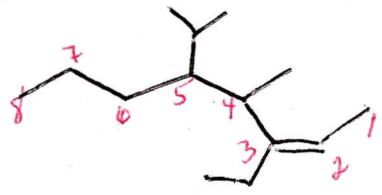
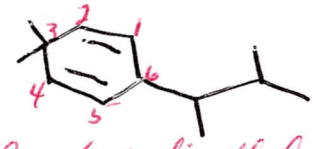
NAME KEY

ORGANIC EXAM #4 (CH 7-9) FALL 2009

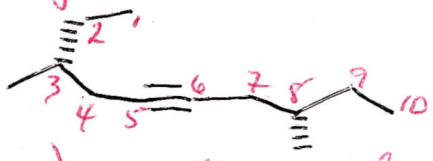
(12) 1. Give the IUPAC name for each of the following.



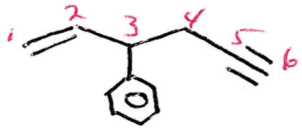
3-ethyl-5-isopropyl-4-methyloct-(2Z)-ene



3,3-dimethyl-6-(1,2-dimethylpropyl) cyclohexa-1,4-diene

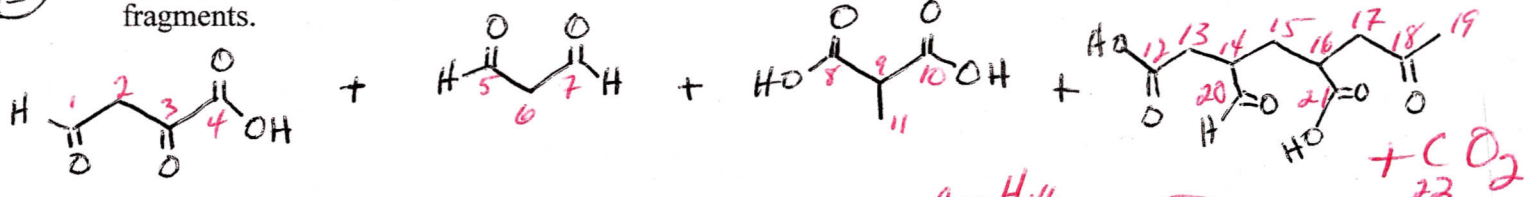


(3R,8S)-3,8-dimethyldec-5-yne



3-phenylhex-1-en-5-yne

(13) 2. Compound A has the formula $C_{22}H_{24}$. It gives a positive test with silver nitrate. Upon catalytic hydrogenation a compound with the formula $C_{22}H_{42}$ is formed. Ozonolysis yields the following fragments.



+ CO_2

a. What is compound A's index of hydrogen deficiency? $C_{22}H_{46} - C_{22}H_{24} / 2 = 11$

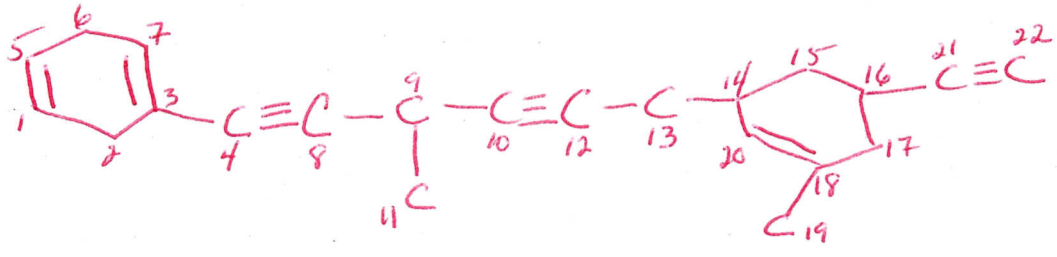
b. How many double bonds are present in compound A? 6 ald/ket so 3 IHD = 3

c. How many triple bonds are present in compound A? 5 acids + CO_2 so 3 = IHD = 6

d. How many rings are present in compound A? 2

e. Suggest what you think is the most likely structure for compound A. Match each carbon in the fragments to the carbons in the final structure by numbering them.

