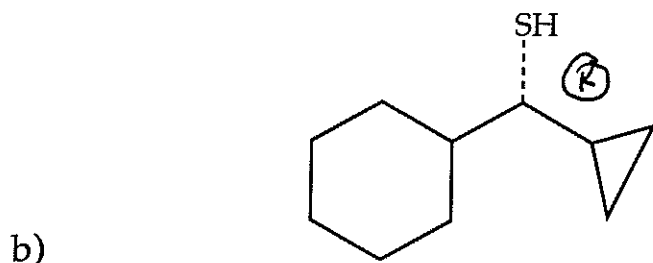
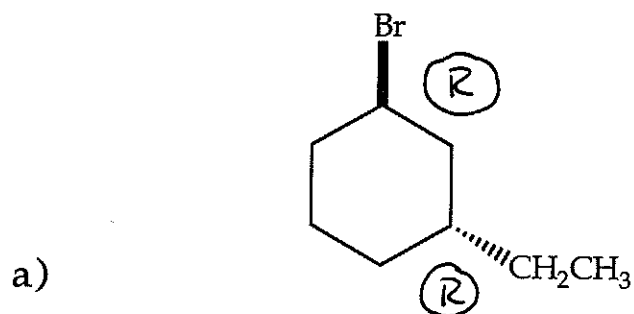


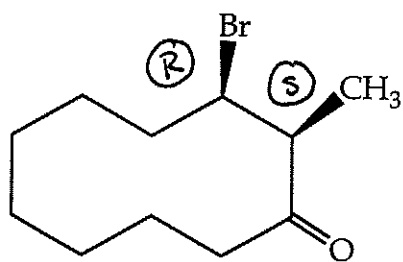
Chemistry 3351-100
Organic Chemistry/Dr. Barney Ellison
Thursday: Oct. 23th @ 7:00pm → 9:00/2nd Exam/Chemistry 142

Name: Key (please print)

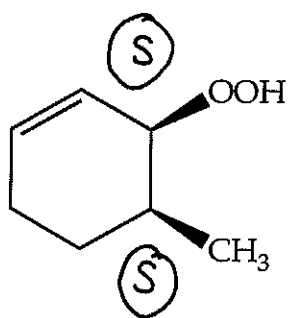
1. (20 pts) For each of the following compounds, assign R or S to each stereocenter.



c)

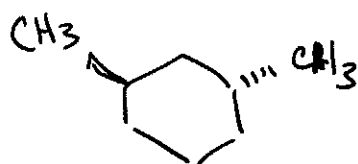


d)

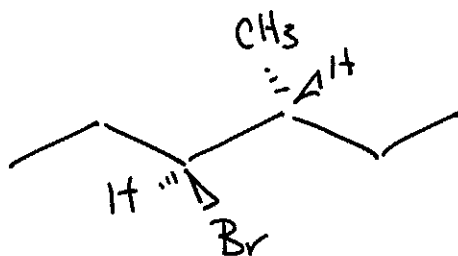


2. (20 pts) Write structures for each of the following compounds

a) (1R, 3R)-1,3-dimethylcyclohexane



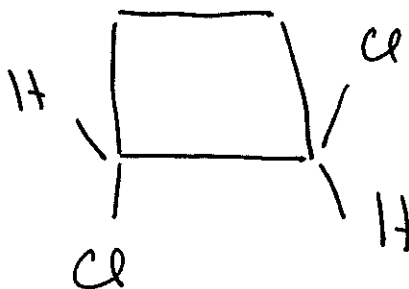
b) (3S, 4R)-3-bromo-4-methylhexane



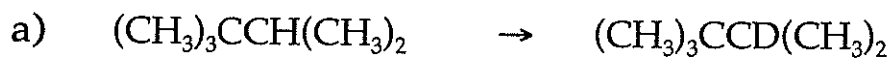
c) the *meso* isomer of 1,3-dimethylcyclopentane



