

### Exam 3

April 20, 2006

CHEM 3311 Spring 2006

Professor Rebecca Hoenigman

I pledge to uphold the CU Honor Code:

Signature \_\_\_\_\_

Name (printed) \_\_\_\_\_

Last four digits of your student ID number \_\_\_\_\_

Recitation TA \_\_\_\_\_

Recitation number, day, and time \_\_\_\_\_

*You have 1 hour and 15 minutes to complete this exam.  
No model kits or calculators allowed; a periodic table is attached.*

**DO NOT TURN PAGE UNTIL INSTRUCTED TO DO SO.**

**Put your name on ALL pages of the exam**

#### Recitation Sections:

Number	Day	Time	TA
121	Tuesday	8 am	Andrew
131	Tuesday	1 pm	Heather
141	Wednesday	8 am	Chris
151	Wednesday	12 pm	Andrew
153	Wednesday	12 pm	Nicole
152	Wednesday	5 pm	Chris
171	Thursday	12 pm	Heather

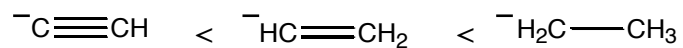
#### Score:

Page 1 _____/14	Page 5 _____/10
Page 2 _____/8	Page 6 _____/15
Page 3 _____/8	Page 7 _____/15
Page 4 _____/30	<b>Total _____/100</b>

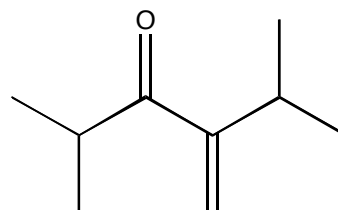
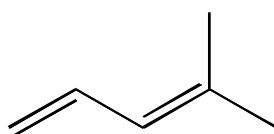
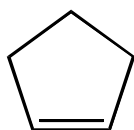
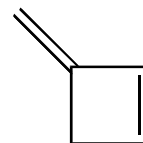
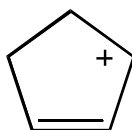
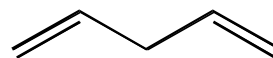
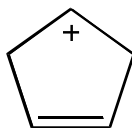
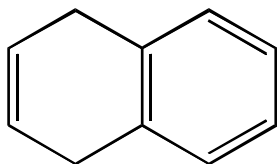
Name: \_\_\_\_\_

1. (4 pts) Give the IUPAC name of the smallest isolable cycloalkyne.

2. (5 pts) The following compounds are listed in order of increasing basicity. Explain this ordering without discussing the pKa values of the corresponding conjugate acids.

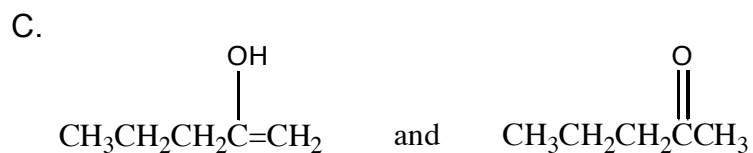
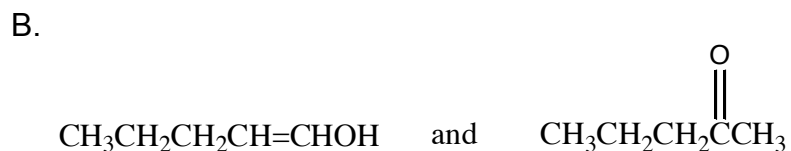
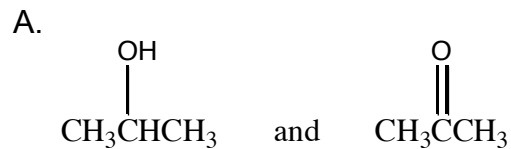


3. (5 pts) Circle the compounds below that have delocalized electrons.



Name: \_\_\_\_\_

4. (3 pts) Of the following pairs, circle the keto-enol tautomers.

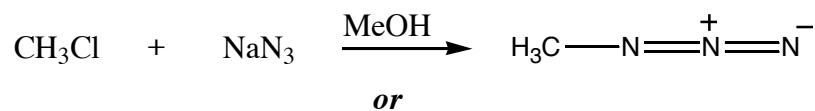


5. (5 pts) A single organic product was obtained when 1-bromo-3-chloropropane was allowed to react with one molar equivalent of sodium cyanide in aqueous ethanol. Draw the product and explain why there is only one product.

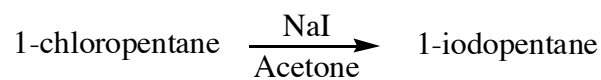
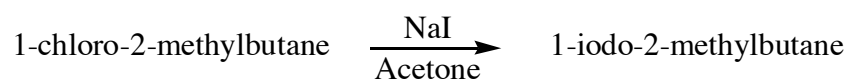
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6. (8 pts) Which reactions in the following pairs will take place more rapidly?  
Circle your answer.

