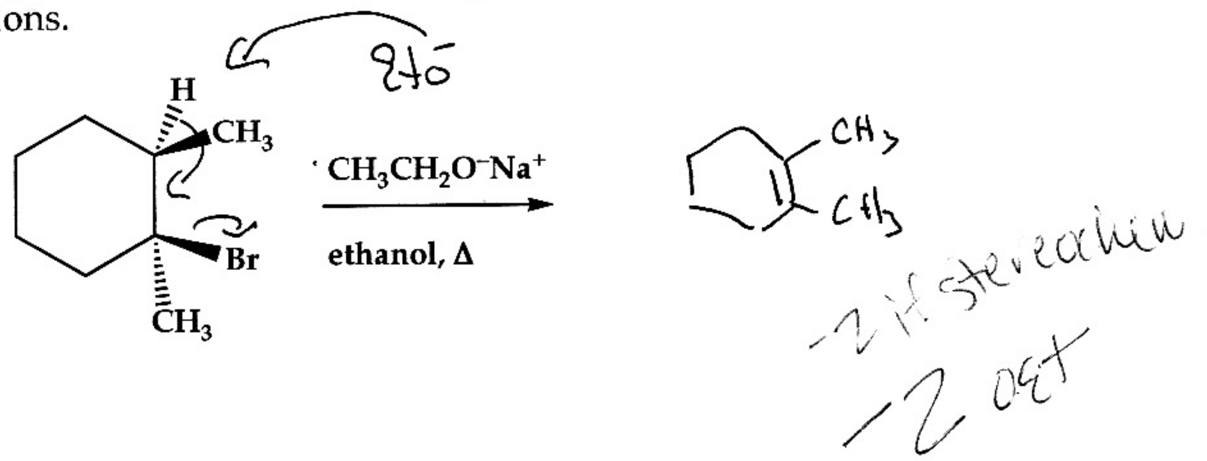
Chemistry 3311-100
Organic Chemistry / Dr. Barney Ellison
Thursday: Mar. 13th @ **7:00pm → 9:00** / 2nd Exam / Math 100

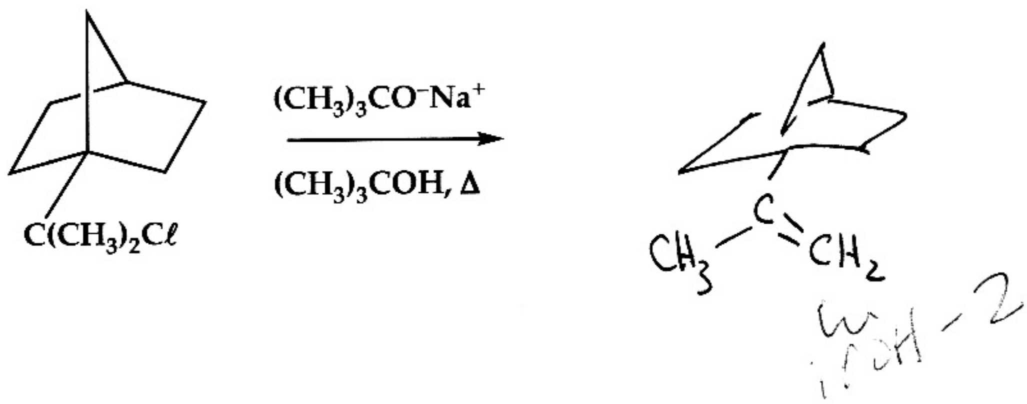
Name: Key (please print)

1. (20 pts) Predict the major organic product of each of the following reactions.

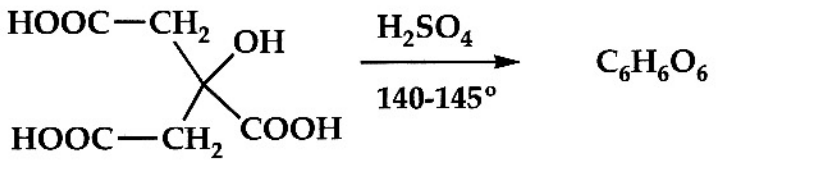
a)

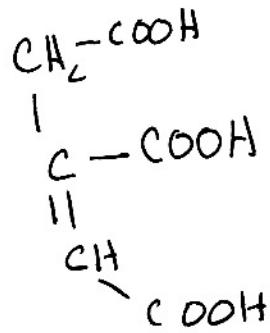


b)

