Chemistry 220b, Section 1 Name _____

Exam 3 (75 pts)

Thursday, April 3, 2008

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!

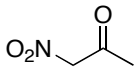
Neatness counts

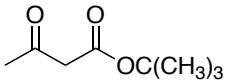
Good Luck !!

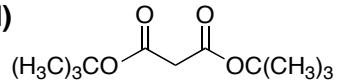
1-10. Multiple Choice. Give the best answer for the following. (30 pts)

1. The pK_a of *tert*-butanol is 18. Which of the following carbonyl compound undergoes α-deprotonation with potassium *tert*-butoxide to give the highest concentration of the corresponding enolate?

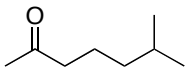
a)  pK_a ~ 20

b)  pK_a ~ 5.1

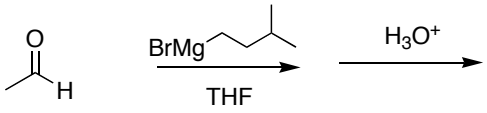
c)  pK_a ~ 11

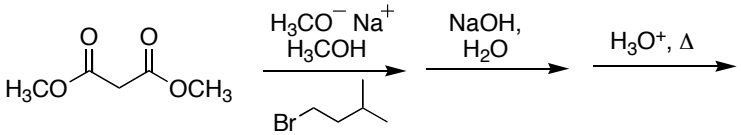
d)  pK_a ~ 19

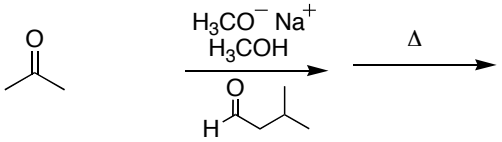
2. Which of the following sequences can be used to synthesize 6-methyl-2-heptanone.

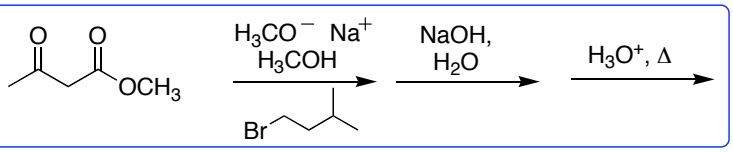


6-methyl-2-heptanone

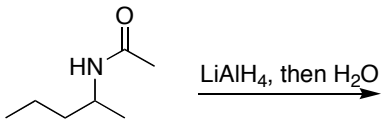
a) 

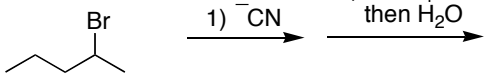
b) 

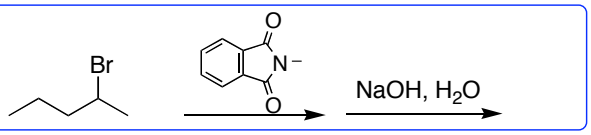
c) 

d) 

4. Which of the following is a feasible way to make 2-aminopentane?

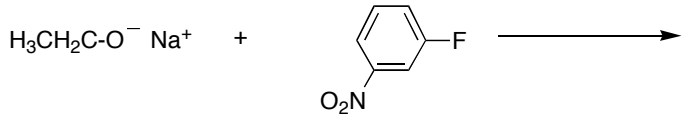
a) 

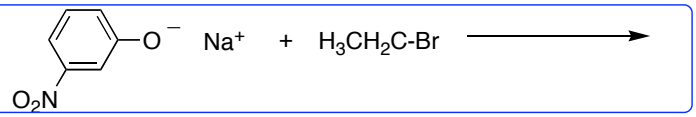
b) 

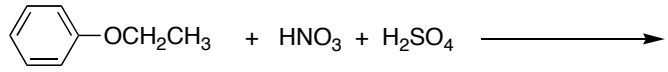
c) 

d) None of the above; i.e., **a**, **b**, and **c**, are *not* feasible ways to make 2-aminopentane

