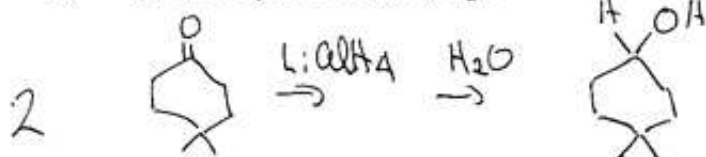


Chemistry 3371-100
Organic Chemistry / Dr. Barney Ellison
Thursday: Feb. 16th @ 7:00pm → 9:00 / 1st Exam / Chem 142

Name: Key (please print)

1. (10 pts) What is the product of the reaction of 4, 4-dimethylcyclohexanone with:

a) (i) LiAlH_4 in ether; (ii) H_2O

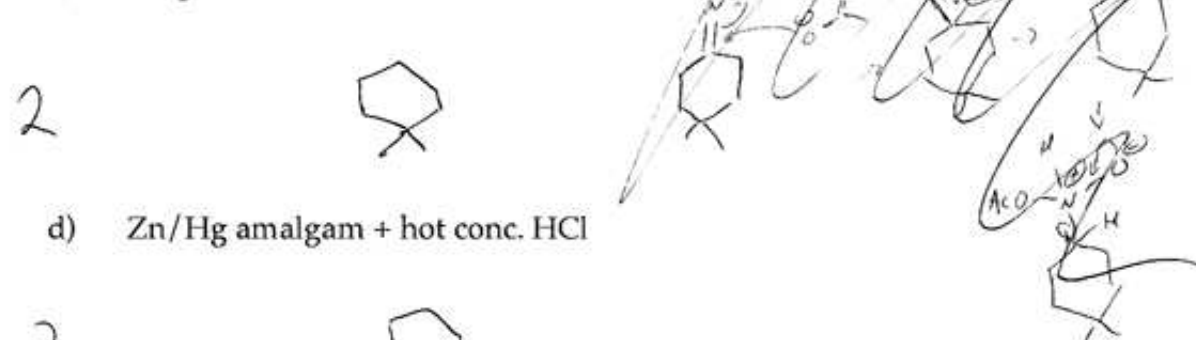


High - 100
Low - 39
Avg. - 66

b) KCN and $\text{H}_2\text{SO}_4 / \text{H}_2\text{O}$



c) NH_2OH + sodium acetate in acetic acid



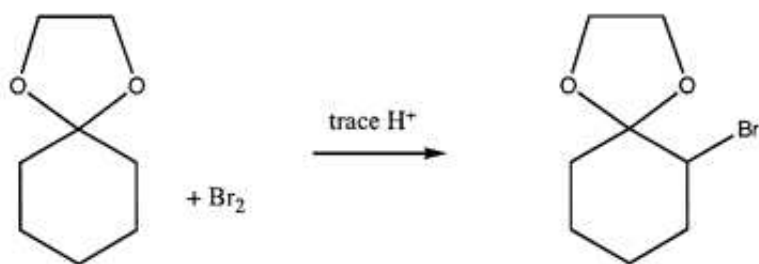
d) Zn/Hg amalgam + hot conc. HCl



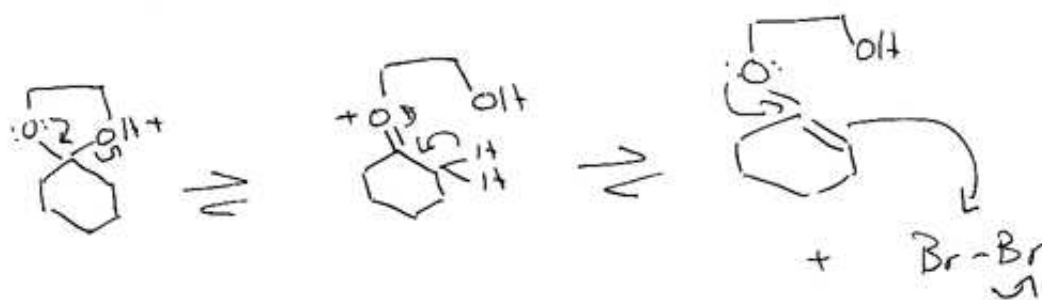
e) $\text{Ph}_3\text{P}=\text{CHCH}_2\text{CH}_3$



