CHEMISTRY 3331: Fundamentals of Organic Chemistry I
Third Exam

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Prof. Ognjen Š. Miljanić

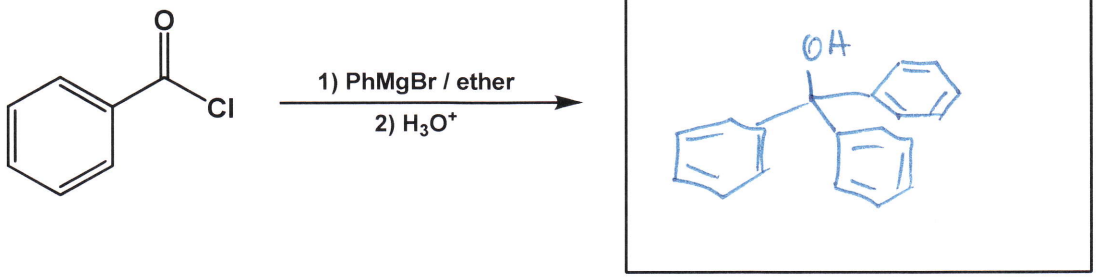
Name: ANSWER KEY
(print legibly) Last First

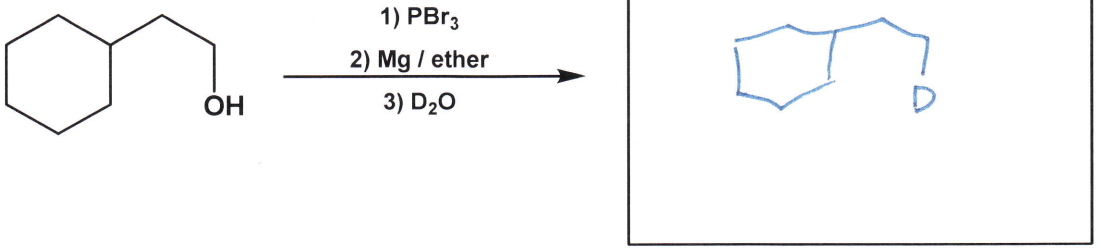
March 24, 2009

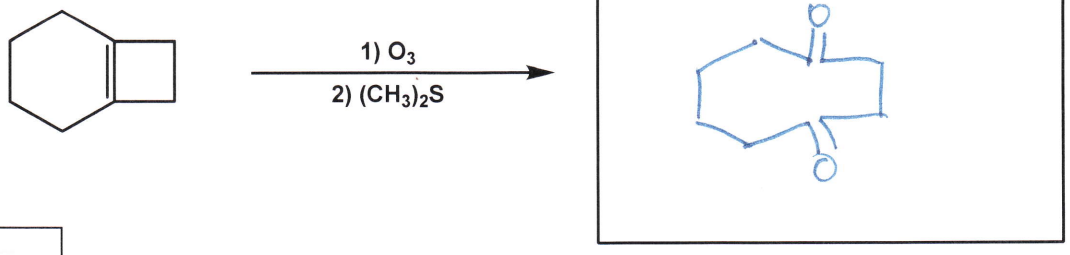
Last 4 Digits of Student ID Number: /

Read all directions very carefully. Write your answer legibly in the designated spaces and **think** about what you are doing. Give **only one** answer for each question. Total number of points is 100.

1. (44 points) For each of the following reactions or series of reactions, draw the structure of the product in the box. Be sure to clearly indicate stereochemistry where this is pertinent. Give **only one** answer for each question.







