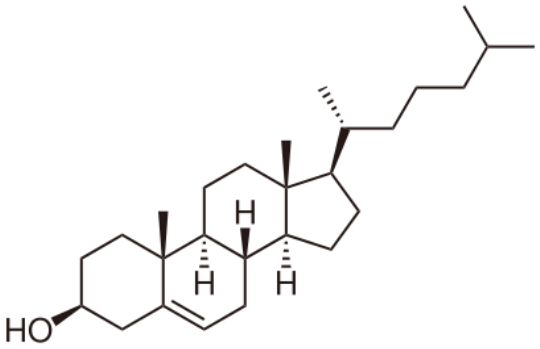
Houston Community College

A Learning Community, A Caring Community

Organic Chemistry II

2425

Sample Exam 3A



Cholestrol

CHEM 2425 Sample EXAM # 3A (Chapters 19-23) NAME_____

Score:

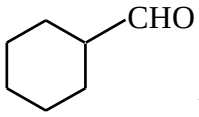
Part I - Multiple choice questions (45 points)

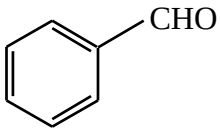
Directions- please write your correct answer next to each question number in space provided.

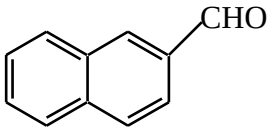
_____ 1. Which of the following is called an acyl group?

A. R-COO- B. R-CO- C. R-CO-O-CO- D. C = O

_____2. Which of the following used as a suffix of carbaldehyde in naming?

A. 

B. 

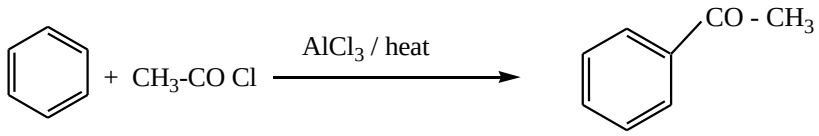
C. 

D. all of these

_____3. When two molecules of acetaldehyde combine to yield the hydroxyaldehyde, the product is known as _____.

A. Ester B. Ether C. Aldol D. Enol

_____ 4. Aryl ketones are prepared by the following reaction. This reaction is called_____.



A. Friedel-Crafts Alkylation B. Friedel-Crafts Acylation
C. Wolff-Kishner reaction D. Hofmann rearrangement

_____ 5. Which of the following is an example of an enamine?

A. R_2 C =NR B. R_2 NH C. R_2 C = C R –NR_2 D. $R_4 N^+$

_____ 6. Aldehydes and ketones are reduced by $NaBH_4$ or $LiAlH_4$ to yield _____ and _____ alcohols.

A. 1^0 and 2^0 B. 2^0 and 1^0 C. 1^0 and 3^0 D. 2^0 and 3^0

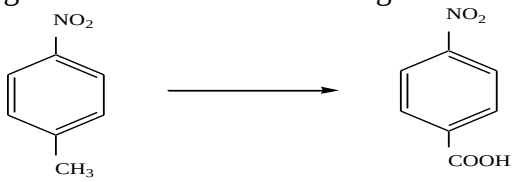
_____7. Which of the following has the highest boiling point?

A. CH_3 COOH B. CH_3 CH_2 COOH C. HCOOH D. C_6H_5COOH

_____ 8. Which of the following is the most acidic?

A. F CH_2 COOH B. ClCH_2 COOH C. F_3 C COOH D. CH_3CH_2 COOH

_____9. Which of the following reagents is used for the following conversion?



A. $KMnO_4$, H_2O, heat B. $LiAlH_4$, THF /H_3O^+ C. CrO_3 /H_3O^+ D. BH_3, THF /H_3O^+

____ 10. Alpha- bromination of carboxylic acid by a mixture of Br_2 and PBr_3 is called _____ .

A. Hell-Volhard Zelinskii (HVZ) reaction B. Claisen- condensation reaction
B. Robinson annulation D. Michael reaction

____ 11. Which of the following is an example of diazonium ion?
A. $CH_3^+N_3^-$ B. $CH_3N_2^+$ C. $H_2N - NH_3^+$ D. none of these

