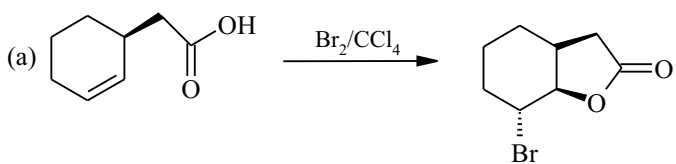
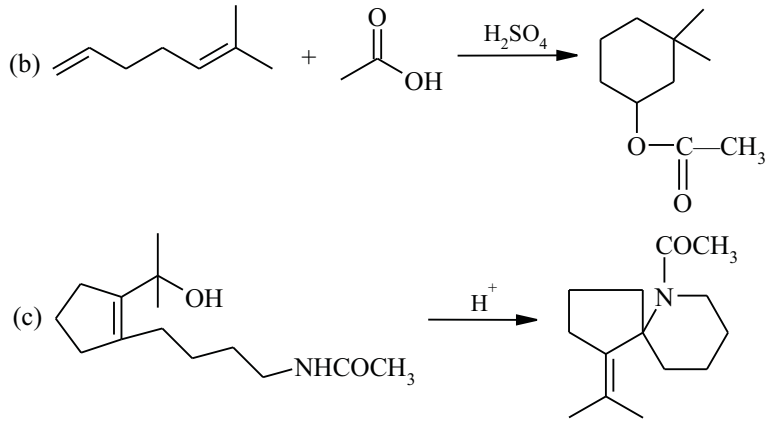
Carboxylic Acid and its Derivatives

Problem 1130 How could you use an acid base extraction technique to separate a mixture of carboxylic acid and phenol into its pure components?

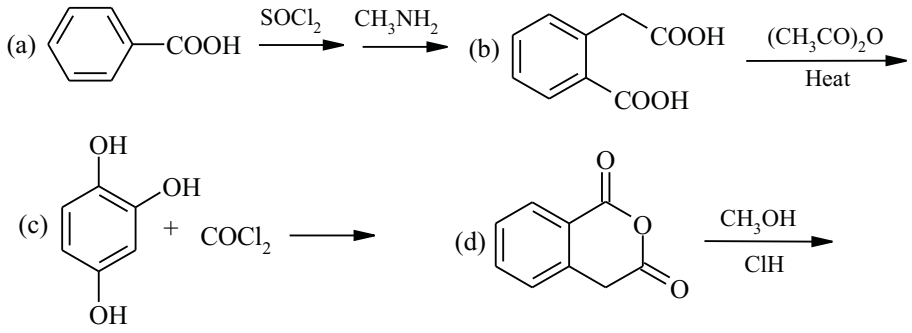
Problem 1131 A carboxylic acid (*A*) of unknown structure was found to contain only C,H and O. 150 mg of *A* required 11.9 mL of 0.22 N NaOH to reach the equivalent point. Gentle heating of *A* evolves CO_2 and a new carboxylic acid (*B*) was formed whose equivalent weight was found to be 74.Identify *A* and *B*.

Problem 1132 Propose mechanism:

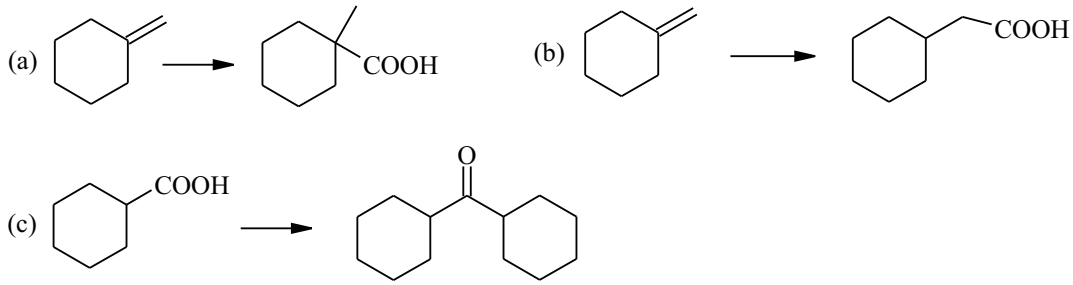




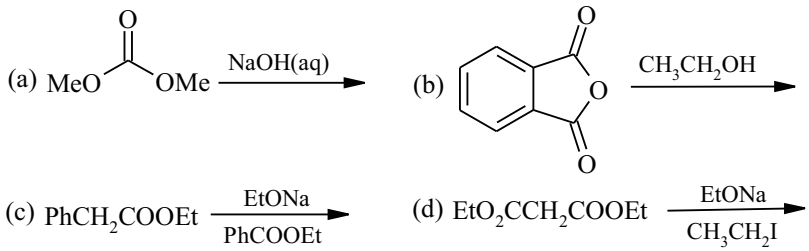
Problem 1133 Predict major product in the following reaction:

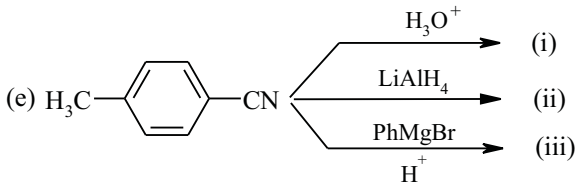


Problem 1134 Bring about the following transformations:

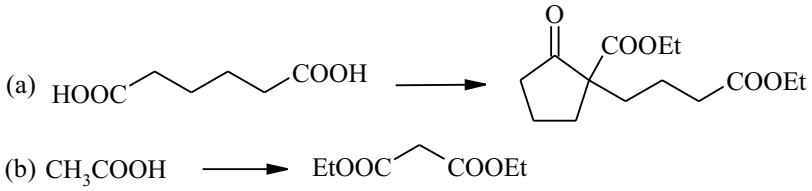


Problem 1135 Complete the following reactions:



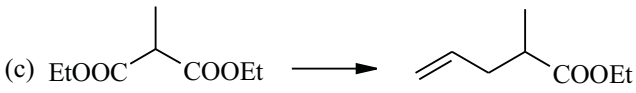


PROBLEM 1136 Convert:

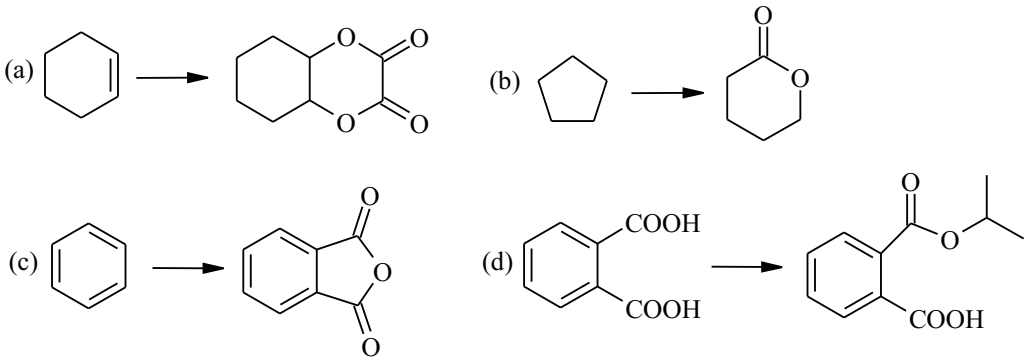


PROBLEM 1137 Bring about the following conversions:

(a) $PhCH_2OH \longrightarrow PhCH_2CN$ (b) $PhCOOH \longrightarrow PhC(CH_3)_2OH$

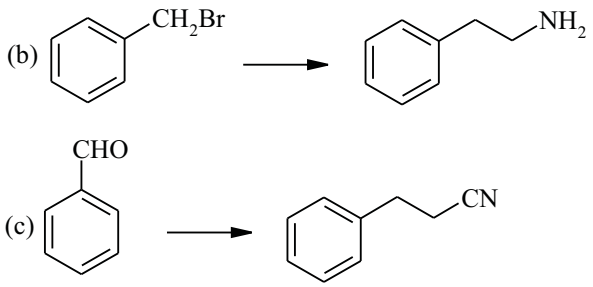


PROBLEM 1138 Show how would you accomplish the following synthesis in good yield?

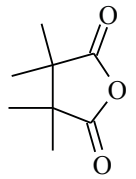
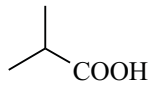


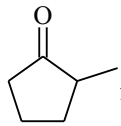
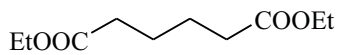
PROBLEM 1139 Show how would you accomplish the following multisteps synthesis?

(a) 6-hepten-1-ol $\longrightarrow$ caprolactum



Problem 1140 Synthesize the following compounds from indicated starting materials:

(a)  from 

(b)  from 

Problem 1141 Show how would you accomplish the following synthesis:
(a) Isobutyl amine ⟶ N-isobutyl formamide
(b) Ethylacetate ⟶ 3-methyl-3-pentanol.
(c) Cyclohexyl amine ⟶ N-cyclohexylacetamide
(d) Bromocyclohexane ⟶ dicyclohexylmethanol

Problem 1142 A neutral organic compound *A* has molecular formula $C_5H_8O_2$ and does not decolourise Bayer's reagent. *A* on acidic hydrolysis produced *B*($C_5H_{10}O_3$) which is resolvable. *B* on heating with concentrated H_2SO_4 undergo dehydration to produce *C*, an isomer of *A*. *C* decolourises Bayer's reagent and show stereoisomerism. Also *B* changes colour of acidic dichromate solution from orange to blue-green converting itself into *D*($C_5H_8O_3$) which is non-resolvable and forms an yellow precipitate on treatment with NaOI solution. Deduce structures of *A* to *D*.

Problem 1143 A neutral organic compound *A*($C_5H_8O_2$) does not decolourise Bayer's reagent and on hydrolysis with dilute H_2SO_4 produces *B*($C_5H_{10}O_3$) which is diastereomeric. *B* on heating with concentrated H_2SO_4 undergoes dehydration producing *C*($C_5H_8O_2$) which shows geometrical isomerism. Also *B* on treatment with acidic dichromate solution produced *D*($C_5H_8O_3$) which is enantiomeric and gives an yellow precipitate with NaOI. *D* on gentle heating produces *E*(C_4H_8O) which is nonresolvable. Deduce structures of *A* to *E*.

Problem 1144 An organic acid *A*($C_5H_{10}O_2$) reacts with Br_2 in presence of phosphorus to produce a resolvable *B*. *B* on dehydrobromination yields *C*. *C* does not show geometrical isomerism and on decarboxylation gives an alkene *D*. *D* on ozonolysis gives *E* and *F*. Compound *E* gives positive Schiff's test but *F* does not. Give structures of *A* to *F*.

Problem 1145 A monobasic acid *A* has neutralization equivalent 116 and does not decolourise Bayer's reagent. Also *A* is enantiomeric. *A* on treatment with Br_2/red phosphorus produces *B* which is still resolvable. *B* on dehydrobromination produced *C* which show stereo isomerism. *C* on decarboxylation produced *D* which does not show stereoisomerism. Deduce structures of *A* to *D*.

Problem 1146 An organic lactum *A* on acid hydrolysis produced *B*, an amino acid. *B* on treatment with nitrous acid gives *C*. *C* on heating with concentrated H_2SO_4 produces a lactone *D*. A can also be synthesized by the reaction of cyclopentanone with hydroxylamine followed by treatment of product with concentrated H_2SO_4. Deduce structures of *A* to *D*.

Problem 1147 A neutral organic compound *A* has formula $C_9H_{16}O_3$ and rotates plane polarized light. *A* on acid hydrolysis produces *B* and *C*(C_3H_8O). *C* on partial oxidation with PCC gives *D*(C_3H_6O) which

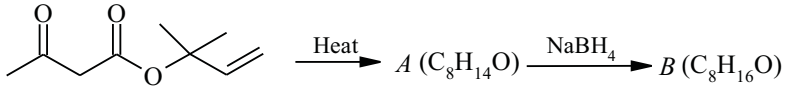
does not gives iodoform test. *D* on treatment with dilute solution of NaOH gives *E*($C_6H_{12}O_2$) which is diastereomeric. *E* on treatment with acidic solution of $KMnO_4$ produces *B*. Deduce structures of *A* to *E*.

