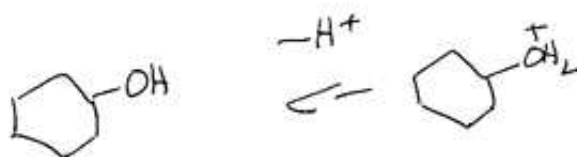
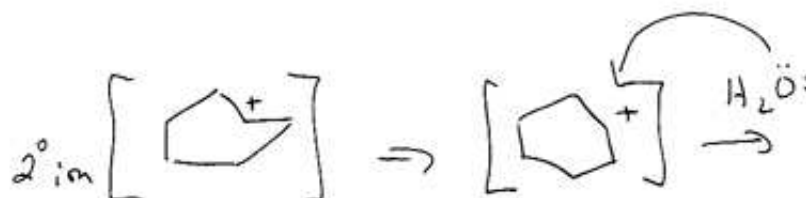
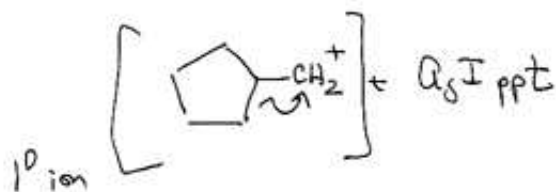
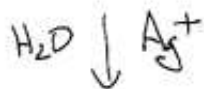
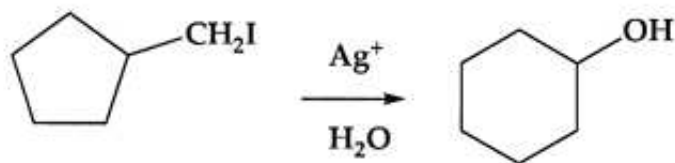


name: _____
~~SN1~~
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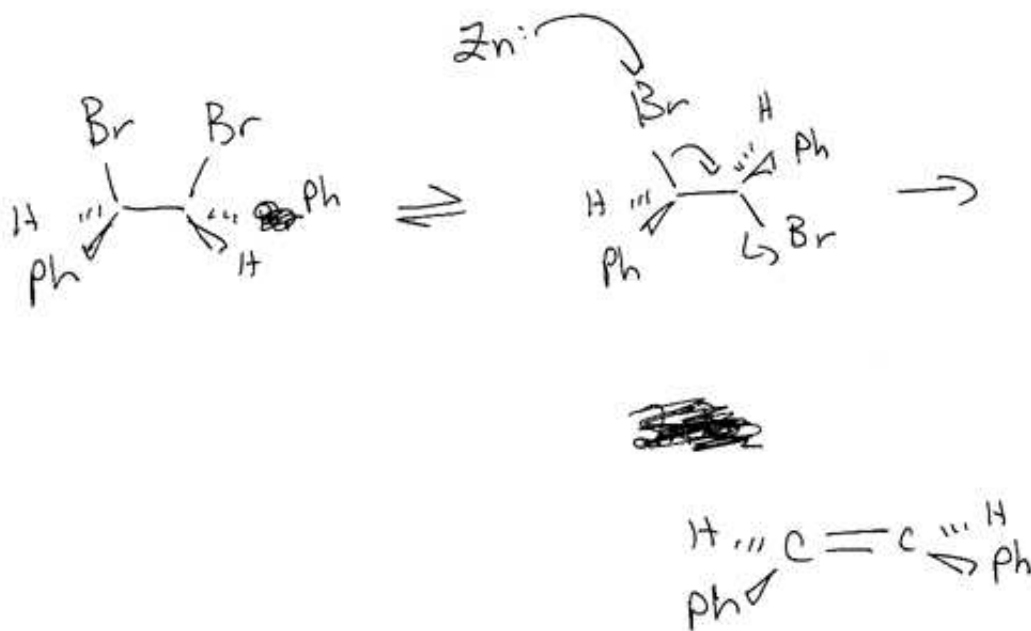
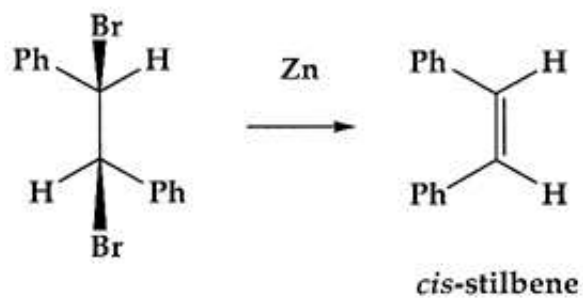
Chemistry 3311-100
Organic Chemistry / Dr. Barney Ellison
Tuesday: May 3rd @ 1:30 pm → 4:00 / Final Exam / Chem 140

Name: Key (please print)

1. (10 pts) When silver halides are treated with aqueous silver nitrate, silver halide precipitates and an alcohol is formed. From what you know about S_N1 reactions, propose a mechanism for the following conversion.

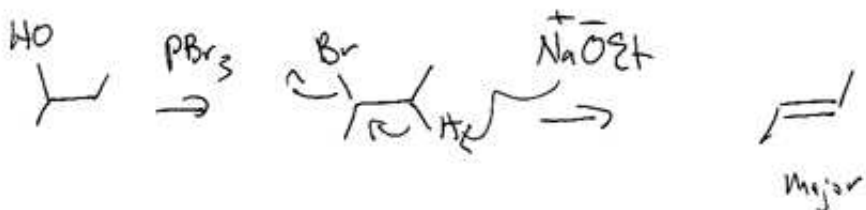


2. (10 pts) When the dibromide below is treated with zinc dust, only *cis*-stilbene is produced. Propose a mechanism.