5. Which of the following is a feasible way to make 3-nitrophenyl ethyl ether.

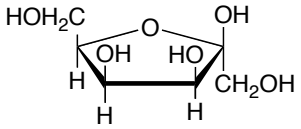
a) 

b) 

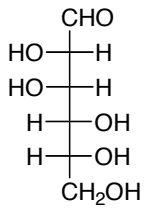
c) 

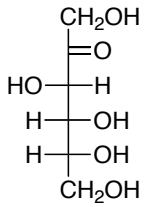
d) All of the above; i.e., **a**, **b**, and **c**, are all feasible ways to make 3-nitrophenyl ethyl ether

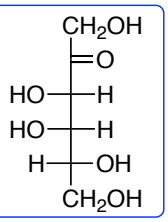
6. Which Fischer projection corresponds to the Haworth formula of tagalose shown below?

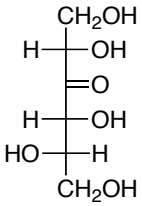


Tagalose

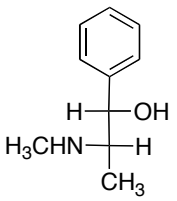
a) 

b) 

c) 

d) 

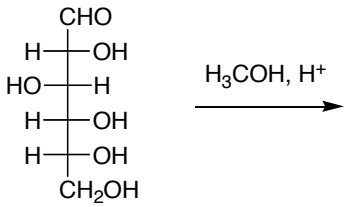
7. The Fischer projection of pseudoephedrine, 2-methylamino-1-phenylpropan-1-ol, is shown. Assign the correct stereochemistry to the Fischer projection.

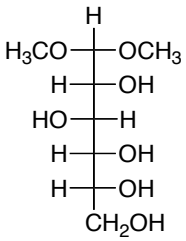


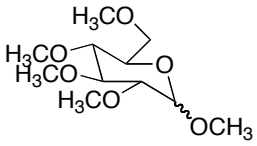
pseudoephedrine,
2-methylamino-1-phenylpropan-1-ol

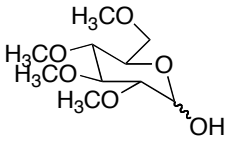
a) (1*S*, 2*S*) **b)** (1*R*, 2*R*) **c)** (1*S*, 2*R*) **d)** (1*R*, 2*S*)

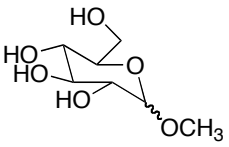
8. Which is the product of the following reaction?



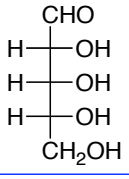
a) 

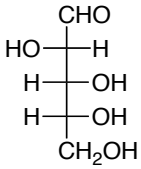
b) 

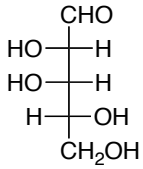
c) 

d) 

9. Which of the following carbohydrates reacts with $NaBH_4$ to give an optically inactive product?

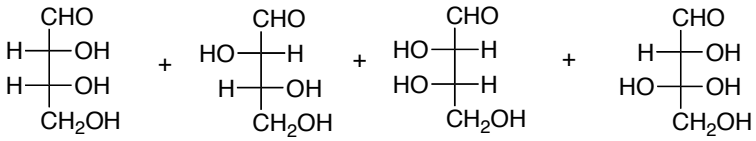
a) 

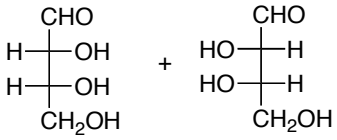
b) 

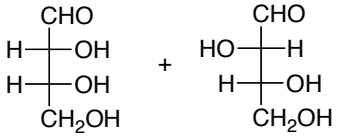
c) 

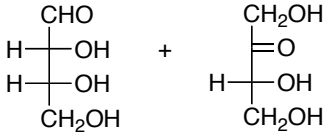
d) None of the above.
i.e., the products from the reaction of **a**, **b**, or **c** with $NaBH_4$ will be optically active