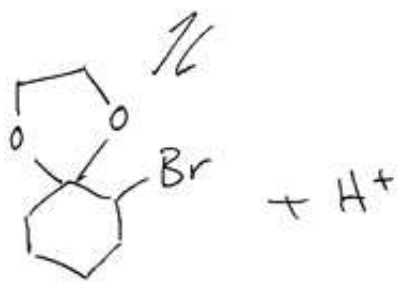
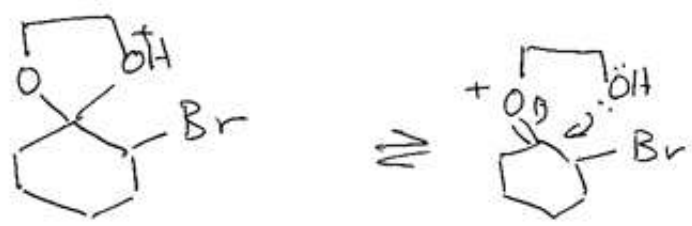
2. (10 pts) Propose a mechanism for the following reaction:



✓✓

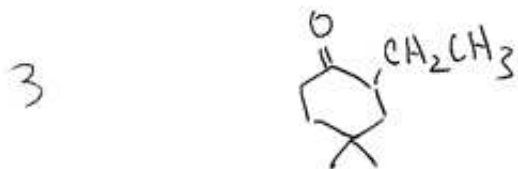


✓✓




3. (12 pts) What is the product of the reaction of 4,4-dimethylcyclohexanone with:

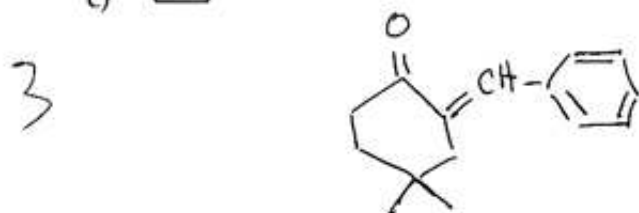
a) (i) LDA in THF followed by (ii) $\text{CH}_3\text{CH}_2\text{Br}$



