Chemistry 1110 R11
Fall 2001
Test #2

Thursday, October 25, 2001 Time: 1 hour 50 minutes

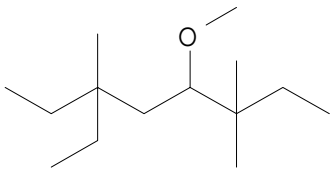
Name: _____ Student number: _____

*This exam consists of **seven** pages of questions and a page with names and priorities of the functional groups. Please ensure that you have a complete paper and, if you do not, obtain one from me **immediately**. Good luck!*

***Neatness counts!** Remember that you are communicating information when you draw structures, and if I can't read what you write because it's messy, I can't tell if you're right or not. In cases of ambiguity (because of messy work), I have no choice but to assume you're incorrect.*

***Note:** Only chemicals written above reaction arrows may be presumed to be present in excess.*

1) **[8 marks]** Name the following compounds:

a) 

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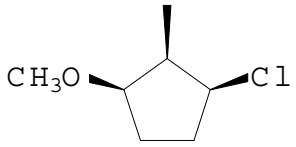
b) 

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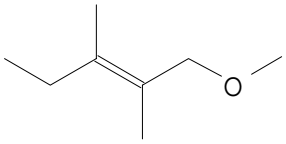
c) 

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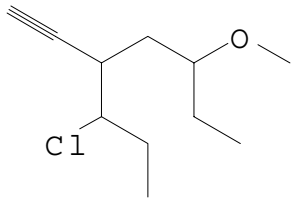
d) 

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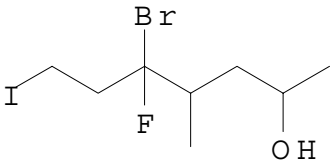
e) 

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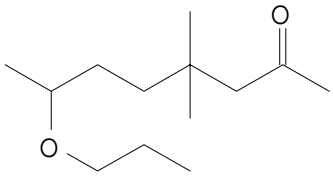
f) 

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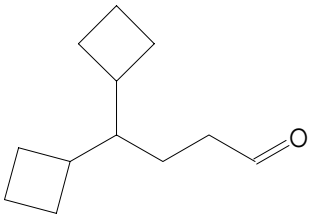
g) 

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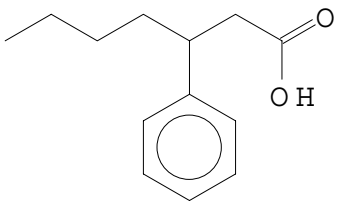
h) 

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2) **[8 marks]** Draw the compounds that correspond to the following names:

a) 4,4-dimethylhexyl 3-chloropropanoate

b) N-(1-bromoethyl)-2-chlorohexanamide

c) N,N-dicyclopropylbutanamine

d) o-dichlorobenzene

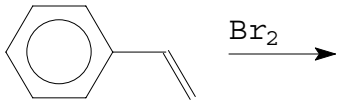
e) 4-nitrotoluene

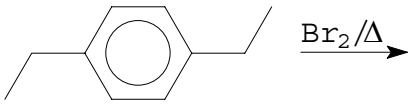
f) 4-chloro-2-methoxybenzoic acid

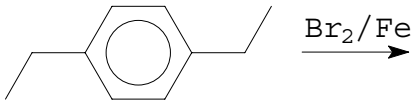
g) 2,4,6-trinitrophenol

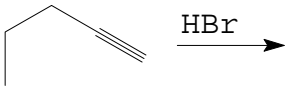
h) o-fluorophenyl ethanoate

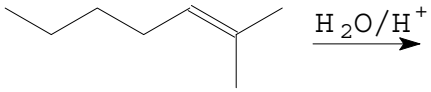
3) **[10 marks total]** Complete the following reactions. Give the structure of the organic product or products only.

