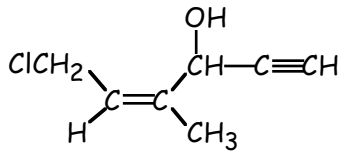
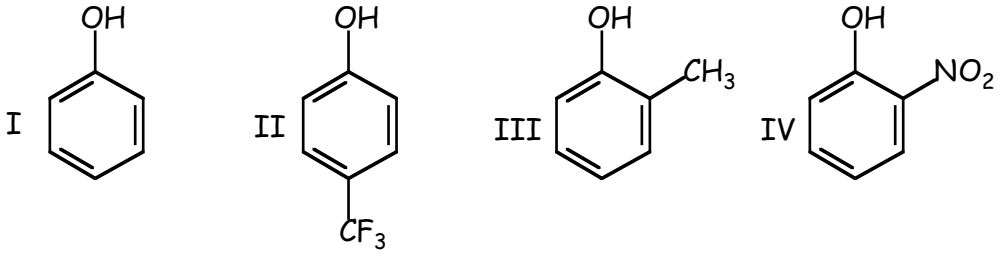
Chem 112B Homework Assignment 3 Answer Key
Due 23 February 2004

1. What is the correct IUPAC name for the following structure?



a) E-6-chloro-4-methyl-4-hexen-1-yn-3-ol
b) E-1-chloro-3-methylhex-2-en-5-yn-4-ol
c) Z-6-chloro-4-methyl-4-hexen-1-yn-3-ol
d) Z-1-chloro-3-methylhex-2-en-5-yn-4-ol

2. Arrange the following substances in order of increasing acidity (least acidic first).



a) III, I, II, IV b) III, I, IV, II c) I, III, II, IV d) I, III, IV, II

3. How many different kinds of hydrogen bonds are possible for a solution of 3-methoxy-1-propanol in diethyl ether?

a) 2 b) 4 c) 5 d) 6

4. Arrange the following hydrogen bonds in order increasing strength (weakest first).

I. $H_2NH\cdots OH_2$ II. $H_2NH\cdots NH_3$ III. $H_2O\cdots HOH$ IV. $H_3N\cdots HOH$

a) I, II, III, IV b) III, I, IV, II c) II, IV, I, III d) I, IV, II, III

5. Arrange the following compounds in order of decreasing acidity (strongest first).

CH_3CH_2OH (I) $ClCH_2CH_2OH$ (II) $CH_3CH_2CH_2OH$ (III) CF_3CH_2OH (IV)

a) IV, I, II, III b) II, I, III, IV c) IV, II, I, III d) IV, II, III, I

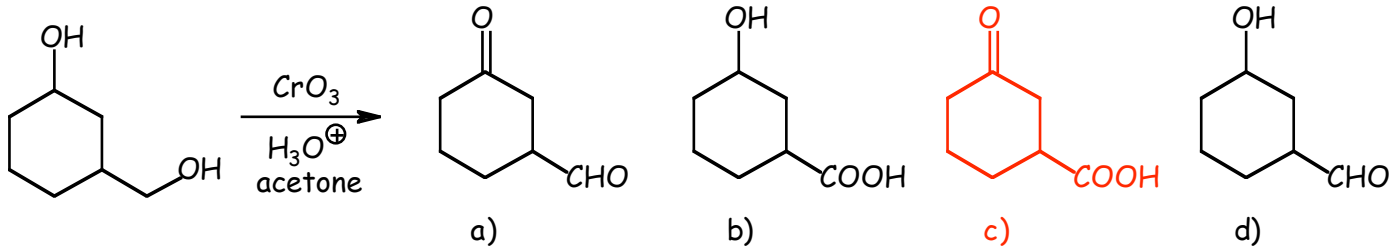
6. Which of the following synthetic methods for preparing alcohols will <u>not</u> yield 2-pentanol from 1-pentene?

a) acid-catalyzed hydration
b) hydroboration-oxidation
c) oxymercuration-demercuration
d) epoxidation then reduction with $LiAlH_4$