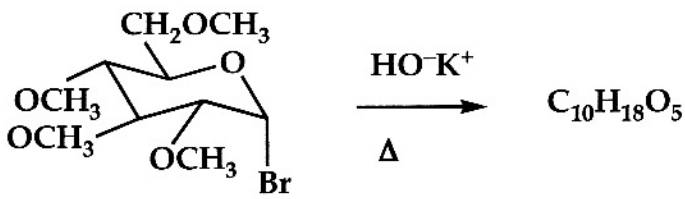


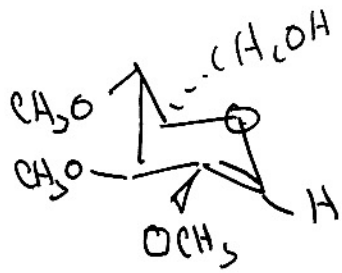
c)


HOOC—CH2
OH
HOOC—CH2
COOH
H2SO4
140-145°
C6H6O6

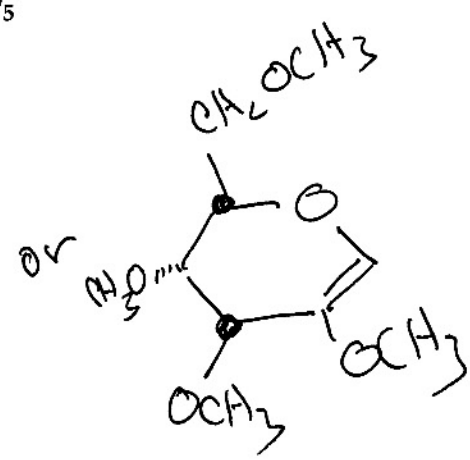


d)