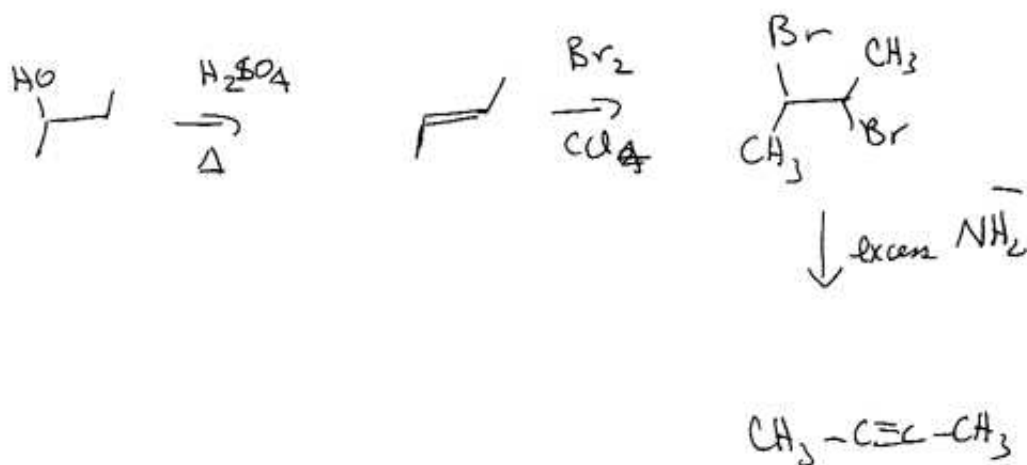


3. (20 pts) Draw the structure of the major product expected when 2-butanol is treated with each of the following sequences of reagents:

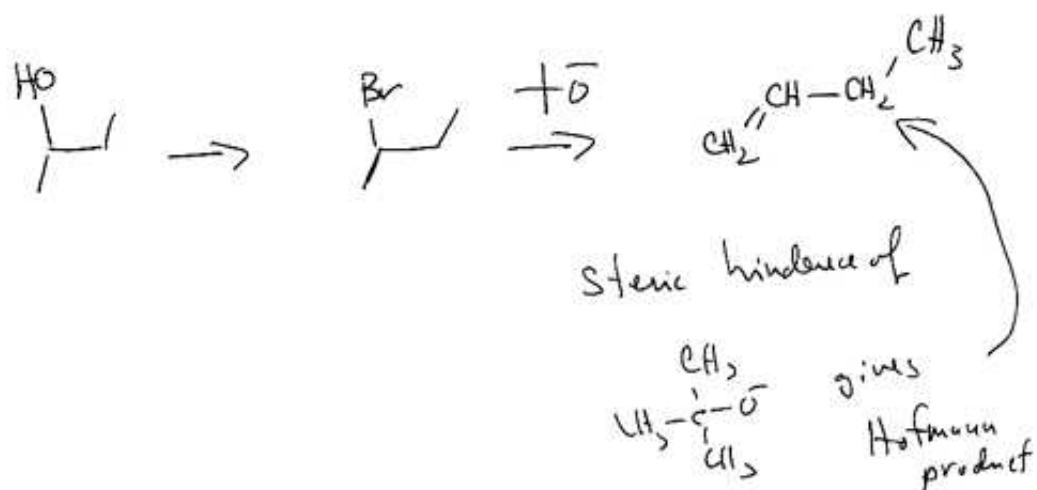
a) PBr_3 ; NaOEt/EtOH



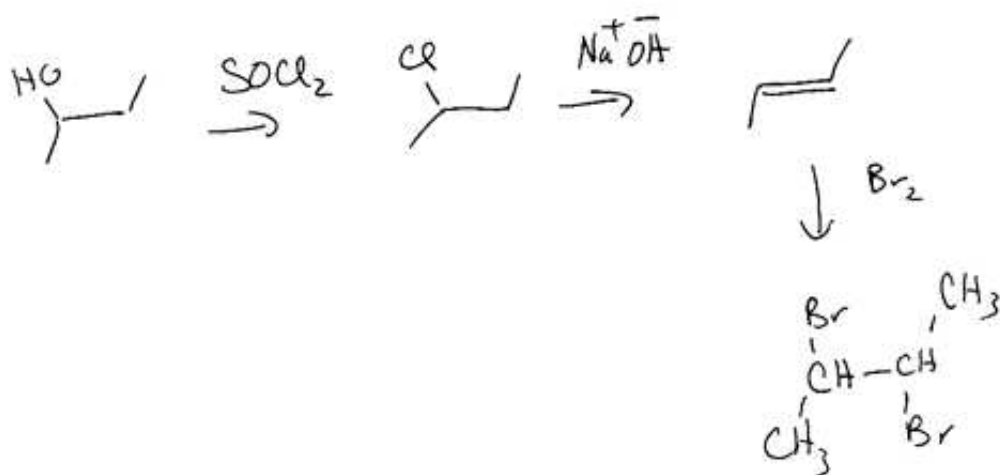
b) Hot H_2SO_4 ; Br_2/CCl_4 ; $\text{NaNH}_2/\text{NH}_3$