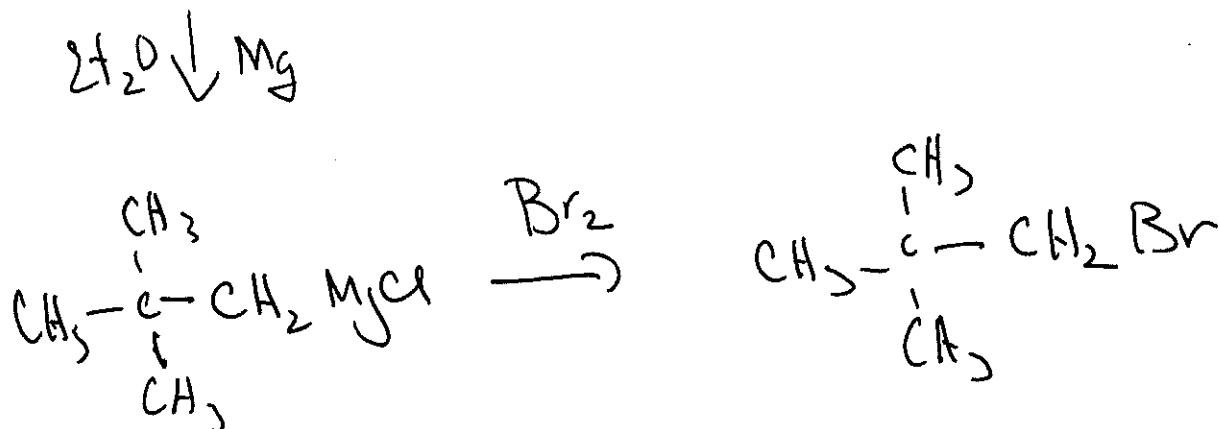
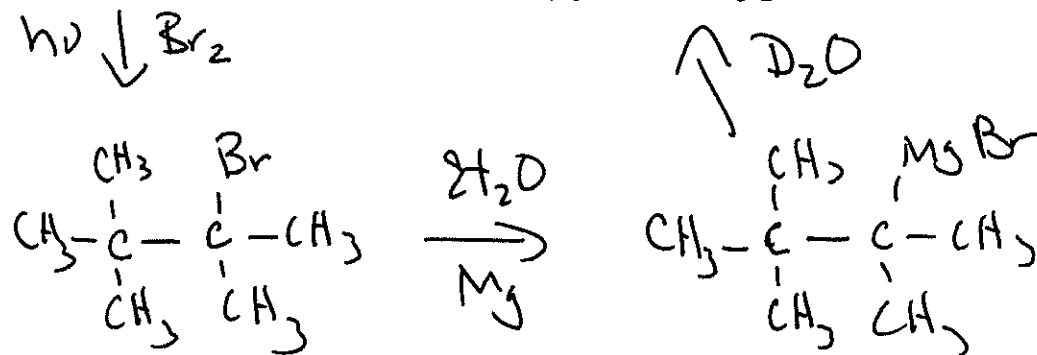
d) an optically active isomer of 1,2-dichlorocyclobutane



3. (10 pts) Show how the following conversions might be accomplished.

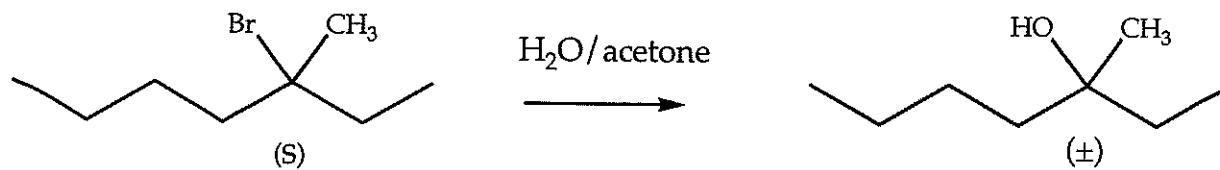


must use
Br₂



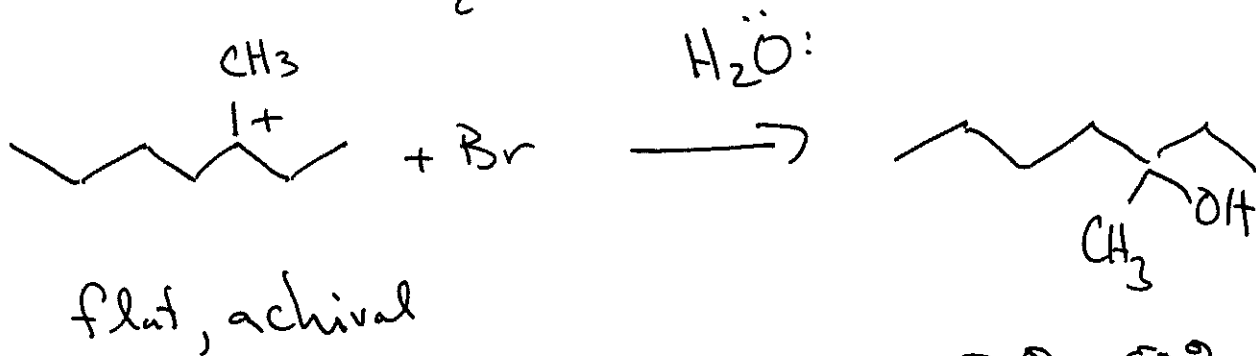
4. (10 pts) Explain the following observations.

a) (S)-3-bromo-3-methylheptane reacts in aqueous acetone to give racemic 3-methyl-3-heptanol.