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FINAL SCORE

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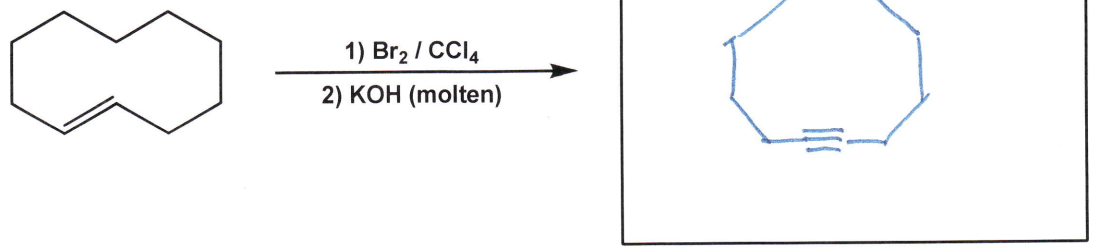

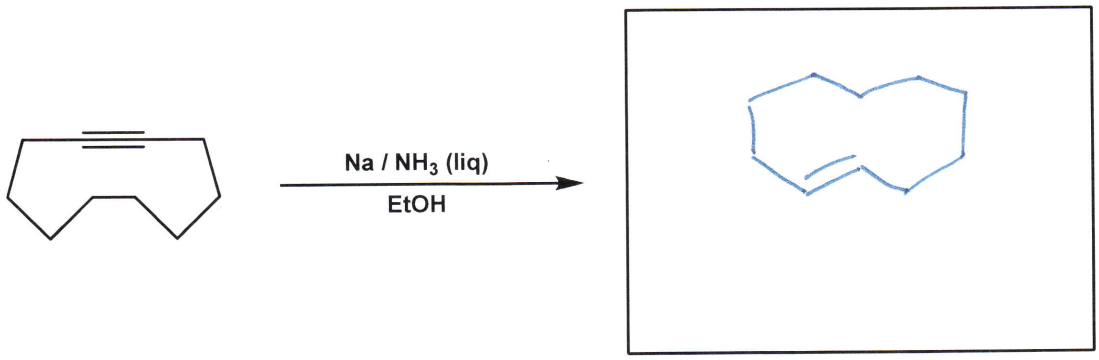

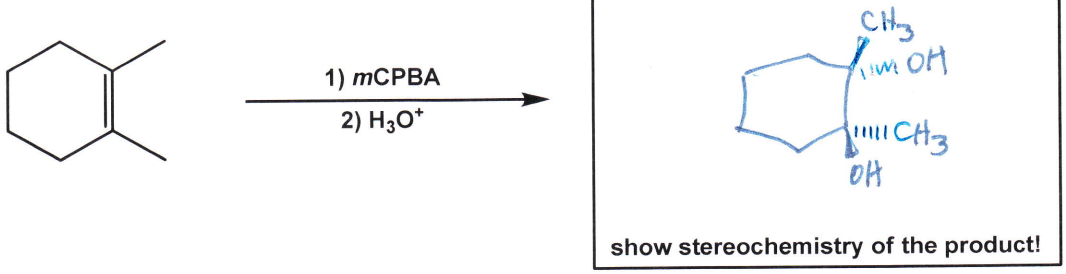

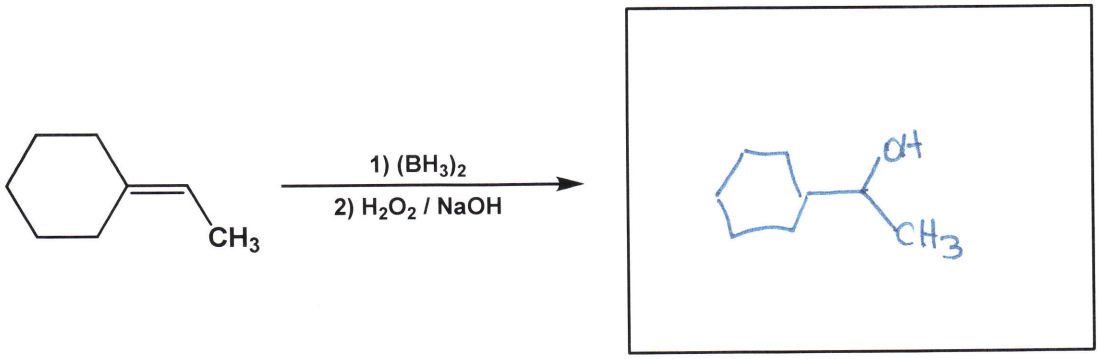

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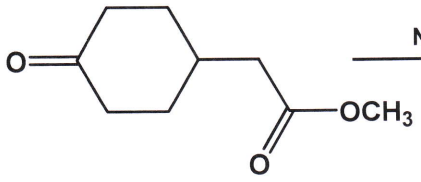
