

*CHEM 14D Practice Final Exam*  
December 2018

**\*Full Name on Every Page\* \*Write Dark\* \*Only front pages will be scanned\***

*Key*

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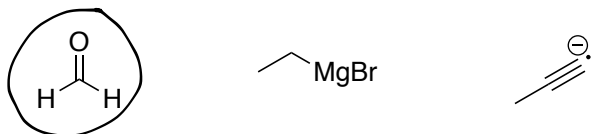
Name (Last) \_\_\_\_\_ (First) \_\_\_\_\_ Student ID \_\_\_\_\_  
Lecture \_\_\_\_\_

Question	1	2	3	4	5	6	7	8	9	10	FULL Name on every page	Total
Points											2	

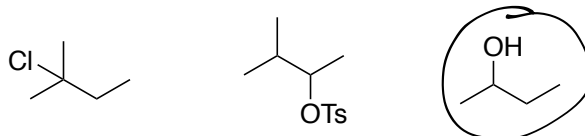
- 1. Write your full name on every page.**
- 2. Answers written on the back of the exam will not be graded.**
- 3. This is a closed book exam. The use of notes, cell phones, calculators, or other devices will not be allowed during exam.**
- 4. Where applicable, answers without a clear indication of stereochemistry will not be given any credit.**
- 5. You may use model sets brought in a clear ziplock bag.**
- 6. For full credit show your work, partial credit will be awarded.**
- 7. A periodic table will be provided to you.**
- 8. Show your student ID when turning in your exam.**

1.1 Circle the structure in each set that fits the description provided.

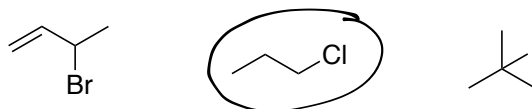
a. Does not contain a nucleophilic carbon.



b. Cannot undergo E2 elimination with KOtBu.

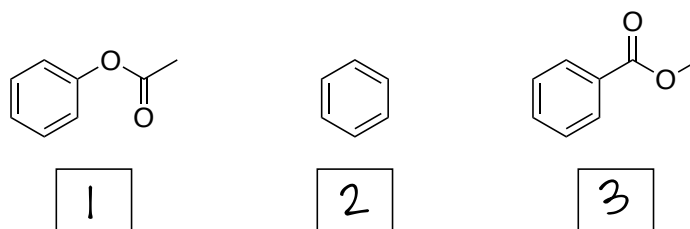


c. Will not undergo an SN1 reaction with MeOH.

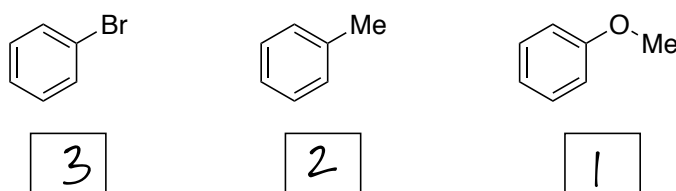


1.2 Within each of the following sets, rank the substrates from the most reactive (1) to the least reactive (3) toward electrophilic aromatic substitution.

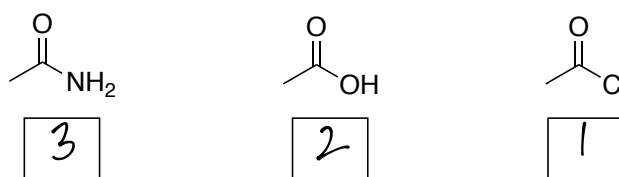
a.



