

Chemistry 220b, Section 1

Name _____

Exam 3 (100 pts)

Thursday, April 2, 2015

Chapters 13, 15-23

Write and sign the VU Honor Pledge:

signature

This exam is closed book and closed notes

NOTE: It is difficult for me to give you partial credit if you do not show your work!

Neatness counts

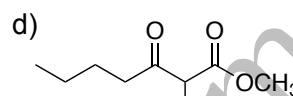
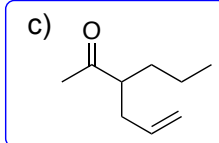
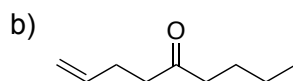
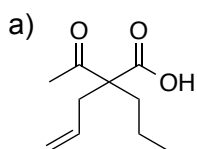
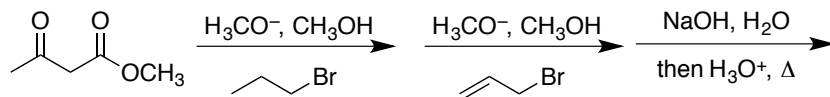
Stereochemistry counts are indicated

Good Luck !!

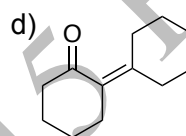
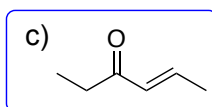
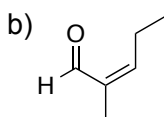
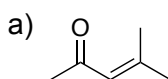
1 H Hydrogen 1.00794							2 He Helium 4.003
3 Li Lithium 6.941	4 Be Beryllium 9.012182	5 B Boron 10.811	6 C Carbon 12.0107	7 N Nitrogen 14.00674	8 O Oxygen 15.9994	9 F Fluorine 18.9984032	10 Ne Neon 20.1797
11 Na Sodium 22.989770	12 Mg Magnesium 24.3050	13 Al Aluminum 26.981538	14 Si Silicon 28.0855	15 P Phosphorus 30.973761	16 S Sulfur 32.066	17 Cl Chlorine 35.4527	18 Ar Argon 39.948

1 – 11. Multiple Choice. Choose the best answer for each of the following questions. (44 pts)

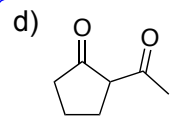
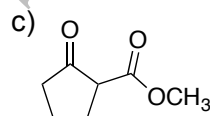
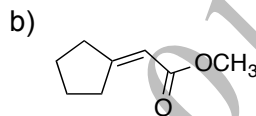
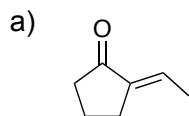
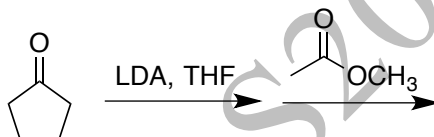
1. Which is the final product of the following reaction sequence?



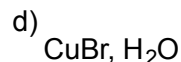
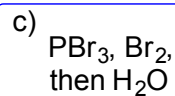
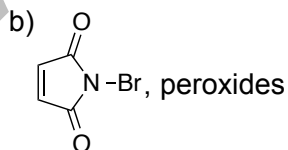
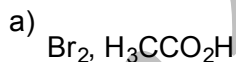
2. Which of the following is a product of a mixed aldol condensation?



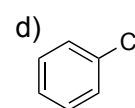
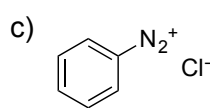
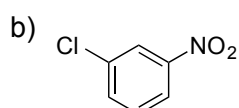
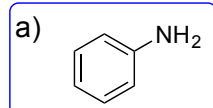
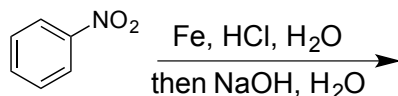
3. Which is the product from the following reaction?



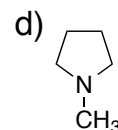
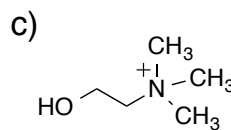
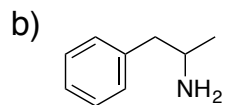
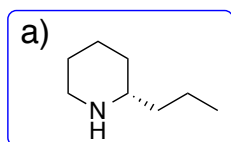
4. What is the best reagent for the following transformation?