CH2OCH3
O
OCH3
OCH3
OCH3
Br
HO⁻K⁺
Δ
C10H18O5

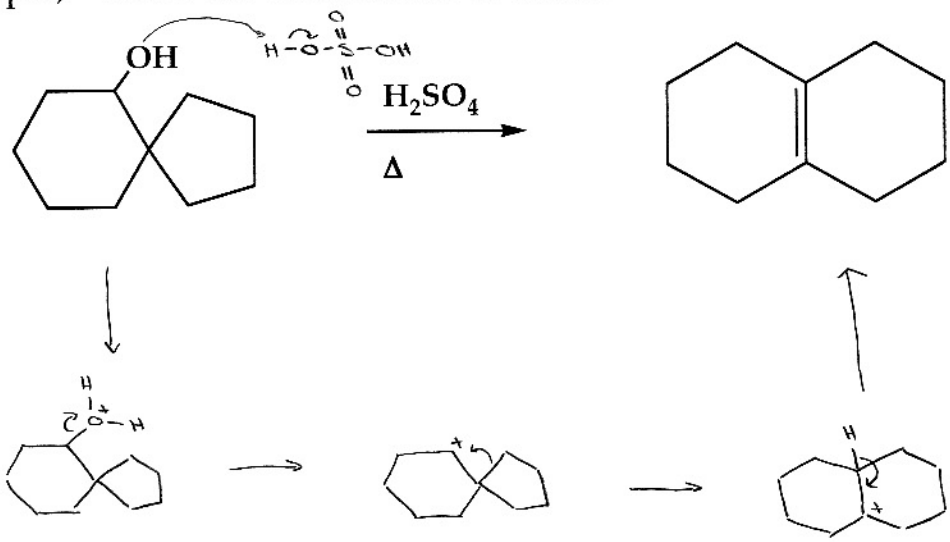


or

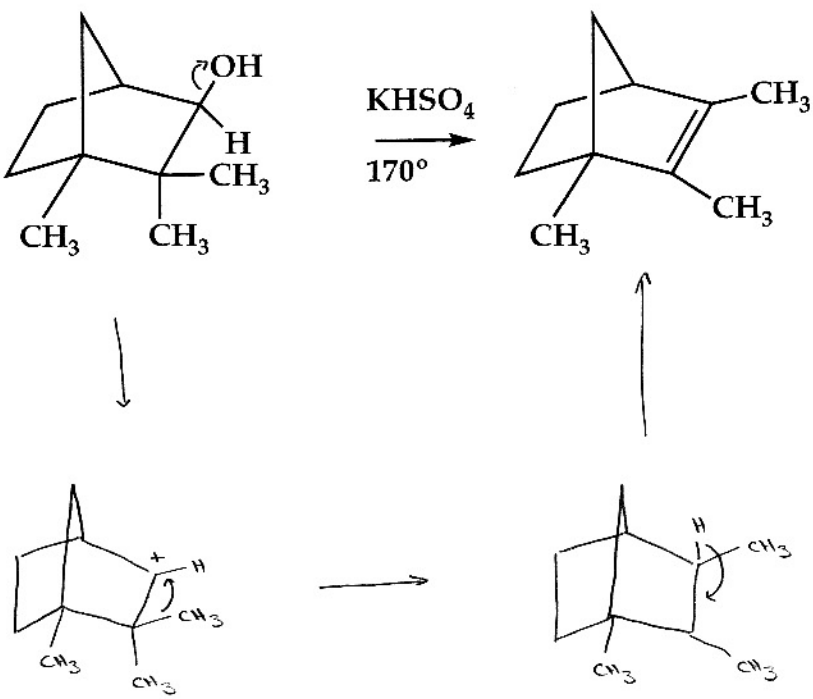


2. (10 pts) Show the mechanism of the reaction.

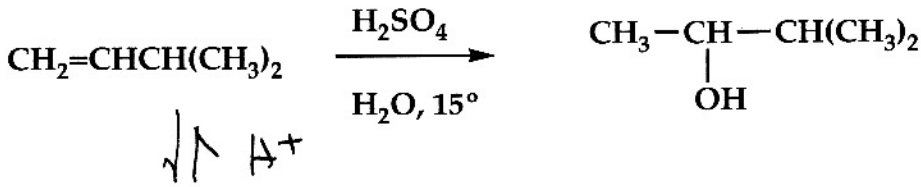
a)

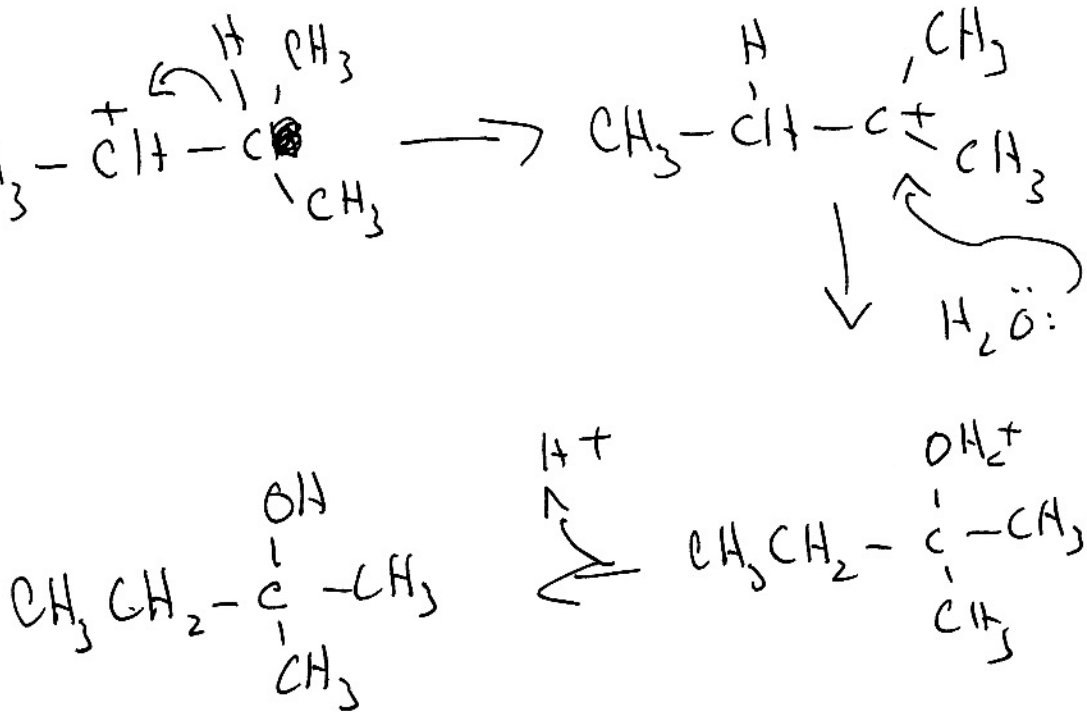


b)



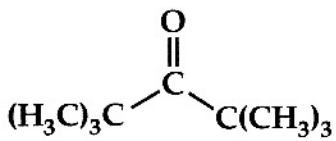
3. (10 pts) In the following acid-catalyzed hydration, can you suggest a reason that the reaction would probably *not* be a good method for the synthesis of 3-methyl-2-butanol?