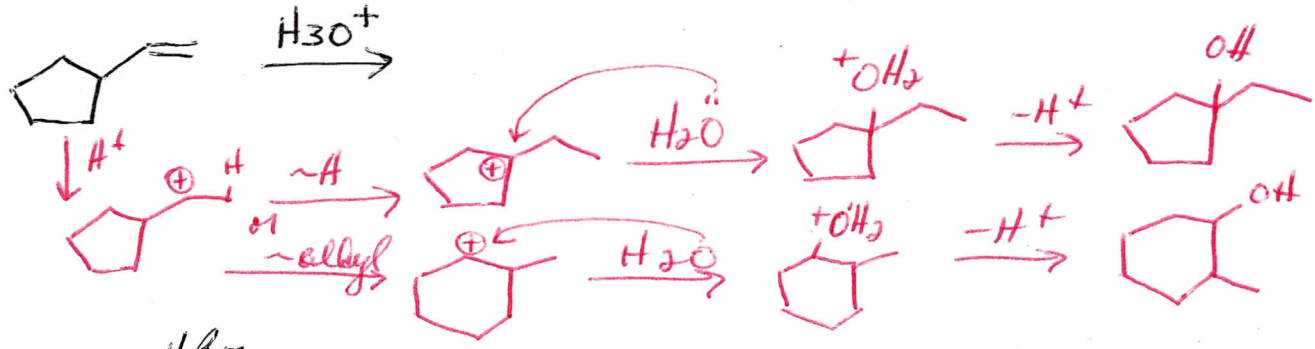
+ silver nitrate = terminal C≡C so CO_2 lost during ozonolysis.



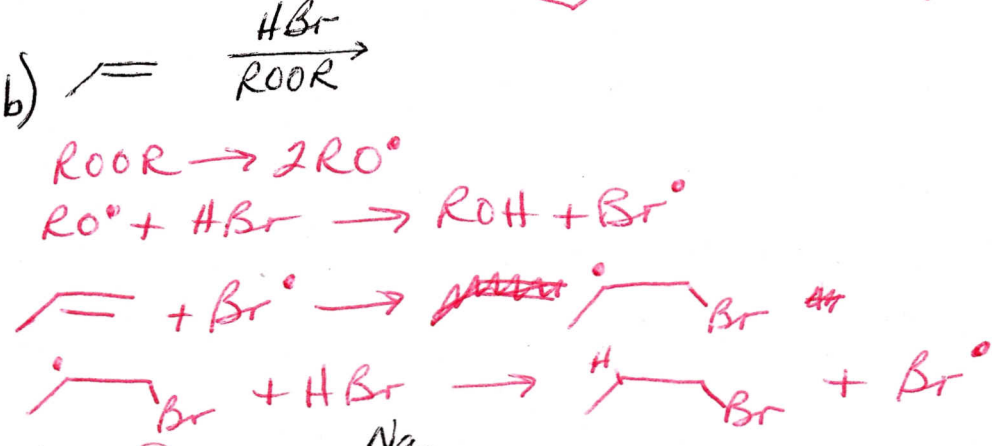
(12)

3. Give step-by-step mechanisms for **three** of the following reactions. If you do all four I will grade the three that are most correct.

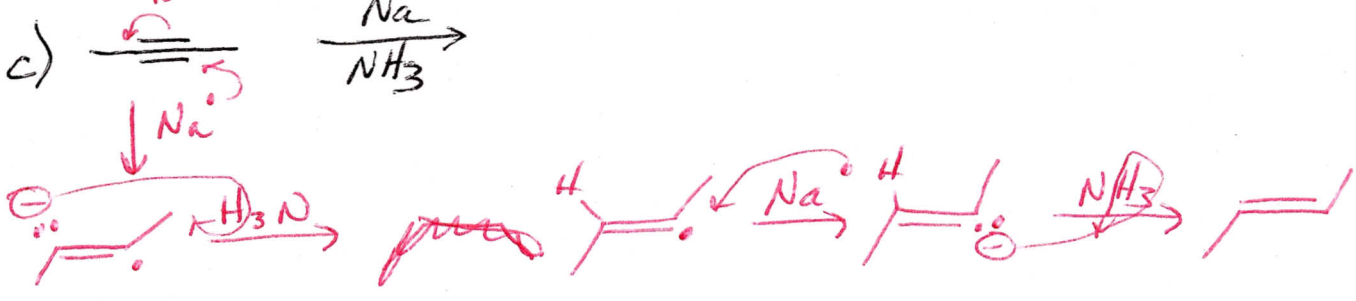
a)



