
Theodore G. Cleveland	Created	January 23, 2003	CIVE3331_Exercises_005.PDF