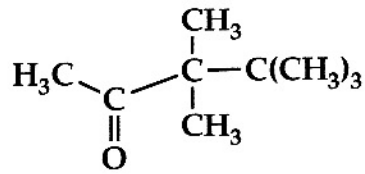


Cation rearranges from 2° → 3°

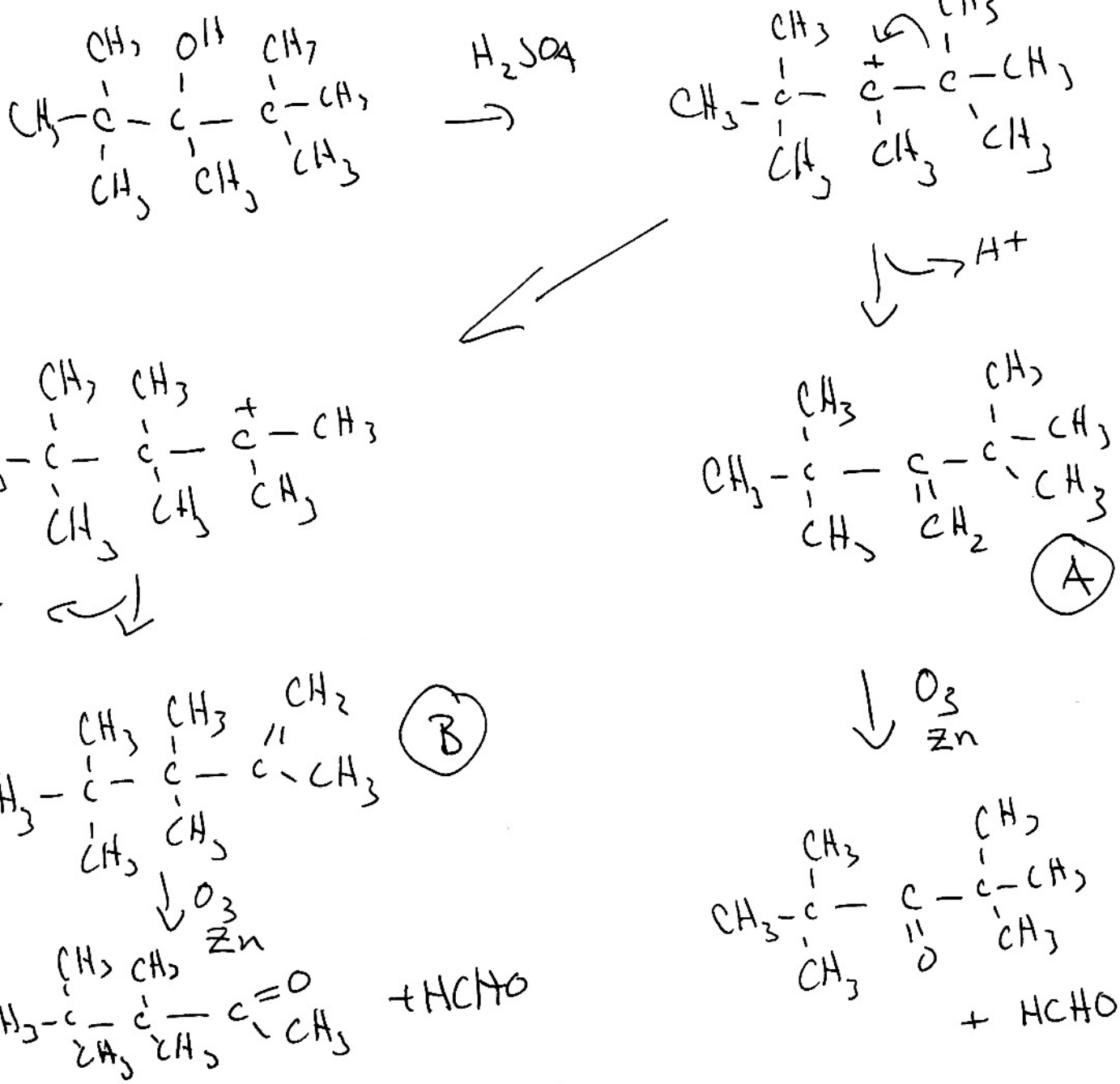
4. (10 pts) Dehydration of $(CH_3)_3C\text{-}C(OH)(CH_3)\text{-}C(CH_3)_3$ gave two alkenes, A and B. Ozonolysis of the lower boiling alkene A gave HCHO and 2,2,4,4-tetramethyl-2-pentanone. Ozonolysis of B gave HCHO and 3,3,4,4-tetramethyl-2-pentanone. Identify A and B.