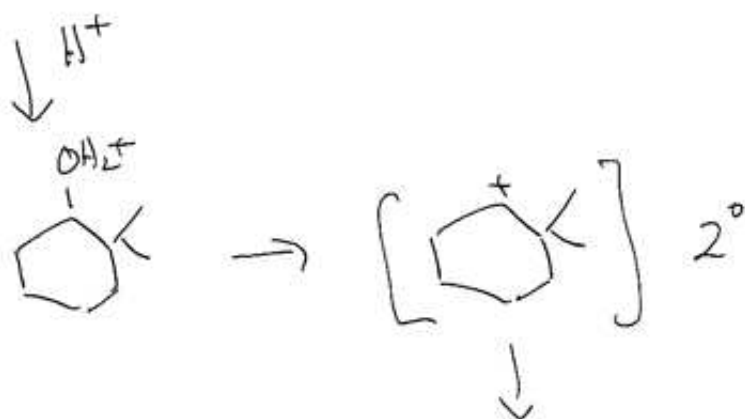
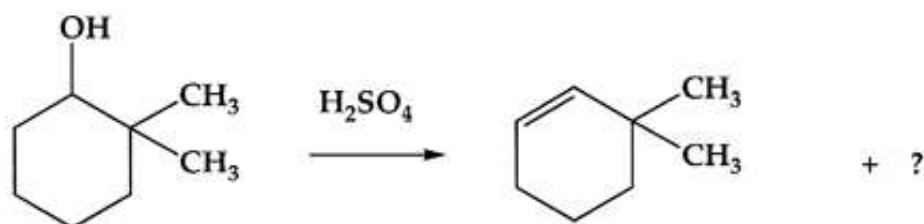
c) Cold HBr ; $(\text{CH}_3)_3\text{CO}^- \text{K}^+ / (\text{CH}_3)_3\text{COH}$



d) $\text{SOCl}_2 / \text{pyridine solvent}$; $\text{NaOH} / \text{EtOH}$; $\text{Br}_2 / \text{CCl}_4$

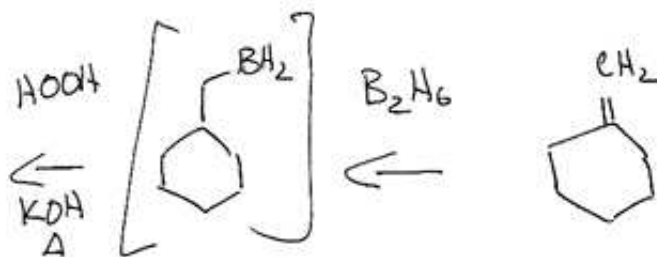
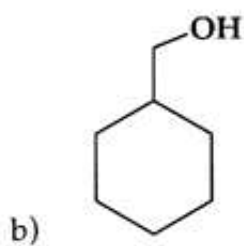
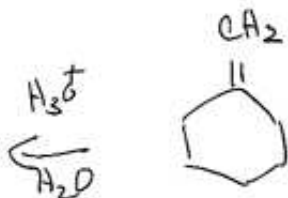
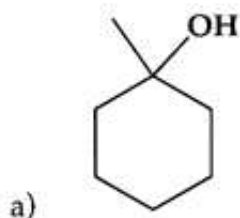
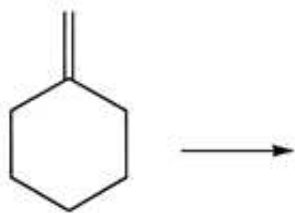


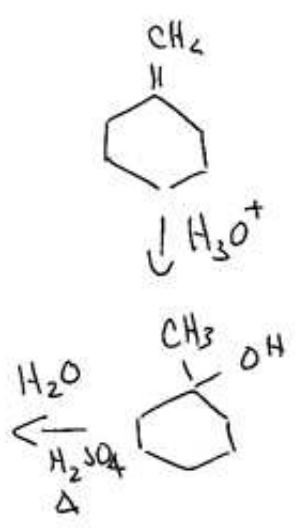
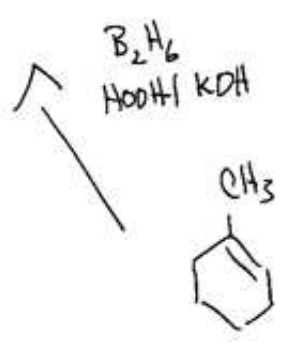
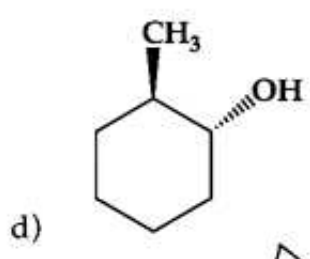
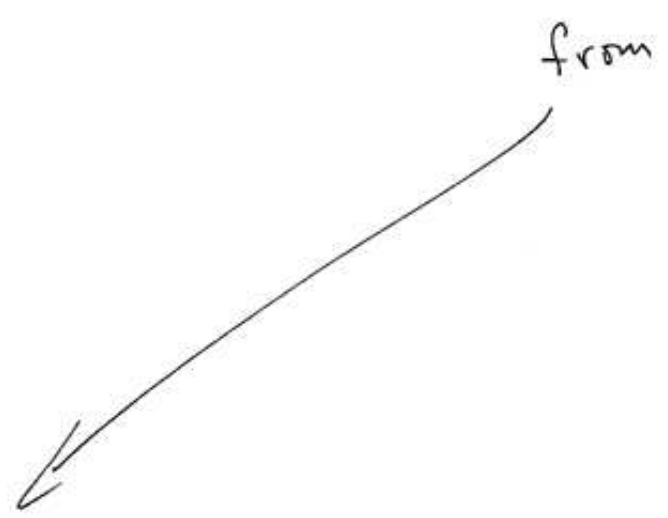
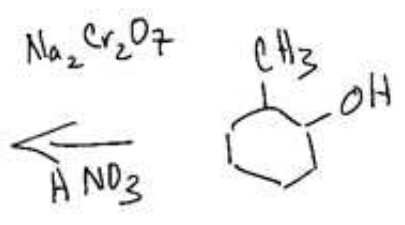
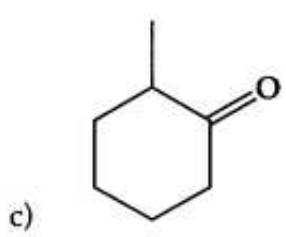
4. (10 pts) Upon treatment with acid, 2,2-dimethylcyclohexanol undergoes dehydration to form a mixture of 3,3-dimethylcyclohexene and another alkene. This additional olefin exhibits 4 unique signals in the ^{13}C NMR spectrum yet has a mass of 110 Daltons, corresponding to the formula C_8H_{14} . What is the additional alkene & how is it formed?