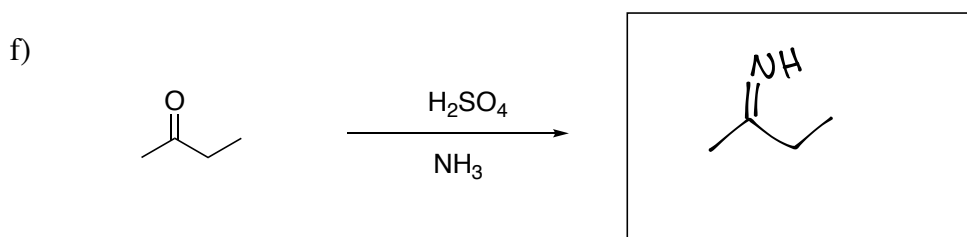
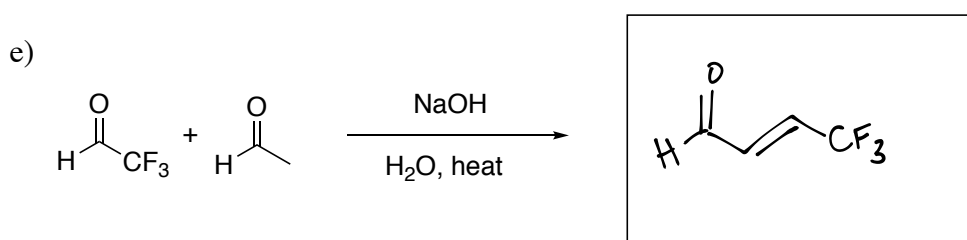
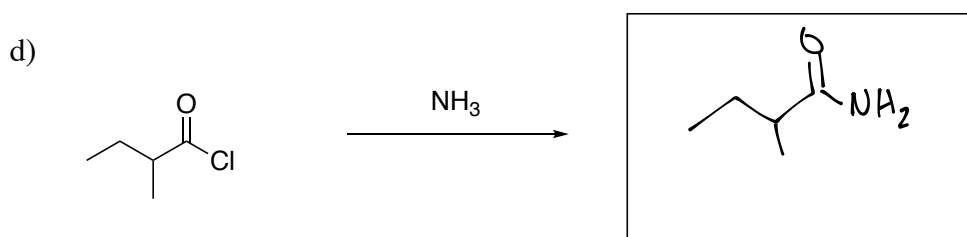
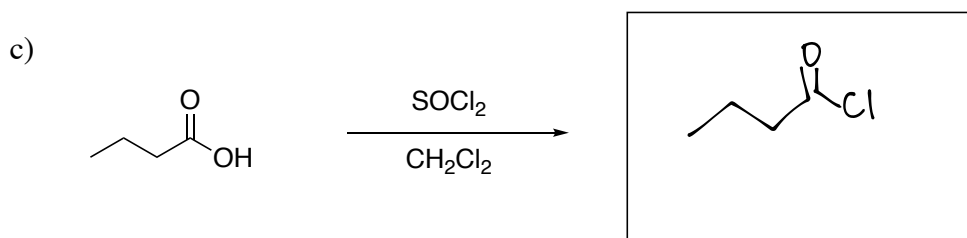
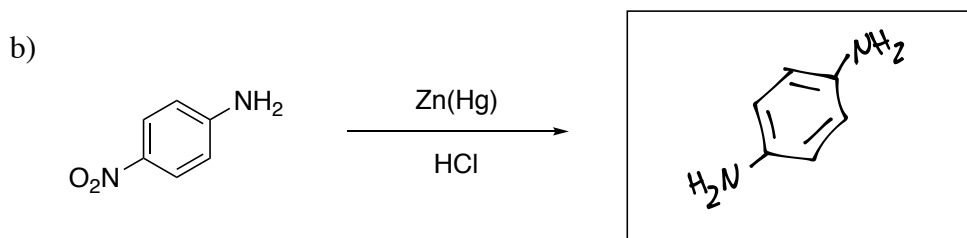
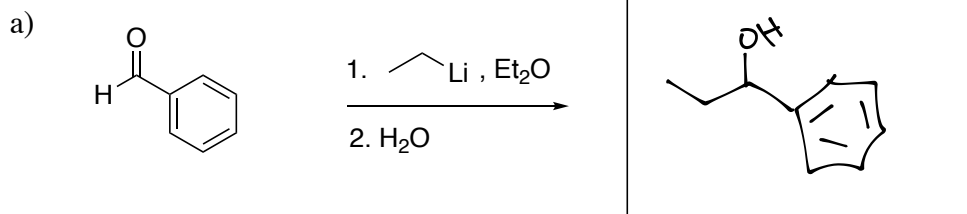
b.