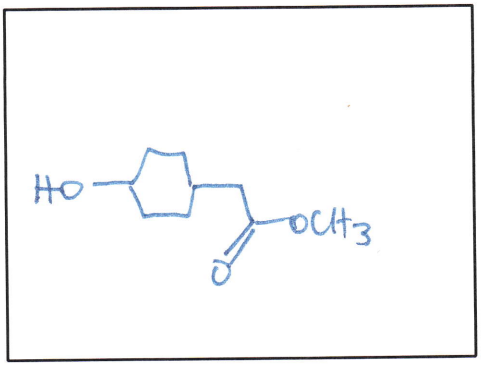
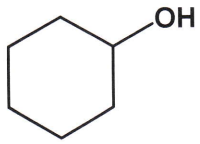
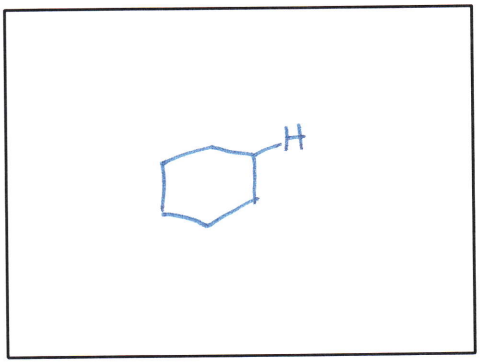


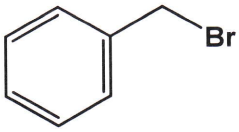
$NaBH_4$ / EtOH



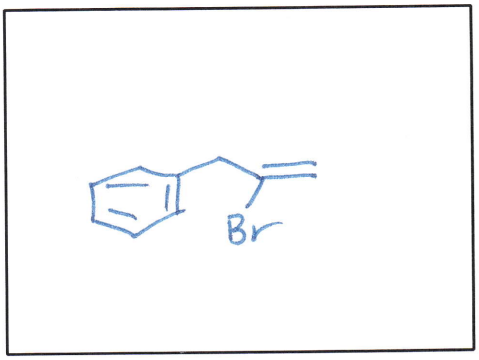


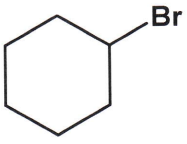
1) TsCl / pyridine
2) $LiAlH_4$
3) H_3O^+



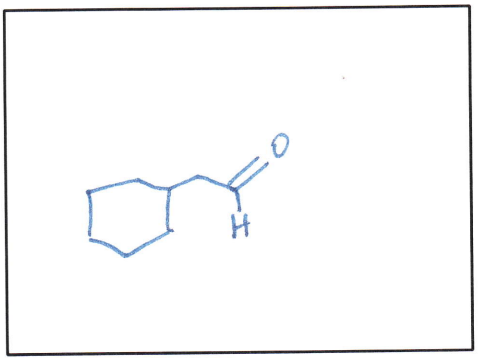


1) $HC{\equiv}CNa$
2) HBr (1 equivalent)