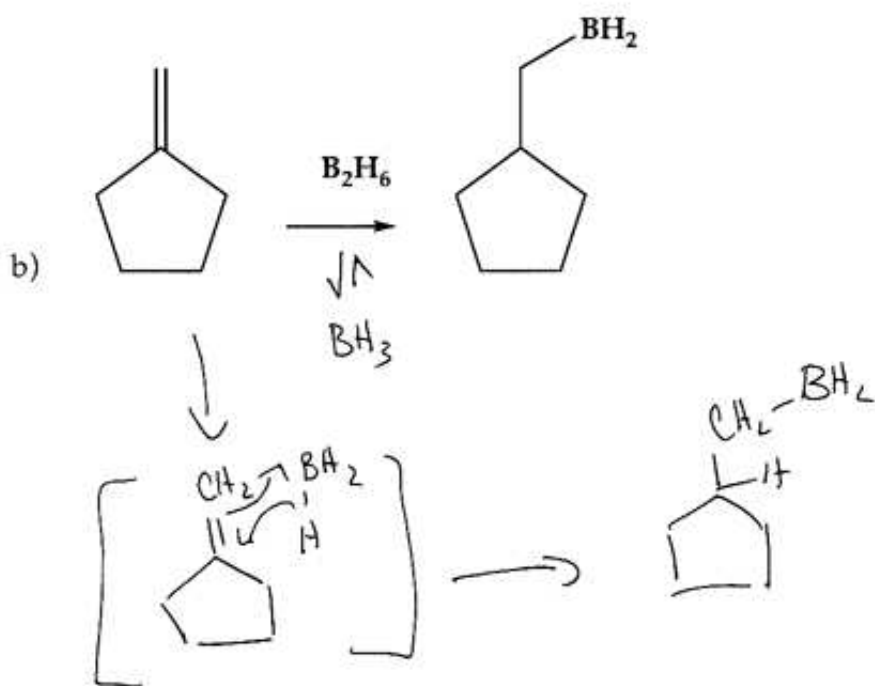
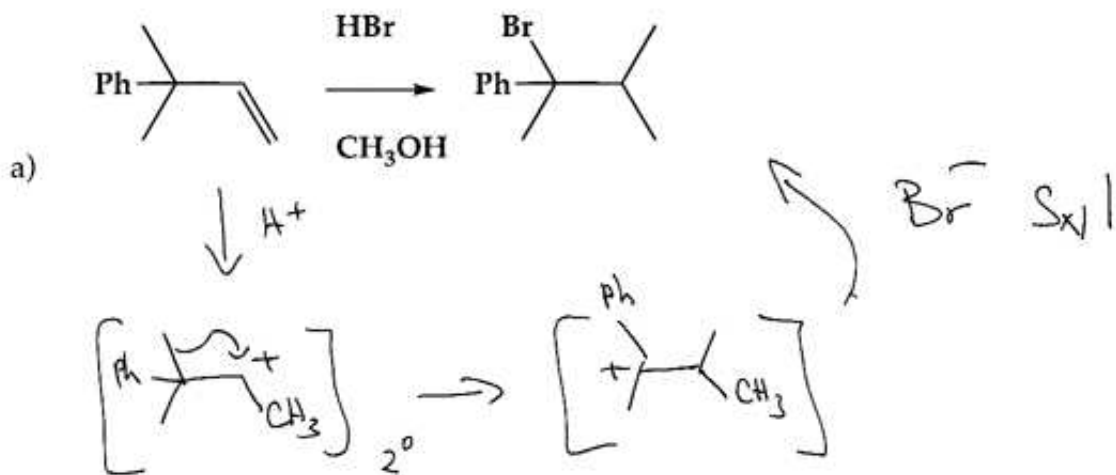
final product