____12. The reaction of carboxylic derivatives by an organometallic reagent to yield an alcohol is called _____.
A. alcoholysis b. Hydrolysis C. Grignard reaction D. reduction

____13. Lactones are common names for :
A. polyaromatic compounds B. cyclic ethers C. cyclic esters D. cyclic amides

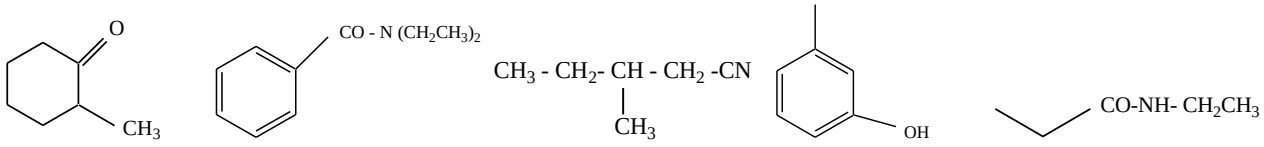
____14. Which of the following carboxylic acids is not classified as dicarboxylic acid?

A. oxalic acid B. adipic acid C. salicylic acid D. succinic acid

____15. Which of the following is not considered to be a carboxylic acid derivative?
A. acid anhydride B. acid halide C. amide D. alkylhalide

PART II - Namenclature(20 points)

a) Write the correct IUPAC names.



(A) **(B)** **(C)** **(D)** **(E)**

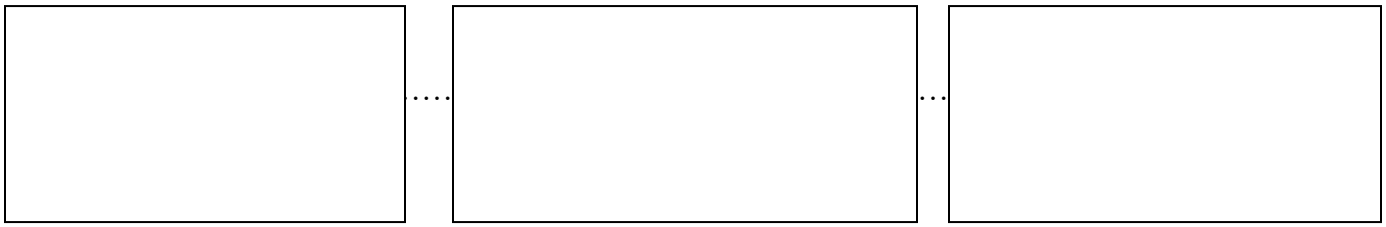
A. _____ **B.** _____

C. _____ **D.** _____

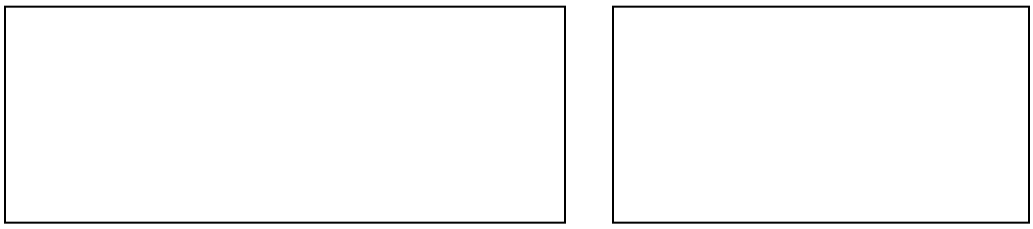
E._____

b) Write the correct structures .

2-phenylcyclopentanone ..... o-hydroxybenzamide ... acetic anhydride



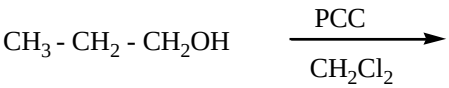
1,4- butanedioic acid 3-methylhexanal



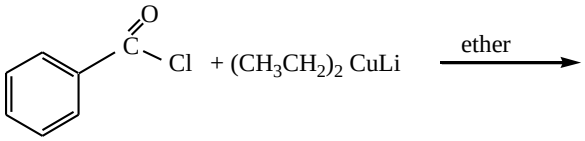
PARTT III- REACTIONS(20 points) What major product(s) would you expect from the following reactions?