1.3 Rank the following substrates from most reactive (1) to least reactive (3) toward nucleophiles.

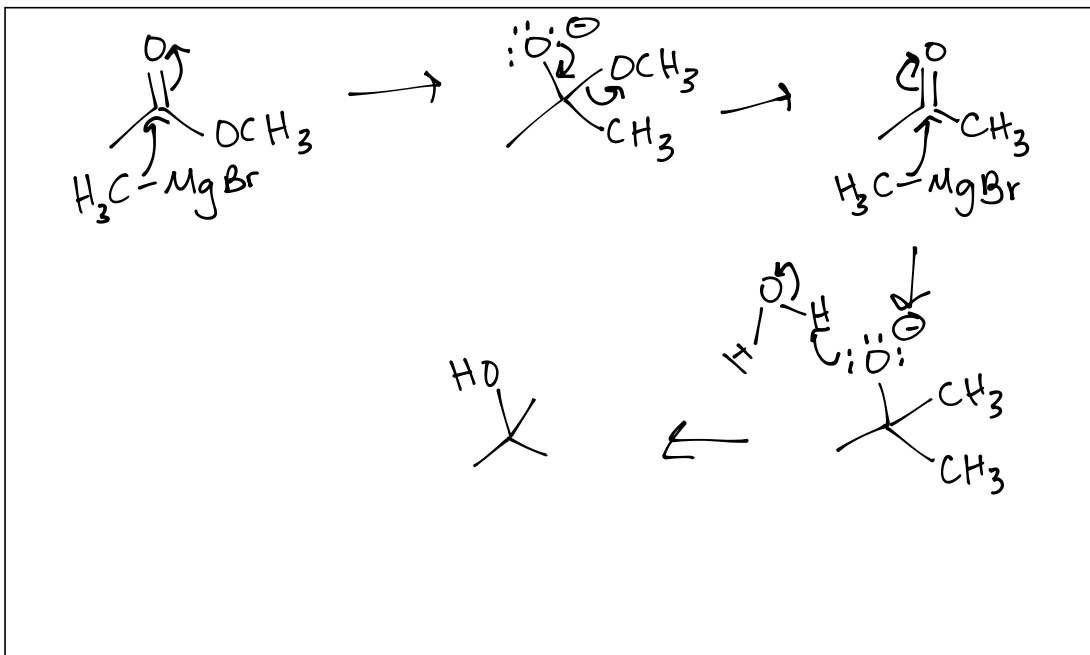
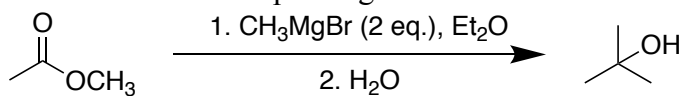


2.1 Predict the major organic product(s) formed in the following reactions. You **do not** need to indicate stereochemistry.

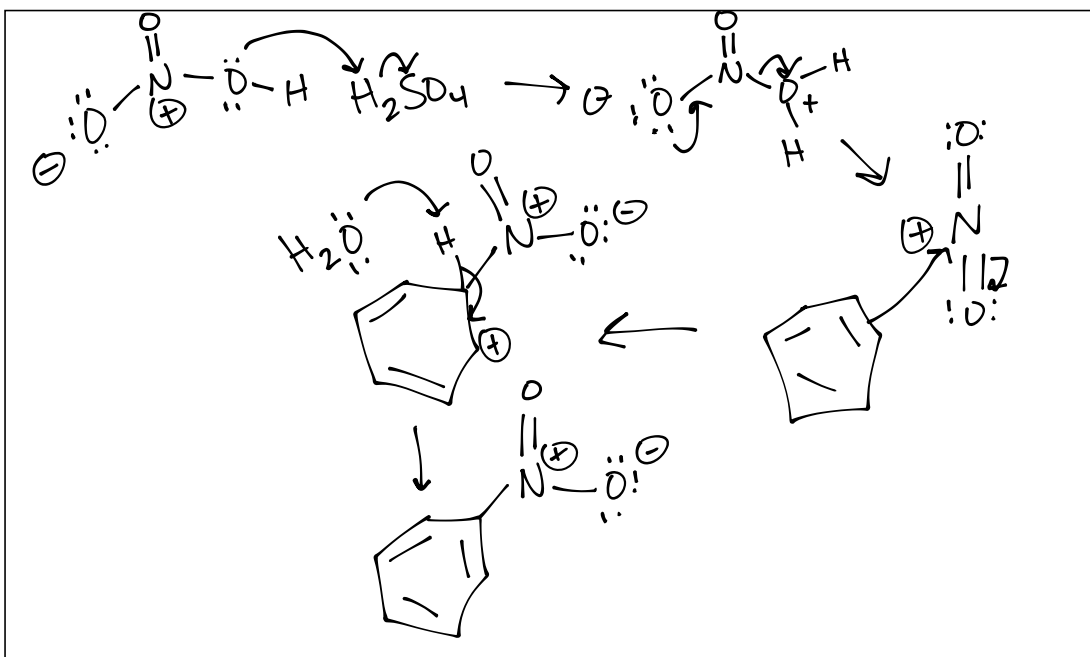
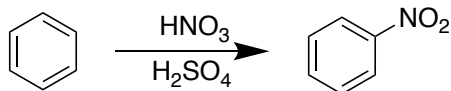