b) Br_2 in acetic acid solvent



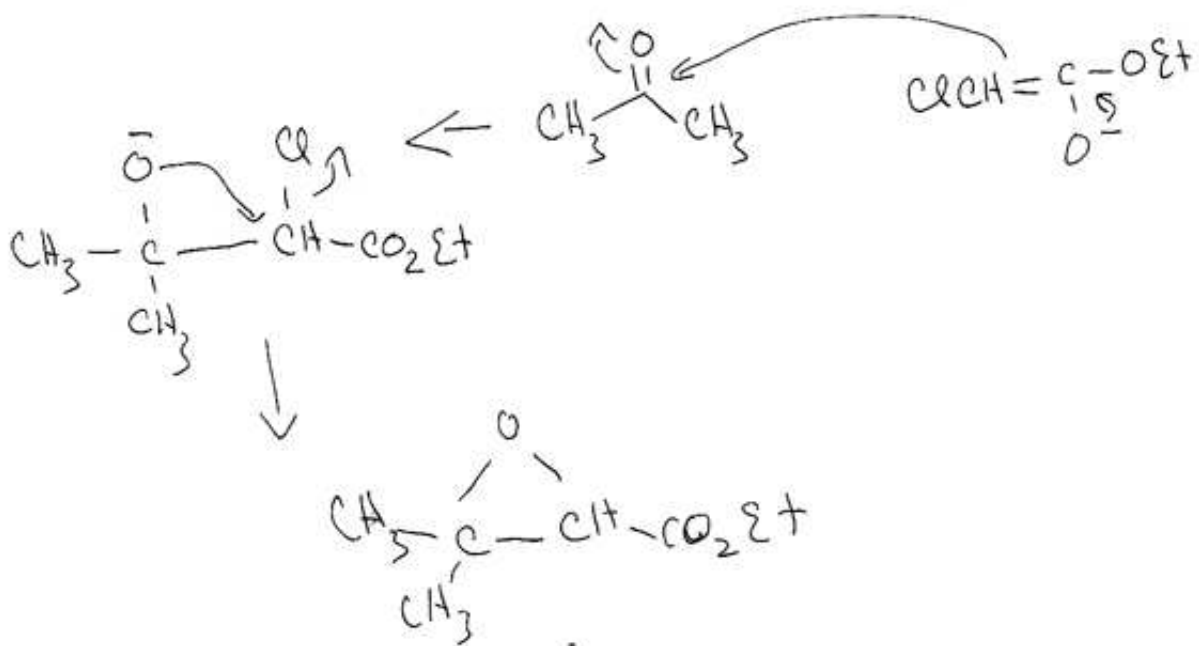
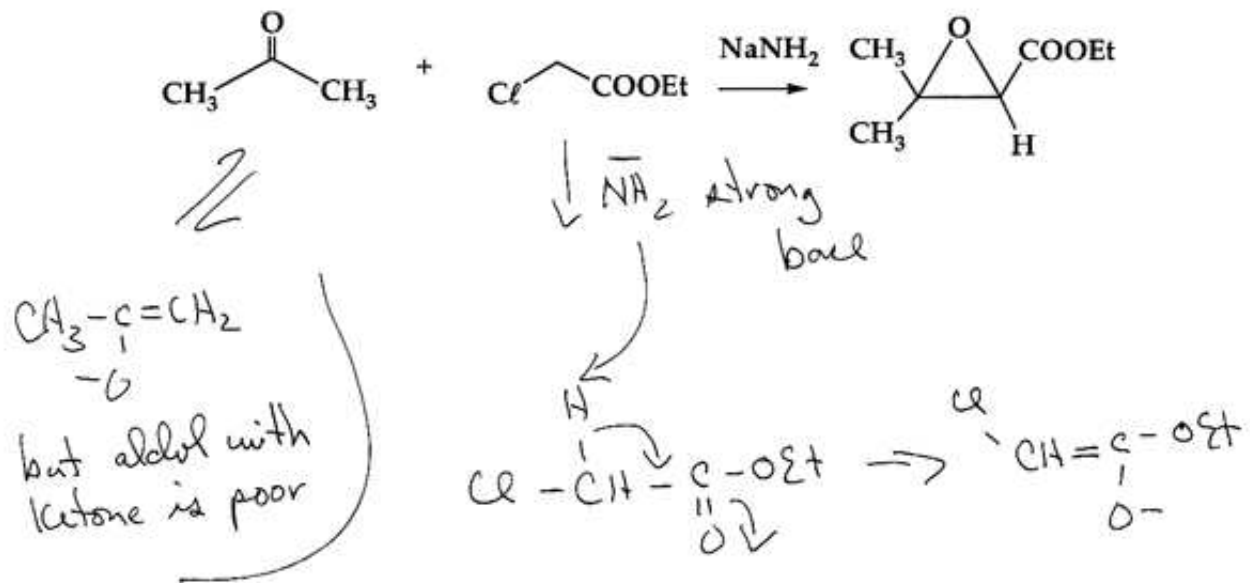
c)  + aqueous NaOH



