Name:_____

CHEMISTRY 3311, Fall 1997
Professor Walba
Third Hour Exam
November 20, 1997

scores:

1)

2)

3)

4)

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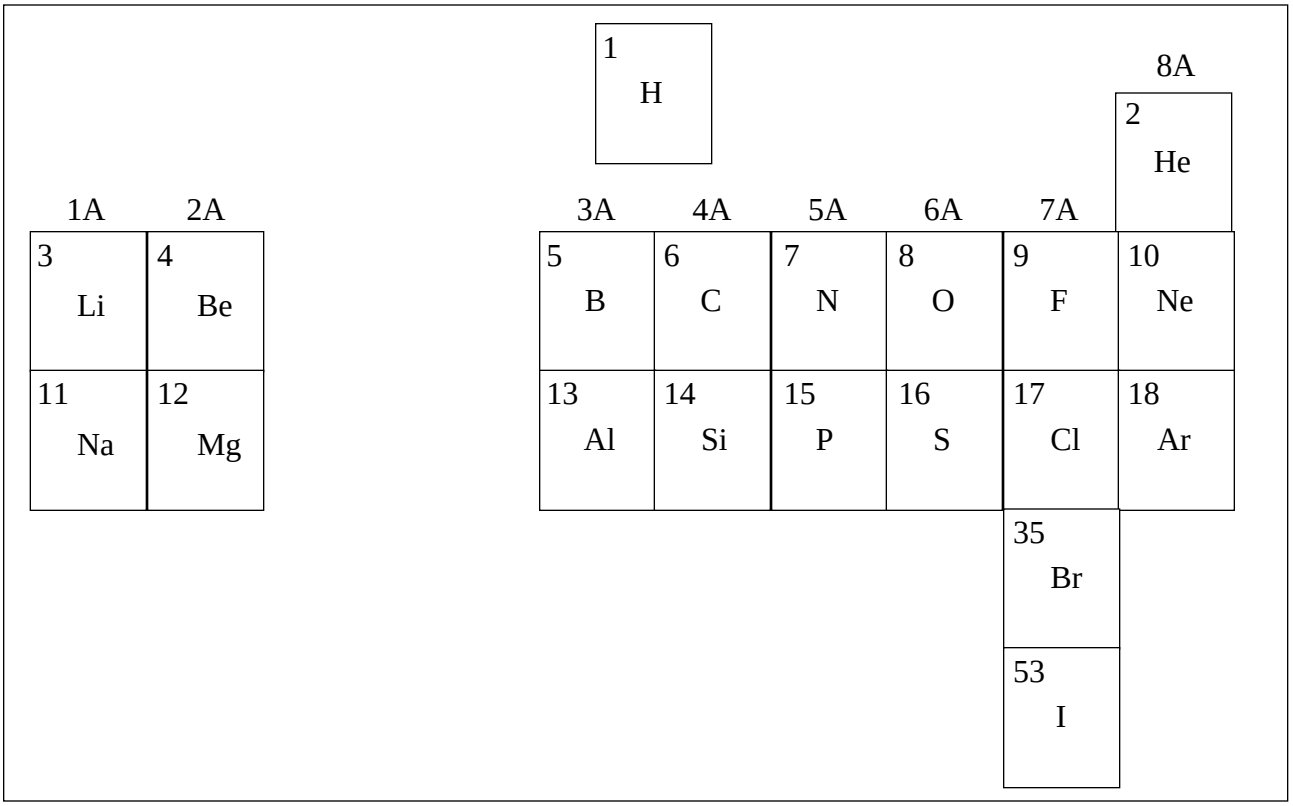
This is a closed-book "open model" exam. You may use models, but no notes or books. Please put all your answers on the test. Use the backs of the pages for scratch. There are additional scratch sheets at the end of the exam.

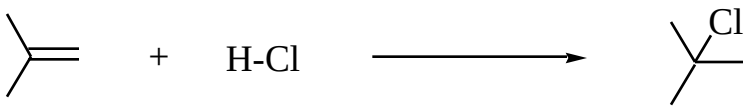
# PLEASE read the questions carefully!

## Partial Periodic Table



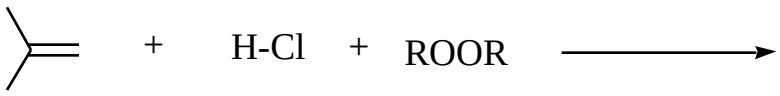
Name:_____

1) (25 pts) a) Propose an arrow-pushing mechanism for the following transformation. Be sure to show all intermediates in the pathway from starting material to product, but do not show transition states. Make all structures in your mechanism proper valence bond structures with correct formal charges and all lone pairs.



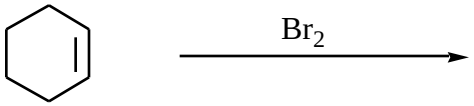

b) Propose an arrow-pushing mechanism for the initiation and propagation steps for the following reaction (you do not need to show termination steps).