7. What is the major product from the acid-catalyzed hydration of 3,3-dimethyl-1-butene?

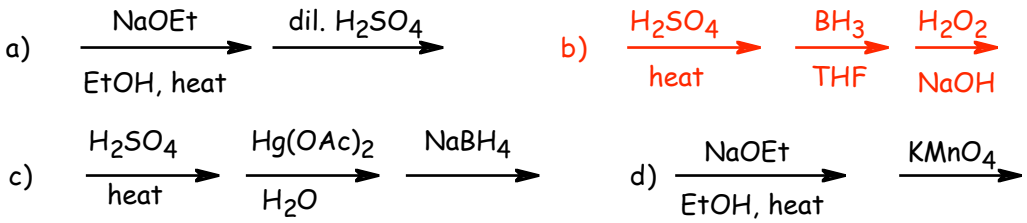
a) 2,3-dimethyl-2-butanol
b) 3,3-dimethyl-2-butanol
c) 3,3-dimethyl-1-butanol
d) 2,3-dimethyl-1-butanol

8. What is the major product of the following reaction?



a) b) c) d)

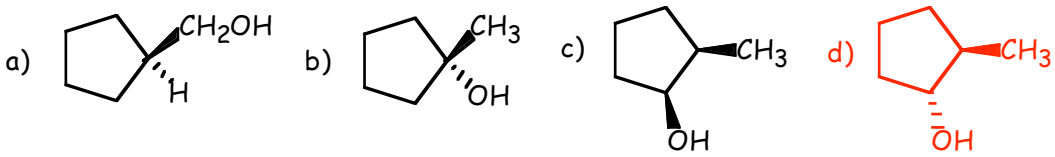
9. Which of the following reaction sequences is best for converting 2-propanol into 1-propanol?



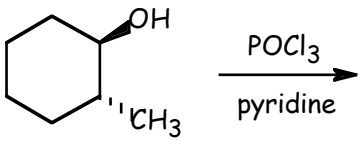
10. Which of the following compounds <u>cannot</u> be prepared from 1-butanol in one step?

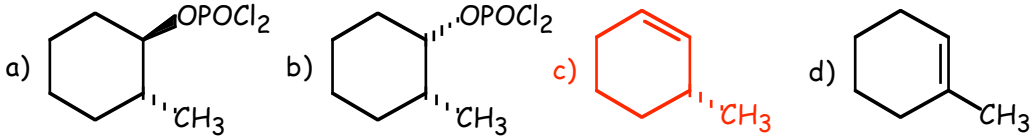
a) 1-butene b) butane c) 1-chlorobutane d) butanal

11. Cyclopentene was treated with HBr, then with Li metal in ether, then with CuI and finally with CH_3I to give substance **A**. Bromination of **A** (Br_2, UV light) followed by heating of the bromination product with KOH gave substance **B**. Hydroboration of **B** followed by treatment with NaOH and H_2O_2, gave final product ***C***. What is the most likely structure for ***C***?



12. The most likely product of the following reaction is:

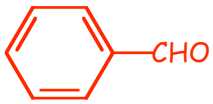


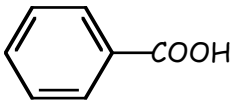


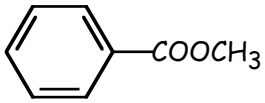
13. The conversion of an alcohol into an alkyl chloride by reaction with $SOCl_2$ is an example of:

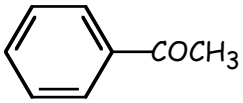
a) an E1 process b) an S_N1 process c) an E2 process d) an S_N2 process

14. Which compound below will give benzyl alcohol when treated with $NaBH_4$ (Sodium Borohydride)?

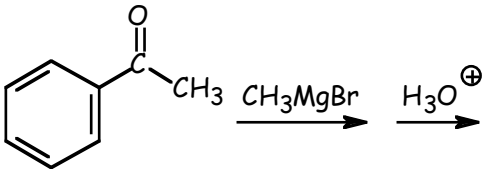
a) 

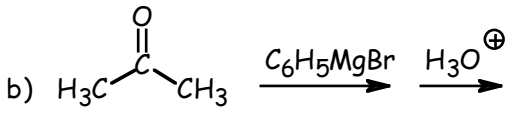
b) 

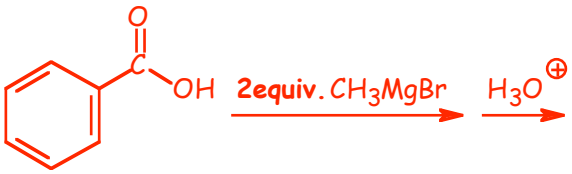
c) 