3.1 For each part, provide a detailed arrow-pushing reaction mechanism for the reaction shown.

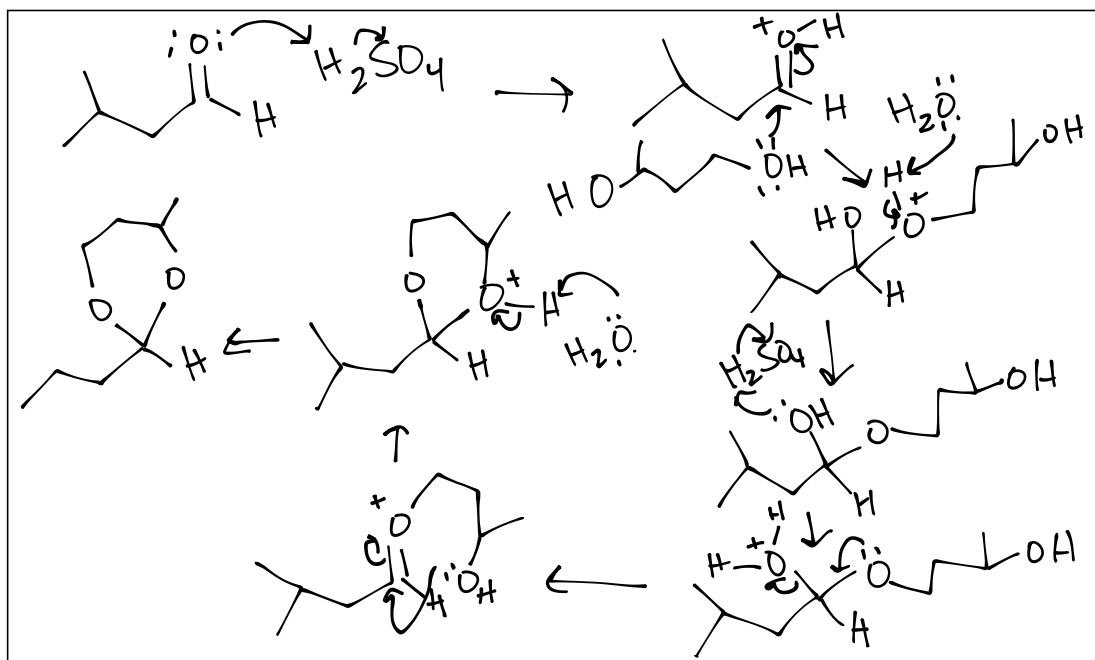
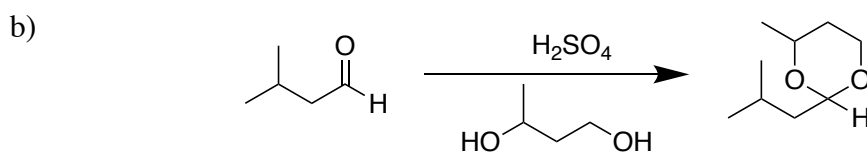
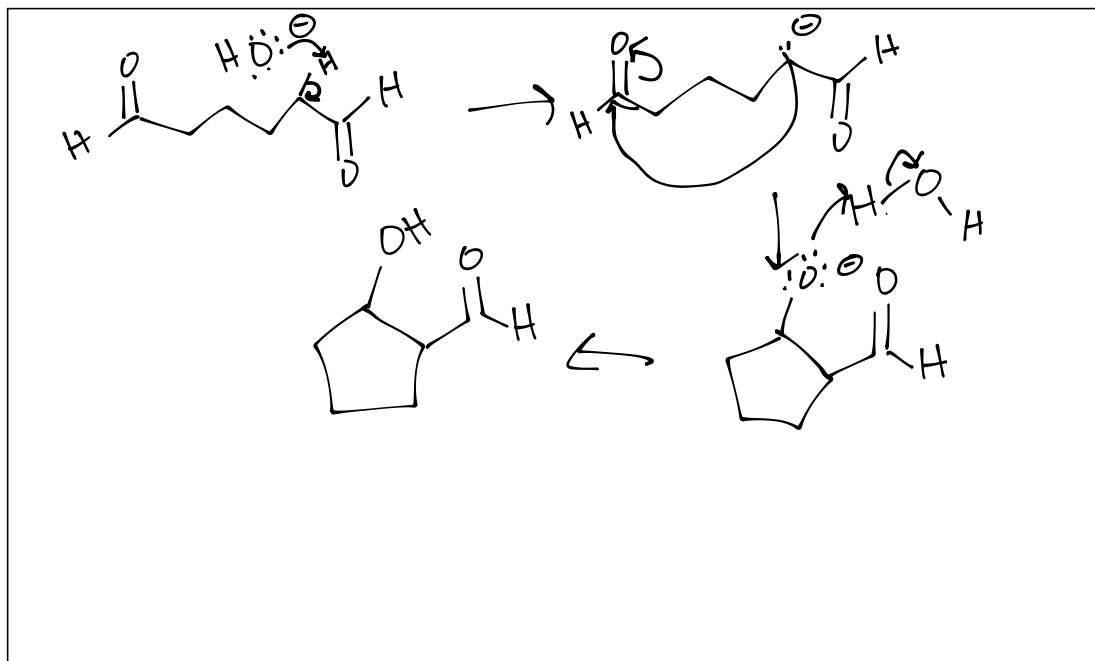
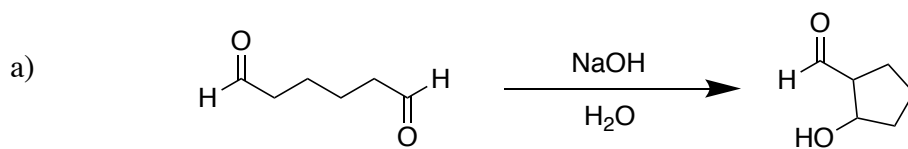
a)



