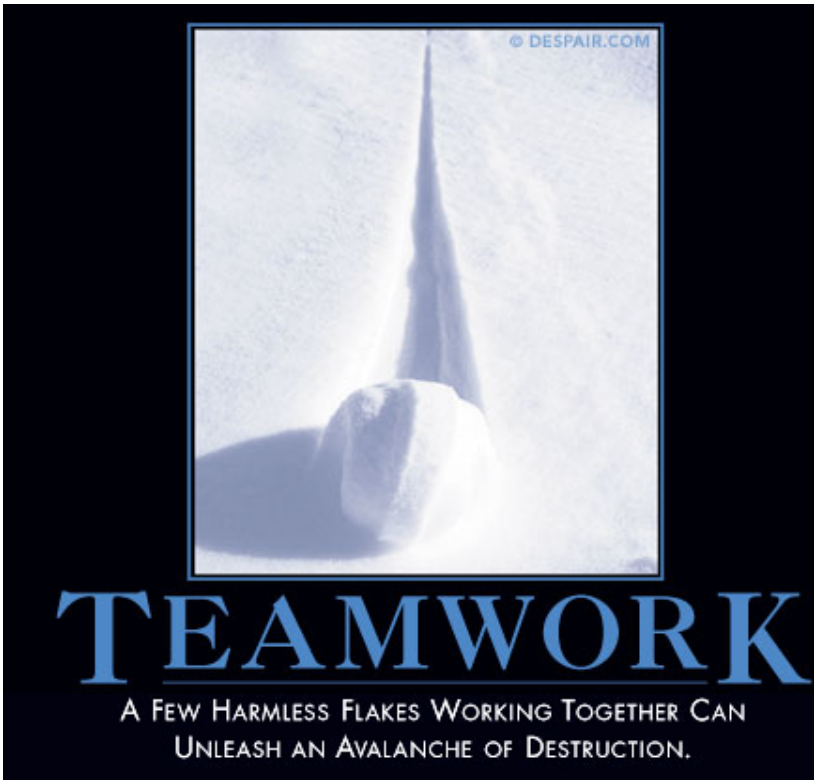
CHEM 260
EXAM 2
OCTOBER 31, 2012

NAME: _____



PAGE 1 _____/

PAGE 2 _____/

PAGE 3 _____/

PAGE 4 _____/

PAGE 5 _____/

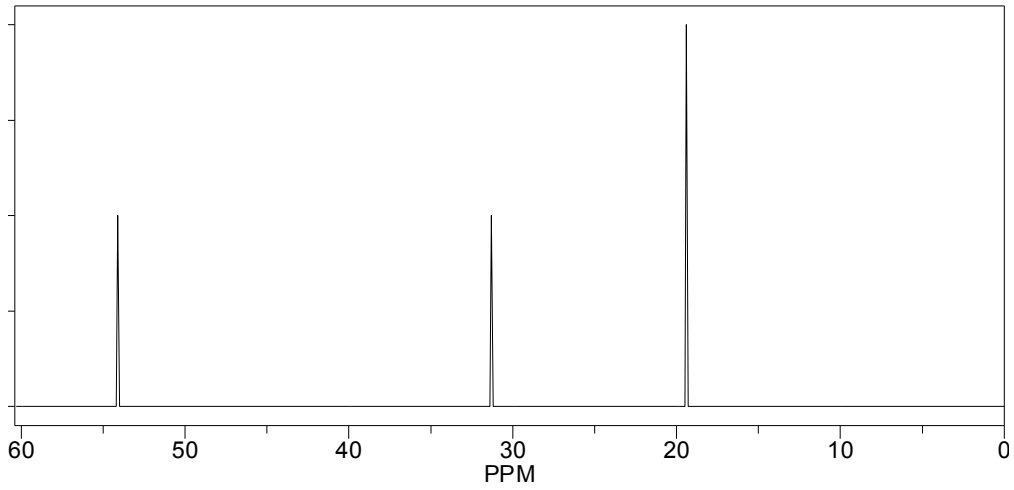
TOTAL:

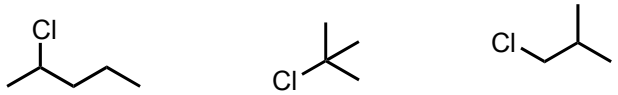
INSTRUCTIONS

- PUT YOUR NAME AT THE TOP OF THE PAGE!!
- MAKE SURE YOUR EXAM HAS THE CORRECT NUMBER OF PAGES
- IF YOU WRITE PART OF AN ANSWER ON THE BACK OF A PAGE, MAKE SURE I KNOW OR IT WILL NOT BE GRADED
- MAKE SURE YOU SHOW ALL YOUR WORK
- READ THE DIRECTIONS CAREFULLY. DON'T DO MORE WORK THAN WHAT I AM ASKING

AND REMEMBER TO BREATHE & RELAX

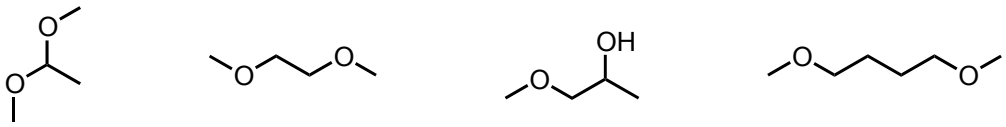
1. Which of the following compounds is consistent with the following ^{13}C NMR spectrum?