2,2,4,4-tetramethyl-3-pentanone

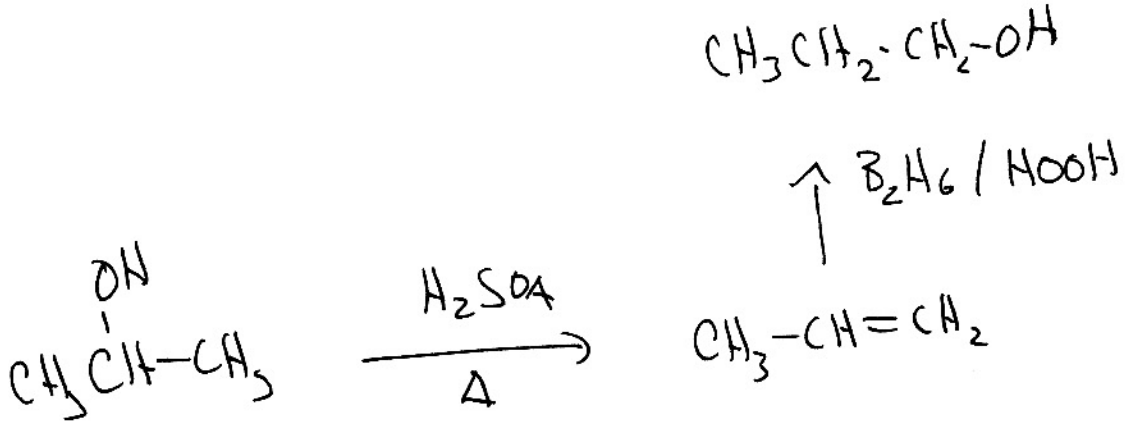


3,3,4,4-tetrametyl-2-pentanone

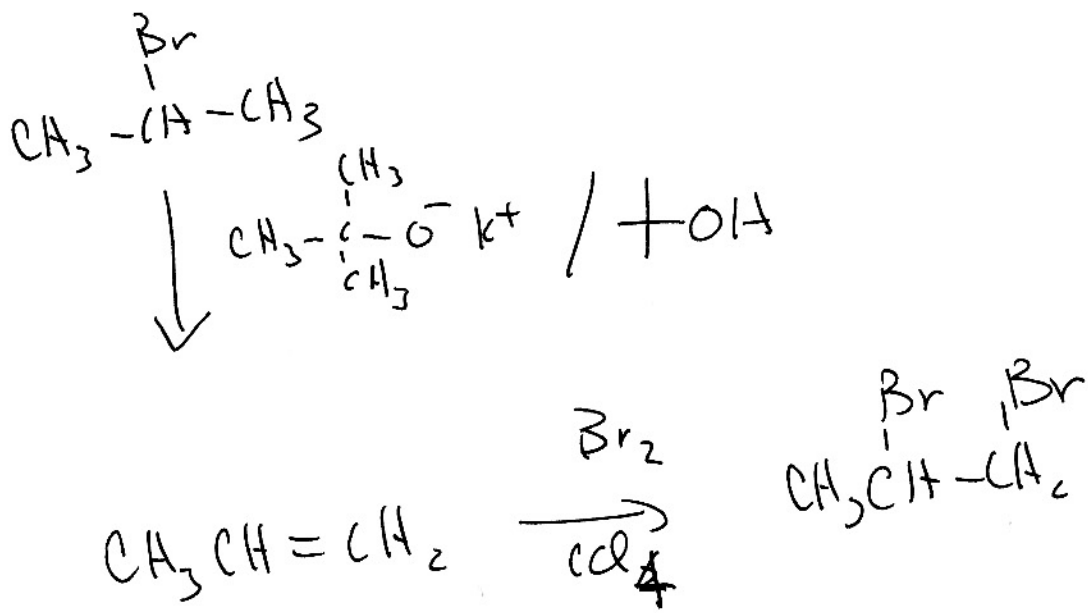


5. (20 pts) Suggest a sequence of reactions for preparing each of the following compounds from the indicated starting materials.