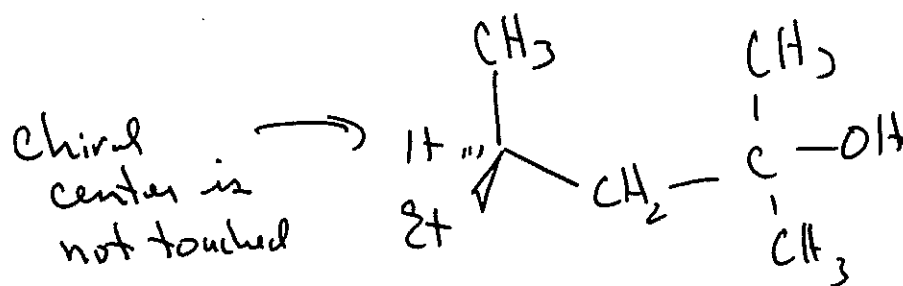
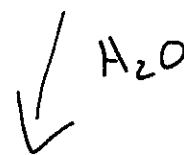
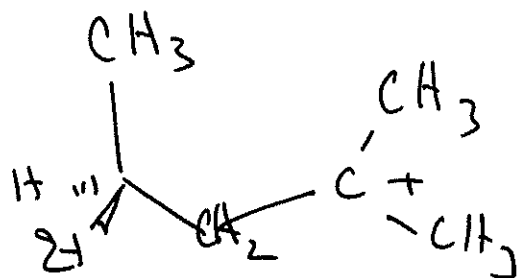
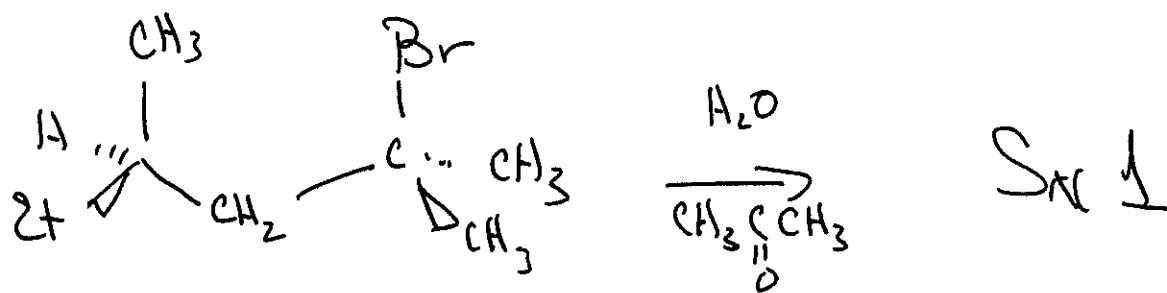
↓ S_N1