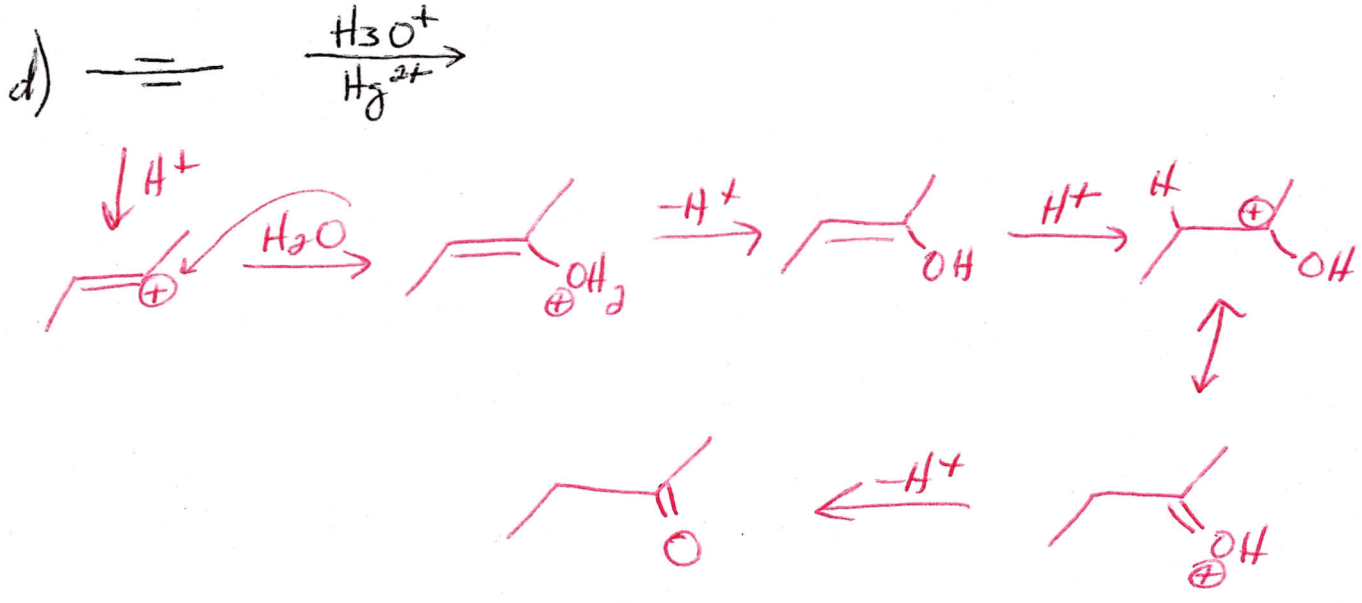
b)



c)