a)

b)



c)



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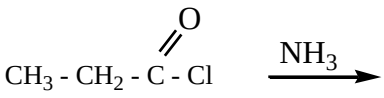

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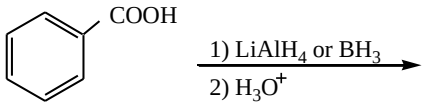

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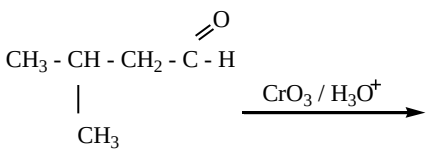
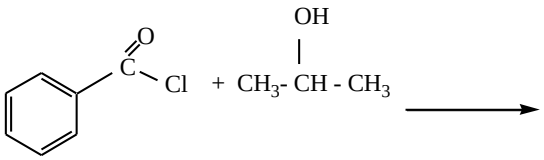


g)



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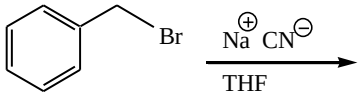

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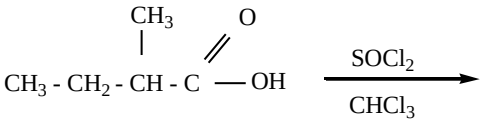

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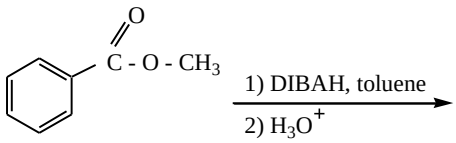
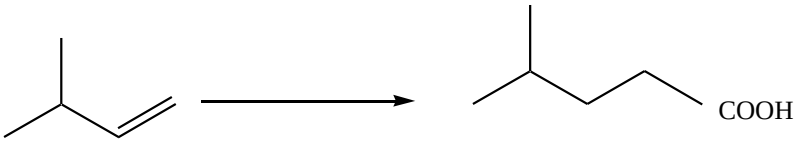


PART IV – SYNTHESIS (10 points)

What is the best procedure for preparing the following compound?
(requires more than one step)

a)



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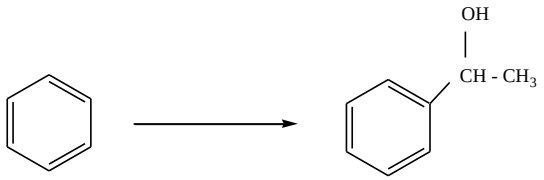
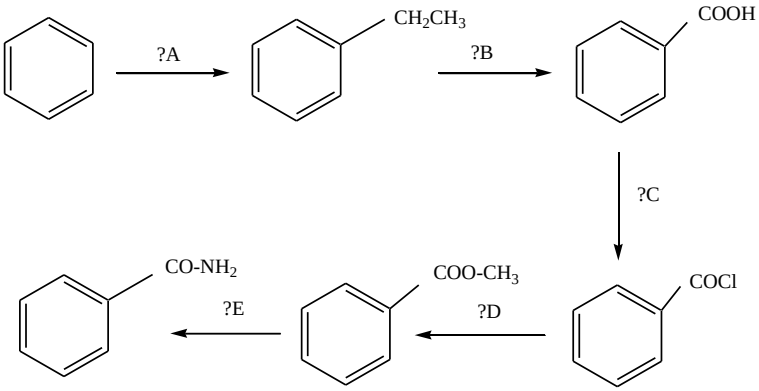


PART V- Road map (5 points)

Identify the structures for compounds A, B, C, D, and E



A. _____ D. _____

B. _____ E. _____

C. _____

CHEM 2425 Sample EXAM # 3A (Chapters 19-23) –Answers

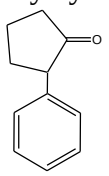
Part I

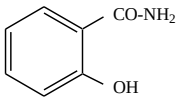
1. B 2. D 3. C 4. B 5. C 6. A 7. D 8. C 9. A 10. A 11. B 12. C 13. C 14. C 15. D

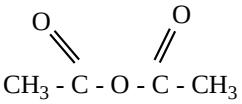
Part II

a) A. 2-methyl-2-cyclohexanone B. N,N- diethylbenzamide C. 3-methylpentanenitrile
D. m-hydroxybenzoic acid E. N-ethylpropanamide