1) Mg / ether
2) 
3) H_3O^+
4) PCC



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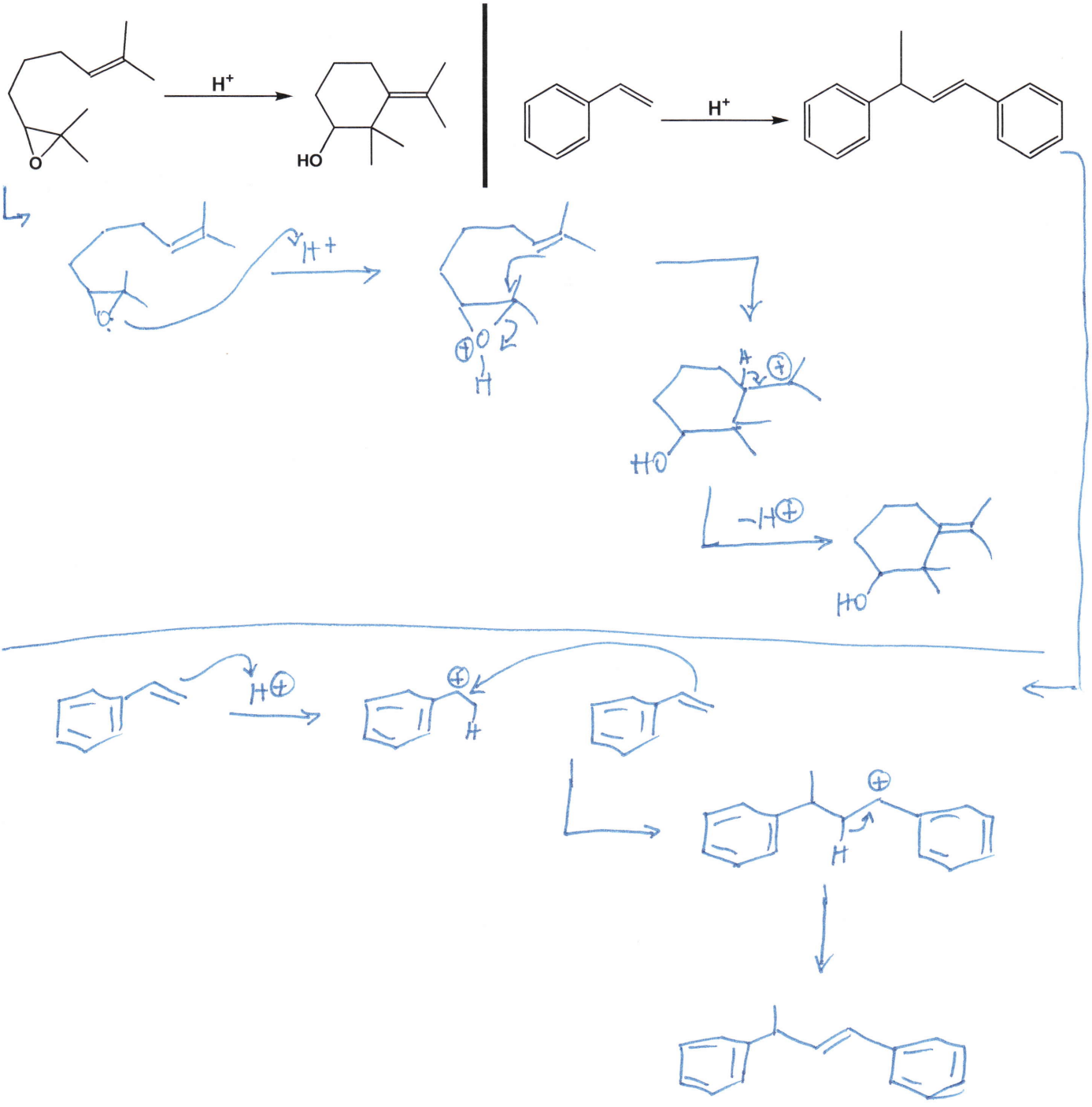
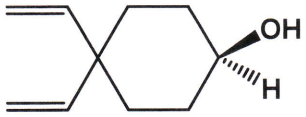
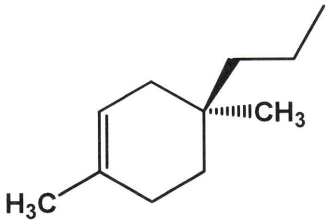
2. (20 pts) **Choose only one of the two reactions given below**, and give a detailed mechanism which explains the reactions. Show all charges and intermediates, and use curved arrows to indicate the flow of electrons. Do not draw transition states.