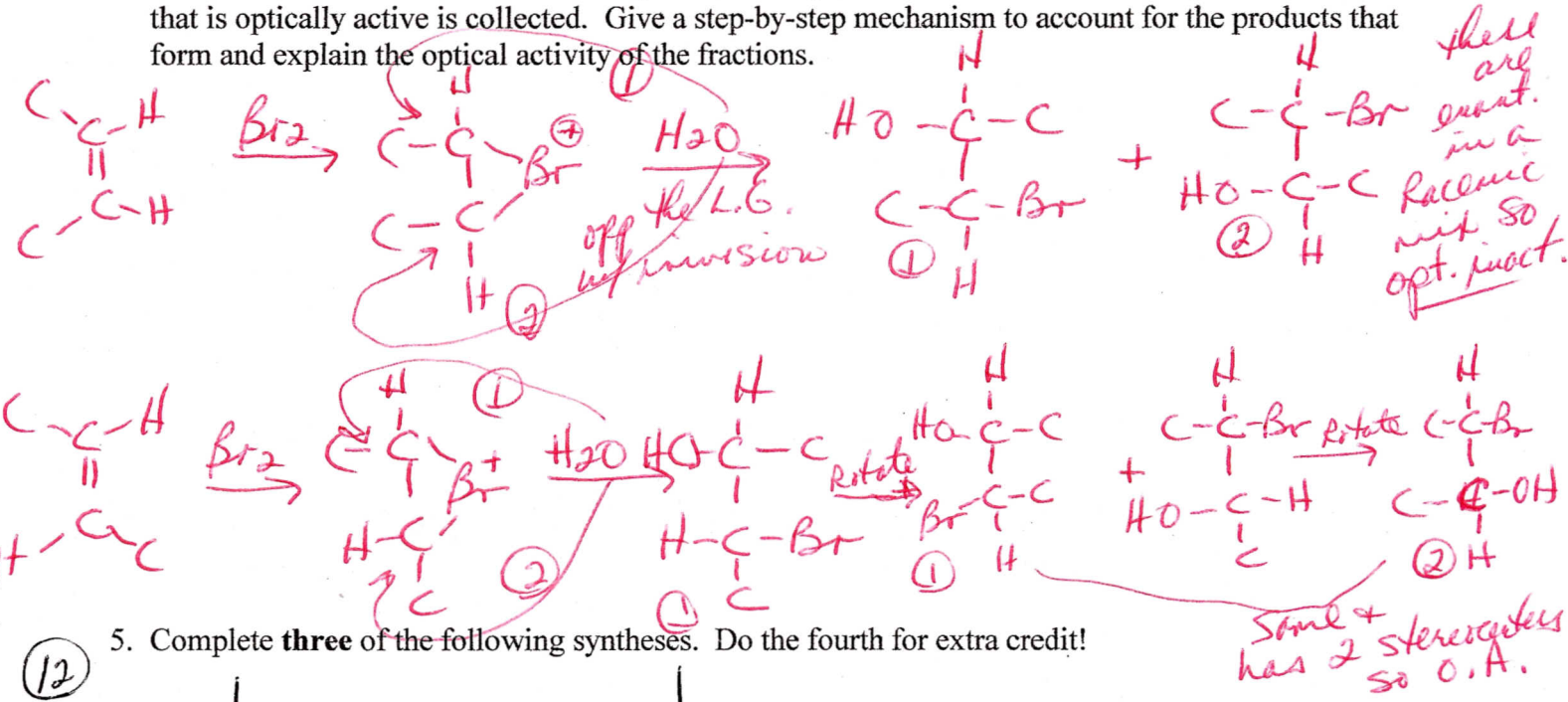


d)



(8)

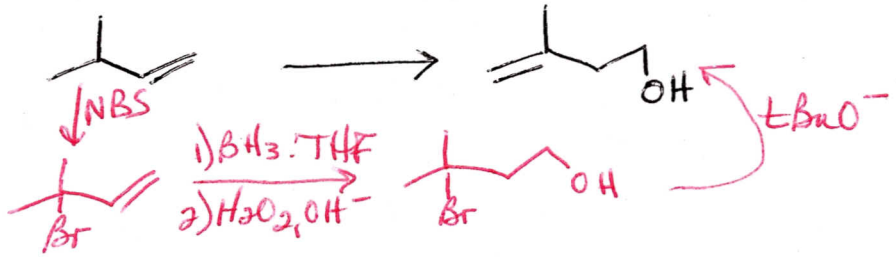
4. When cis-2-butene is reacted with bromine in water and the product is subjected to fractional distillation, one fraction is collected which is not optically active. However, if trans-2-butene is reacted with bromine in water and the product is subjected to fractional distillation, one fraction that is optically active is collected. Give a step-by-step mechanism to account for the products that form and explain the optical activity of the fractions.



(12)

5. Complete **three** of the following syntheses. Do the fourth for extra credit!

a)