b)

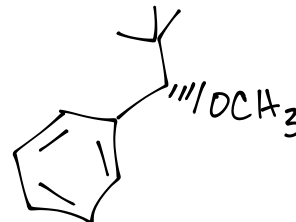
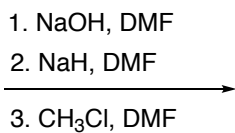
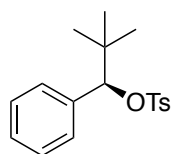


4.1 For each part, provide a detailed arrow-pushing reaction mechanism for the reaction shown.

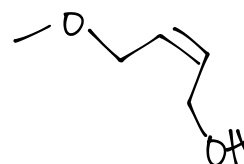
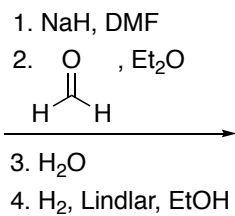
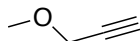


5.1 Predict the final **major organic product(s)** formed in the following reactions or reaction sequences. Be sure your answer clearly shows stereochemistry, if applicable. If more than one stereoisomer would be formed, **draw them all**.

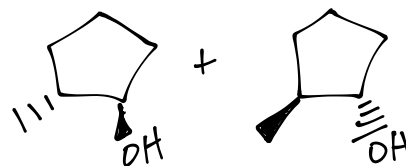
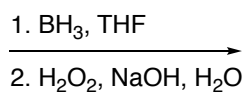
a)



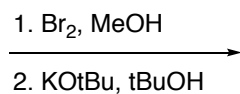
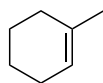
b)



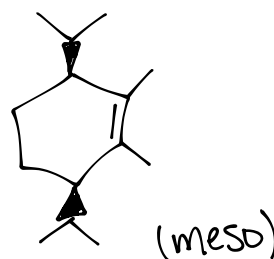
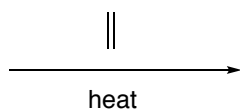
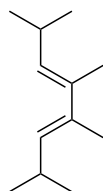
c)



d)



e)

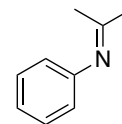
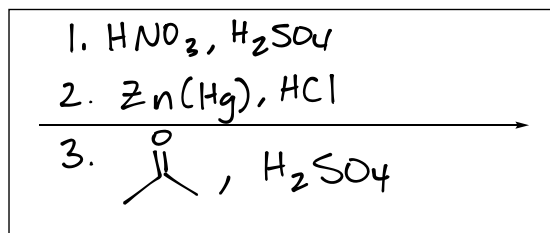


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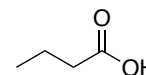
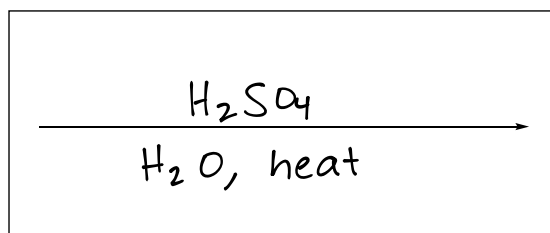
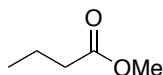
UID: \_\_\_\_\_ Lec: \_\_\_\_\_

6.1 Provide reagents(s) that could be used to make the following products as **selectively** as possible from the starting material. Write your answers within the boxes surrounding the reaction arrows. If you need to use more than one step, please number your steps appropriately (1., 2., ect.).

