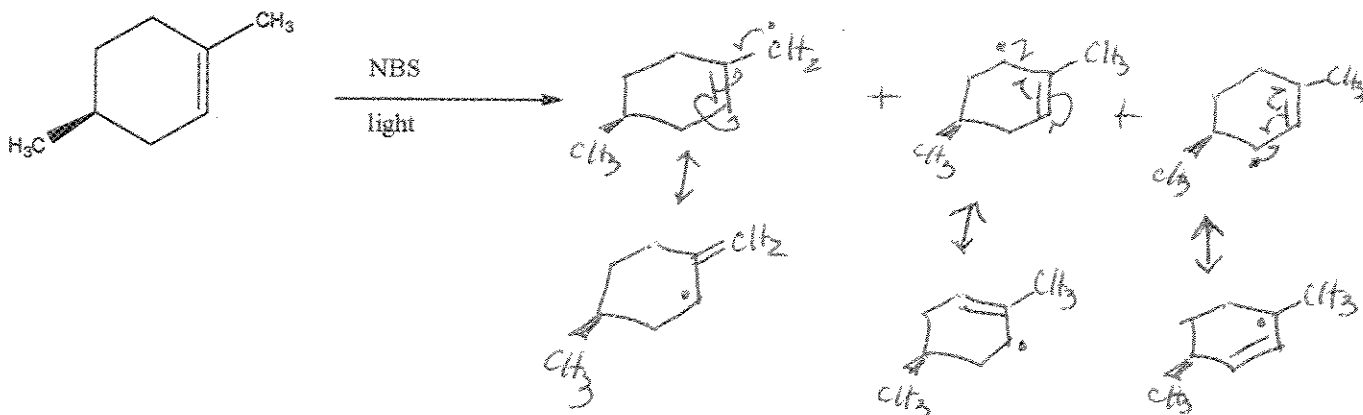
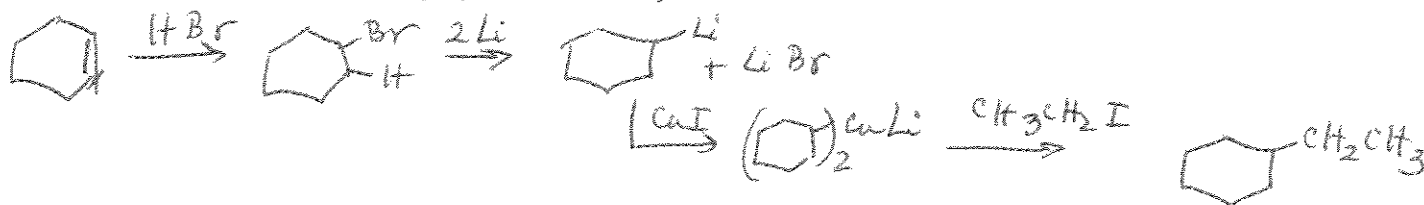


Read all questions carefully. Take your time counting carbon and hydrogen atoms. Specify stereochemistry when relevant.

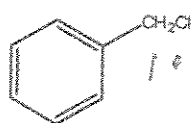
1. (6 points) The allylic bromination reaction of 1,4-dimethylcyclohex-1-ene with NBS in the presence of light (hv) results in the formation of several monobromination products. Show the structure of six (6) radical intermediates involved in this reaction.



2. (5 points) How would you prepare ethyl cyclohexane from cyclohexene?



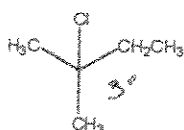
3. (6 points) Given the following alkyl halides, predict whether they would react by a S_N1 mechanism, a S_N2 mechanism, or either mechanism depending of the reaction conditions. Circle your answer and explain your choice.