d) NaOD in D_2O @ 25°

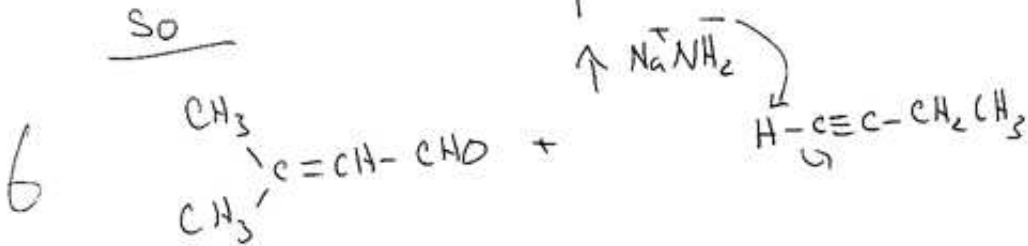
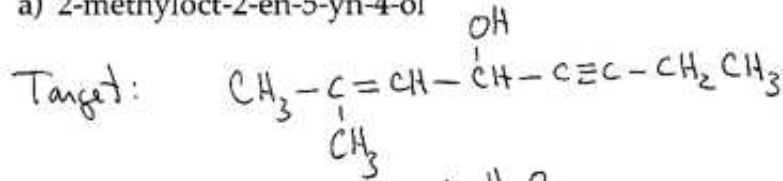


4. (10 pts) When a mixture of an aldehyde or ketone and an α -halo ester is treated with a strong base, an α, β epoxy ester is obtained. Propose a mechanism for the following:

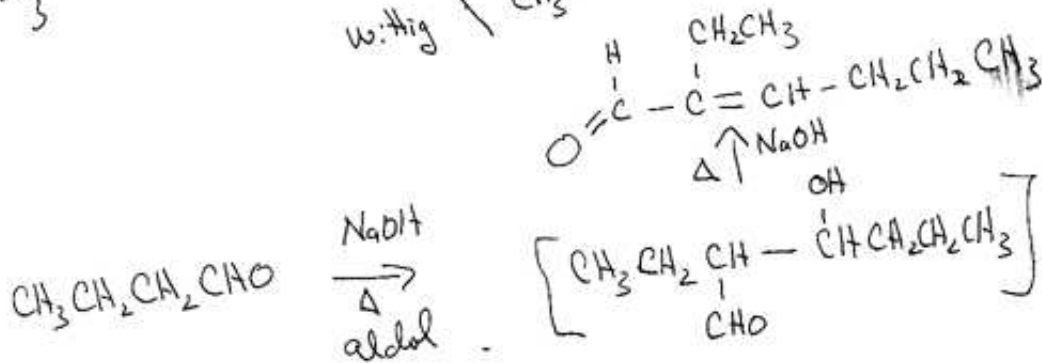
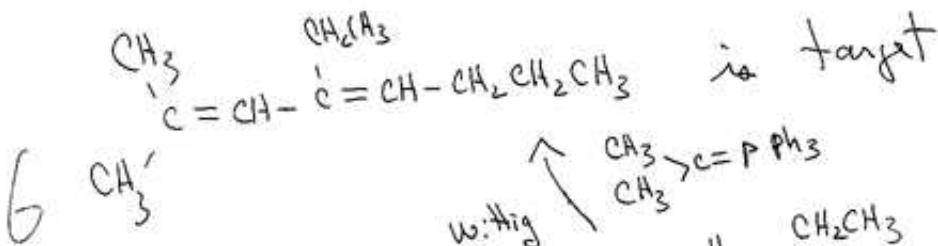


5. (18 pts) Plan a synthesis for each of the following compounds from difunctional starting materials containing 5 or fewer C atoms.

