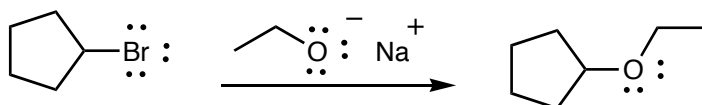
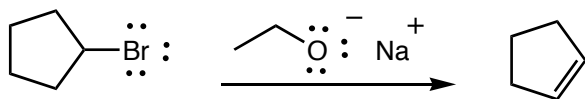


Homework - Chapter 10
Chem 2310

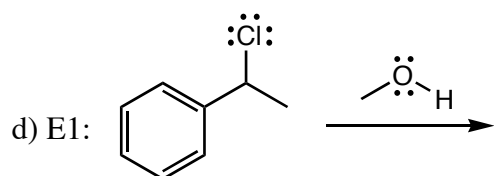
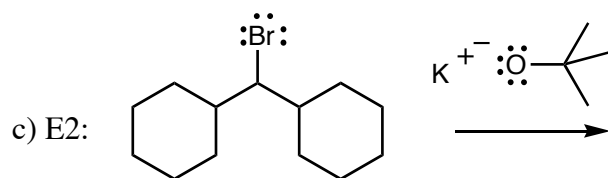
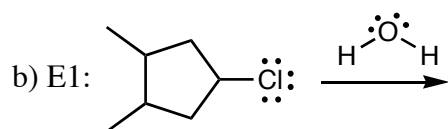
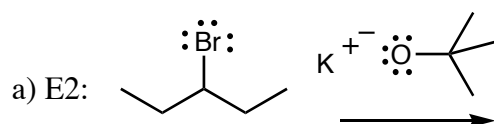
Name: _____

I. Elimination Reactions of Alkyl Halides

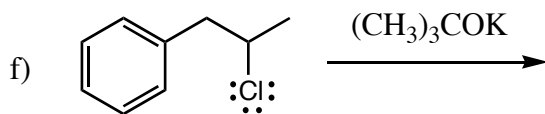
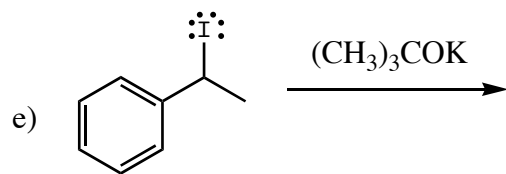
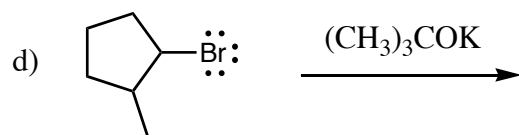
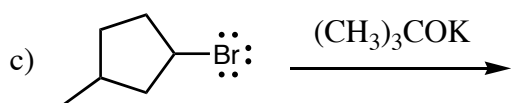
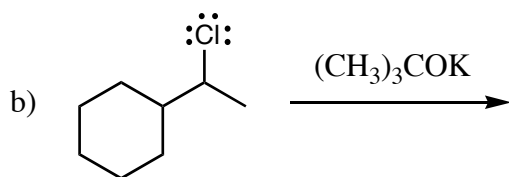
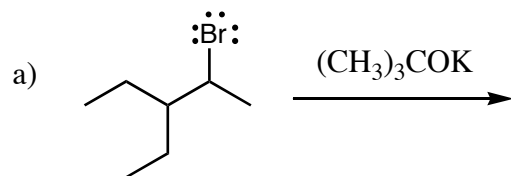
1. Which of the following is a substitution reaction, and which is an elimination reaction? What can you learn from the fact that they both have the same reactants?

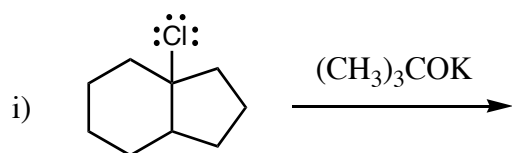
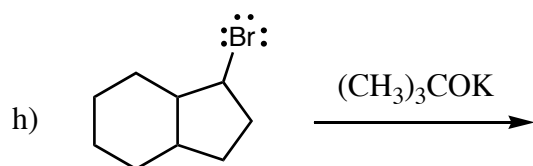
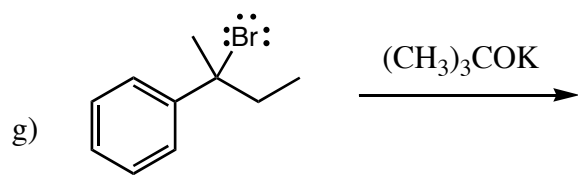


2. For each of the following reactions, draw the elimination mechanism, showing the intermediates (if any) and the product that would be formed.



