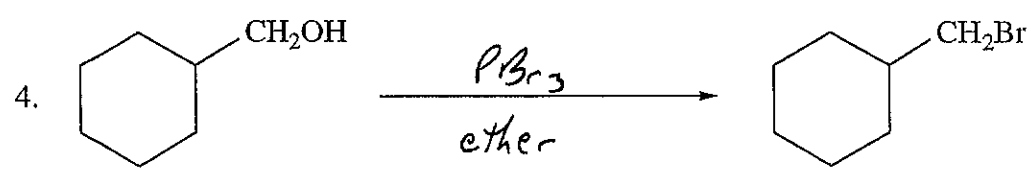
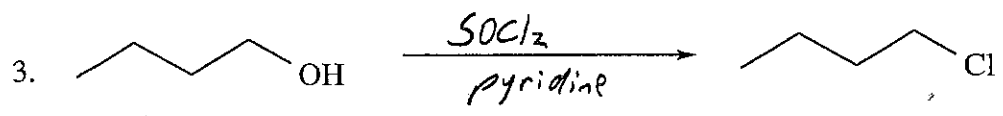
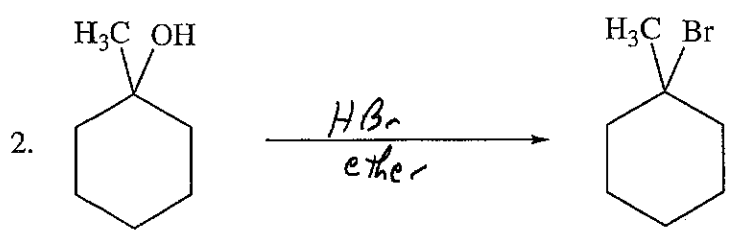
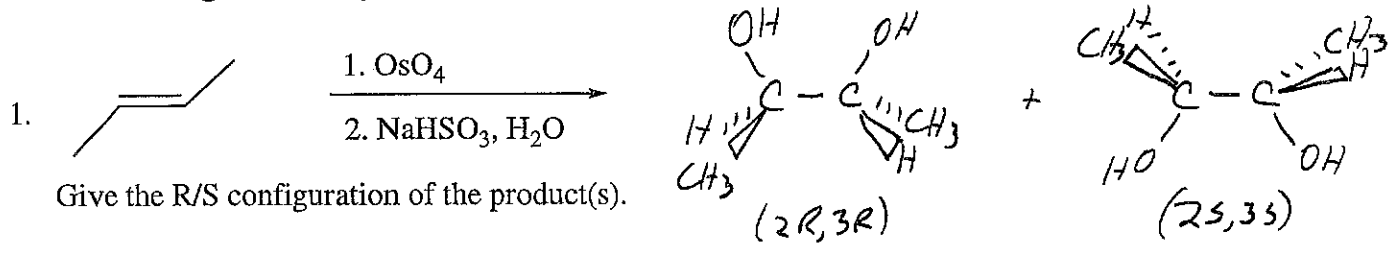


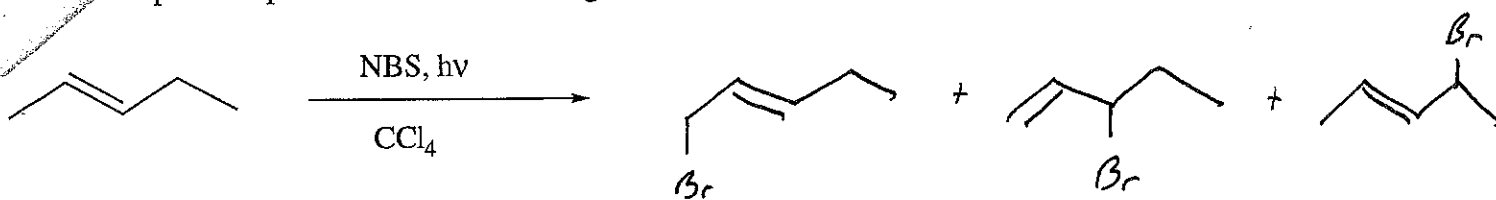
...ne that you have carried out a radical chlorination reaction on (R)-2-chloropentane and have isolated (a low yield) 2,4-dichloropentane. How many stereoisomers of the product are formed? Are any of the isomers optically active?