~~scribble~~

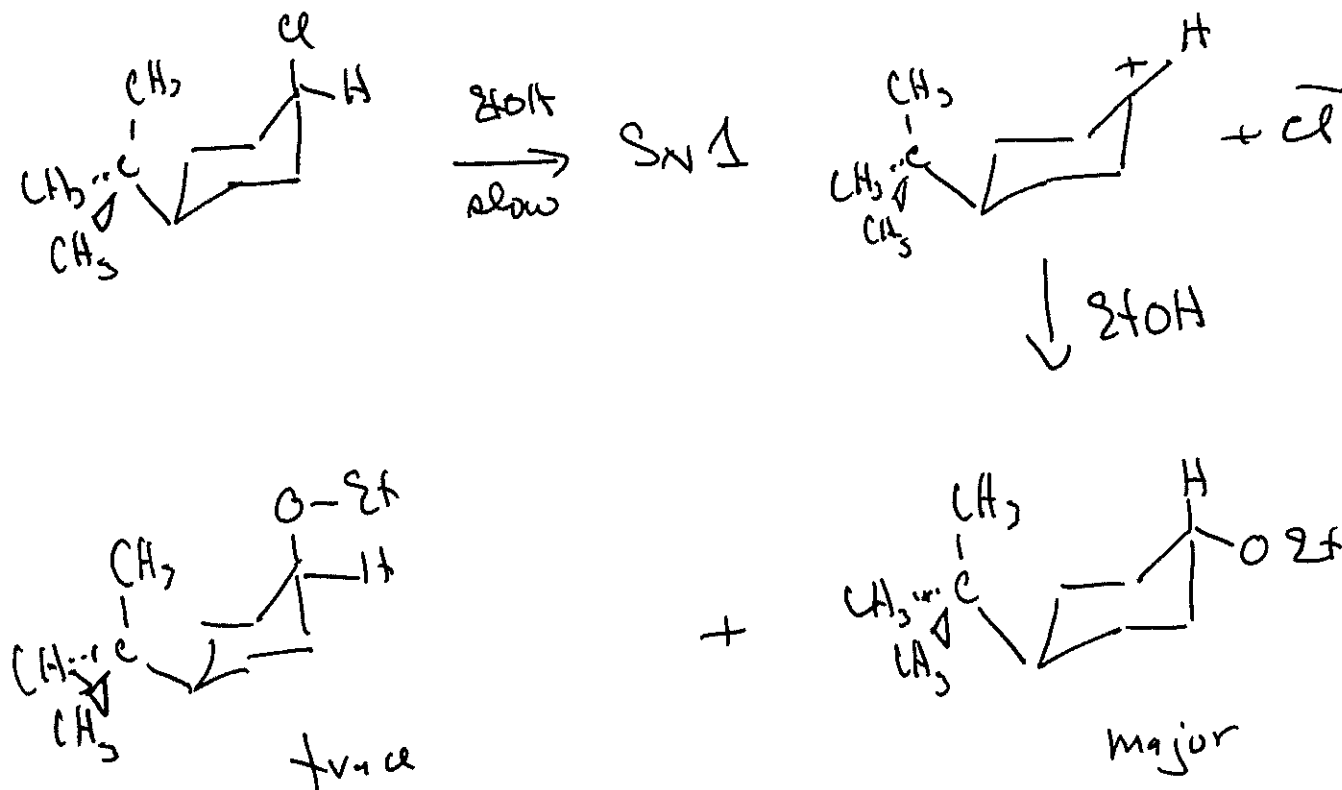


50% : 50%
mixture of both
isomers

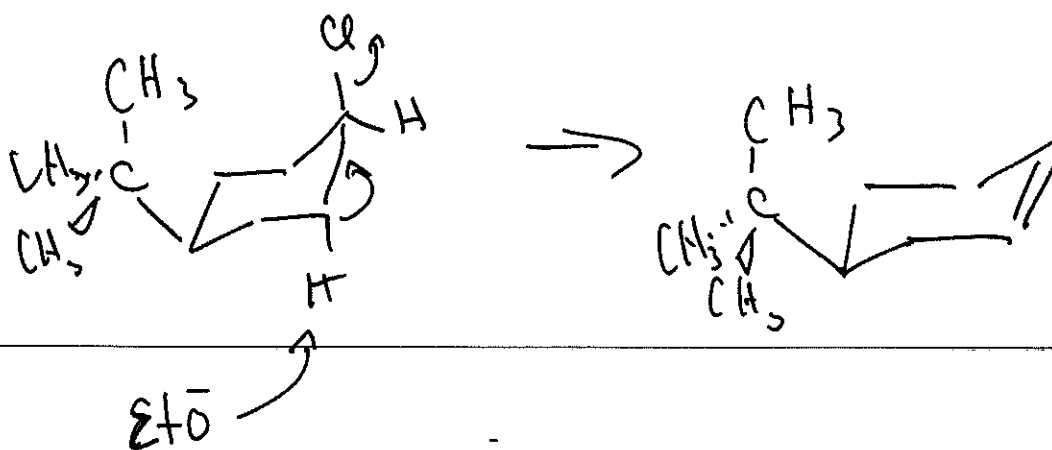
- b) (R)-2-bromo-2,4-dimethylhexane reacts in aqueous acetone to give optically active 2,4-dimethyl-2-hexanol.



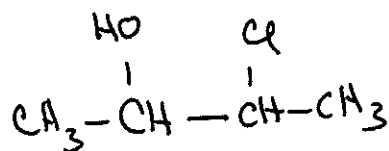
5. (10 pts) When a solution of *cis*-1-*t*-butyl-4-bromocyclohexane in ethanol is refluxed for several hours, the major product is found to be *trans*-1-*t*-butyl-4-ethoxycyclohexane. However if the solution is made 2.0 M in sodium ethoxide, the major product is found to be 4-*t*-butylcyclohexene. Explain.