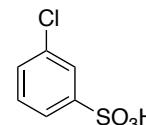
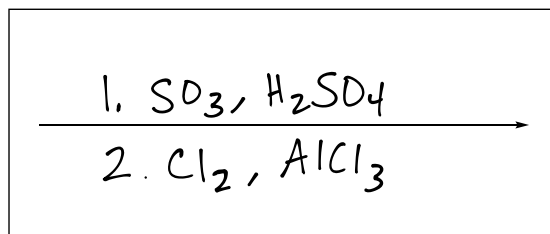
a)



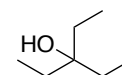
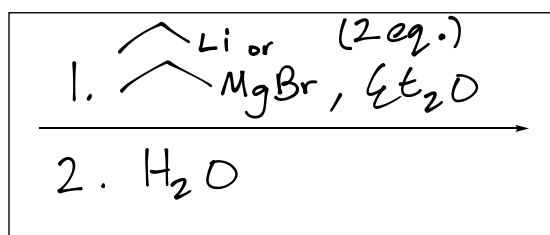
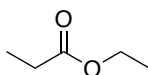
b)



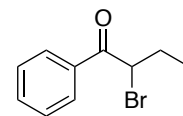
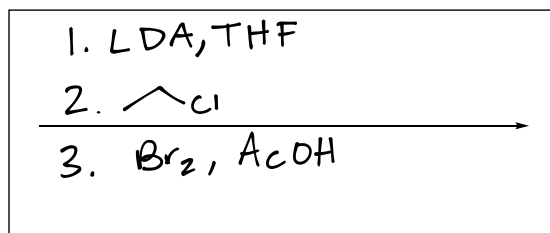
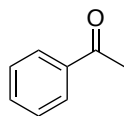
c)



d)

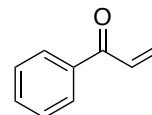
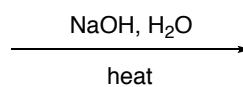
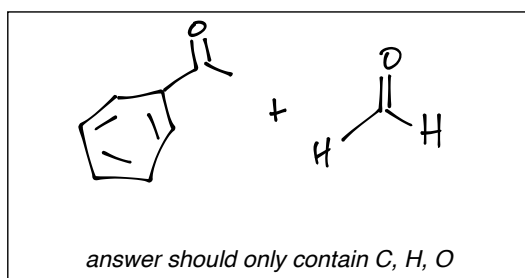


e)

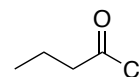
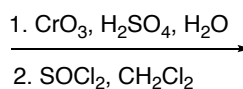
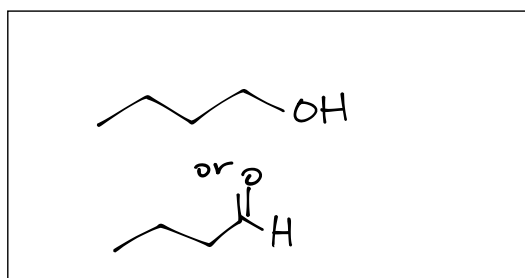


7.1 Provide starting **material(s)** that would react under the conditions shown to make the following products as selectively as possible. You **do not** need to show stereochemistry.

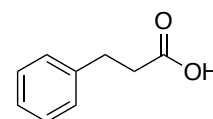
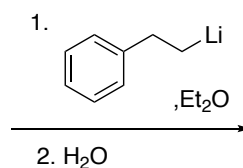
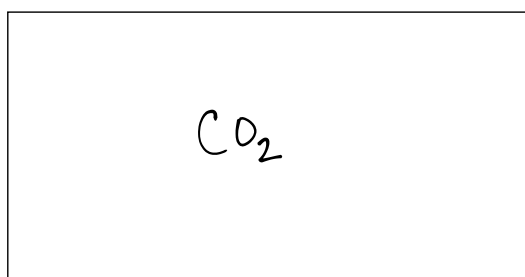
a)