3. (16 points) For each of the following structures, give a **complete systematic IUPAC name**.

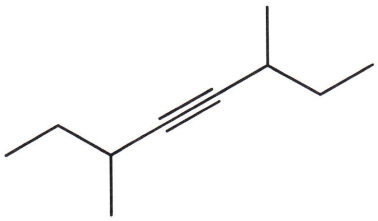


4,4-divinyl cyclohexanol

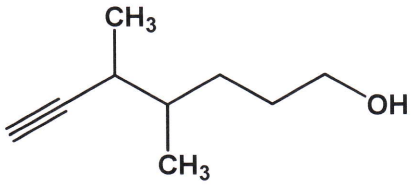


(S)-1,4-dimethyl-4-propyl-cyclohexene

Indicate absolute stereochemistry!



3,6-dimethyl-4-octyne



4,5-dimethyl-6-heptyn-1-ol

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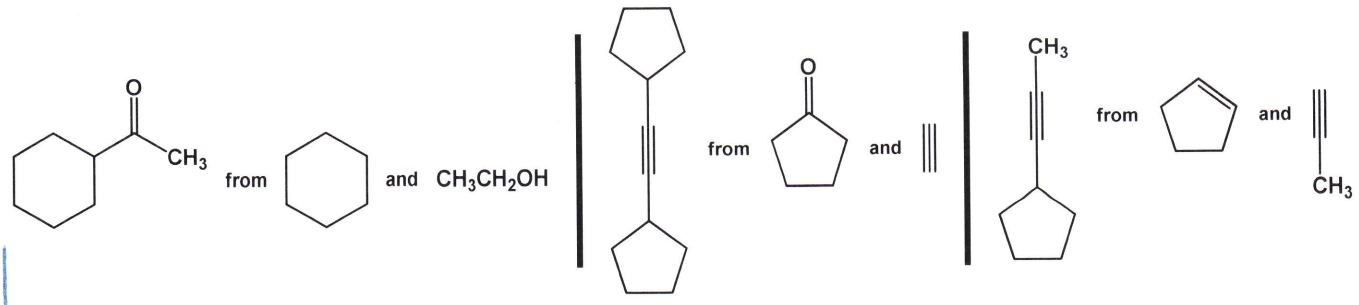