10. Which are products from the Kiliani-Fischer chain extension reaction (1. HCN 2. H_2, $Pd/BaSO_4$, H_2O) of D-glyceraldehyde (an aldotriose)

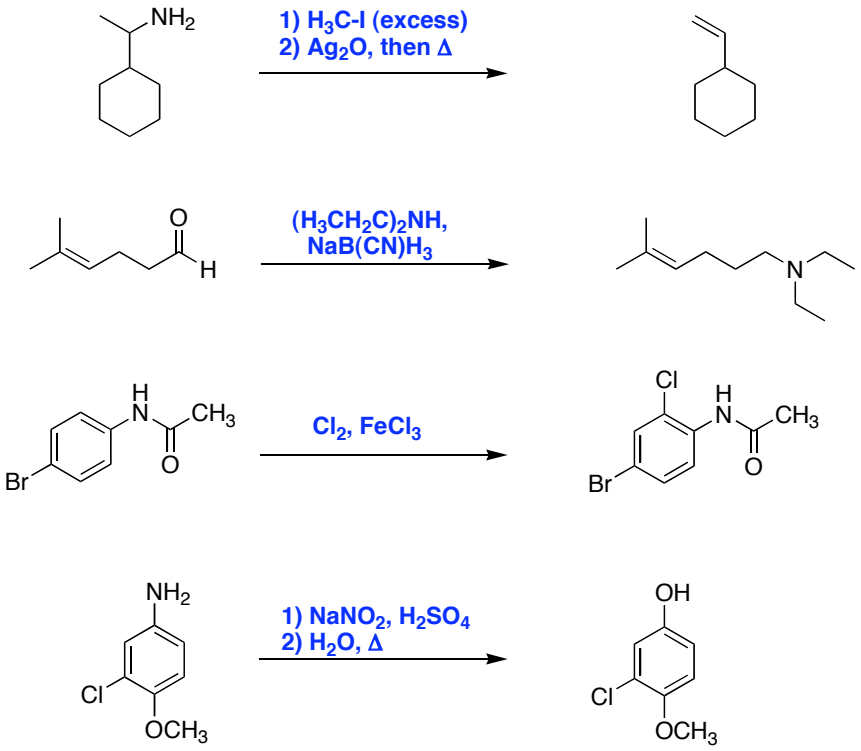
a) 

b) 

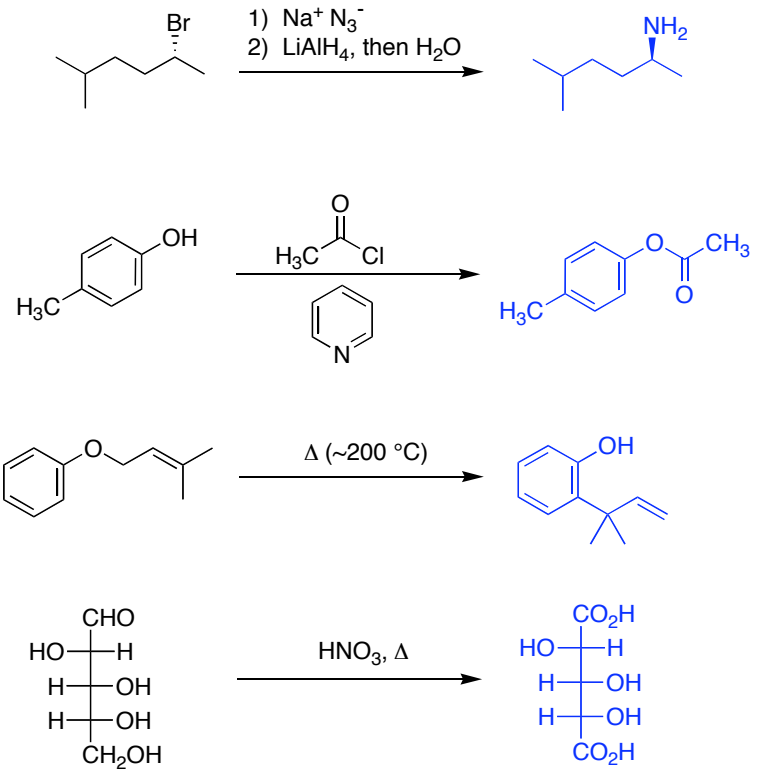
c) 

d) 