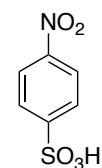
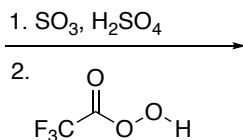
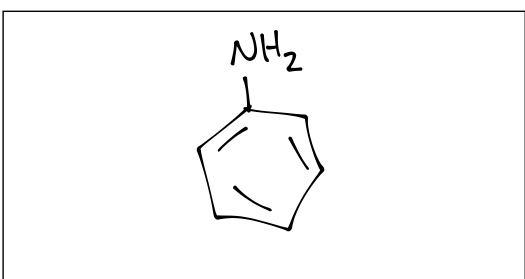
b)



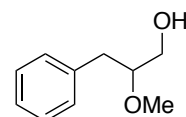
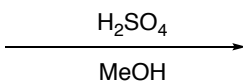
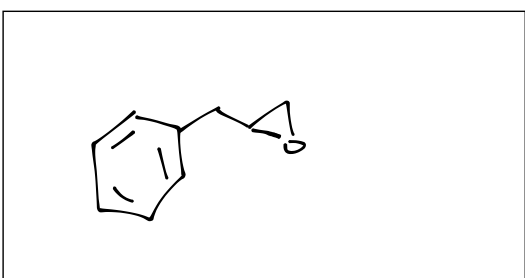
c)



d)



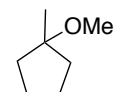
e)



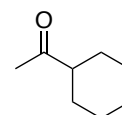
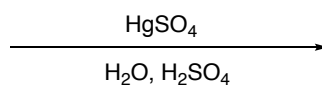
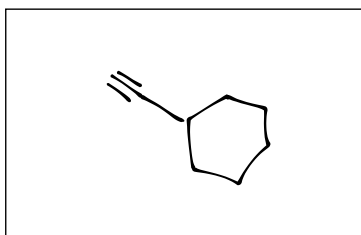


8.1 Predict the missing reagents or reactants to complete the following transformations. You **do not** need to show stereochemistry.

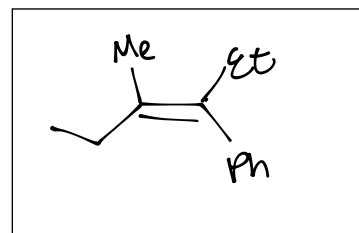
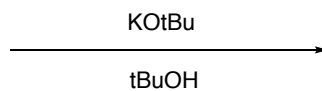
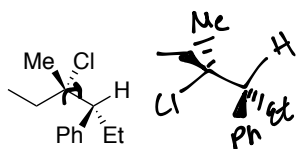
a)