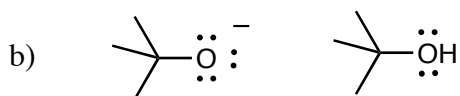
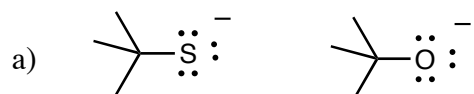
2. Draw in all beta hydrogens in the following alkenes. Then draw arrows to show how they could undergo an E2 reaction. Finally, give all products (including constitutional and stereoisomers), and indicate which will be favored by the reaction.

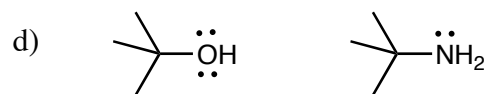




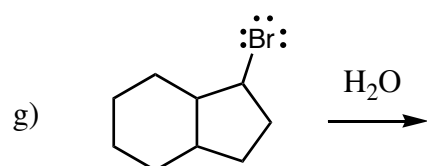
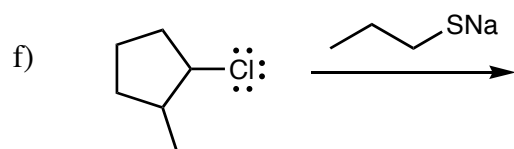
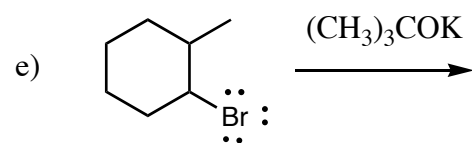
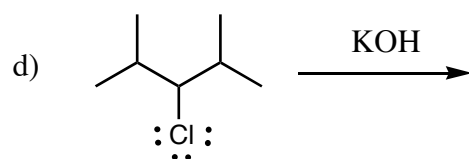
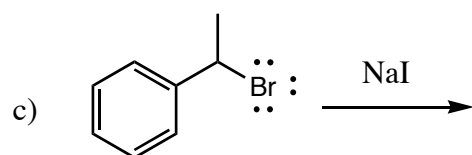
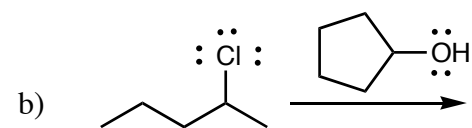
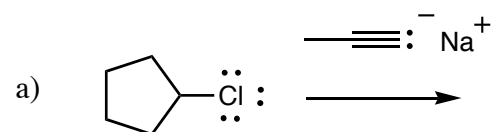
4. Explain in your own words why adding a weak base to an alkyl halide results in an E1 reaction, while adding a strong base to an alkyl halide results in an E2 reaction.

5. Circle the molecule which is the stronger base. Then explain why!

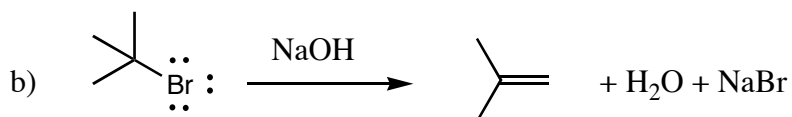
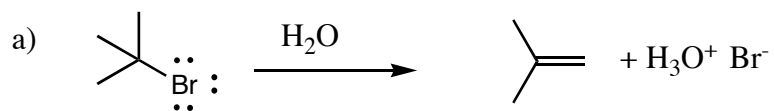




6. After each reaction, write "E2" or "E1" or "neither" to indicate which elimination reaction will occur.



7. Write the rate laws for the following reactions. Use the names of the compounds.



8. Draw out the structure of each of the following compounds. Then rank them according to which will react fastest with a strong base. (1 = fastest)

cyclopentyl bromide

methyl bromide

3-bromo-3-methylpentane

propyl bromide

3-iodo-3-methylpentane

9. Draw out the structure of each of the following compounds. Then rank them according to which will react fastest with a weak base. (1 = fastest)