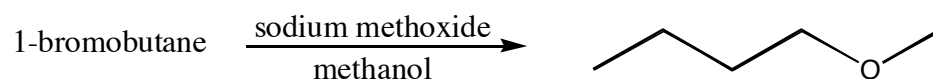
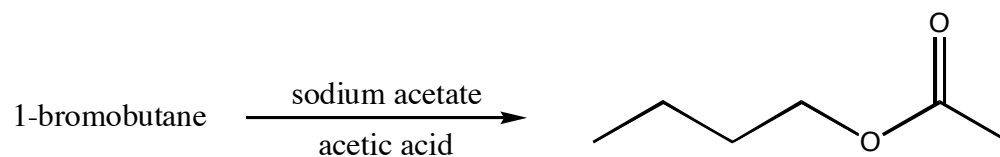
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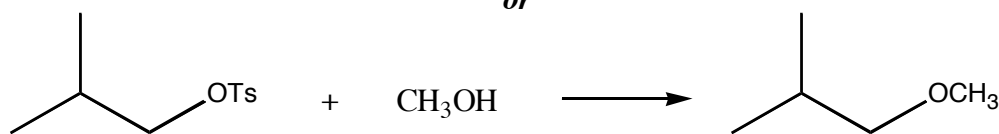
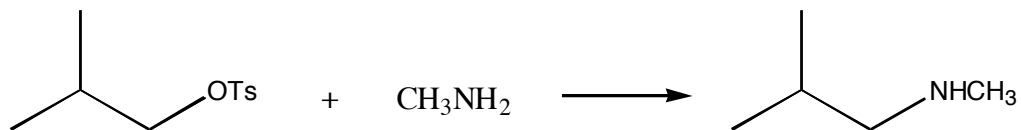
B.



C.



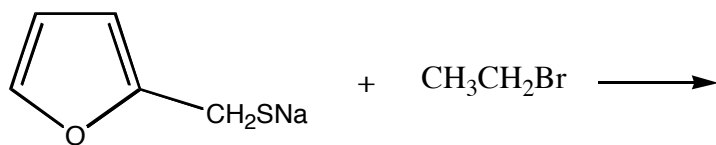
D.



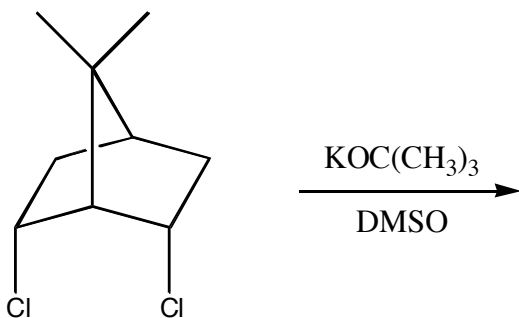
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7. (30 pts) Give the organic products for the following reactions. If necessary, clearly show the stereochemistry of the products. Write NR if no reaction occurs.

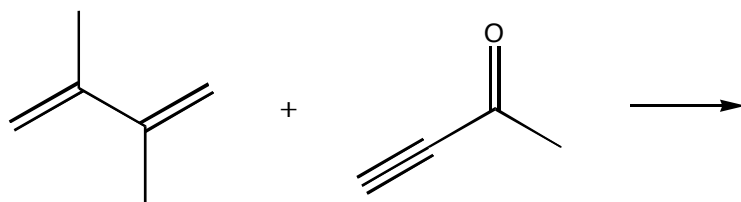
A.



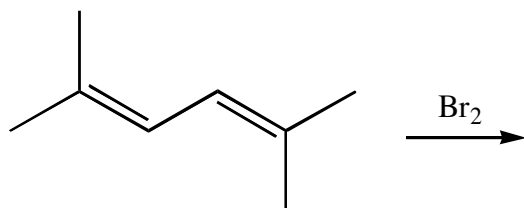
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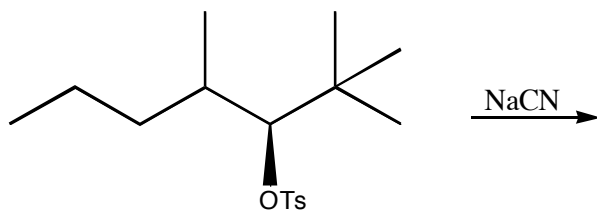
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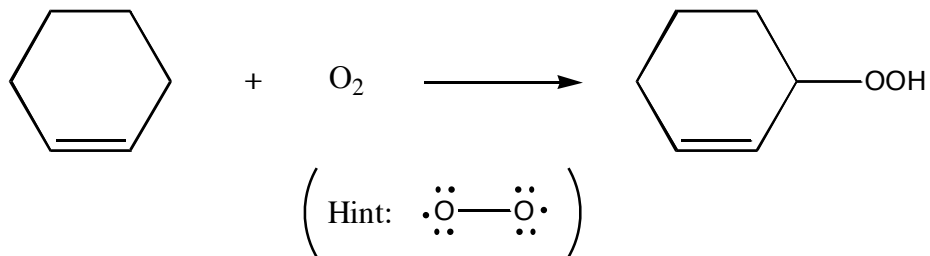


E.



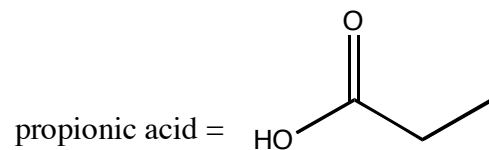
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8. (10 pts) Alkenes slowly undergo a reaction in air called *autoxidation* in which allylic hydroperoxides are formed. Keeping in mind that oxygen has two unpaired electrons, suggest a reasonable mechanism for this reaction.



Name: \_\_\_\_\_

9. (15 pts) Give an efficient synthesis for propionic acid. You may only use acetylene, organic compounds containing two or fewer carbons, and any inorganic reagents you like. Note: the last step of your synthesis should produce 2 moles of propionic acid.



Name: \_\_\_\_\_

10. (15 pts) Give an efficient synthesis for the formation of 1-butyne from 1-chlorobutane. You may use any reagents you like.



Name: \_\_\_\_\_

## Scratch Page

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## Scratch Page