- a) Four stereoisomers are formed; three are optically active
- b) Two stereoisomers are formed; one is optically active.**
- c) Two stereoisomers are formed; both are optically active.
- d) Four stereoisomers are formed; all four are optically active.
- e) Three stereoisomers are formed; two are optically active.

Part II. Reactions. Show the product(s) or reaction conditions of each of the following reactions. Clearly indicate the regiochemistry and stereochemistry when appropriate. (4 points each)

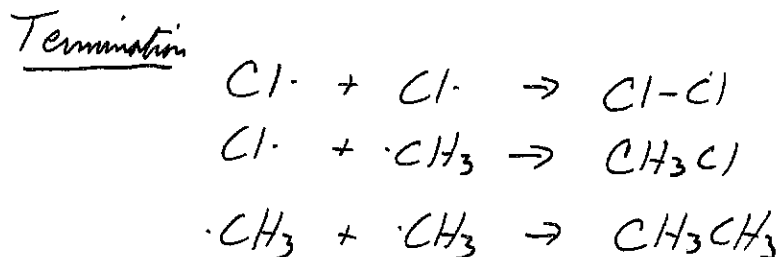
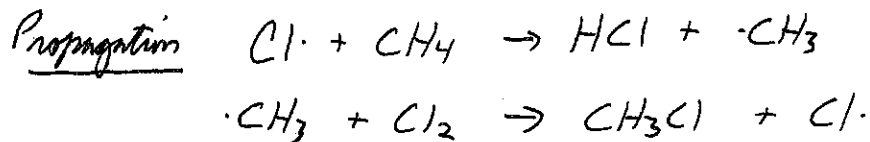
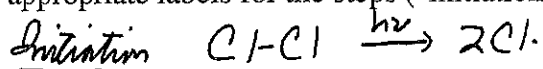


all possible products for the following reaction:

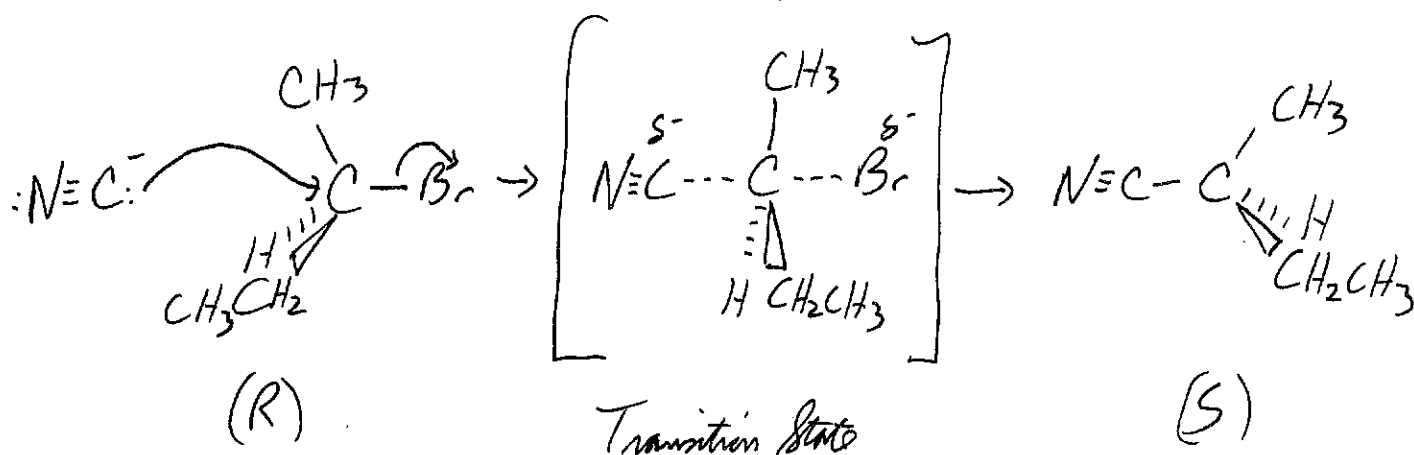


Part III. Mechanisms. (4 points each)