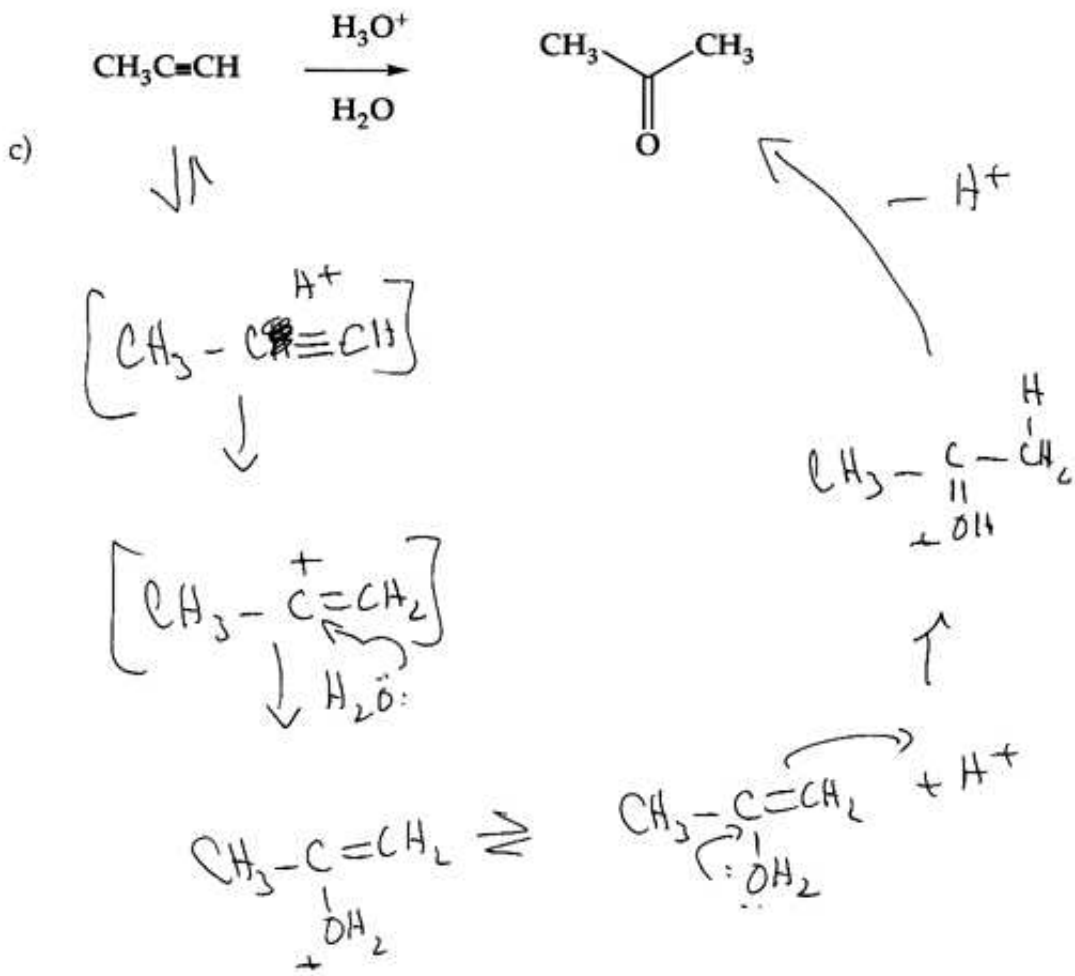
5. (20 pts) Suggest a route to convert methylenecyclohexane into each of the following. Some transformations may require 2 separate steps.



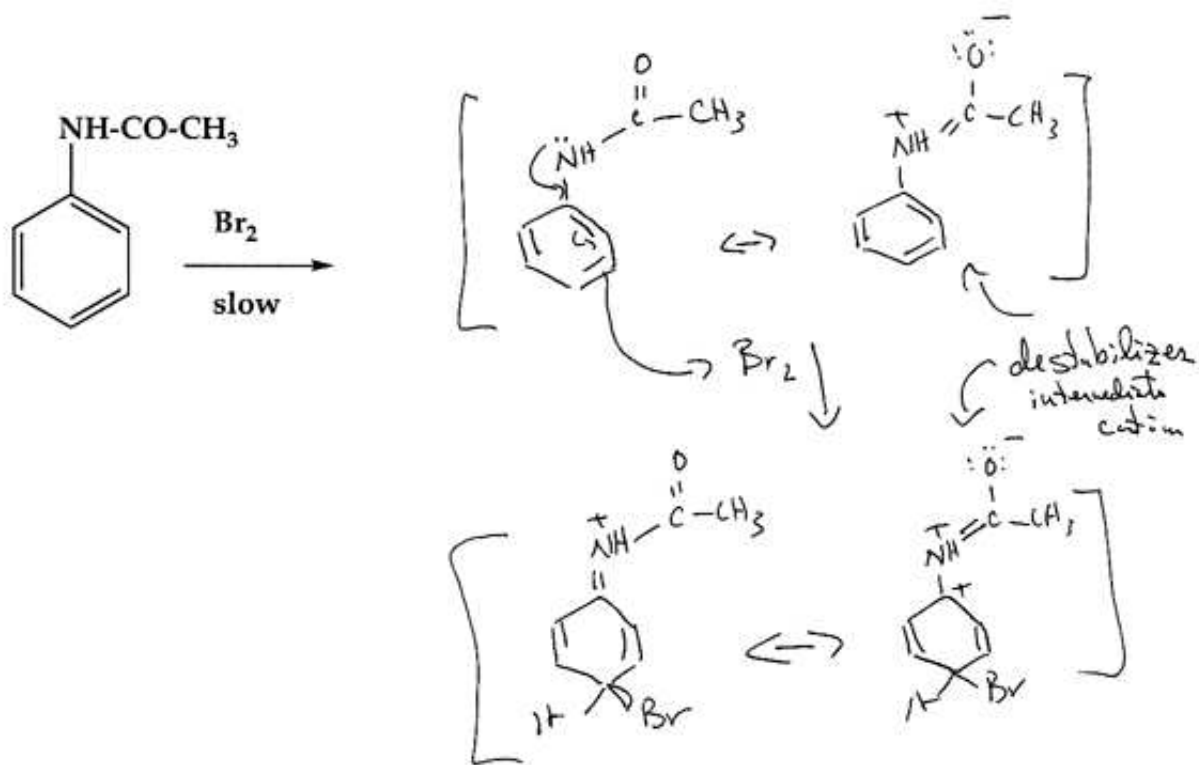
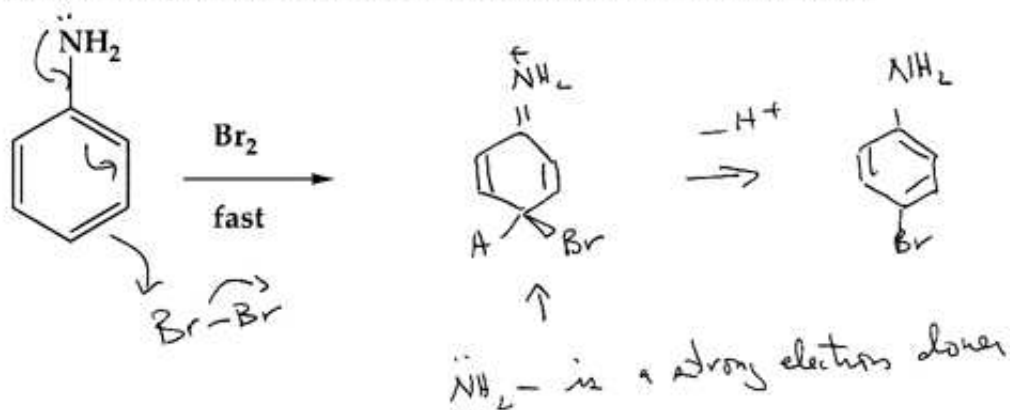