S_N1
 S_N2
Either (also acceptable)

Explain

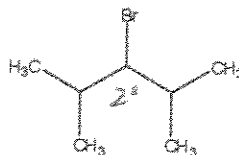
1° alkyl halide reacts preferentially S_N2 because it is not sterically hindered
either answer acceptable with appropriate explanation



S_N1
 S_N2
Either

Explain

3° alkyl halide reacts S_N1 preferentially because it forms a stable carbocation intermediate

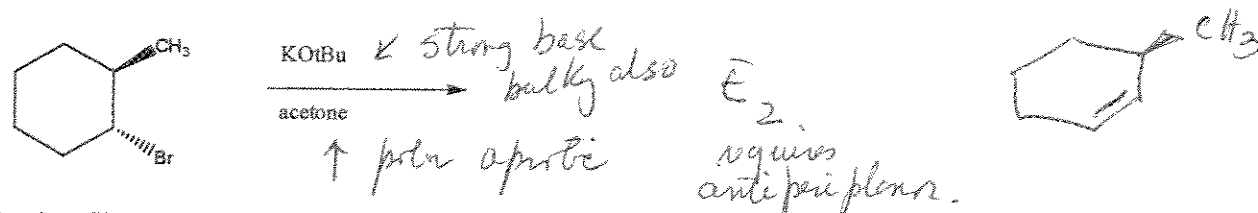
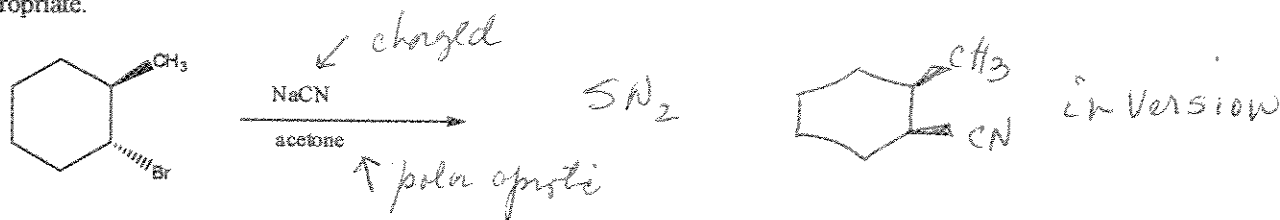


S_N1
 S_N2
 Either

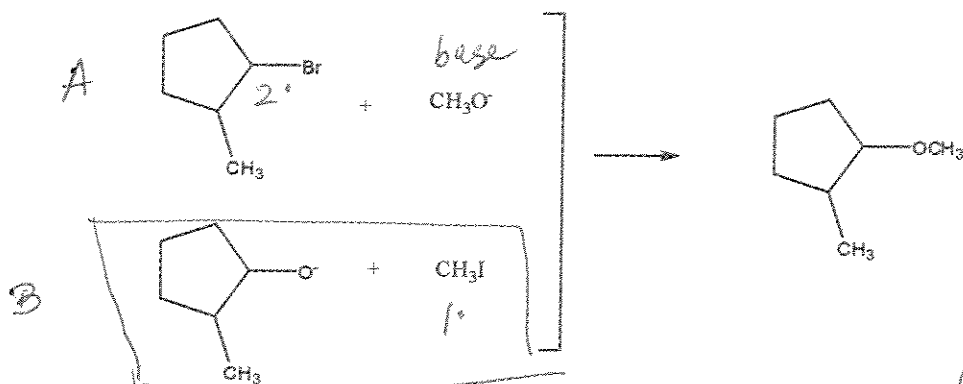
Explain

2° alkyl halides can react S_N2 with weak charged nucleophiles in aprotic solvents. They can react S_N1 with neutral nucleophiles and protic solvents.

3. (4 points) Draw the major product (or products) expected from each of the following reactions. Show stereochemistry whenever appropriate.



4. (4 points) Ethers can be prepared by S_N2 reactions of alkoxide ions, RO^- , acting as nucleophile with alkyl halides. If you wanted to prepare 2-methyl cyclopentyl methyl ether (shown below), which of the two possible routes given would you choose? EXPLAIN.



EXPLANATION:

in A substrate is 2° and nucleophile can act as a base leading to elimination products.

B is preferred because alkyl halide is 1° and nucleophile, although, bulky can easily approach an RX than only has one carbon.

5. (5 points) Given the following reaction, write a complete reaction mechanism for the formation of the two products.