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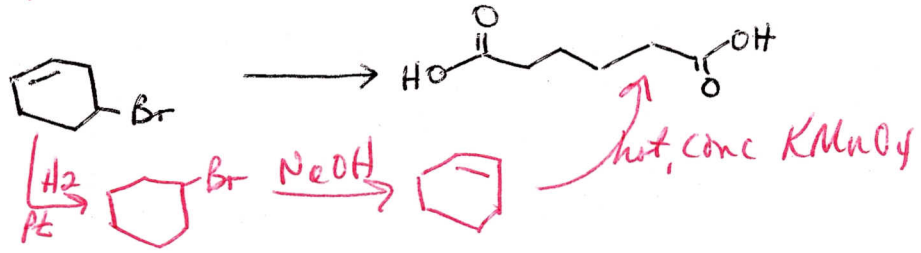
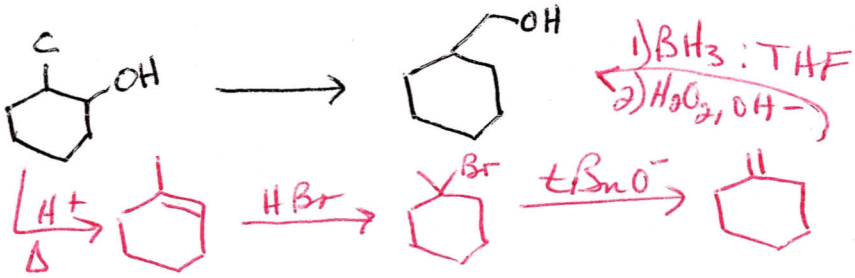
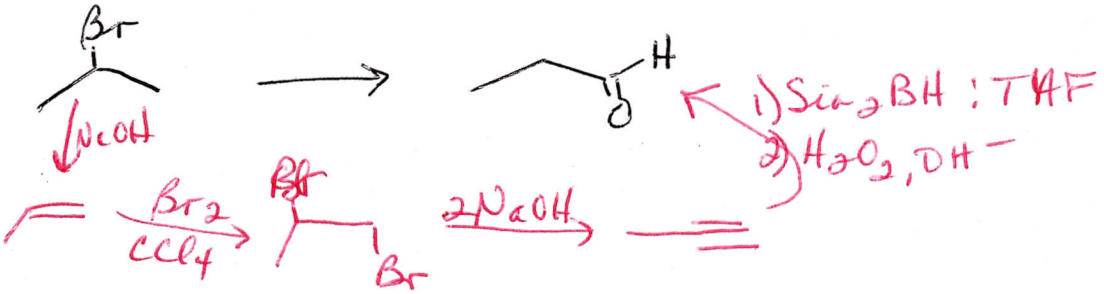


c)



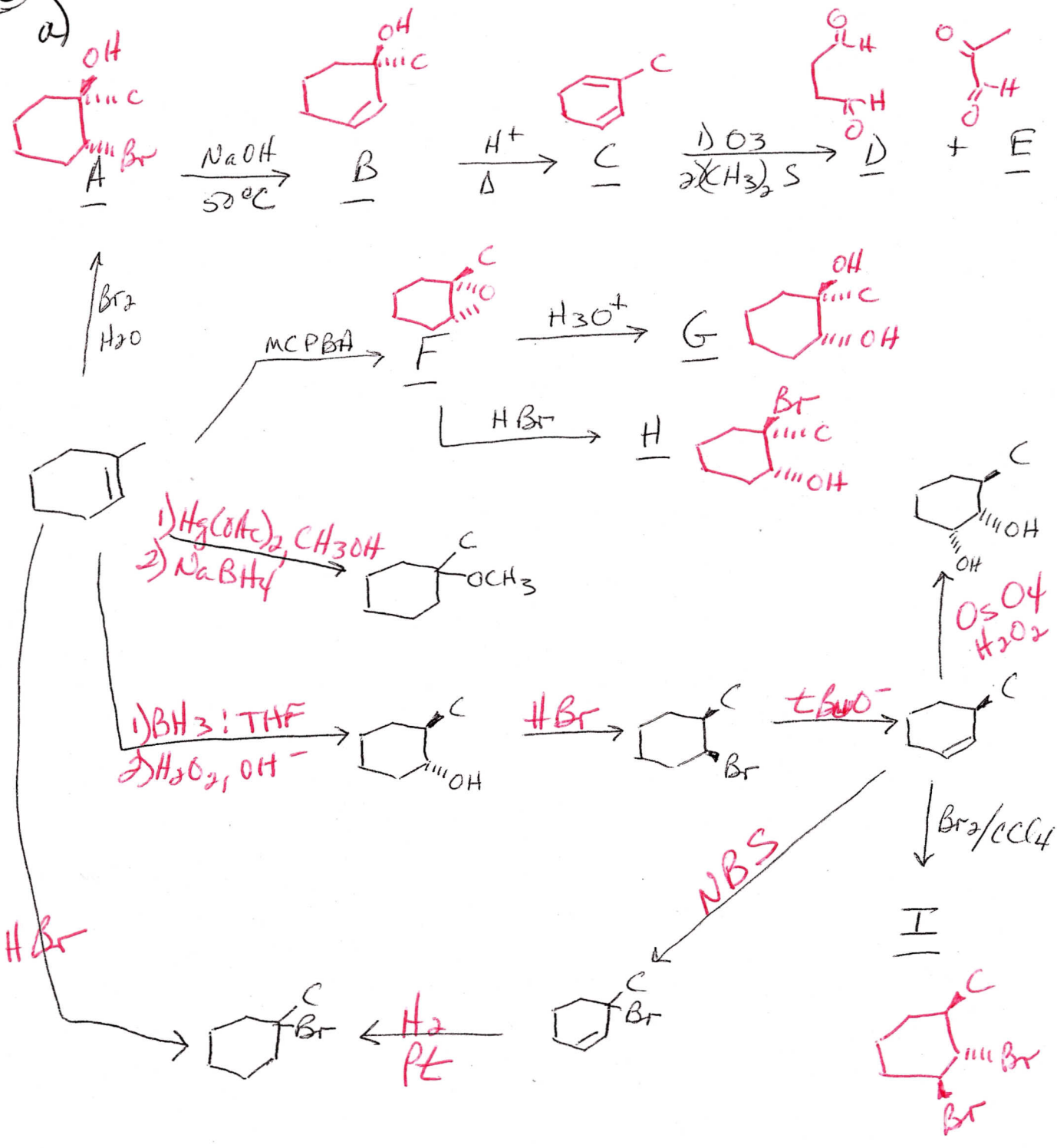
d)