6. (15 pts) Write a detailed mechanism for the following reactions:

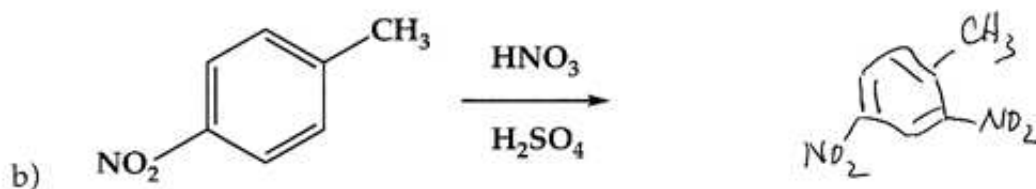
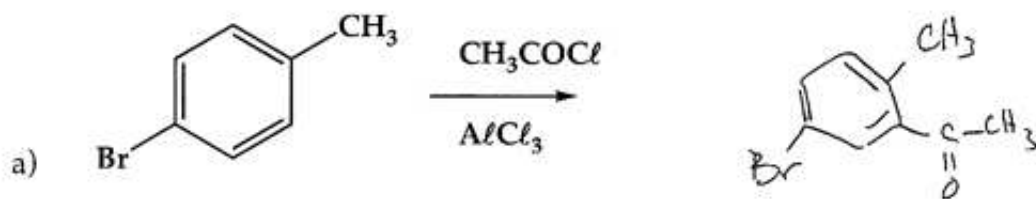


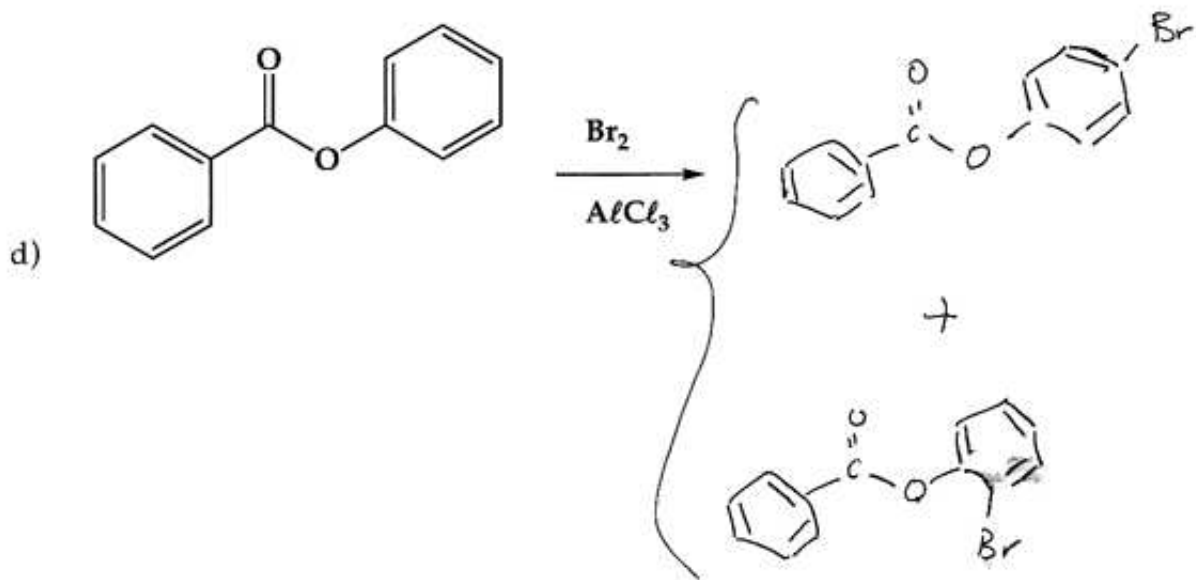
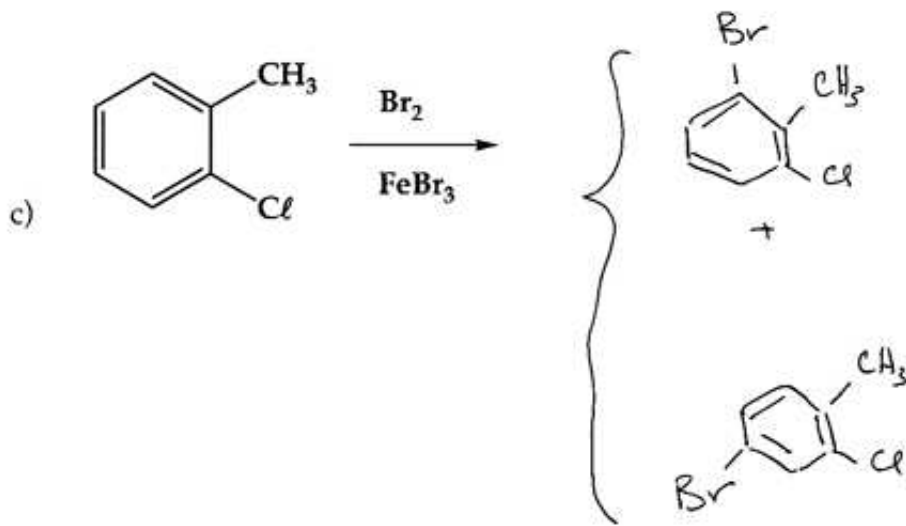


7. (10 pts) Explain why the reaction of acetanilide with bromine is considerably slower than the reaction of aniline with bromine.