2-iodopentane

3-bromo-3-ethylpentane

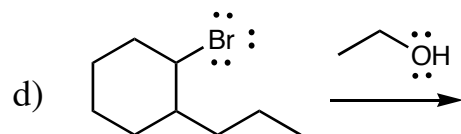
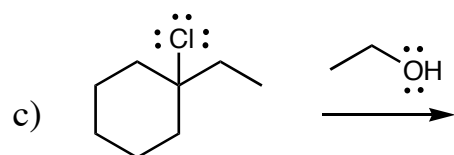
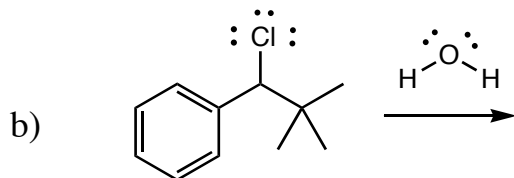
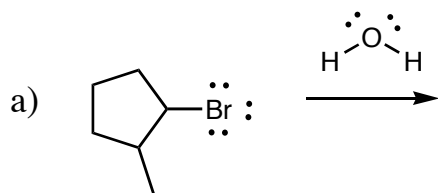
2-fluoro-2-methylpentane

3-chloropentane

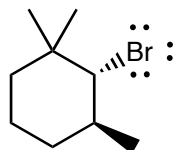
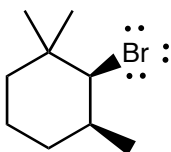
1-chloropentane

benzyl chloride

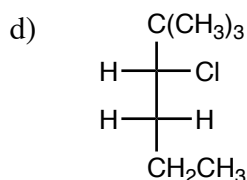
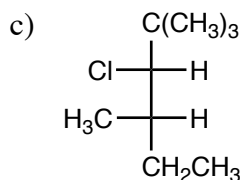
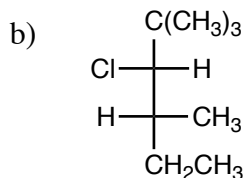
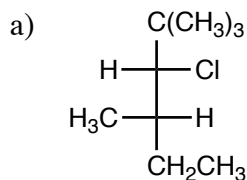
10. Draw the carbocation intermediate and the products for the following E1 reactions. Watch out for rearrangements, and be sure to include all E1 products.



11. One of the following alkyl halides will undergo an E2 reaction, while the other will not. Which is which? Explain your answer. Use both chair conformations of each compound to help you decide.



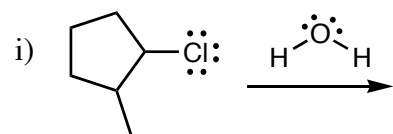
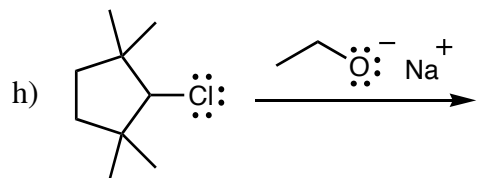
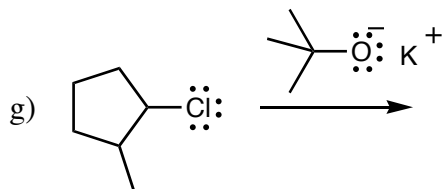
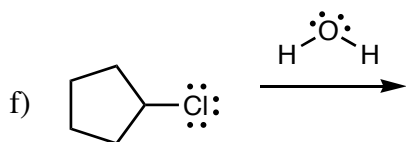
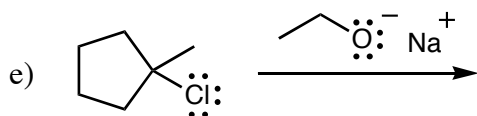
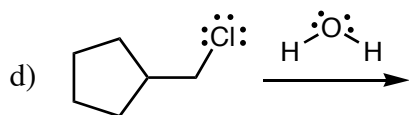
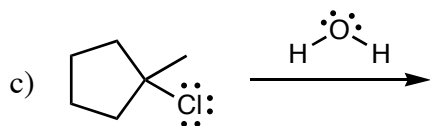
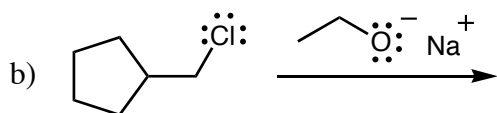
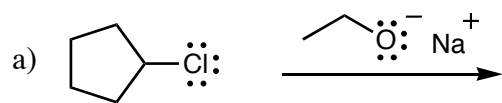
13. For each of the following alkyl halides, make a model of the Fischer projection, then draw the line structure. Then give the alkene(s) that would be formed in an E2 reaction, including correct stereochemistry. Take note of the relationships between the starting alkyl halides!