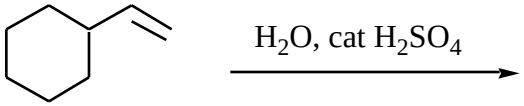

c) Give the product of the following reaction, and explain briefly why it is formed.

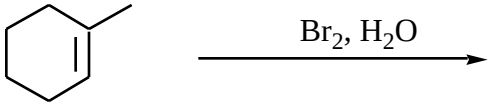


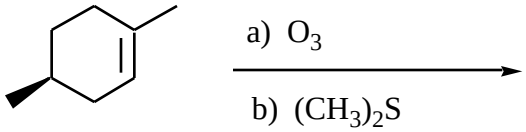
Name:_____

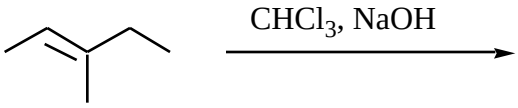
2) (25 pts) Give the single major organic product (or two products if more than one major product is formed) for each of the following reactions. If a racemate is formed, consider this to be one product, show only one of the enantiomers, and label the structure racemic (rac). Carefully show the stereochemistry of the product(s) using wedges and dashes if appropriate.

a) 


b) 


c) 


d) 


e) 

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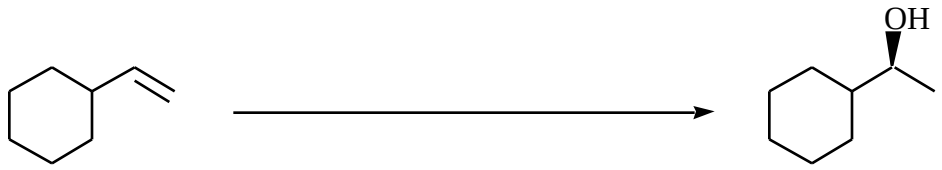
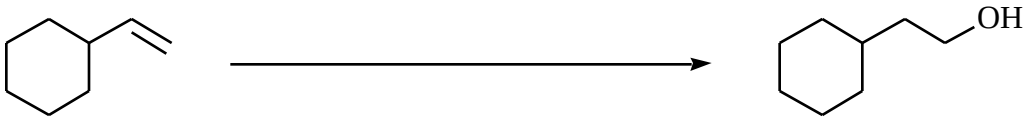
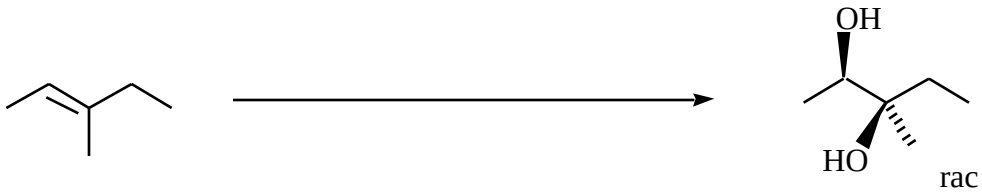
3) (25 pts) Propose reagents for accomplishing the following transformations. NOTE: more than one step may be required! Try to make your synthesis efficient (i.e. the desired product should be the major product). You must use the starting material given, and you may use any other organic or inorganic reagent you want.

a) 


rac

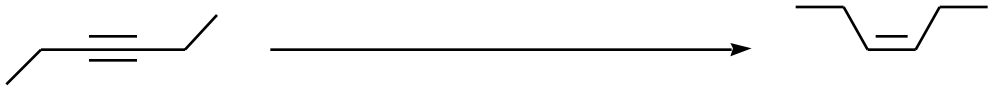
b) 


c) 


rac

d) 


rac

e) 

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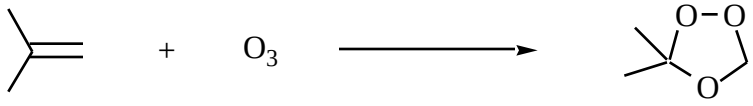
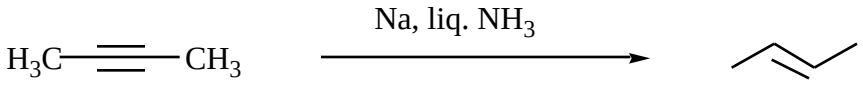
4) (25 pts) Propose an arrow pushing mechanism for each of the following transformations. Carefully show the structure of each intermediate in your mechanism (for this question please show one valence bond structure for each intermediate even if the actual molecules is a resonance hybrid of several important contributors).

a) 


b) 

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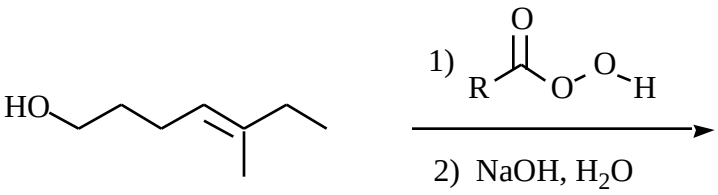
c) For the following reaction, propose a structure for the single major product (please note the molecular formula of the product). Carefully show the stereochemistry of the product using wedges and dashes.




$C_8H_{16}O_2$

d) Propose arrow-pushing mechanisms for both steps in the transformation given in 4c.