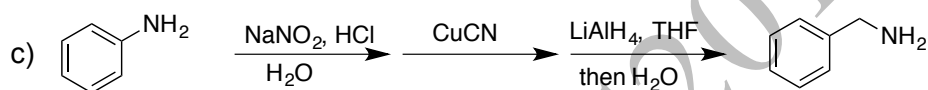
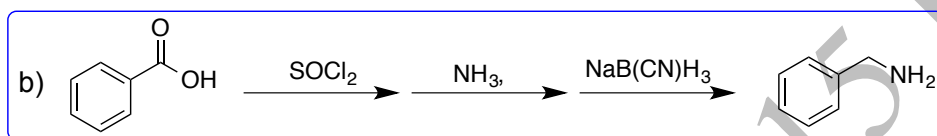
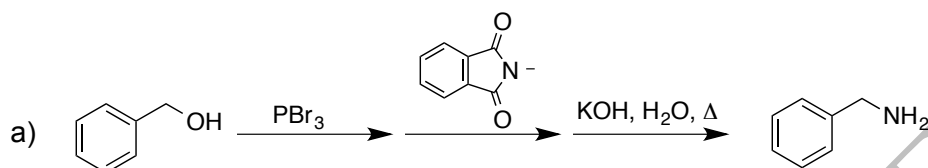
5. Which is the product of the following reaction?



6. Which of the following contains a secondary (2°) amine?

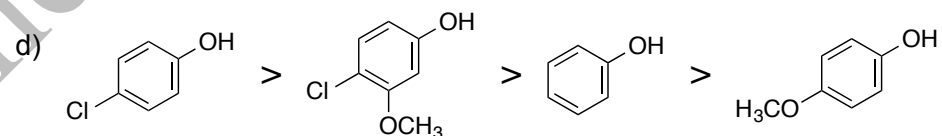
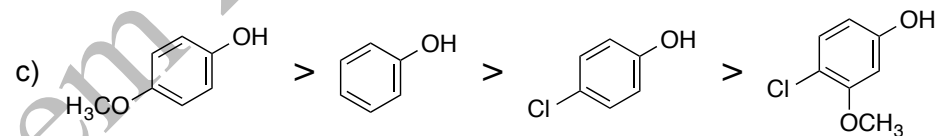
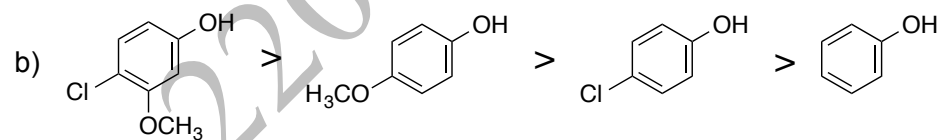
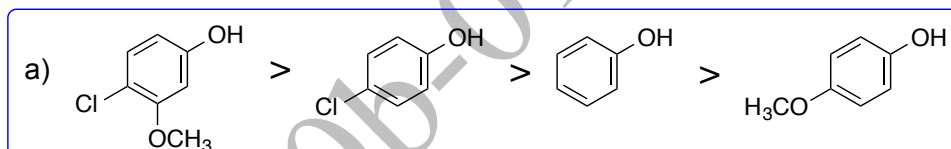


7. Which of the following reaction sequences does not afford benzylamine?

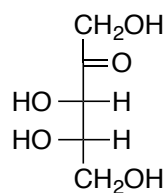


d) **a, b, and c** all afford benzylamine

8. What is the correct order of acidity from most acidic to least acidic?



9. What is the stereochemistry of the following Fischer projection?



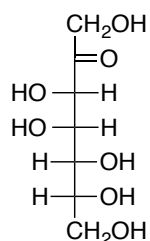
a) (3R, 4R)

b) (3S, 4R)