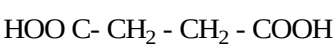
b) 2-phenylcyclopentanone o-hydroxybenzamide acetic anhydride



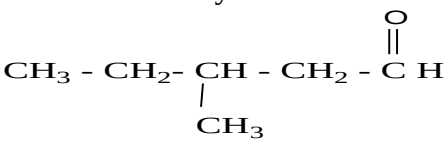




1,4-butanedioic acid

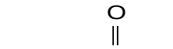


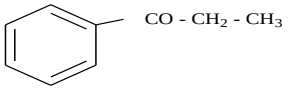
3-methylhexanal

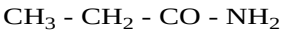


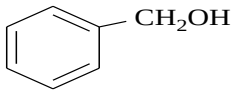
Part III

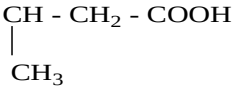
a) 

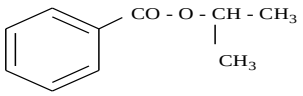
b) 

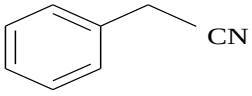
c) 

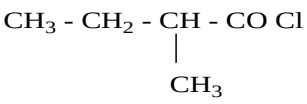
d) 

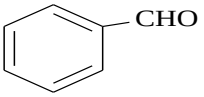
e) 

f) 

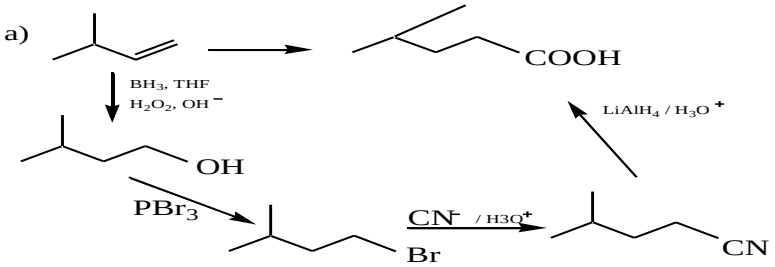
g) 

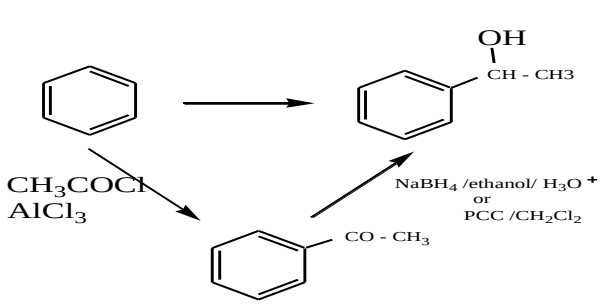
h) 

i) 

j) 

Part IV

a) 

b) 

Part V

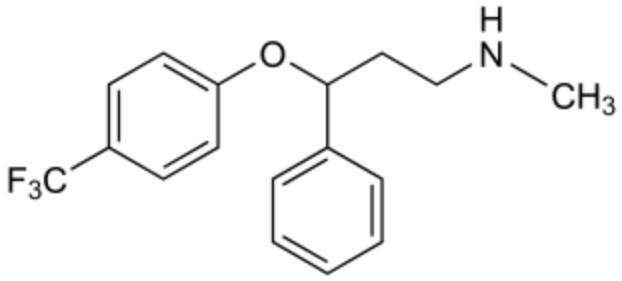
A. $CH_3 – CH_2 Cl / AlCl_3$, **B**. $KMnO_4$, H_2O /heat , C. $SOCl_2$, **D.** CH_3OH /pyridine , **E**. NH_3

HOUSTON COMMUNITY COLLEGE

Organic Chemistry II

2425

Sample Exam 3B



PROZAC- **Prozac is an anti-depressant that is classified as an SSRI. An SSRI is a Selective Serotonin Reuptake Inhibitor. Prozac's chemical name is Fluoxetine Hydrochloride and is usually used to treat depression. The symptom of depression that Prozac aides in curing is the "blue mood" feeling that is universally felt in depressed patients. While it is most frequently used as an anti-depressant, Prozac is also used to treat obsessive compulsive disorder, anxiety, panic disorder and most eating disorders.**

CHEM 2425 Sample EXAM # 3B (Chapters 19-23) NAME_____

Score:

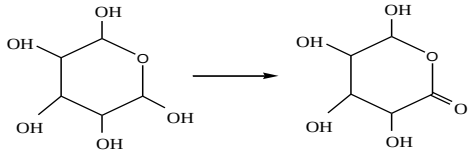
Directions- please write your correct answer next to each question number in space provided.

