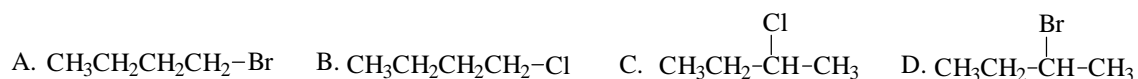


Exam # 3
Chemistry 2401 – March 23, 2007

(8) I. Draw all isomers with a molecular formula of C_2H_2BrCl . Indicate which ones are stereoisomers and which are constitutional isomers.

(30) II. MULTIPLE CHOICE: Circle the letter corresponding to the correct response.

1. Which of the following would undergo an S_N2 reaction fastest with CN^- ?



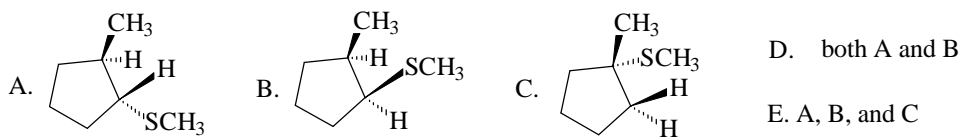
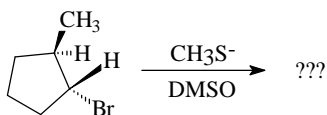
2. Which of the following is the best nucleophile in an acetone solution?



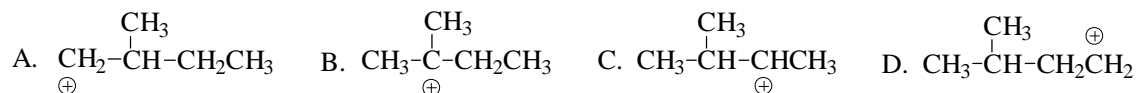
3. Which of the following is the best nucleophile in a ethanol solution?



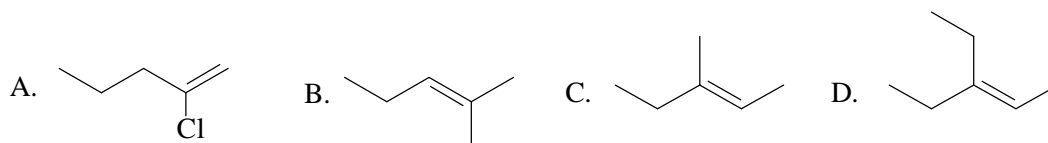
4. Which of the following would result from the S_N2 reaction shown?



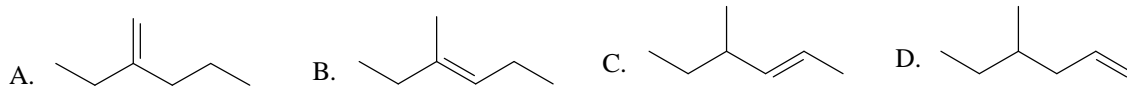
5. Which of the following carbocations would be formed fastest from the corresponding alkyl bromide in an ethanol solution?



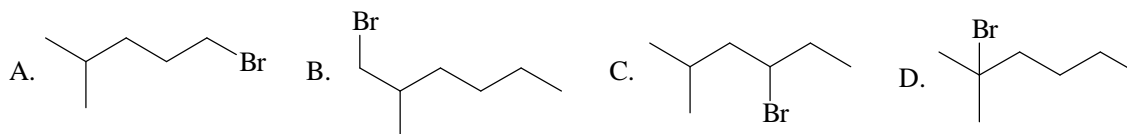
6. Which of the following alkenes exists as stereoisomers?



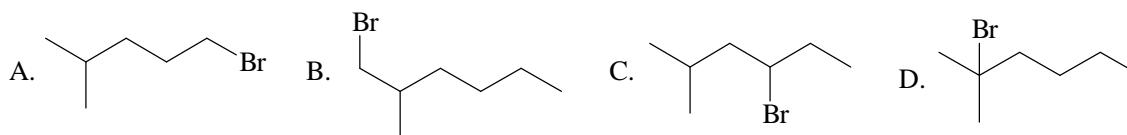
7. If you burned each of the following alkenes, which one would produce the most heat?