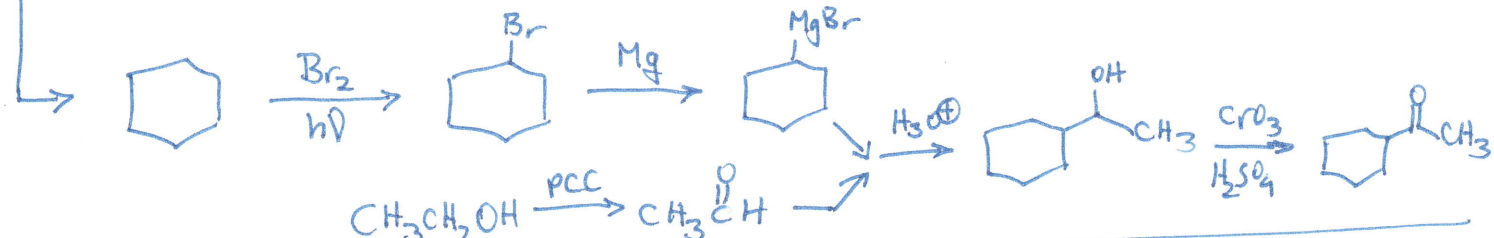
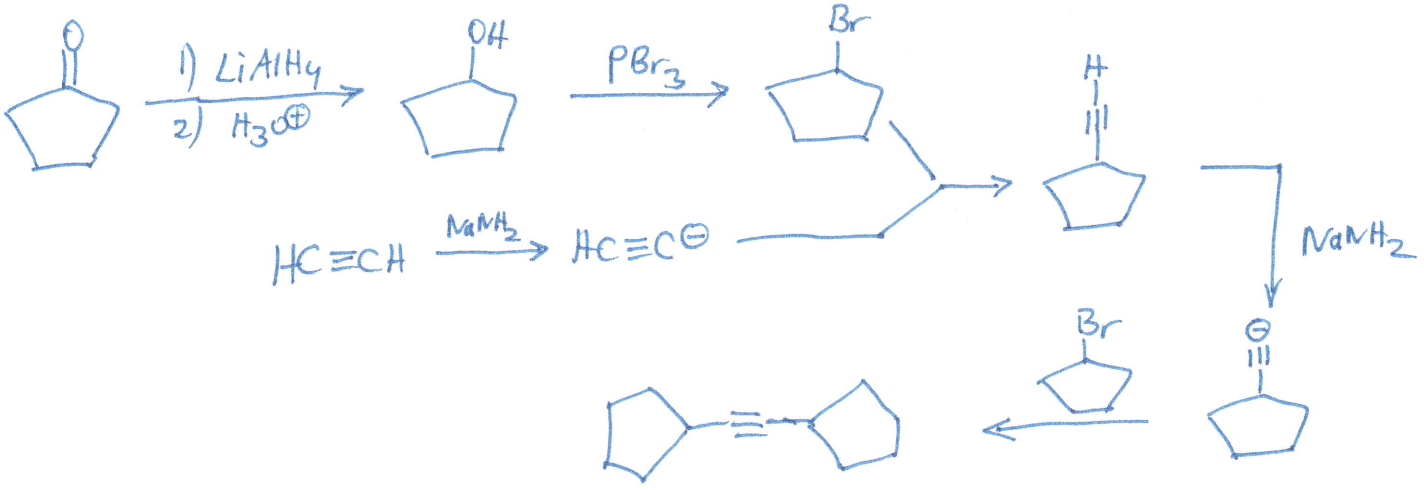
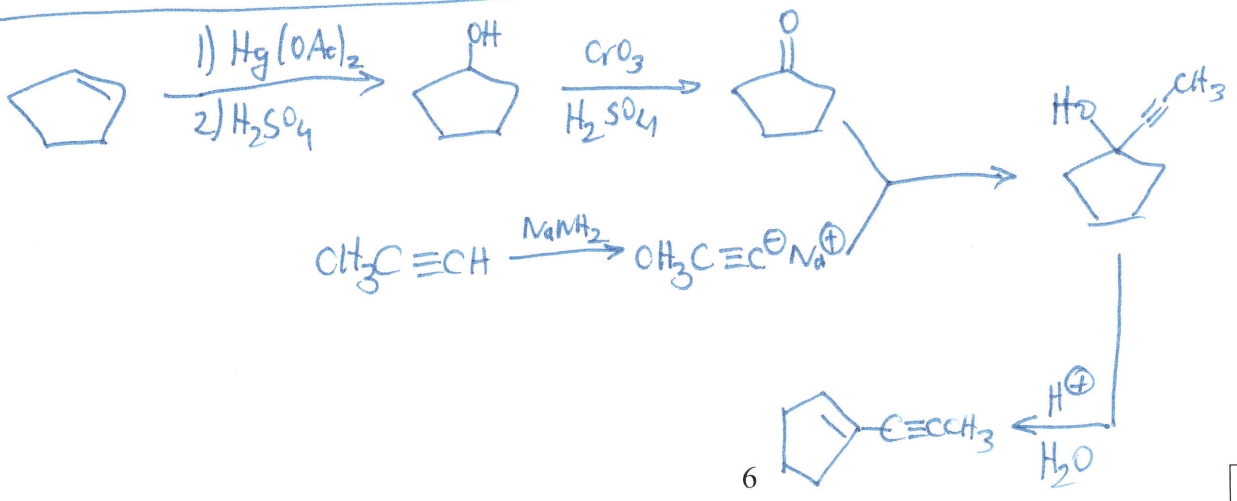
5. (20 points) **Choose only two of the three conversions given below**, and outline a series of synthetic steps which would efficiently accomplish the conversion. Give a step-by-step outline and **do not** give mechanisms.