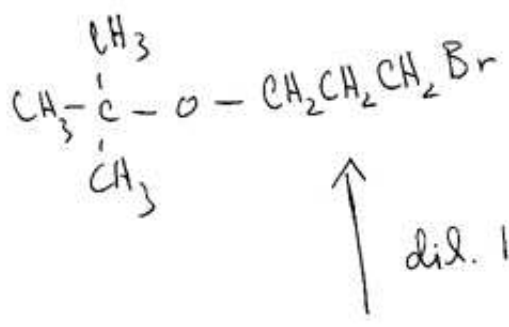
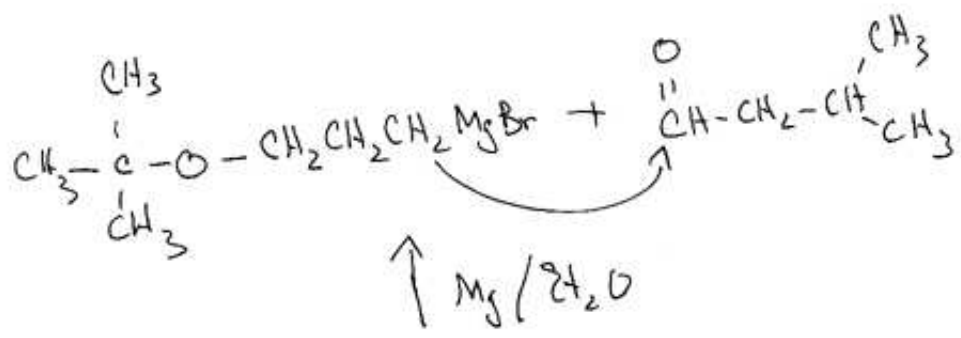
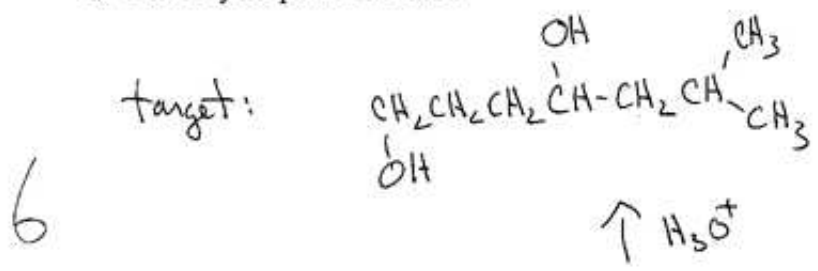
a) 2-methyloct-2-en-5-yn-4-ol



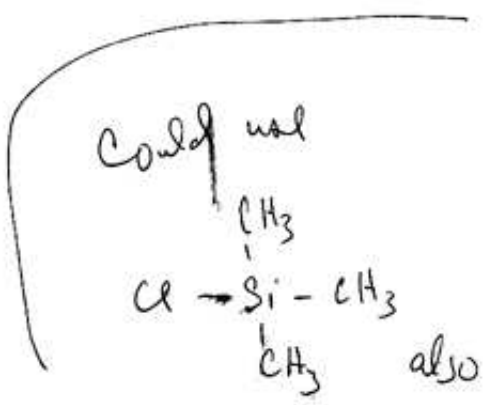
b) 4-ethyl-2-methyl-2,4-octadiene



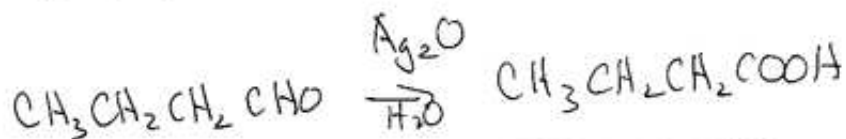
c) 6-methylheptan-1,4-diol



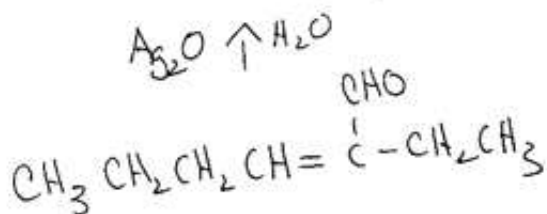
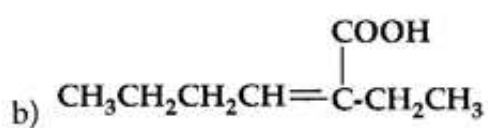
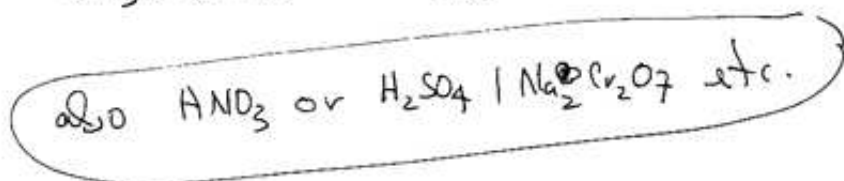
protecting group