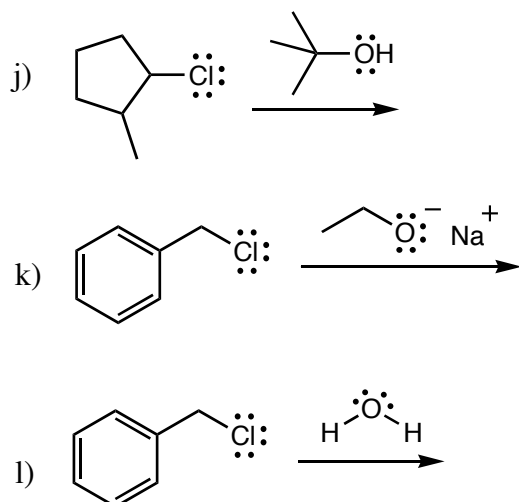


14. Answer each question with S_N2 , S_N1 , E2, or E1 (or more than one of these) as appropriate.

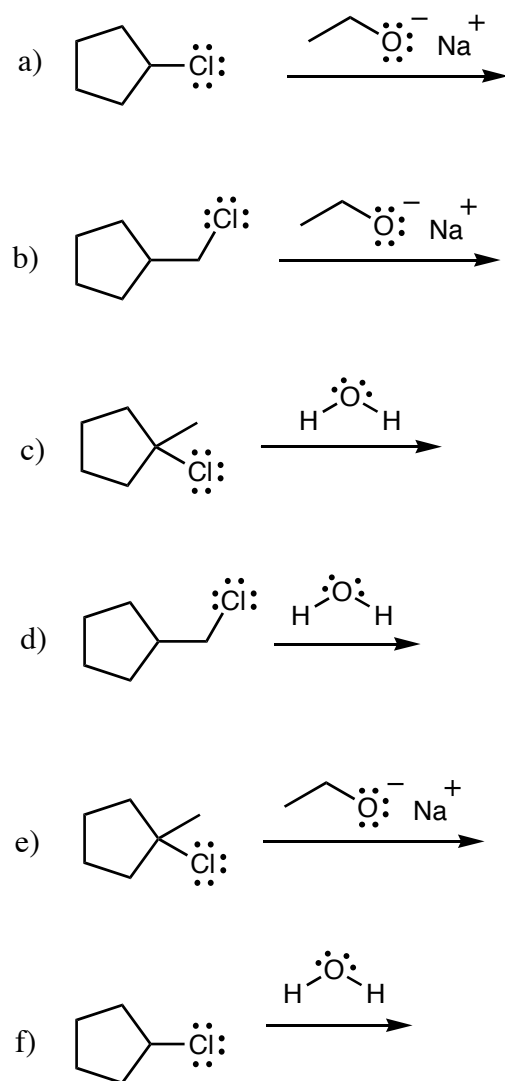
- Which reactions involve a reagent attacking a carbon atom? _____
- Which reactions involve a reagent removing a H from a carbon atom? _____
- Which reactions include a dissociate reaction? _____
- In which reactions is the reagent often used as a solvent? _____
- In which reaction does the alkyl halide act as an acid? _____
- In which reaction does the alkyl halide act as an electrophile? _____
- Which reaction requires a strong nucleophile? _____
- Which reaction requires a strong base? _____
- Which reaction requires a weak nucleophile? _____
- Which reaction requires a weak base? _____
- Which reactions create a $\text{C}=\text{C}$? _____
- Which reactions involve formation of a carbocation? _____
- Which reactions take place in a single step? _____
- Which reactions run best in polar, aprotic solvents? _____

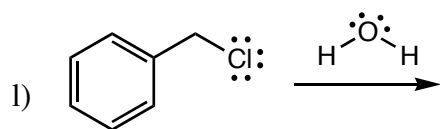
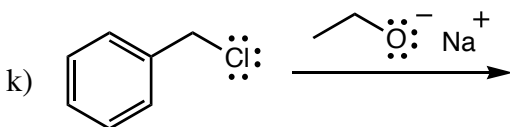
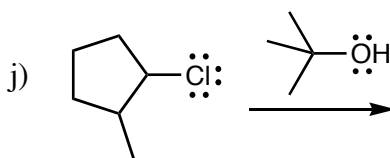
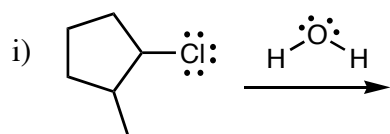
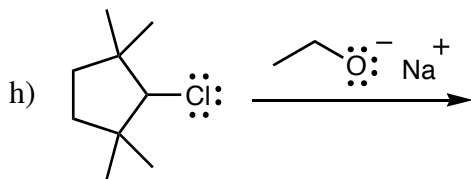
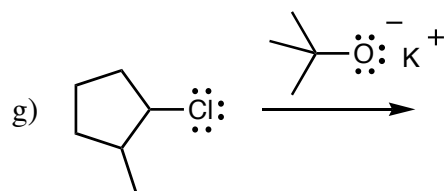
15. Evaluate the following reactions. Determine whether S_N2 , S_N1 , E2, E1, or some combination of these will occur. DO NOT GIVE THE PRODUCTS of these reactions; instead, give an explanation of your choice of reactions.