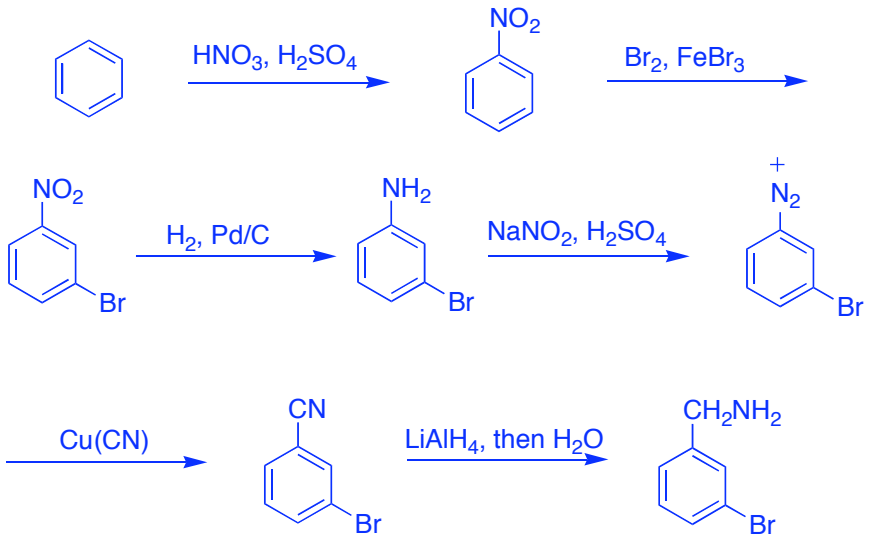
11. Provide the reagent(s) and any other necessary reactants for the following reactions (12 pts)



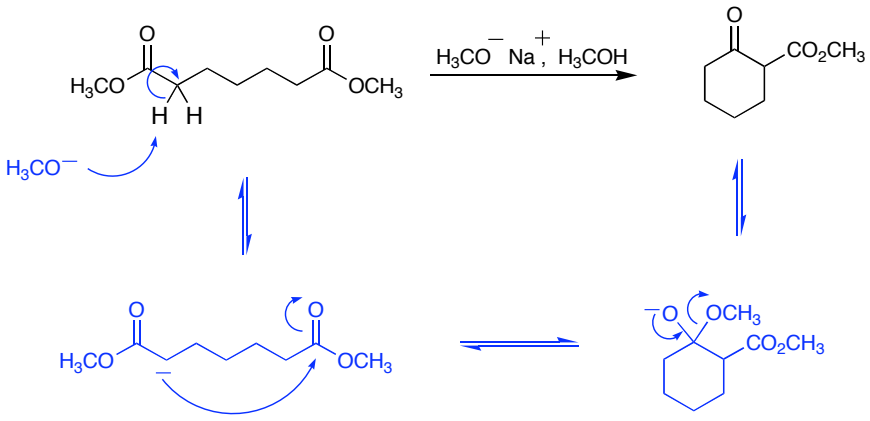
12. Give the product of the following reactions. Stereochemistry is as shown. (12 pts)



13. Synthesize *m*-bromobenzylamine starting from benzene. (12 pts)



14. Give a complete, stepwise mechanism for the following reaction. (9 pts)



Problem 1-10:_____ (30 pts)

11:_____ (12 pts)

12:_____ (12 pts)

13:_____ (12 pts)

14:_____ (9 pts)

Total out of 75: _____