6. (20 pts) Show how butanal can be converted into each of the following compounds:

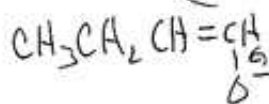
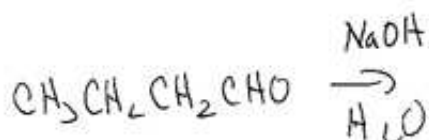
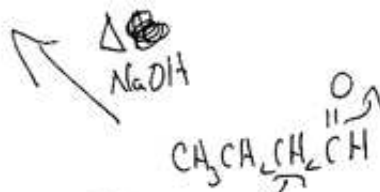


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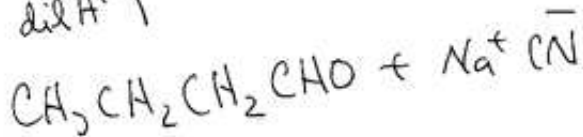
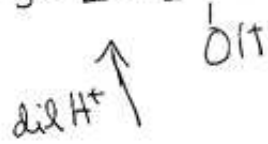
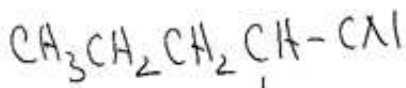
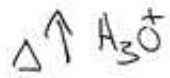
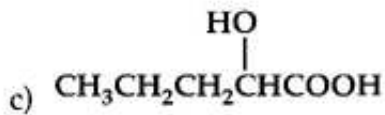


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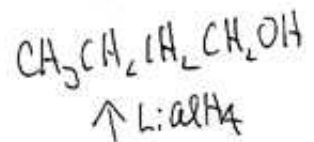
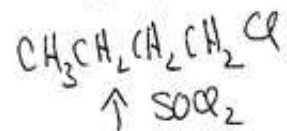
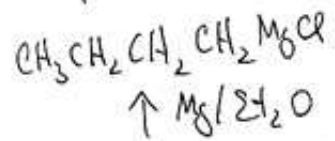
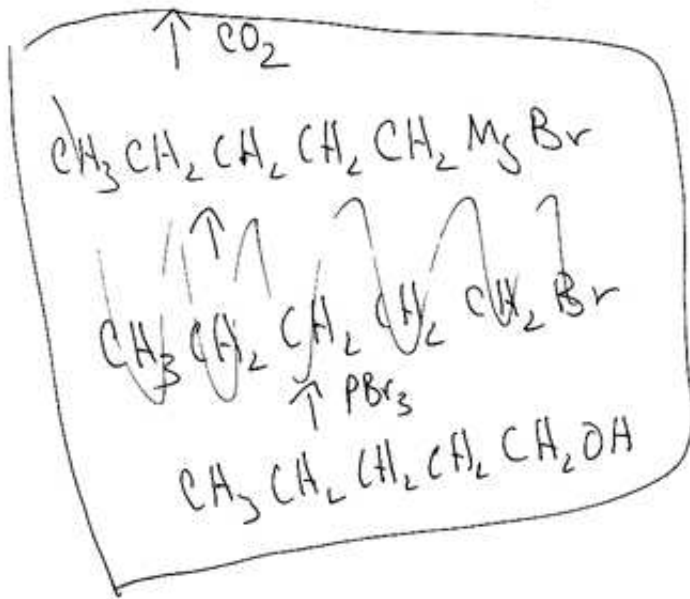
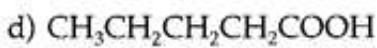
alcohol