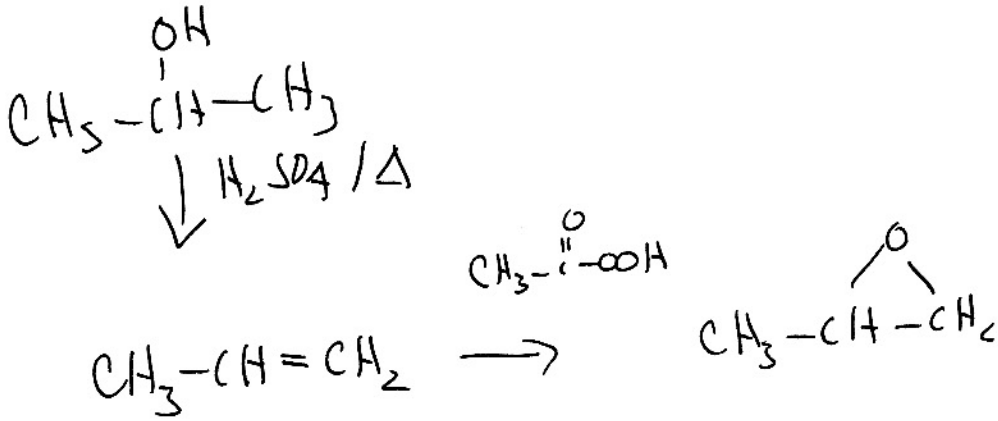
a) 1-propanol from 2-propanol



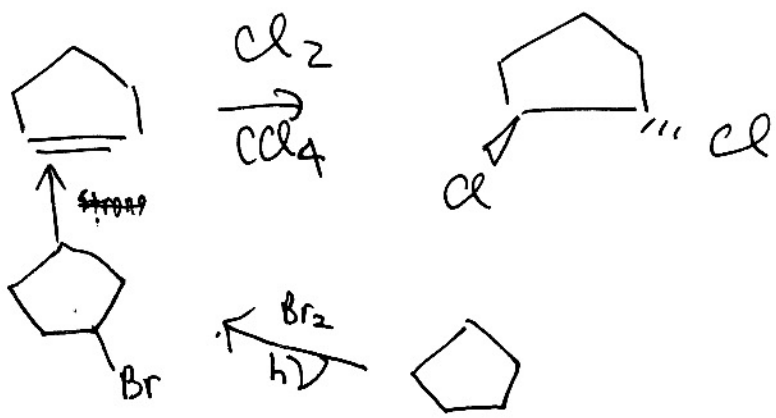
b) 1,2-dibromopropane from 2-bromopropane