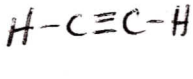
6. Complete the following reactions by providing either the necessary reagents or the products. **Show stereochemistry** where necessary.

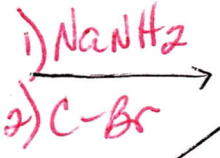
(25)

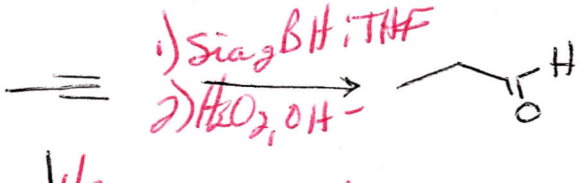
a)

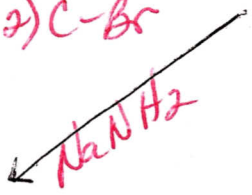


(18)

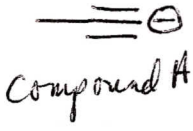
b) 


1) NaNH2
2) C-Br


1) Sia2BH ; THF
2) H2O2, OH-
H
O

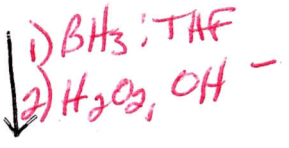

NaNH2

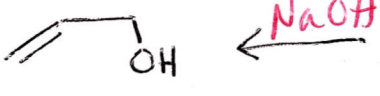

H2
Lindlar's catalyst

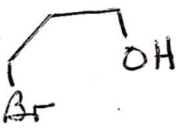

Compound A

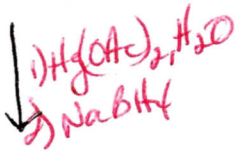

NBS
Br

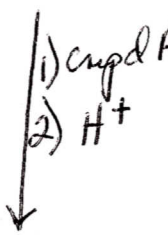

MCPBA


1) BH3 ; THF
2) H2O2, OH-

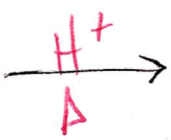

NaOH
OH

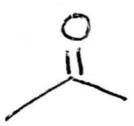

Br
OH


1) Hg(OAc)2, H2O
2) NaBH4

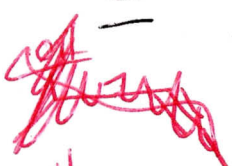

1) cmpd A
2) H+

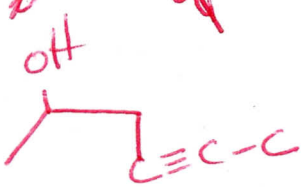

HO
OH

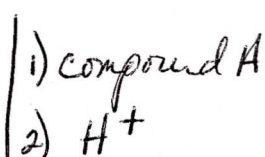

H+
Δ


O

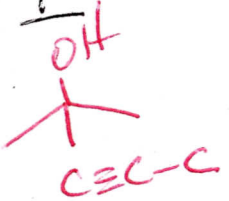
C




OH
C≡C-C


1) compound A
2) H+

β


OH
C≡C-C