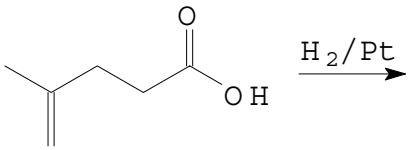
a) 

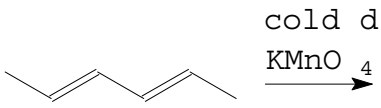
b) 

c) 

d) 

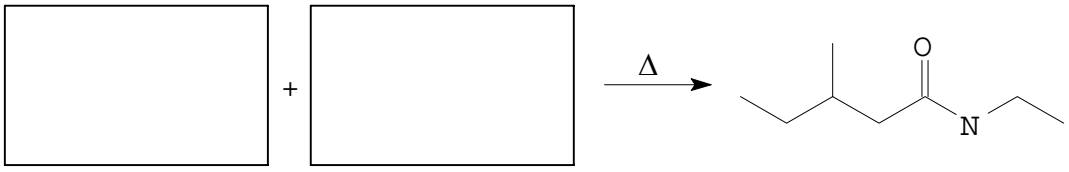
e) 

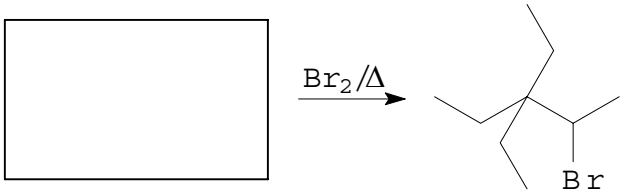
f) 

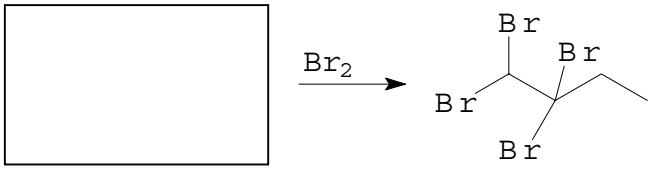
g) 

h) 

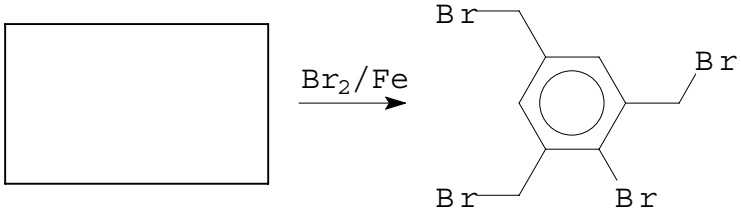
4) **[8 marks]** Provide the single organic reagent necessary to obtain the indicated organic products.

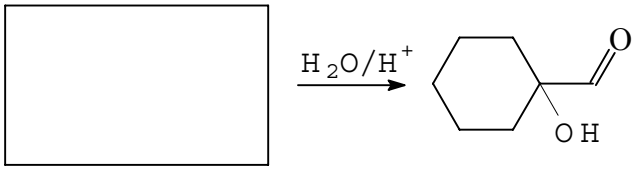
a) 

b) 

c) 

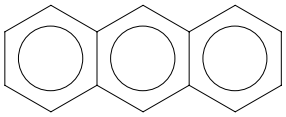
(no halogens in starting material)

d) 

e) 

f) **[3 marks]** Starting from benzene, and using any other organic and inorganic reagents required, show how you would make TNT.

5) **[2 marks]** How many units of unsaturation are present in:

a)  ____

b) $C_{12}H_{15}FIN_3O_2$ ____

6) **[9 marks total]** Using the formula C_4H_8O and drawing only *saturated compounds*, answer the following questions:

a) **[3 marks]** Draw all possible functional, skeletal and positional isomers.

b) **[2 marks]** Pick a compound from (a) that is capable of geometric isomerism. Draw and label the cis and trans forms.

c) **[2 marks]** Pick a compound from (a) that is capable of optical isomerism. Put an asterisk beside the chiral carbon atom or atoms.

d) **[2 marks]** Draw a pair of functional isomers.

7) **[9 marks total]** Using the formula C_4H_9N, answer the following questions:

a) **[1 mark]** Draw a compound that will not react with H_2.

b) **[2 marks]** Draw a pair of saturated positional isomers.

c) **[2 marks]** Draw a saturated compound that cannot have positional isomers.

d) **[2 marks]** Draw one molecule that will react with $KMnO_4$ and one that will not. Circle the molecule that will react with $KMnO_4$.

Functional Group Priorities and Prefix/Suffix Labels
(in order of functional group priority)

Compound Type	Prefix	Suffix
Carboxylic Acid	N/A	oic acid
Ester	N/A	oate
Amide	N/A	amide
Nitrile	cyano	nitrile
Aldehyde	oxo	al
Ketone	oxo	one
Alcohol	hydroxy	ol
Amine	amino	amine
Alkene	enyl	ene
Alkyne	ynyl	yne
Alkyl halide	halo	N/A
Ether	oxy	ether