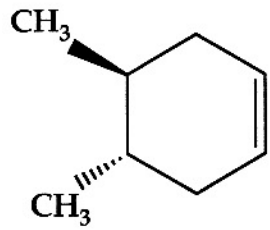
c) 1,2-epoxypropane from 2-propanol



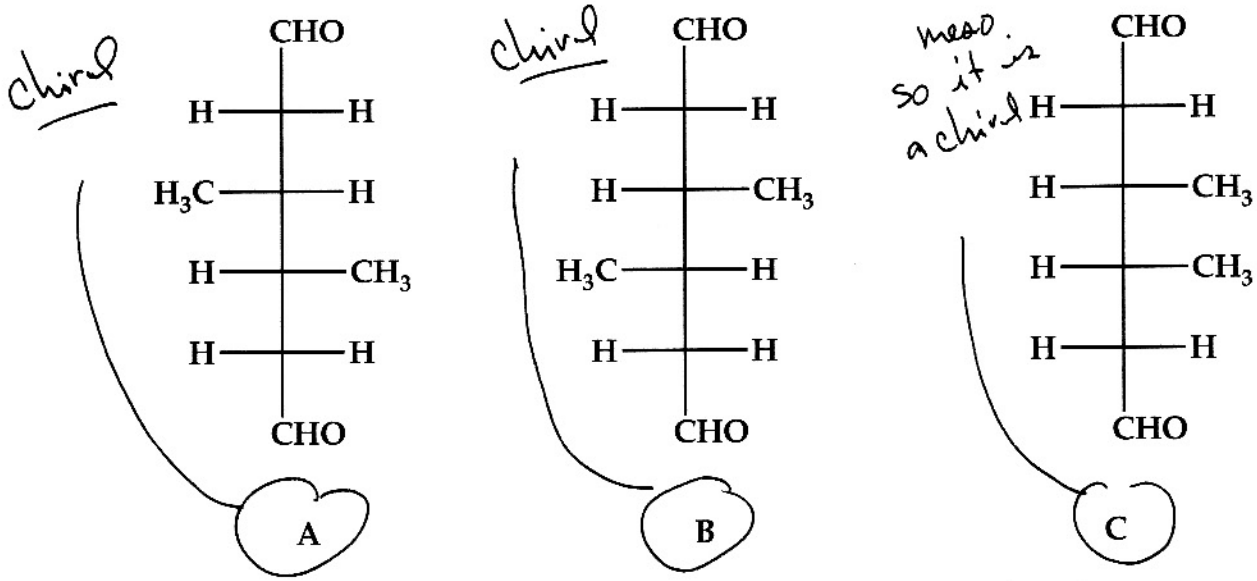
d) *trans*-1,2-dichlorocyclopentane from cyclopentane



6. (12 pts) Consider the ozonolysis of *trans*-4,5-dimethylcyclohexene.



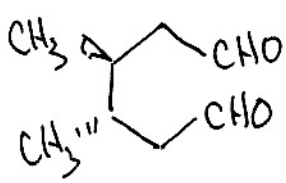
Structures A, B, and C are 3 stereoisomeric forms of the reaction product.



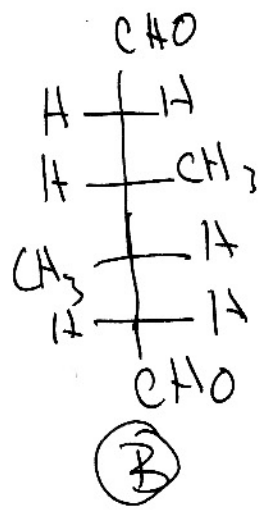
a) Which, if any, of the compounds A, B, and C are chiral?

b) What product is formed in the reaction?

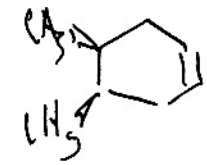
c) What product would be formed if the methyl groups were *cis* to each other in the starting material"

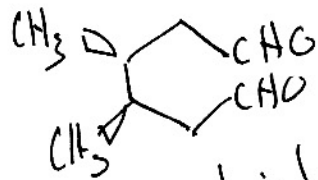


which is



B

if  is oxidized

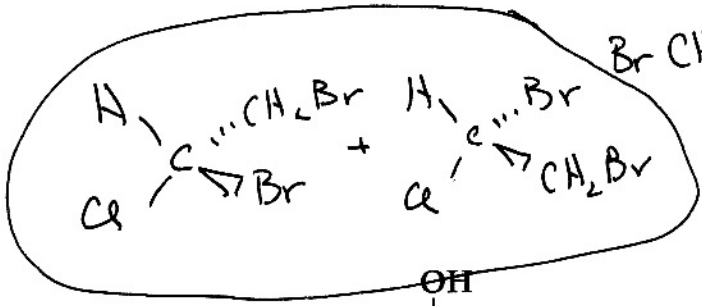


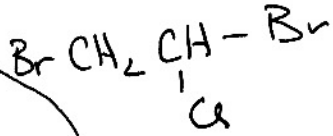
which is

C

7. (12 pts) Each of the following reactions gives a mixture of two stereoisomers. Write their structures.