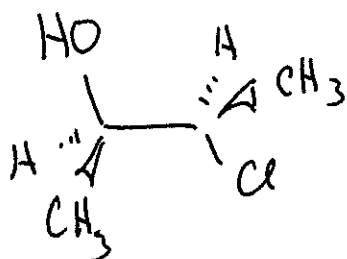
EtO^- is a strong base & eliminates. ~~SN2~~ ~~to~~ ~~product~~.



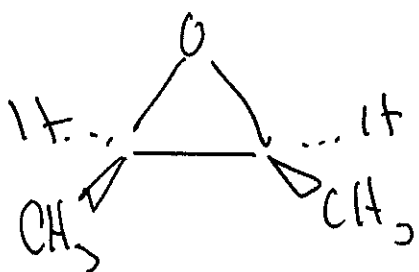
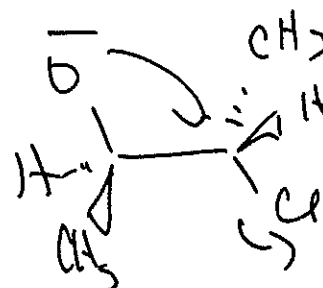
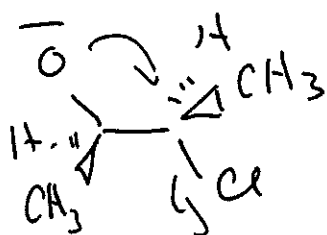
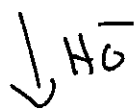
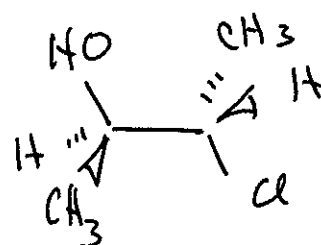
6. (10 pts) Optically active 3-chloro-2-butanol is treated with KOH in CH₃OH to obtain an optically inactive product having the formula C₄H₈O. What is the structure for this material?



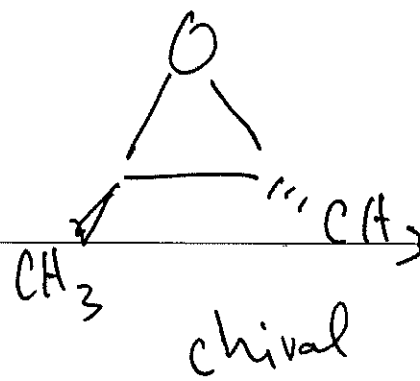
+ 2 Mirror images



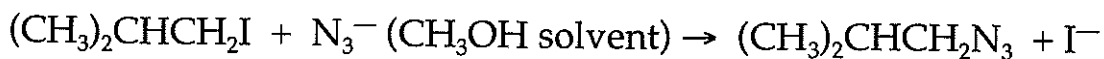
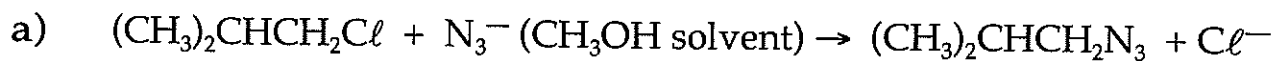
or



meso - a chiral
Correct product.

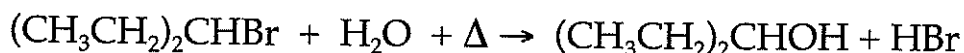
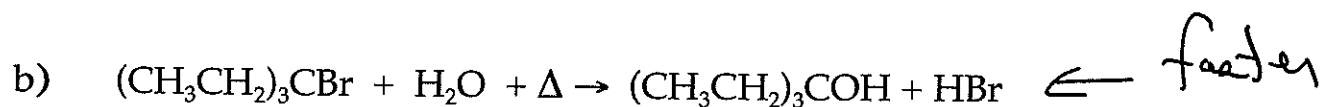


7. (20 pts) In each of the following pairs of reactions, predict which one is faster and explain why.