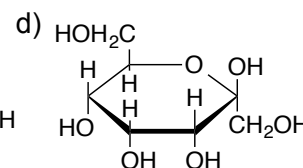
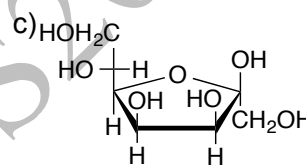
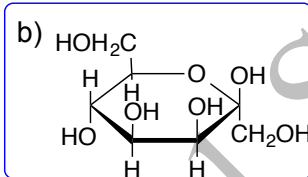
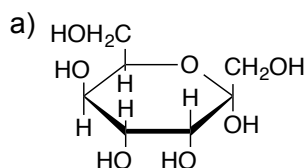
c) (3R, 4S)

d) (3S, 4S)

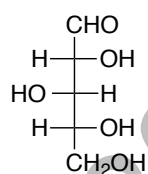
10. Mannohepulose is one of the few natural heptuloses (found in avocados). Which of the following is the Haworth representation of the β -pyranose form of D-mannohepulose?



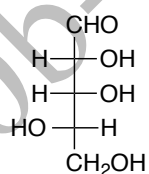
D-mannohepulose



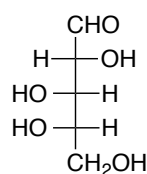
11. Which two of the following aldopentoses gives the identical alditol upon treatment with sodium borohydride?



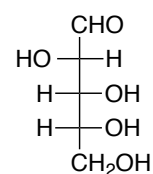
D-Xylose



L-Lyxose



L-Arabinose



D-Arabinose

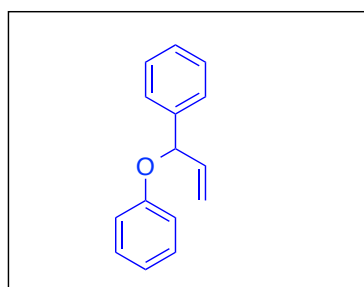
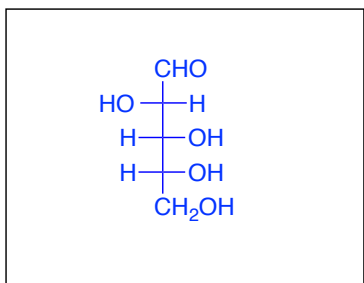
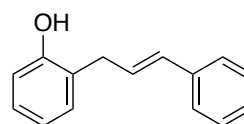
a) L-Lyxose and L-Arabinose

b) L-Arabinose and D-Arabinose

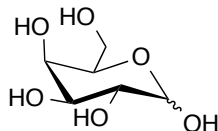
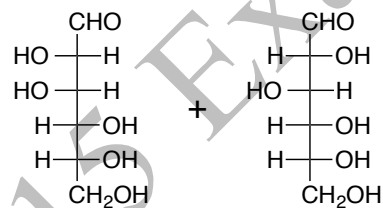
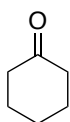
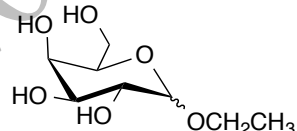
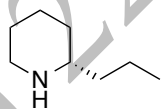
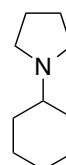
c) L-Arabinose and D-Xylose

d) L-Lyxose and D-Arabinose

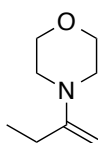
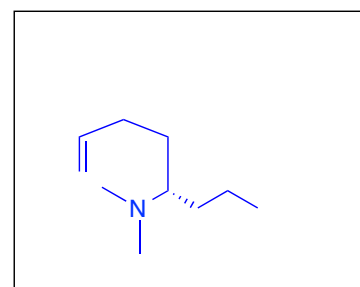
12. Provide the missing substrate, reagent(s), or product for each of the following (18 pts)


 Δ (~200 °C)