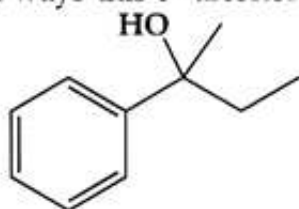


8. (20 pts) Predict the major product expected when each of the following compounds is treated with the indicated reagents:





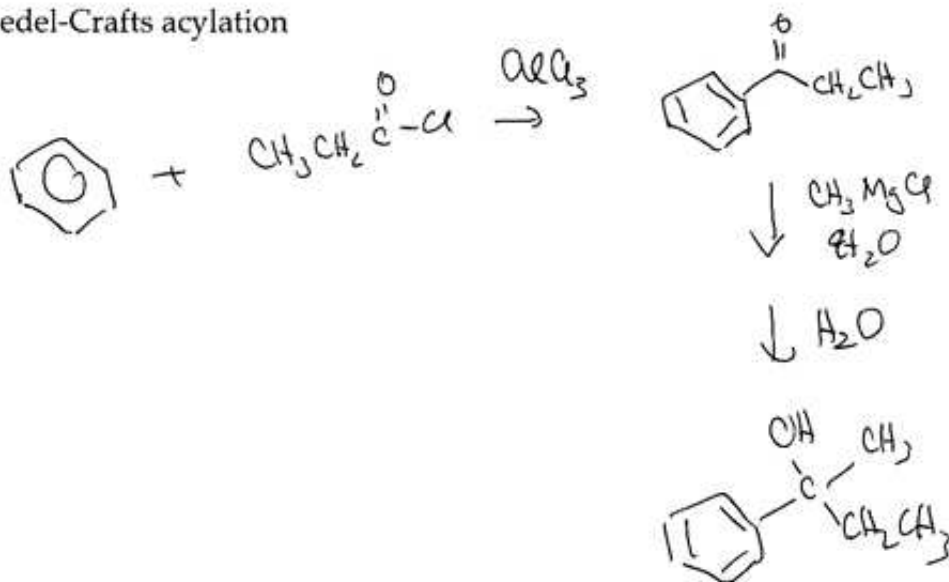
9. (15 pts) There are a number of ways this 3° alcohol could be prepared



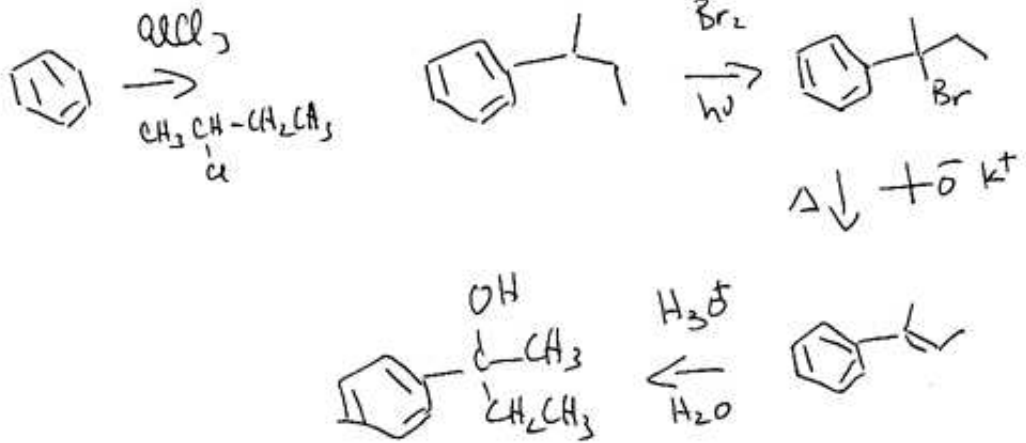
from benzene:

Sketch three syntheses using:

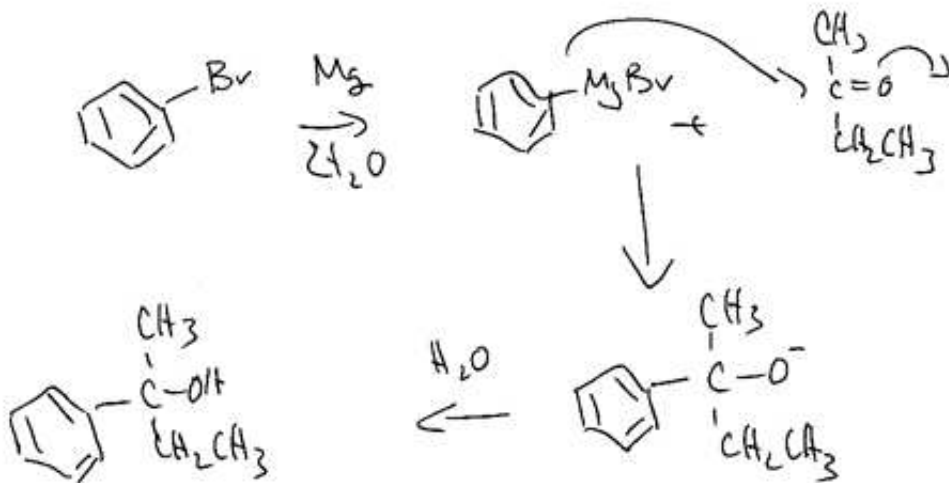
a) Friedel-Crafts acylation



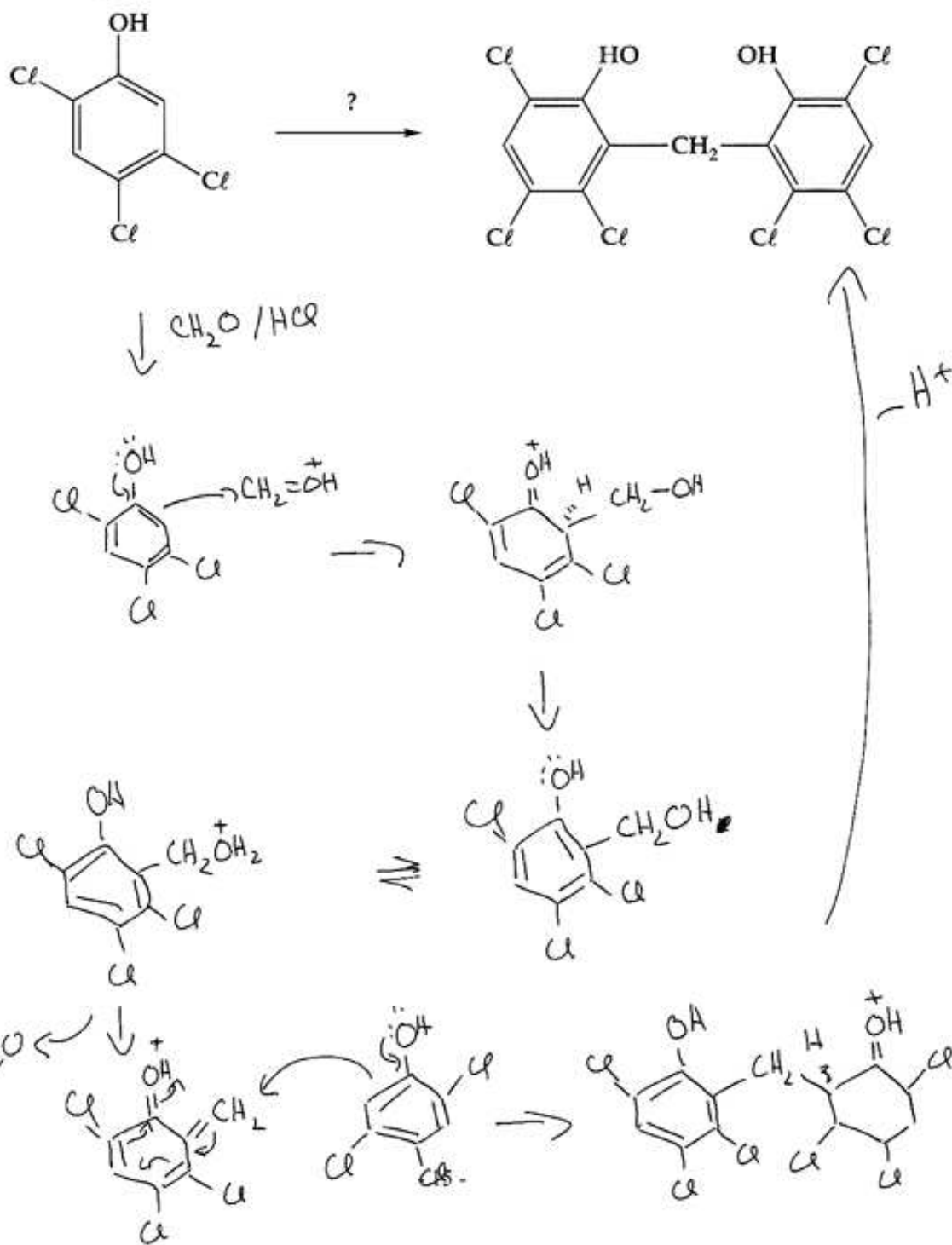
b) Friedel-Crafts alkylation



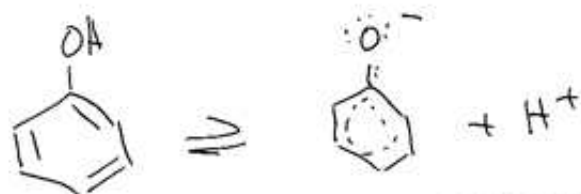
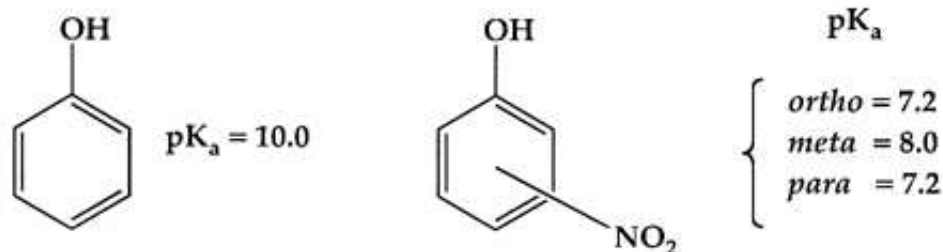
c) electrophilic aromatic substitution



10. (10 pts) Propose a synthesis for hexachlorophene starting with 2,4,5-trichlorophenol.



11. (10 pts) The presence of a nitro group increases the acidity of phenol. Rationalize this observation. Why is this effect greater when the nitro group is *ortho* or *para* to the acidic group rather than *meta*?



contrast with