Part I - Multiple choice questions (45 points)

_____ 1. Which of the following compounds is the strongest acid?

A. CH_3CH_2COOH B. $BrCH_2CH_2COOH$ C. $CH_3CH(CH_2Br)CH_2COOH$ D. $CH_3CH(Br)COOH$ E. $CH_3CH_2CH_2COOH$

_____ 2. The transition shown below is an example of _____.



A. dehydration B. Reduction C. Oxidation D. Rearrangement E. Nutarotation

_____ 3. A primary alcohol can be oxidized to which of the following?

A. An aldehyde B. A ketone C. A carboxylic acid D. A hemiacetal E. A&C

_____ 4. What is the order of boiling point (highest to lowest) in the following compounds?

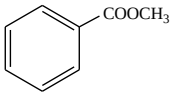
I. $CH_3–CH_2–COOH$ II. CH_3-CH_2-CH_2OH III. $CH_3CH_2OCH_3$

A. III > II > I B. I > II > III C. II > III > I D. II > I > III E. III > I > II

_____ 5. Acyl halides react with alcohols to form _____ .

A. carboxylic acids B. ethers C. esters D. acid anhydrides E. amides

_____ 6. The compound below is classified as _____.

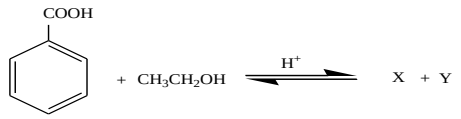


A. an ester B. a symmetrical anhydride C. a mixed anhydride
D. an ether E . a lactone

_____ 7. Treatment of a nitrile with a Grignard reagent followed by hydrolysis results in _____.

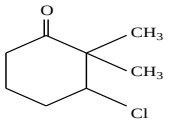
A. An ester B. a ketone C. an aldehyde D. an ether E. an alcohol

_____ 8. In the following reaction, the product X and Y are:



A. an ester and water B. an ester and hydrogen halide C. an ester and an acid
D. an alcohol and water E. an ether and water

_____9. What is the correct IUPAC name of the following compound?

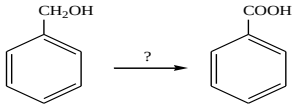


A. m-chlorodimethylcyclohexanone B. m-chloro-m-dimrthylcyclohexanone
C. p-chloro-m-dimethylcyclohexanone D. 3-chlorodimethylcyclohexanone
E. 3-chloro-2,2- dimethylcyclohexanone

_____10. Which of the following would react most rapidly with aqueous NaOH?

A . $CH_3COOCH_2CH_3$ B. CH_3COCH_3 C. $CH_3CH_2OCH2CH_3$
D. CH_3COCl E. CH_3CONH_2

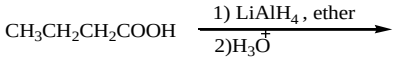
_____11. What is the reagent for the following reaction?



A. $LiAlH_4$ B. CrO_3/H_2SO_4 C. $SOCl_2$ D. PBr_3 D. H_3O^+

_____12. In the proton NMR spectra of aldehydes and ketones, the protons bonded to carbons adjacent to the carbonyl group typically fall into which of the chemical shift ranges below?
A. 1.0- 2.0 ppm B. 2.0-3.0 pm C. 4.0-4.5 ppm D. 7.0- 8.0 ppm E. 9.0-10 ppm

_____13. What is the major product of the following reaction?



A. $CH_3CH_2CH_2CH_3$ B. CO_2 C. $CH_3CH_2CH_2COCl$ D. $CH_3CH_2CH_2CH_2OH$ E. $CH_3CH = CH\ COOH$

_____14. Cyclic amides are called _____.

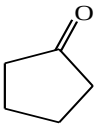
A.Lactones B. imines C. aminals D. lactams E. enamine

_____15. The relationship between ketones and their corresponding enols is one of _____.

A.Allotropes B. tautomers C. enantiomers D. diastereomers E. cis-trans isomers

PART II - Nomenclature (20 points)

b) Write the correct IUPAC names.