Problem 1148 An organic compound *A*($C_9H_6O_3$) does not reacts with aqueous solution of $NaHCO_3$ and does not change the colour of litmus paper. *A* on acid hydrolysis gives *B*($C_9H_8O_4$) whereas *A* on treatment with methanol in acid medium gives *C*($C_{10}H_{14}O_4$) as the major alcoholysis product. *B* on heating with excess of soda-lime produces toluene. Deduce structures of *A* to *C*.

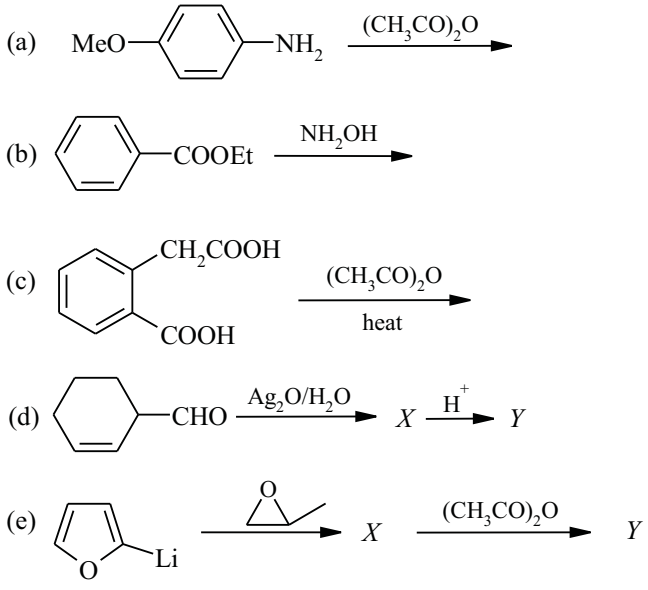
Problem 1149 Diethyl malonate on treatment with one mole of C_2H_5ONa followed by reaction with one mole of 5-bromoethyl pentanoate produces *A*($C_{14}H_{24}O_6$). *A* on heating with dilute H_2SO_4 yields *B*($C_7H_{12}O_4$). *B* on treatment with excess of C_2H_5OH in presence of catalytic amount of H_2SO_4 yields *C*($C_{11}H_{20}O_4$). *C* on treatment with one mole of EtONa followed by work-up with dilute HCl yields *D*($C_9H_{14}O_3$). *D* on further treatment with one mole EtONa followed by reaction with CH_3I yields *E*($C_{10}H_{16}O_3$). *E* on heating with HCl yields 2-methylcyclohexanone. Deduce structures of *A* to *E*.

Problem 1150 An organic compound contain C,H and oxygen and its aqueous solution is neutral. 1.44 g of *A* on refluxing with dilute H_2SO_4 produces two organic compound *B* and *C* of which only *B* is resolvable and gives effervescence with $NaHCO_3$. Also neutralization of entire *B* require 0.4 g of NaOH. *B* on reduction with HI/red phosphorus produces a hydrocarbon *D* which is non-resolvable. Also *D* on monochlorination yields three alkyl halide in which only one is resolvable. Deduce structures of *A* to *D*.

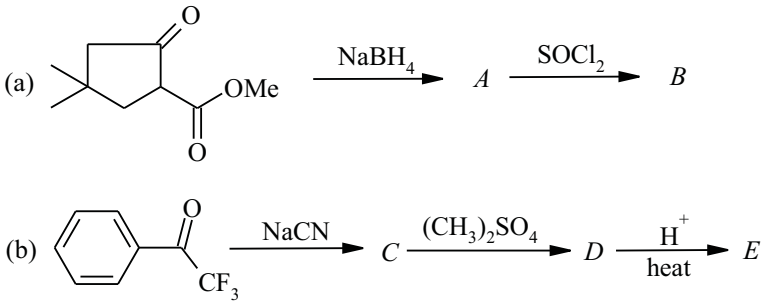
Problem 1151 Identify the labelled product and explain their formations:



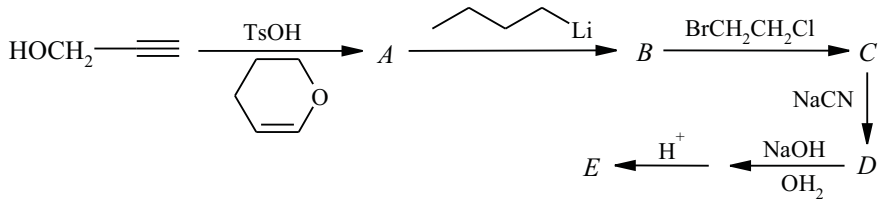
Problem 1152 Give structural formula of all possible products in the following reactions:



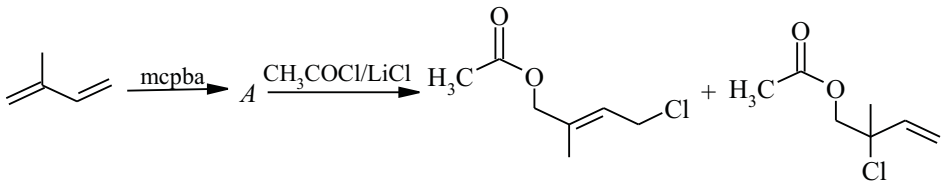
Problem 1153 Complete the following reactions:



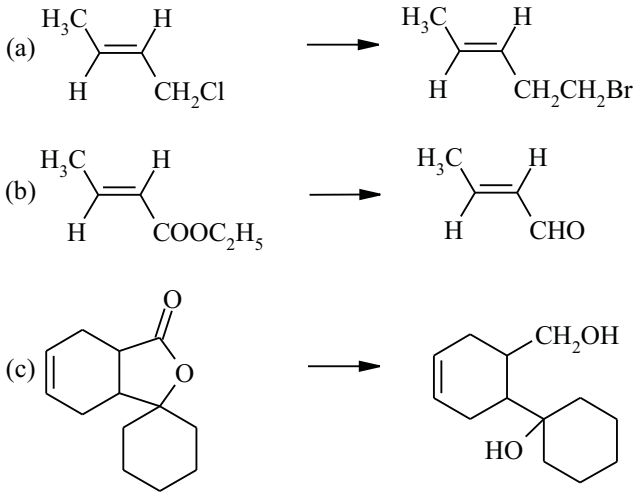
Problem 1154 Complete the following sequence of reaction:

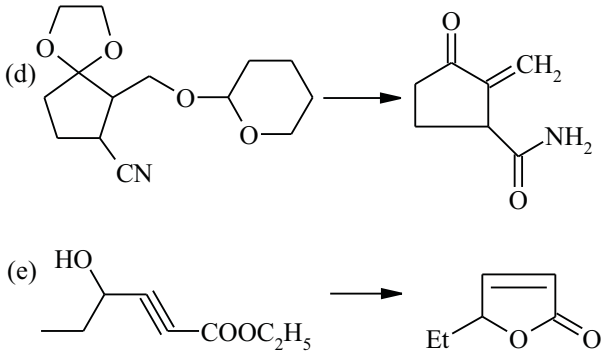


Problem 1155 Complete the following sequence of reaction explaining the formations of products in the second step:

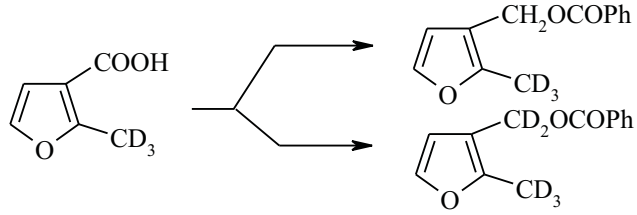


Problem 1156 Bring about the following transformations:





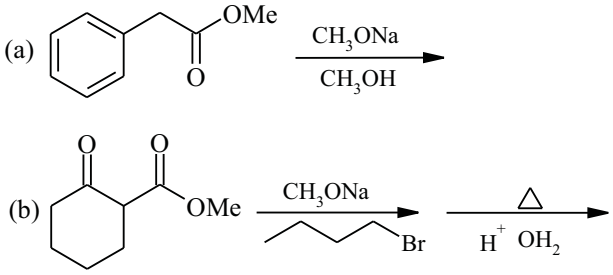
Problem 1157 Bring about the following transformations:



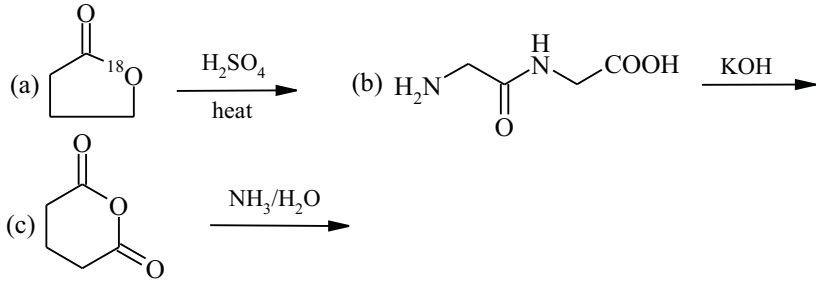
Problem 1158 An organic compound exist in three isomeric forms *A*, *B* and *C* with their molecular formula $C_{10}H_{12}O_2$ and all are resolvable. Decarboxylation of either *B* or *C* gives the same *D*(C_9H_{12}) whereas decarboxylation of *A* gives *E* an isomer of *D*. Both *D* and *E* are non-resolvable. Treatment of either *D* or *E* with $KMnO_4$ in acidic medium produces benzoic acid as one product. Monobromination of *E* in presence of sunlight yields only two isomeric products whereas *D* on monobromination yields three isomers. Also *B* is more reactive than *C* towards decarboxylation reaction. Deduce structures of *A* to *E*.

Problem 1159 An organic compound *A*(C_6H_{10}) decolourises Bayer's reagent and it is nonresolvable. *A* on treatment with acidic permanganate solution gave *B*($C_6H_{10}O_4$) which is still nonresolvable. *B* on treatment with excess of ethanol in presence of acid catalyst gave *C*($C_{10}H_{18}O_4$) which is a neutral sweet smelling liquid. *C* on refluxing with ethanolic solution of C_2H_5ONa gave *D*($C_8H_{12}O_3$) which is resolvable. *D* on treatment with acidic solution of ethylene glycol yields *E*($C_{10}H_{16}O_3$). *E* on treatment with one equivalent of Grignard reagent followed by reduction of product with Zn(Hg)—HCl and finally hydrolyzing product yields 2-ethylcyclopentanoate. Deduce structures of *A* to *E*.

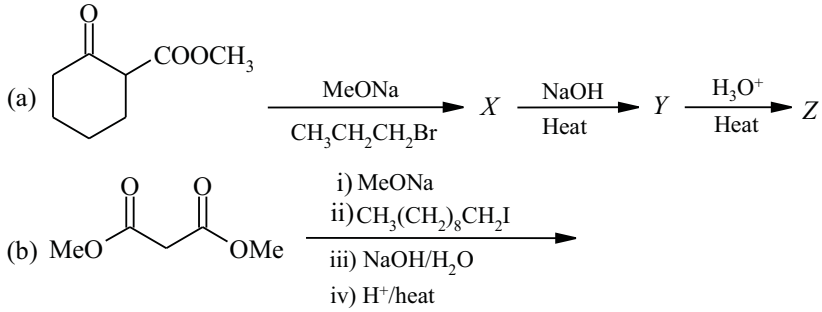
Problem 1160 Provide products:



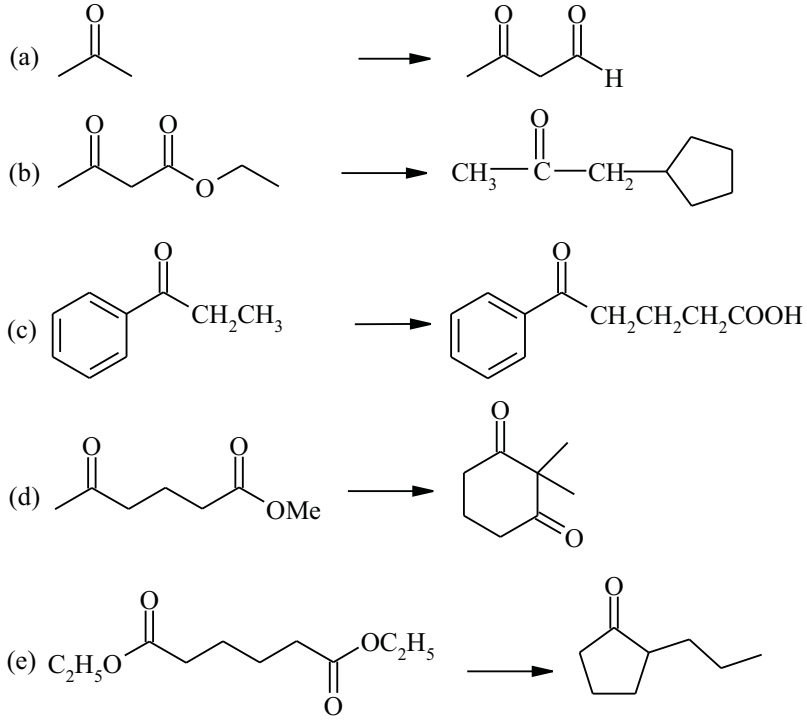
Problem 1161 Predict products and write mechanism of their formations:



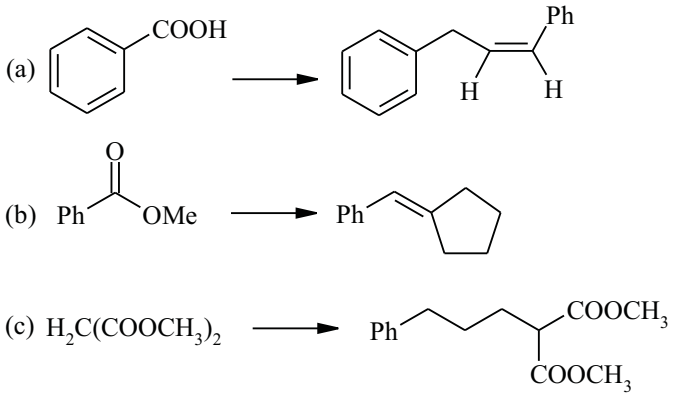
Problem 1162 Provide organic products in the following reactions:



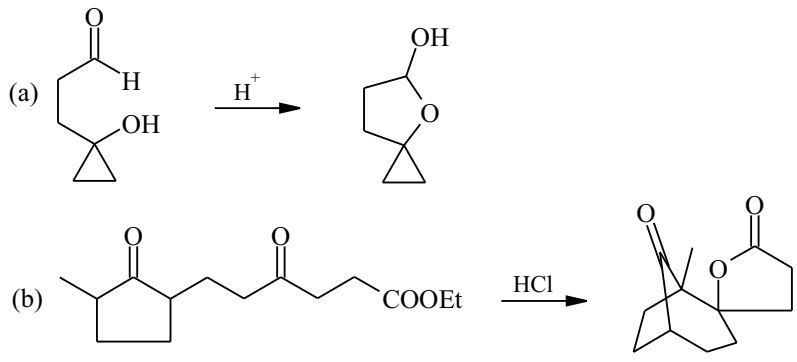
Problem 1163 Indicate how each of the following compounds can be synthesized from the given starting material?



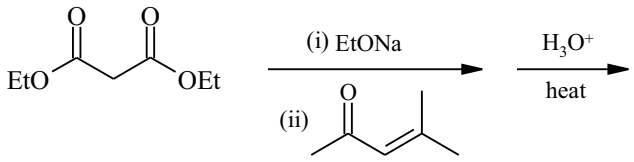
PROBLEM 1164 Bring about the following transformations:



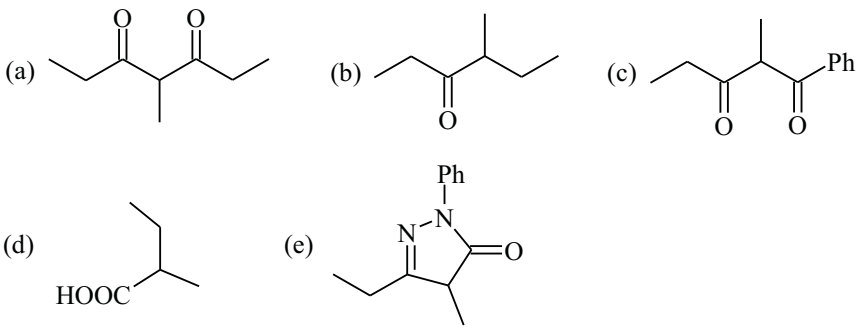
PROBLEM 1165 Propose mechanism:



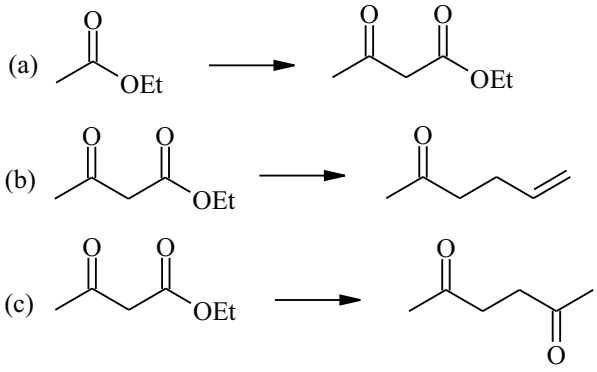
PROBLEM 1166 Provide mechanism:



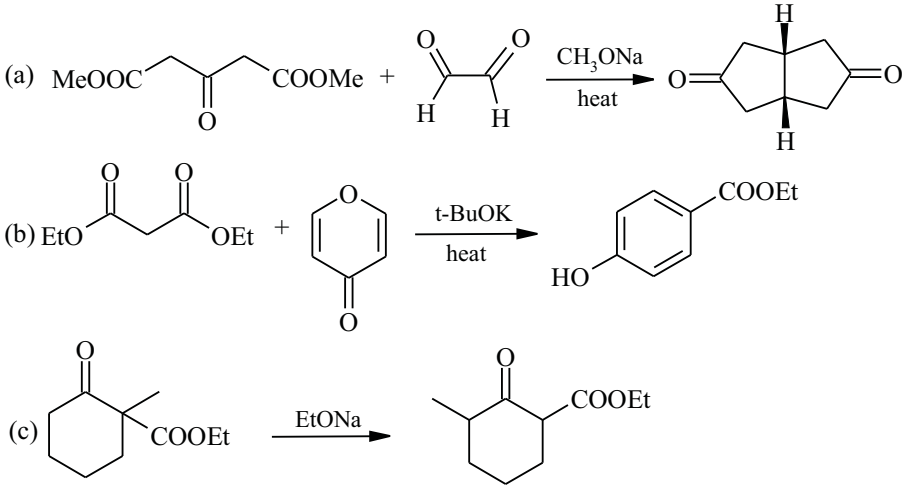
PROBLEM 1167 Starting from ethyl propanoate synthesize:



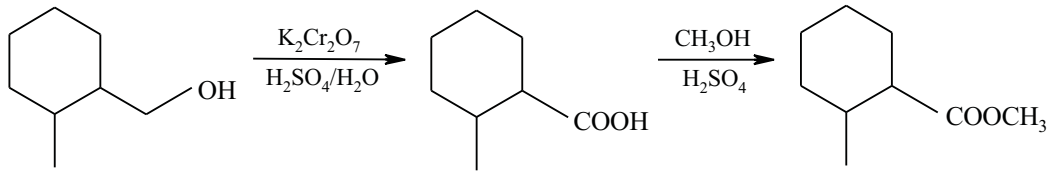
Problem 1168 Bring about the following conversions:



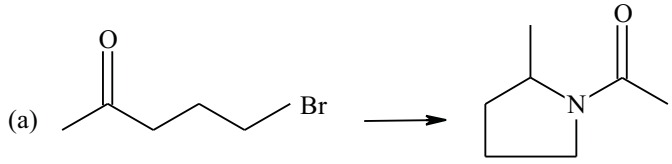
Problem 1169 Propose mechanism of formation of products in the following reactions:



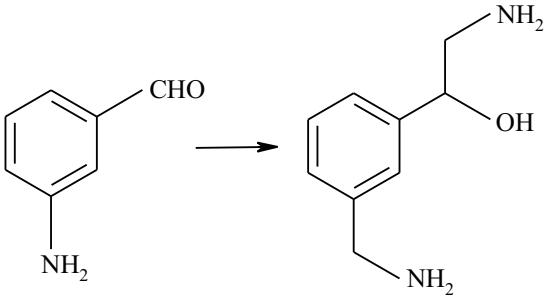
Problem 1170 Propose mechanism of the following transformations:



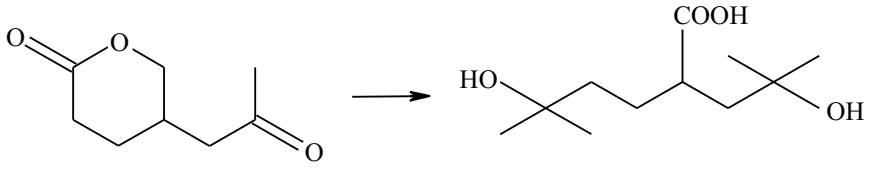
Problem 1171 Devise synthesis of the compounds shown below from the indicated starting materials:



(b)

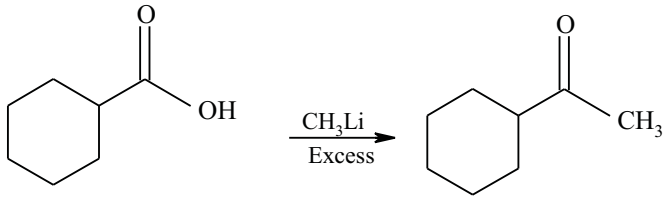


PROBLEM 1172 Propose an efficient synthesis of the compound shown below from indicated starting material and methanol.



PPROBLEM 1173 Propose mechanism of the following reactions:

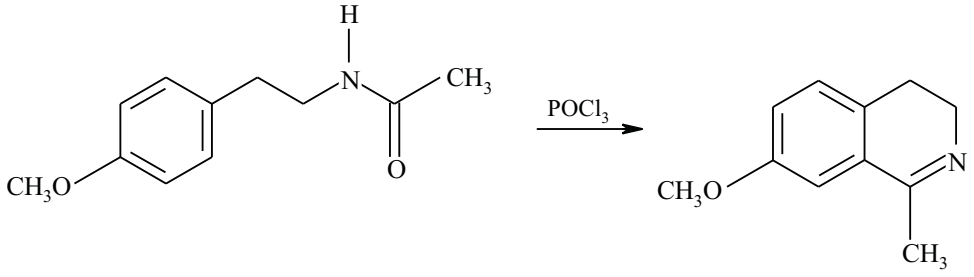
(a)



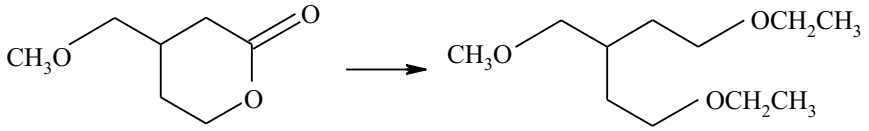
(b) $R\text{—CN} \xrightarrow[\text{HCl}]{H_2O} R\text{COOH} \xrightarrow{SOCl_2} R\text{—COCl}$

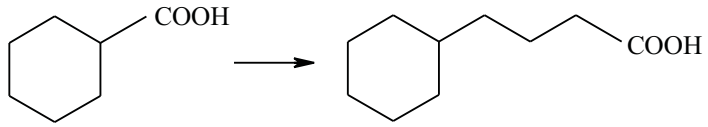
(c) $R\text{—}\overset{\overset{O}{\|}}{C}\text{—}N_3 \xrightarrow[\text{heat}]{H_2O} R\text{—}NH_2 + CO_2 + N_2$