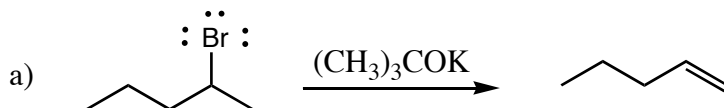
16. Now, give the actual products of the reactions you analyzed in the last problem. Watch out for rearranged products and multiple elimination products.

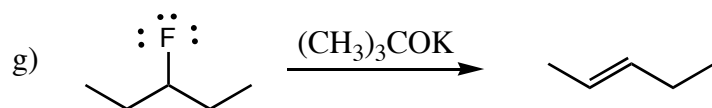
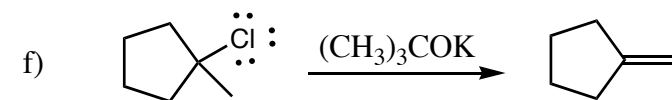
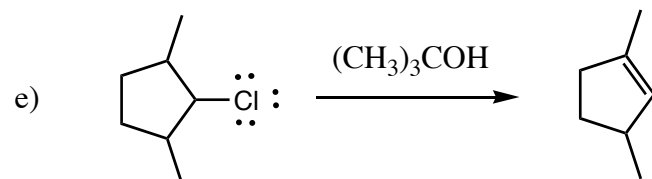
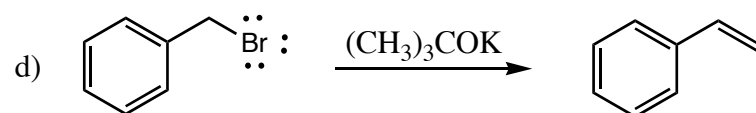
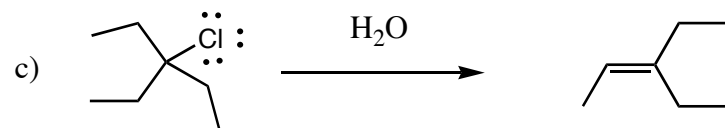
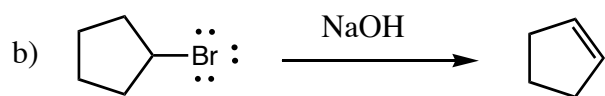


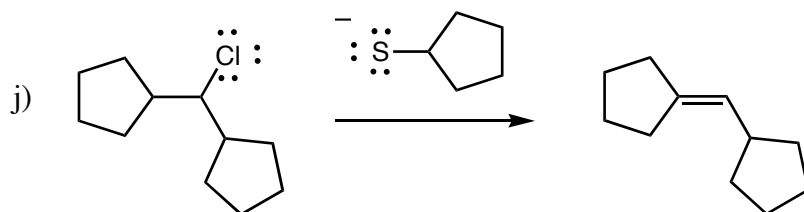
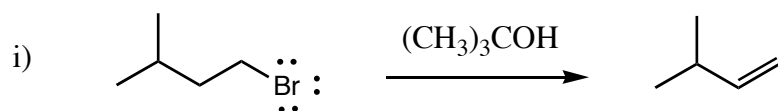
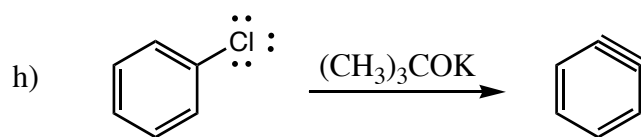


III. Synthesis Using Elimination Reactions

17. Explain why the following syntheses would not be effective.







18. Create a reaction (starting material and reagent) which would give the following products without making any other compounds, using the reactions from this chapter and the previous one.