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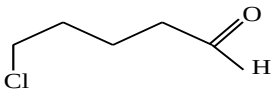

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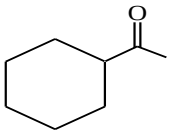
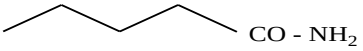


_____

_____



_____

b) Write the correct structures.

2,2- dichlorocyclohexanone

acetophenone

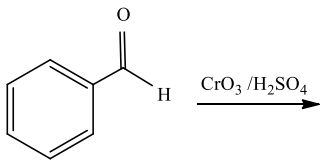
sodium propionate

pentanoyl bromide

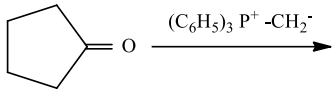
cyclobutane carbonitrile

PARTT III- REACTIONS(20 points) What major product(s) would you expect from the following reactions?

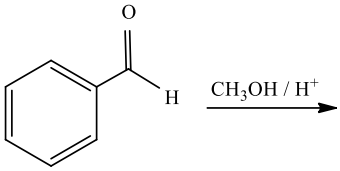
a)



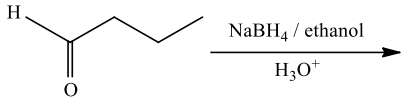
b)



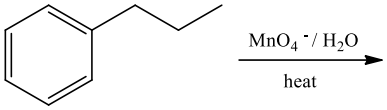
c)



d)



e)



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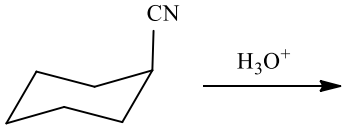
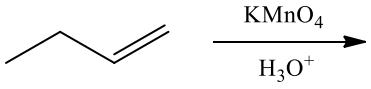
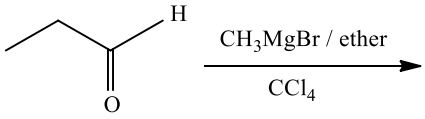


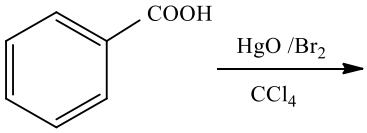
g)



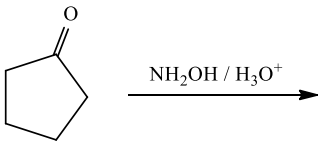
h)



i)

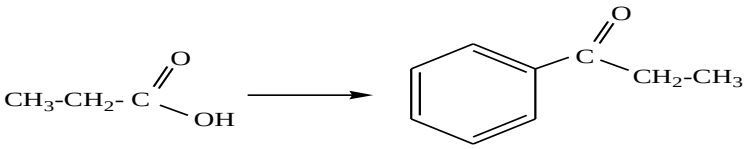


j)

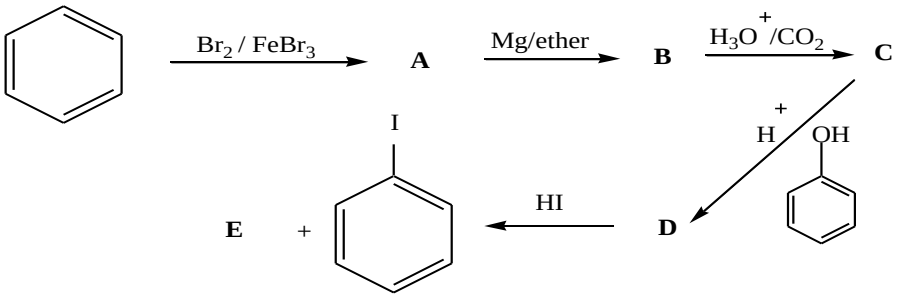


PART IV – SYNTHESIS (15 points)

a) What is the best procedure for preparing the following compound? Requires more than one step.



b) Identify the structure for compounds A, B, C, D and E.