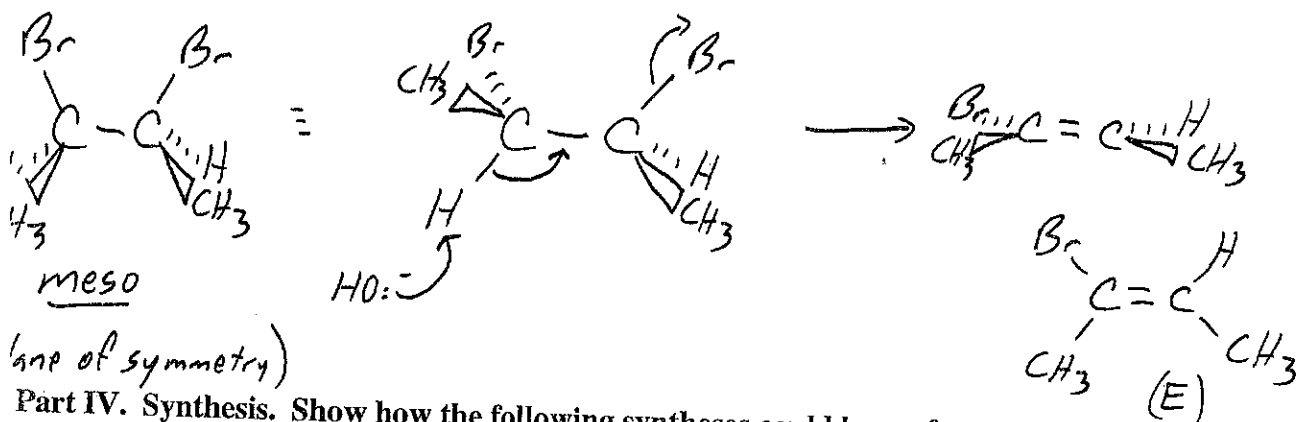
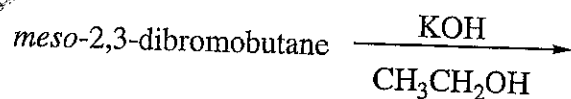
1. Write the complete mechanism for the monochlorination of methane. Include all steps, and provide the appropriate labels for the steps ("initiation", etc.).



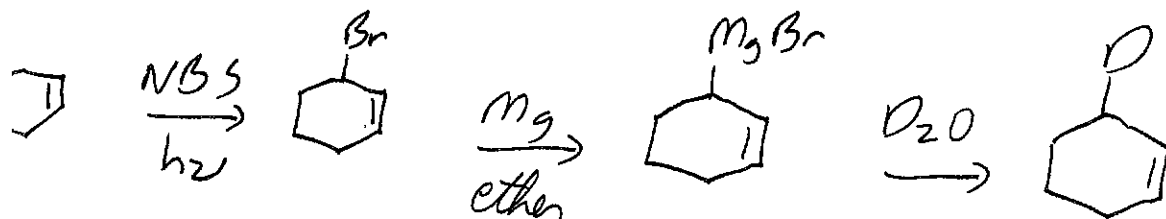
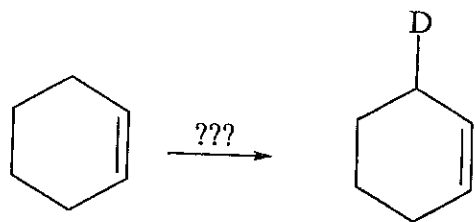
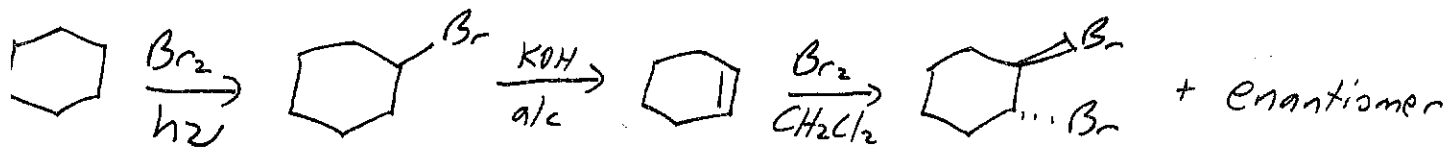
2. Draw the complete mechanism for the reaction of (R)-2-bromobutane with NaCN in DMSO. Use the curved arrow formalism.