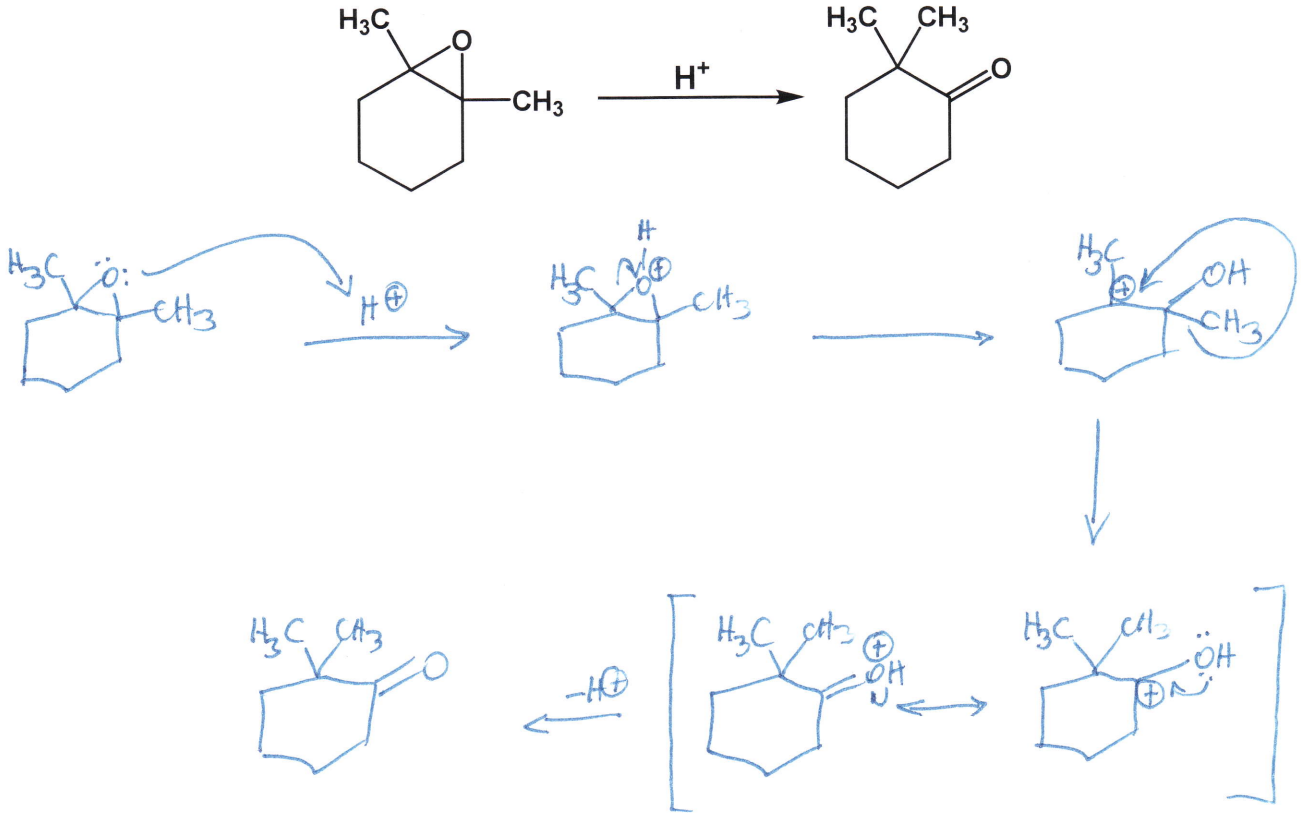








6. (10 points) EXTRA CREDIT! Provide a detailed mechanism for the following transformation. Show all charges and intermediates, and use curved arrows to indicate the flow of electrons. Do not draw transition states.



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7. (4 points) EXTRA CREDIT! Among the following four compounds, circle the one that is **able to hydrogen bond both to water and to itself.**

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