A. _____ B. _____ C. _____

D. _____ E. _____

c) Deduce a reasonable structure for the compound which exhibits the following spectroscopic data.

$C_5H_9ClO_2$ IR : 2700-3400 cm^{-1} (broad)
^{1}H NMR: 1.40 ppm (6H, singlet) , 10.1ppm (1 H, singlet)

CHEM 2425 Sample EXAM # 3A (Chapters 19-23) –Answers

Part I. - Multiple choice questions

1. D 2. C 3. B 4. B 5. C 6. A 7. B 8. A 9.E 10. A 11. B 12. B 13. D 14.D 15.B

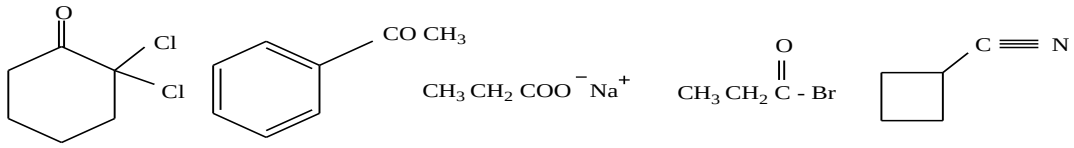
Part II- Nomenclature

a)

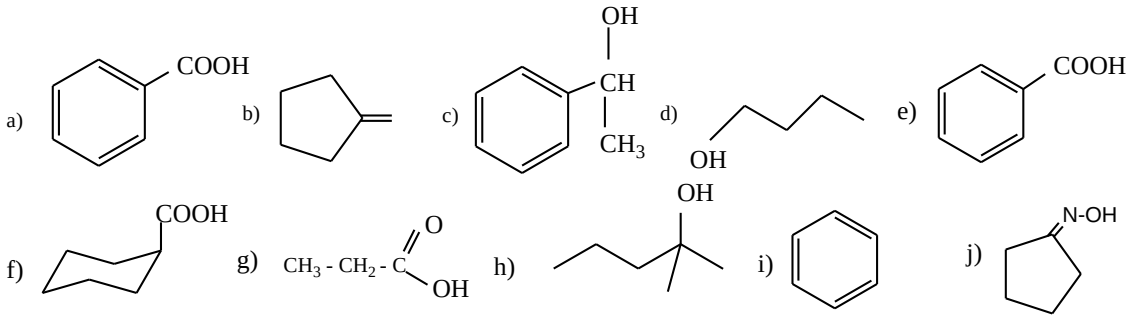
Cyclopentanone 5-Chloropentanal Cyclohexylmethyl ketone

Cyclohexane carboxylic acid Pentanamide

b)

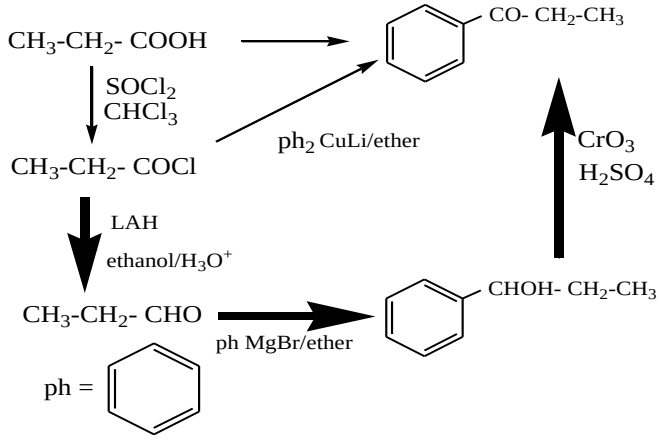


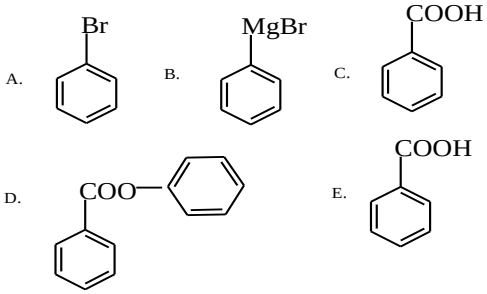
Part III. REACTIONS



Part IV- SYNTHESIS

a and b





c)