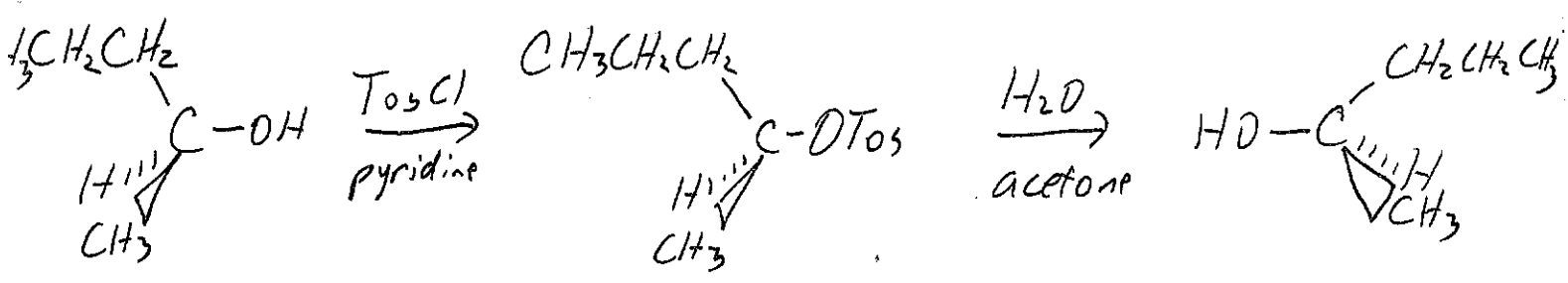
Write the complete mechanism for the following reaction using the curved arrow formalism. (Assume only one equivalent of base reacts.)



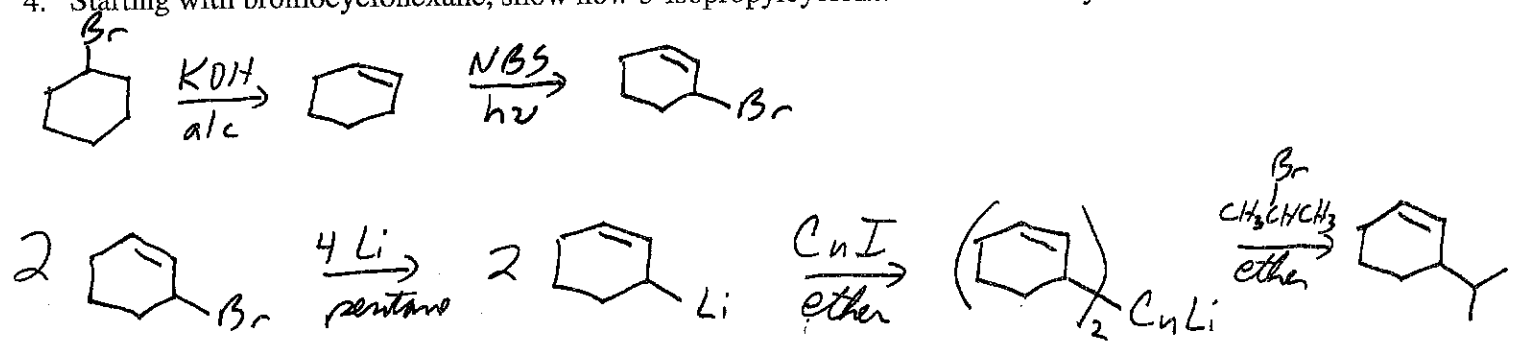
Part IV. Synthesis. Show how the following syntheses could be performed. More than one step may be required. Show all reagents and all intermediate compounds in your synthetic scheme. (4 points each)



How you could convert (S)-2-pentanol to (R)-2-pentanol.

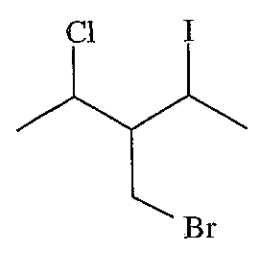


4. Starting with bromocyclohexane, show how 3-isopropylcyclohexene could be synthesized.



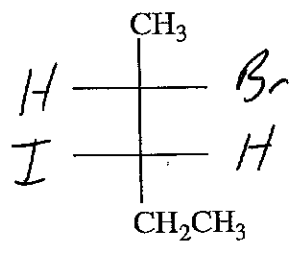
Part V. Short Answer. (4 points each)

1. Give the IUPAC name of the following structure:



3-(bromomethyl)-2-chloro-4-iodopentane

2. Complete the structure of the following compound:



(2S,3S)-2-bromo-3-iodopentane