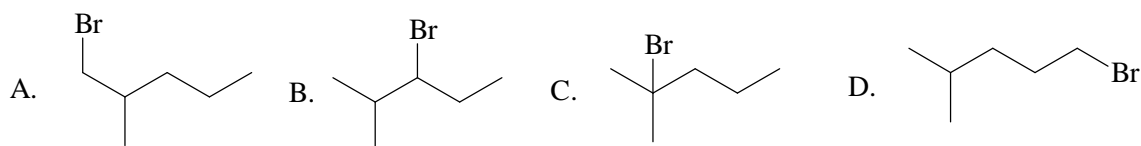
8. Which of the following alkyl halides would undergo an E2 reaction fastest?



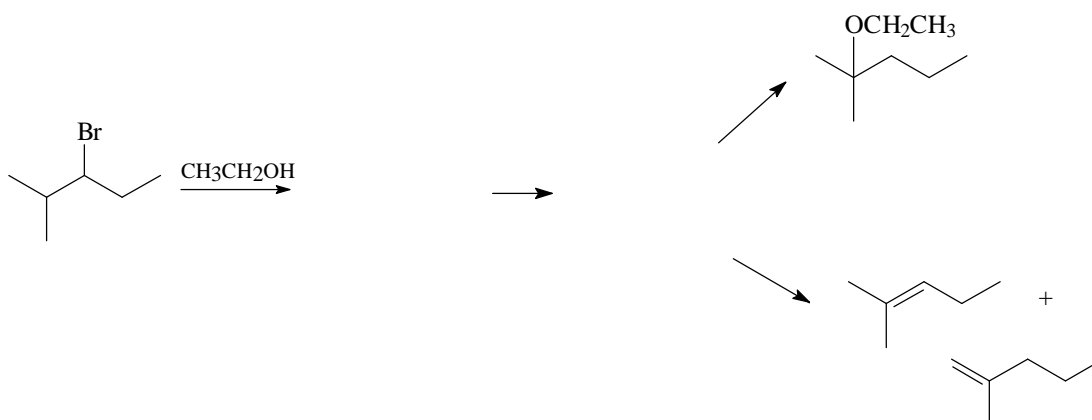
9. Which of the alkyl halides in # 8 would undergo an E1 reaction fastest?



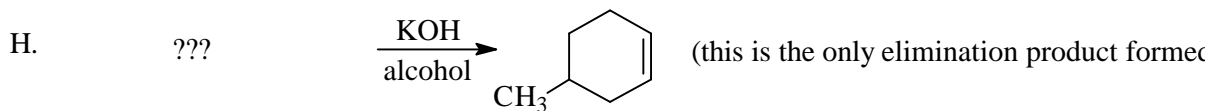
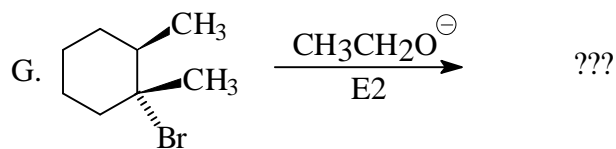
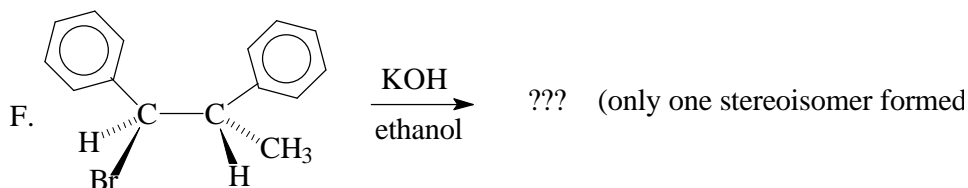
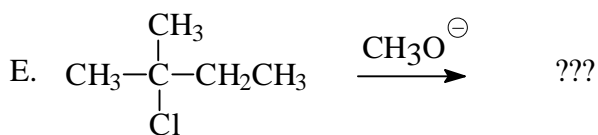
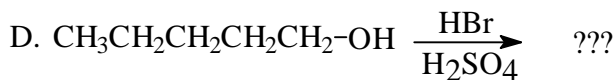
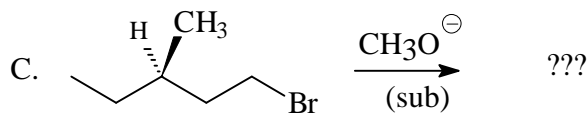
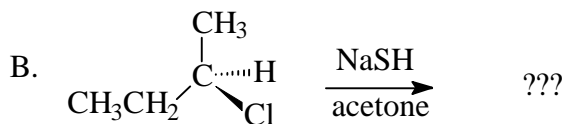
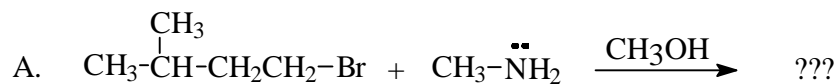
10. Which of the alkyl halides would produce 3 different products when subjected to an E2 elimination reaction?