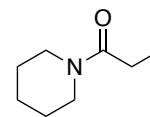
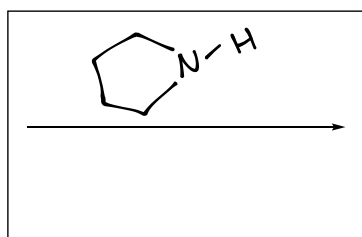
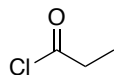
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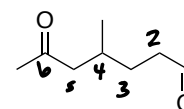
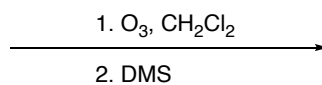
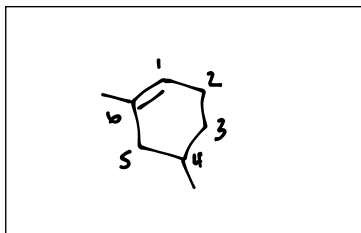
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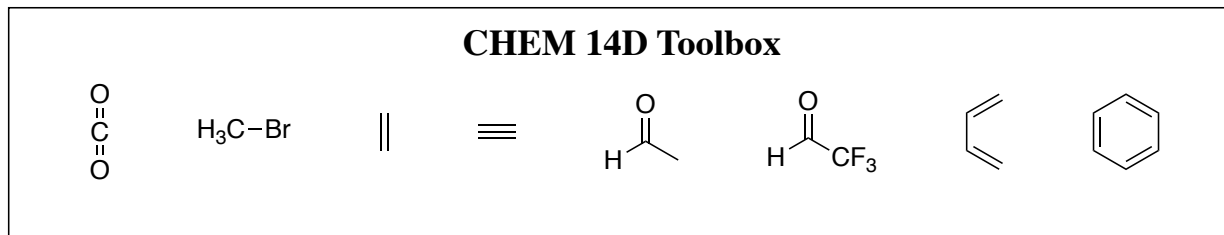
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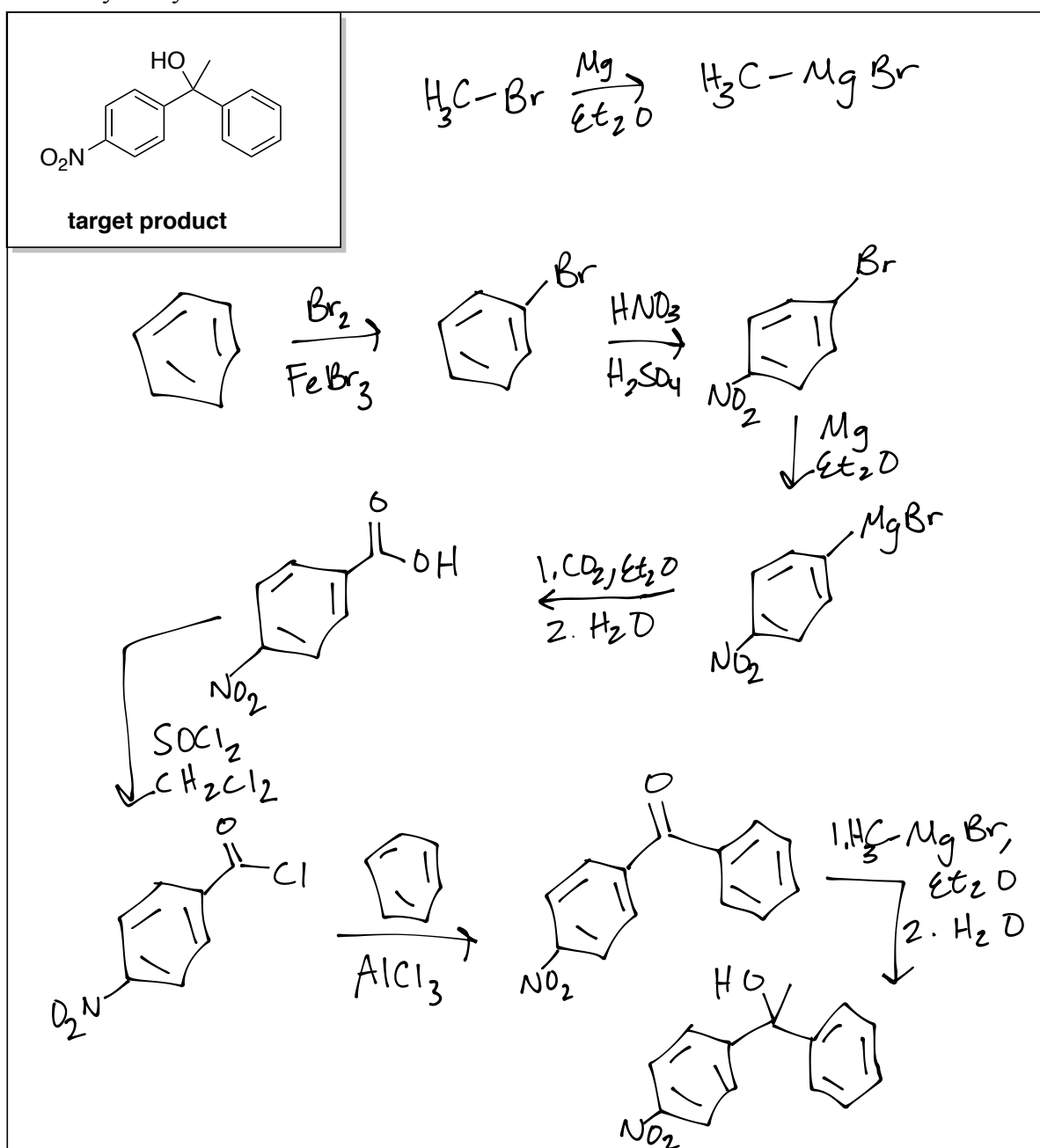
e)



For questions 9.1 and 10.1 propose a multi-step synthesis to prepare each **target product** using any of the molecules in the CHEM 14D toolbox as your only source of carbons. In addition, you may use any common reagents and solvents you have seen in CHEM 14D. If you use an organometallic reagent, show how it is made. **Do not** show an arrow pushing mechanisms or retrosynthetic analysis in your answers. There is more than one correct answer.



9.1 Write your synthesis in the box below.



10.1 Write your syntheses in the boxes below.