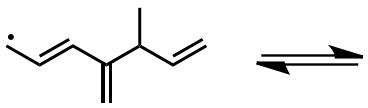


A B C

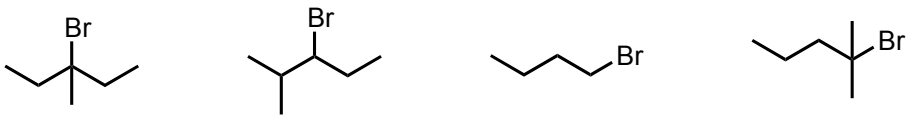
2. Which of the following compounds will display two triplets and a singlet in the ^{1}H NMR spectrum?



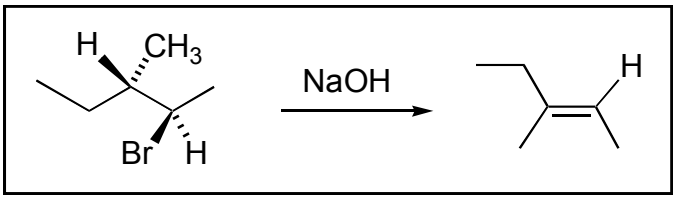
3. Use correct arrow formalism to draw all the resonance structure for the radical shown below.



4. Which of the following alkyl halides would likely undergo rearrangement during an S_N1 reaction? **Briefly** explain why.

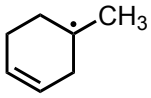


5. If the concentration of NaOH is doubled in the following reaction, what will happen to the reaction rate? What is the rate law of this reaction?

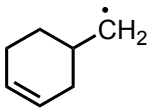


6. Rank the following radicals according to their increasing stability.

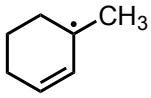
A



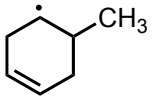
B



C

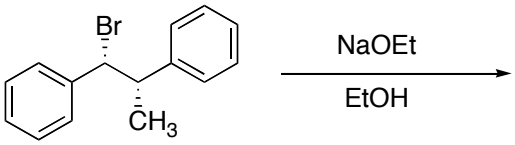


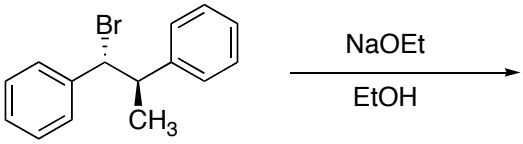
D



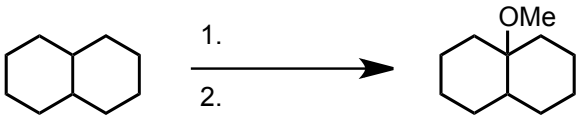
E

7. Give the products of the reaction of the following compounds in sodium ethoxide in ethanol. One of these compounds undergoes this reaction 50 times faster than the other. Which compound is it? Why? (8 pts)



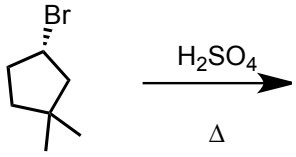


8. Provide the **products**, **reactants**, or **starting material** to complete the following reactions. Be sure to include major and minor products and/or stereochemistry if required. Circle the correct reaction mechanism for the identified reactions below. If no reaction occurs, please state **NR. (6 pts each)**



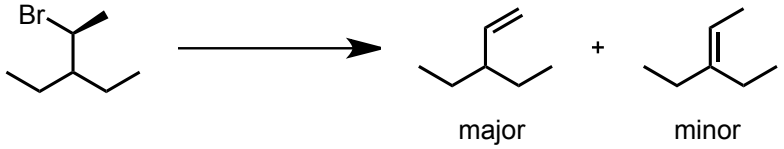
SN1 SN2

E1 E2



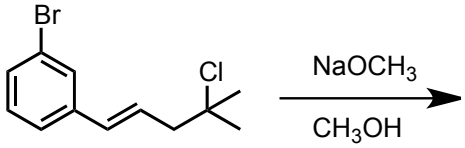
SN1 SN2

E1 E2



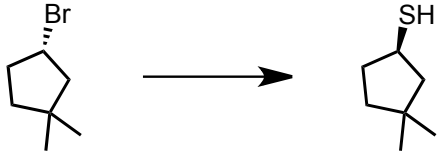
SN1 SN2

E1 E2



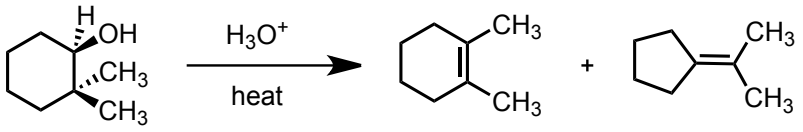
SN1 SN2

E1 E2

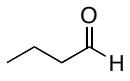


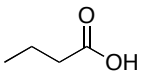
9. The alcohol, 2, 2-dimethylcyclohexanol, undergoes an acid-catalyzed reaction to produce two different alkenes, which are shown below.

Provide a reasonable arrow-pushing mechanism for the two products that can form.



10. Shown below are three sets of isomers. We have learned three spectroscopic techniques that are useful in discerning the structures of compounds (IR, ^{1}H NMR & ^{13}C NMR). Tell which one of those methods you would use to distinguish which isomer from the other. Tell me specifically what you would see in each case that would allow you to tell which isomer you had. An example is given in the first case so you can see how your answers should look.

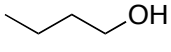


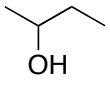
A VS 

B

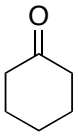
*In the ^{1}H NMR spectrum, you would see a proton downfield at about 10 - 12 ppm that is the OH of the carboxylic acid **B.** If it is **A**, you would see a proton at about 9 ppm for the aldehyde. An IR would also have the OH blob around 3200 cm^{-1}*

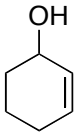
Pick two of the three



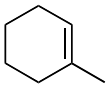
C VS 

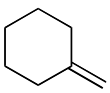
D



E VS 

F



I VS 

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