Δ
NaOH

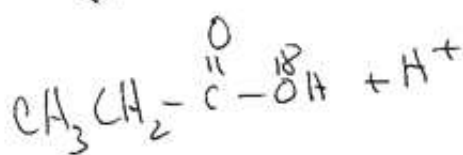
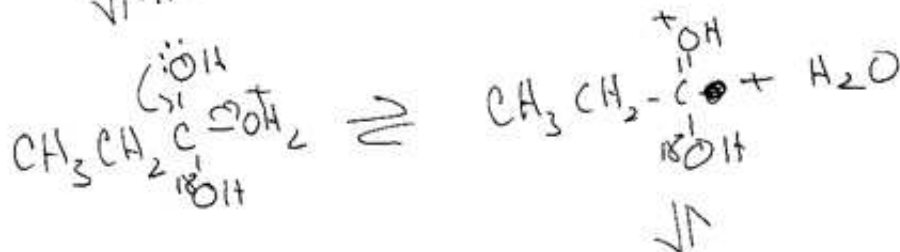
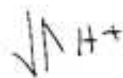
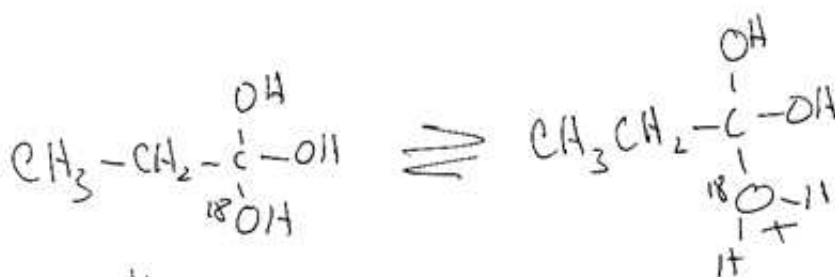
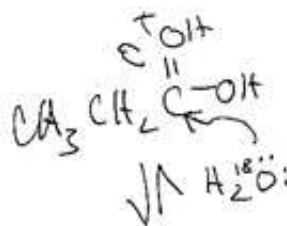
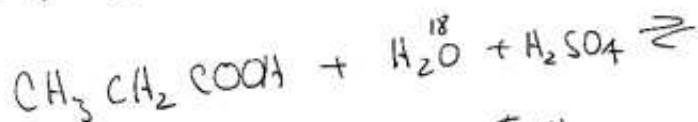
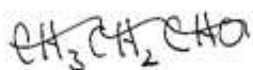


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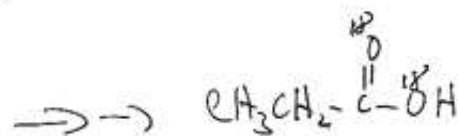


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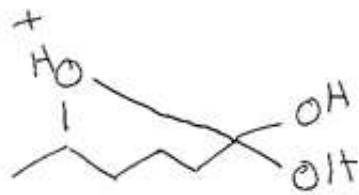
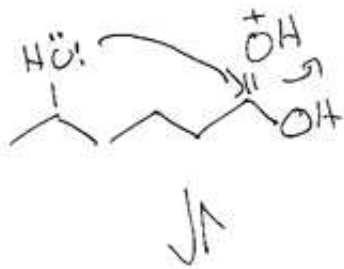
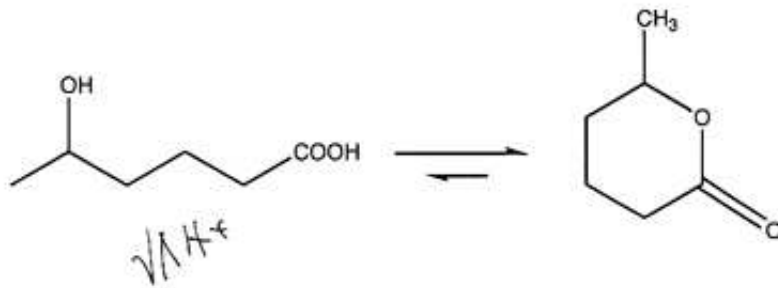
7. (10 pts) When propanoic acid is refluxed in some H_2SO_4 in $H_2^{18}O$, ^{18}O gradually appears in the $COOH$ group. Write a mechanism.



Because $H_2^{18}O$ is in huge excess, entropy drives acid to take up ^{18}O



8. (10 pts) When 5-hydroxyhexanoic acid is treated with a trace of sulfuric acid in benzene solution, the following reaction occurs. What is the mechanism?



or