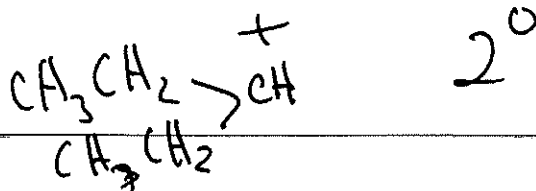
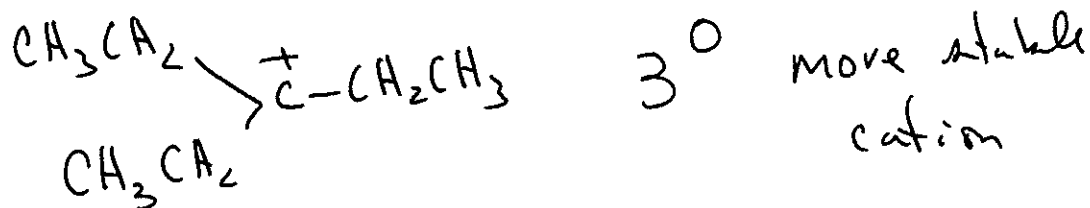


faster \rightarrow

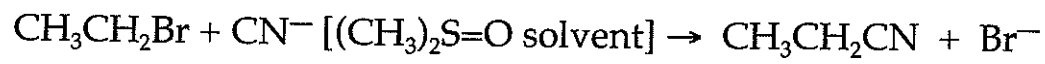
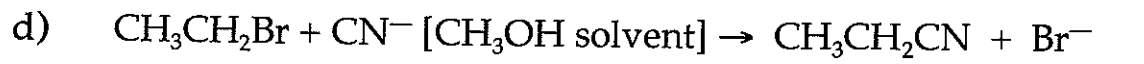
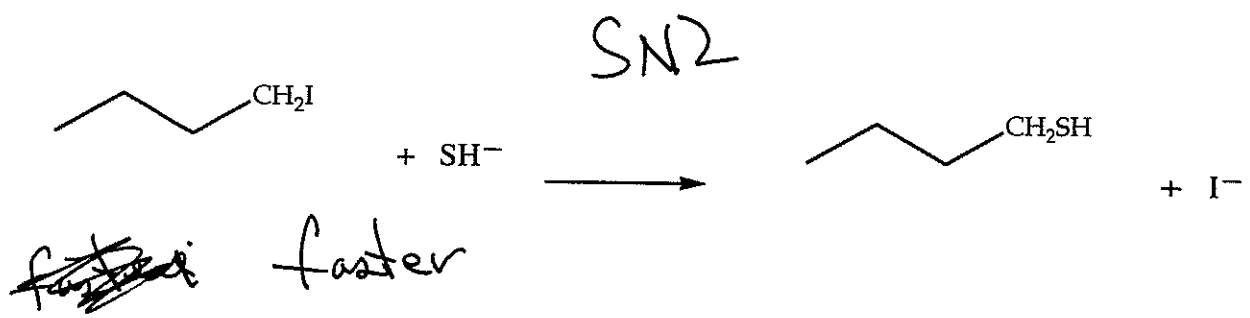
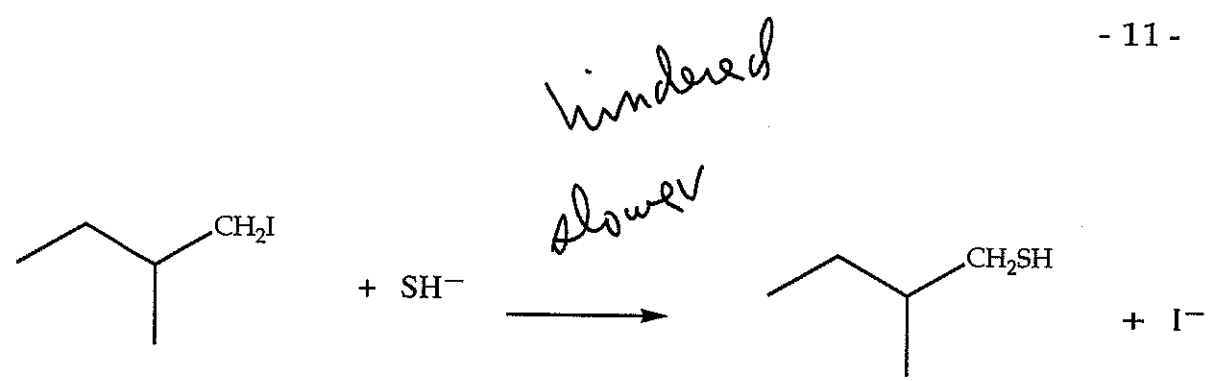
I^- is a better leaving group



Both are $\text{S}_\text{N}1$ rxn's



c)



DMSO rx is faster

CN⁻ is H-bonded in MeOH but not complexed in