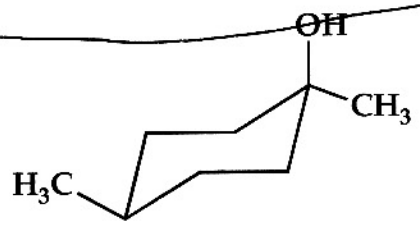
a) $BrCH_2CH_2Br + C\ell_2 + \Delta \rightarrow C_2H_3Br_2C\ell + HC\ell$

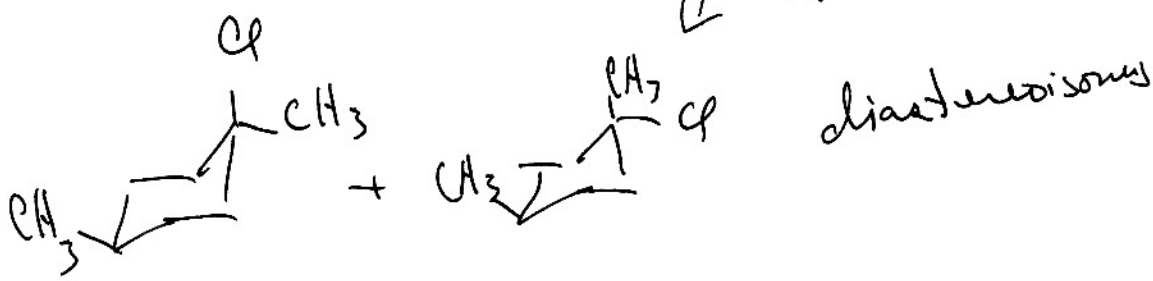




enantiomers

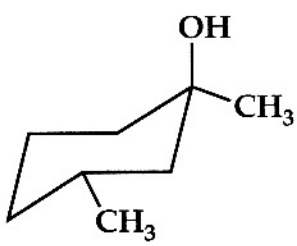
b)

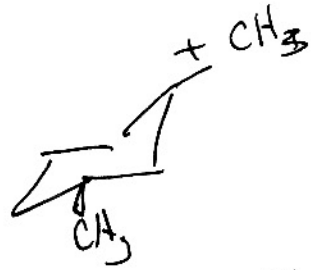


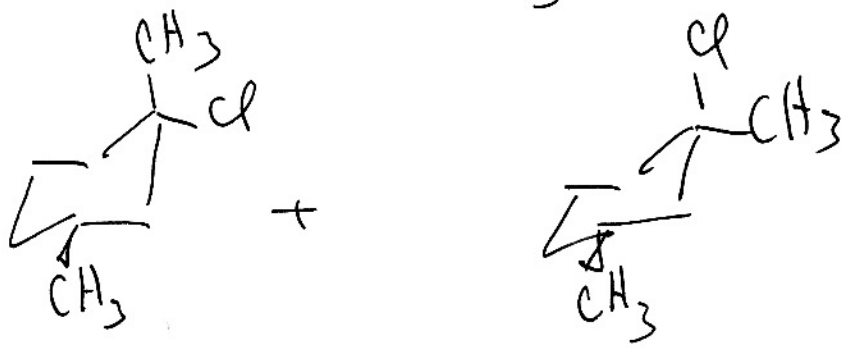


diastereoisomers

c)

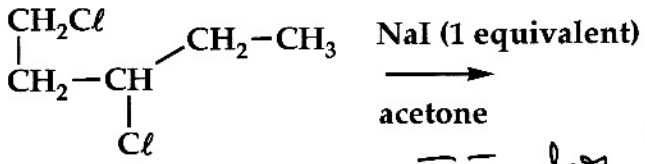




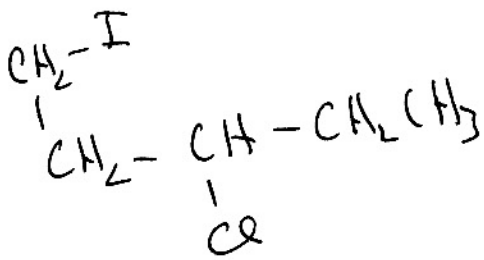


diastereisomers

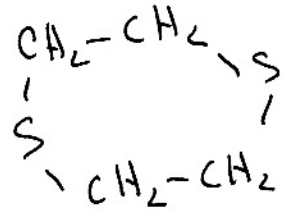
8. (6 pts) Identify the product in each of the following reactions:

a) 

I^- does S_N2 on least hindered Cl.



b) $BrCH_2CH_2Br + NaSCH_2CH_2SNa \rightarrow C_4H_8C\ell\text{-}I$ ~~$C_4H_8S_2$~~



c) $ClCH_2CH_2CH_2CH_2Cl + Na_2S \rightarrow C_4H_8S$