(9) III. The rates of the reactions shown below depend only on the concentration of the alkyl halide. Fill in the structures of the missing reactive intermediates.

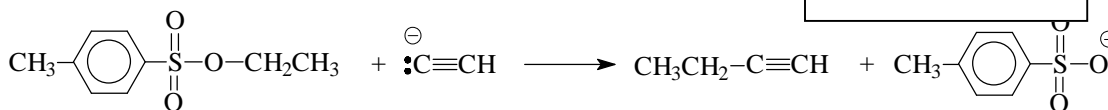


(24) III. Write structural formulas for the products resulting from each of the following reactions.

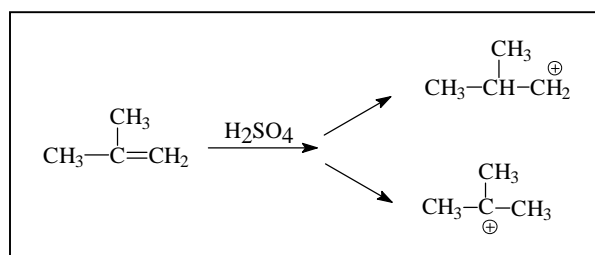


(12) IV. Explain briefly each of the following.

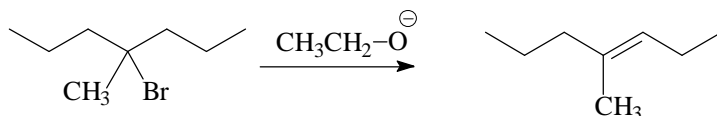
Given that the pK_a for p-toluenesulfonic acid (right) is -6.5 , what can you say about the rate of the reaction shown below. Explain your answer.



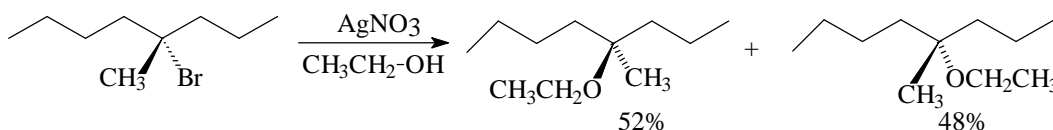
B. The transfer of a proton from a strong acid to isobutylene can occur in two ways as shown at the right. Use **Hammond's postulate** to explain why, in practice, the tert-butyl cation is formed much faster than the isobutyl cation.



C. Explain why the E2 reaction shown below occurs many times faster in DMSO solution than it does in methanol.



D. The reaction of S-4-bromo-4-methyloctane with a solution of silver nitrate in ethanol yields the results shown.



1) Why are almost equal amounts of the two enantiomers formed?

2) Why is a slight excess of the R enantiomer formed?