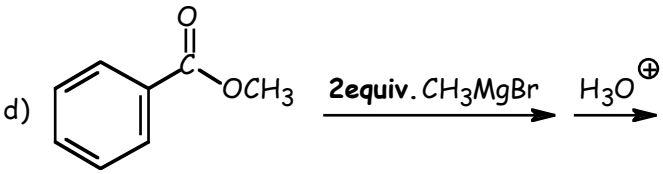
d) 

15. Which synthetic scheme will <u>not</u> give 2-phenyl-2-propanol?

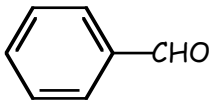
a) 

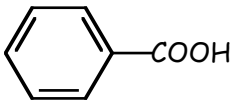
b) 

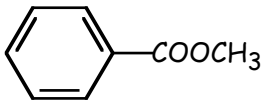
c) 

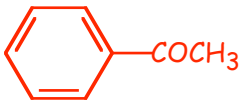
d) 

16. Which compound below will <u>not</u> give benzyl alcohol when treated with $LiAlH_4$ (Lithium Aluminum Hydride)?

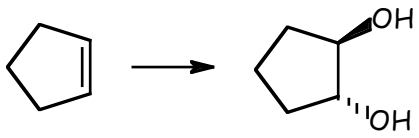
a) 

b) 

c) 

d) 

17. Which of the reaction sequences below is best for effecting the following conversion?



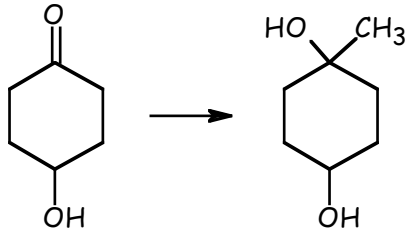
a) $\xrightarrow[NaOH]{KMnO_4}$

b) $\xrightarrow[CH_2Cl_2]{m\text{-}ClC_6H_4CO_3H}$ $\xrightarrow{H_3O^{\oplus}}$

c) $\xrightarrow[THF]{BH_3}$ $\xrightarrow[NaOH]{H_2O_2}$

d) $\xrightarrow[pyridine]{OsO_4}$ $\xrightarrow[H_2O]{NaHSO_3}$

18. What is the best way to effect the following conversion?



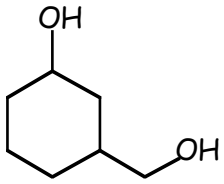
a) CH_3MgBr → $H_3O^{\oplus}$

b) CrO_3, H_2SO_4, H_2O → **2equiv.** CH_3MgBr → $H_3O^{\oplus}$

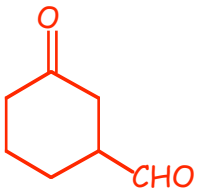
c) $(CH_3)_3SiCl$, $(CH_3)_3N$ → CH_3MgBr → $H_3O^{\oplus}$

d) *p*-TosCl, pyridine → CH_3MgBr → $H_3O^{\oplus}$

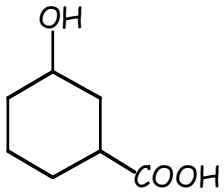
19. What is the major product of the following reaction?



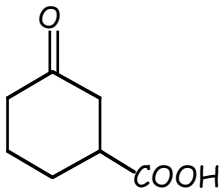
PPC, CH_2Cl_2



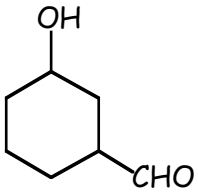
a)



b)

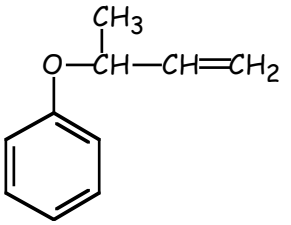


c)



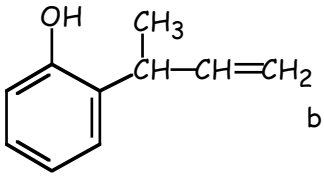
d)

20. What is the major product of the Claisen rearrangement of the following ether?

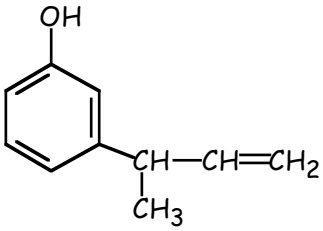


250° C

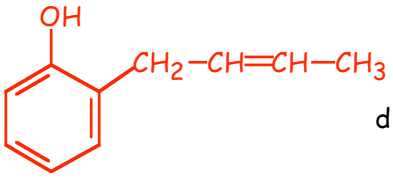
a)



b)



c)



d)