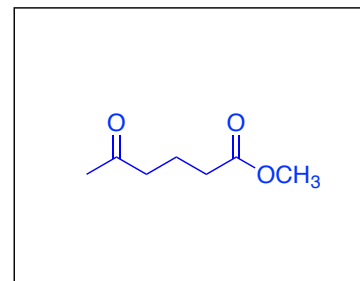
1) HCN
2) H₂, Pd/BaSO₄
3) H₂O


 $\text{HOCH}_2\text{CH}_3, \text{H}^+$

 $\text{NaB}(\text{CN})\text{H}_3$


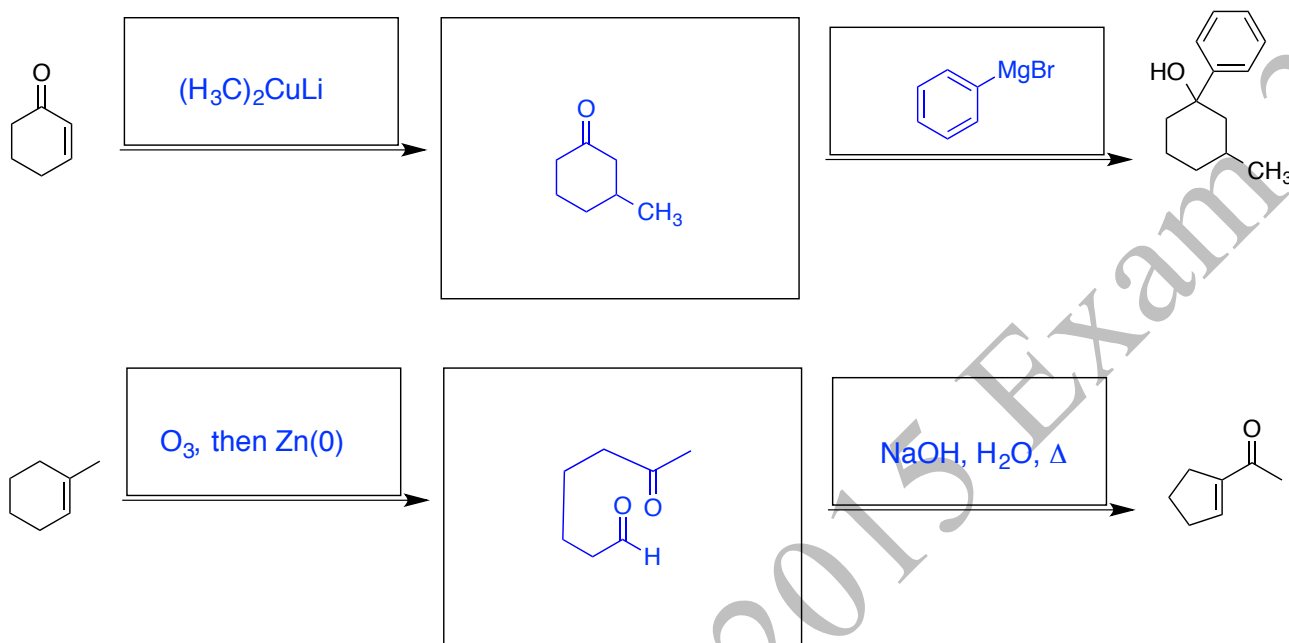
1) H₃C-I (excess)
2) Ag₂O, H₂O, then Δ



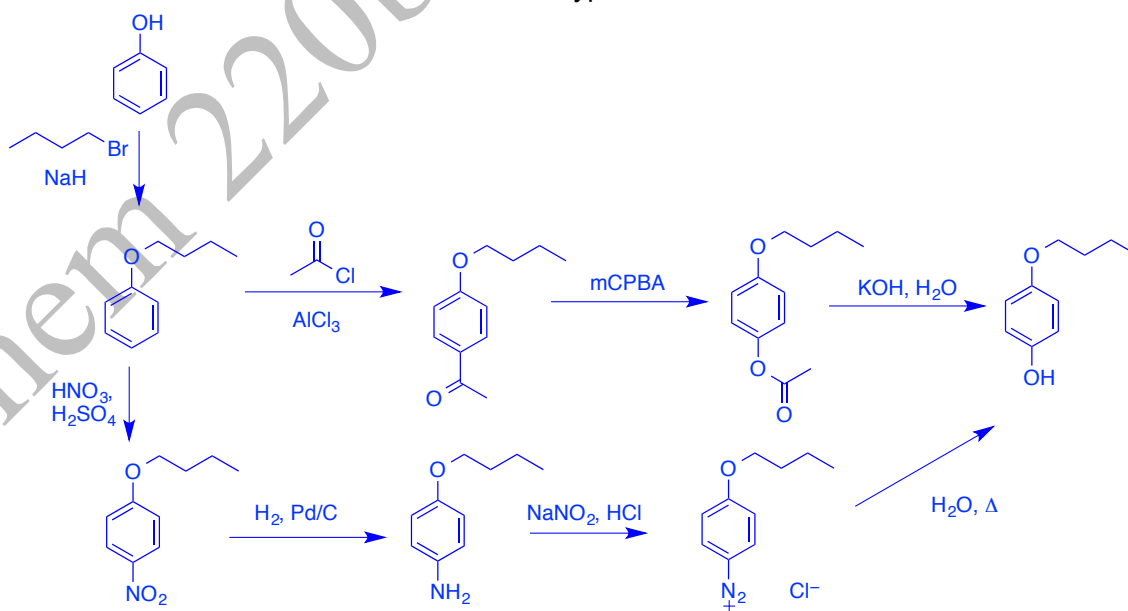
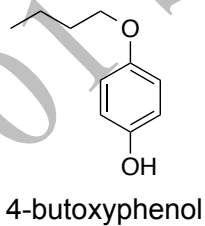
OCH_3
then H₂O



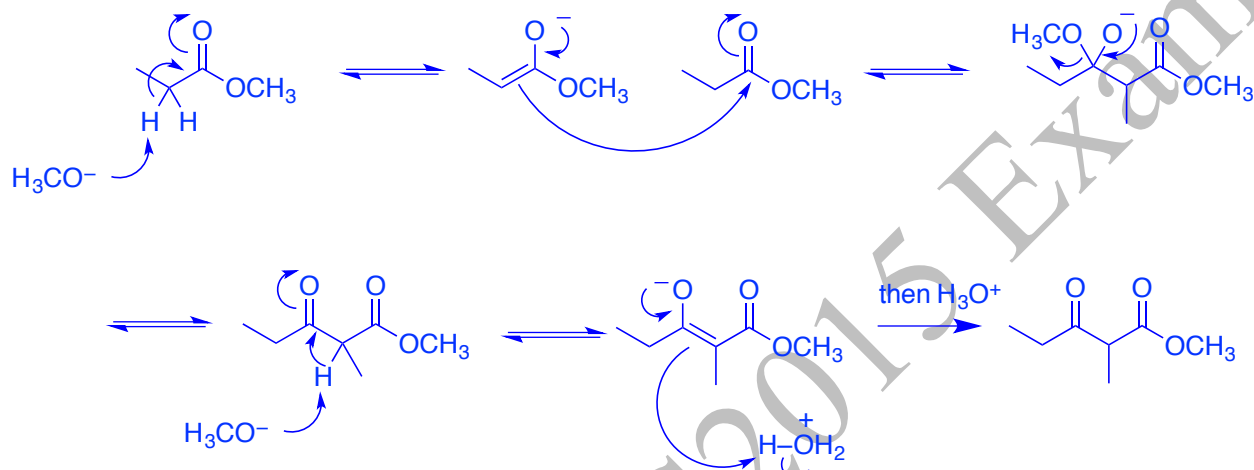
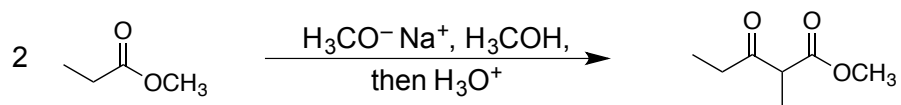
13. Complete the following reaction sequences by providing the correct reagents and the structure of the intermediate. (18 pts)



14. Synthesize 4-butoxyphenol from phenol. Note: *Brevity is the soul of wit and organic synthesis.* (10 pts)



15. Give a complete, step-wise mechanism for the base promoted condensation of methyl propionate. (10 pts)



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Problem 1-11: _____ (44 pts)

12: _____ (18 pts)

13: _____ (18 pts)

14: _____ (10 pts)

15: _____ (10 pts)

Total out of 100: _____