PROBLEM 1174 Provide a mechanism for the following reaction:



Problem 1175 Bring about the following transformations:

(a) 

(b) 

Problem 1176 Arrange the followings in increasing order of reactivity towards nucleophile:

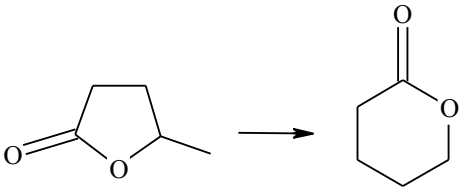
(a) $H_3C-\overset{\overset{O}{\|}}{C}-NH_2$ (I), $CH_3-\overset{\overset{O}{\|}}{C}-Cl$ (II), $CH_3-\overset{\overset{O}{\|}}{C}-OAc$ (III), $H_3C-\overset{\overset{O}{\|}}{C}-OCH_3$ (IV)

(b) $CH_3-\overset{\overset{O}{\|}}{C}-Cl$ (I), $CH_3CH_2-\overset{\overset{O}{\|}}{C}-Cl$ (II), $(CH_3)_2CH-\overset{\overset{O}{\|}}{C}-Cl$ (III), $(CH_3)_3C-\overset{\overset{O}{\|}}{C}-Cl$ (IV)

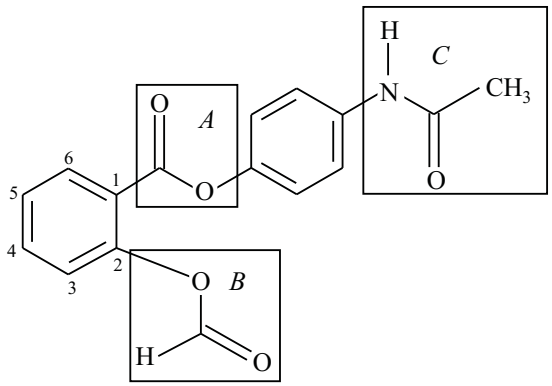
(c) $CH_3-\overset{\overset{O}{\|}}{C}-OCH_3$ (I), $CH_3-\overset{\overset{O}{\|}}{C}-OCH_2CH_3$ (II), $H_3C-\overset{\overset{O}{\|}}{C}-OCH(CF_3)_2$ (III)

Problem 1177 Convert

(a) $CH_3CH_2CH_2COOH \longrightarrow CH_3CH_2CH_2CH_2COOCH_3$

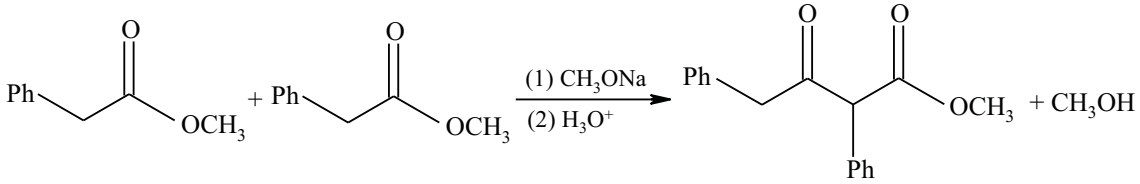
(b) 

Problem 1178 Consider the following acid derivative:



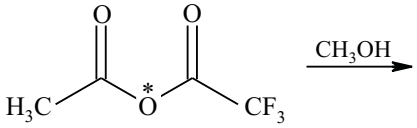
(a) Which of the groups in square will hydrolyze first in base catalyzed medium?
(b) How the rate of hydrolysis be affected if a nitrogroup is substituted at C–4?
(c) How the rate of hydrolysis be affected if an amino group is substituted at C–4?
(d) How the rate of hydrolysis be affected if a methoxy group is substituted at C–3?

PROBLEM 1179 Propose mechanism of the following reaction and calculate enthalpy of reaction from the given bond-energies data:



BE : C—C = 85 kcal/mol; C—O = 91 kcal/mol; O—H = 102 kcal/mol; C—H = 99 kcal/mol.

PROBLEM 1180 Predict major product in the following giving mechanistic reasoning:

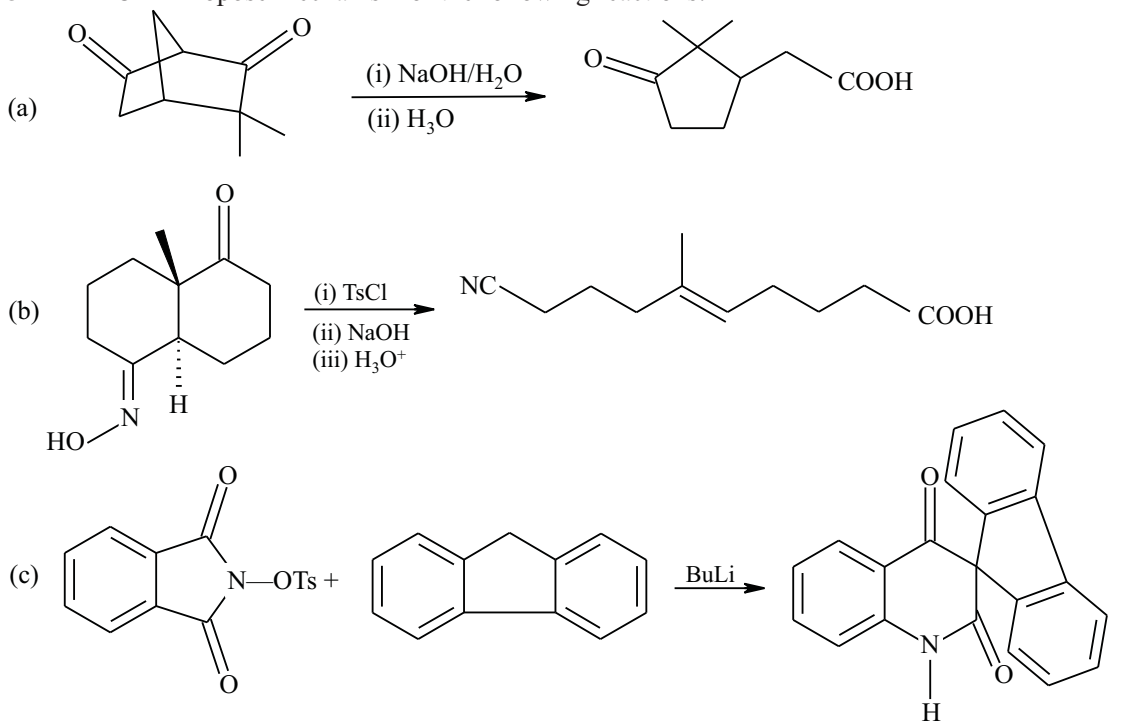


PROBLEM 1181 An optically active organic compound A has molecular formula ($C_7H_{12}O_3$) and found to produce an yellow precipitate with alkaline solution of Iodine. Also A neither decolourised brown colour of bromine water nor evolved any gas with aqueous solution of $NaHCO_3$ but evolved a gas on heating with sodium metal. On hydrolysing in acidic medium, A produced antoher optically active compound B($C_7H_{14}O_4$) which also produced yellow ppt with NaOH/I_2. Also B evolved a colourless, acidic gas on treatment with aqueous $NaHCO_3$ solution. A on treating with CrO_3/HCl/Pyridine in CH_2Cl_2 produced another optically active compound C($C_7H_{10}O_4$). C on refluxing with aqueous Ag_2O produced an optically inactive compound D($C_7H_{10}O_5$). D does not decarboxylate (does not evolve CO_2) on simple heating. However, heating D with sodalime gave E($C_5H_{10}O$). In a separate analysis, 3-oxo ethylbutanoate was heated with excess of sodium metal and then with CH_3I to produce X ($C_8H_{14}O_3$). X on hydrolysis followed by simple heating of product yielded E. Identify A to E and X.

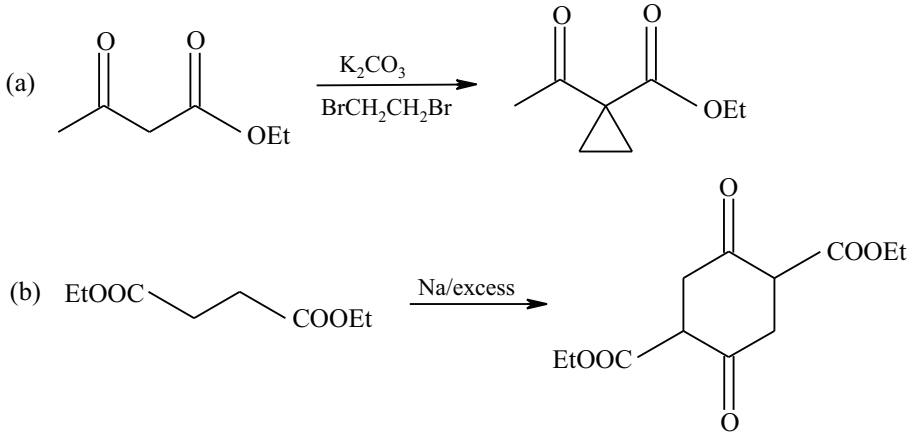
PROBLEM 1182 An oily liquid A is insoluble in water but on heating with aqueous NaOH for half an hour it dissolves. From the reaction mixture a liquid B can be distilled, which gave an yellow precipitate with iodine and NaOH. On careful oxidation, B gives an aldehyde, C, which also gives an yellow precipitate with iodine and NaOH solution. If sulphuric acid is added to the solution obtained from heating A with NaOH solution, a white precipitate D is obtained. D liberates a gas on treatment with aqueous $NaHCO_3$. Heating D with sodalime produced benzene. Identify A–D.

PROBLEM 1183 An organic compound A has molecular formula $C_9H_8O_2$ and if exist in stereoisomeric forms. A effervesces with $NaHCO_3$. A decolourises brown colour of bromine water forming B($C_9H_8O_2Br_2$) which is distereomeric. B on hydrolysing with aqueous NaOH followed by refluxing of product with acid gave C($C_9H_{10}O_4$). C on oxidising with acidified dichromate solution gave D($C_9H_6O_4$) which gives orange precipitate with 2,4-dinitrophenylhydrazine but did not react with ammonical $AgNO_3$ solution. D on reacting with PCl_5 yielded a steamy fumes of E($C_9H_5O_3Cl$). E on treatment with aqueous ammonia yielded F($C_9H_7O_3N$). Both A and F are oxidized by hot aqueous $KMnO_4$ solution to yield a white crystalline substance which on heating with sodalime yielded benzene. Identify A to F.

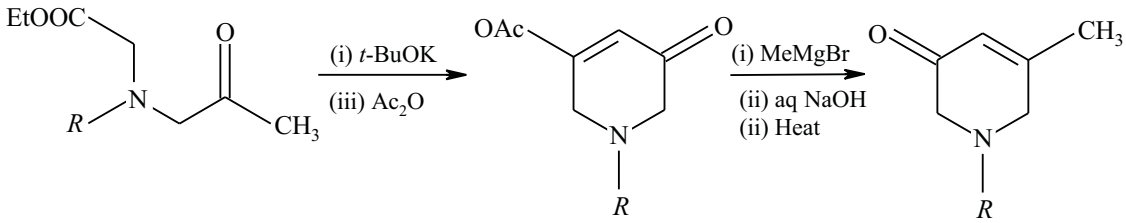
Problem 1184 Propose mechanism of the following reactions:



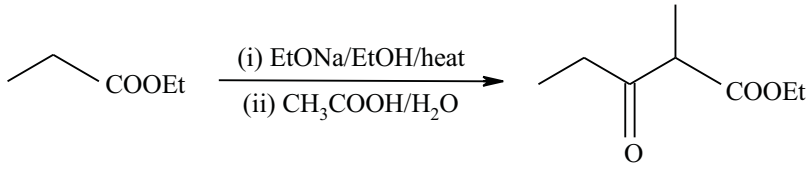
Problem 1185 Propose mechanism of the following reactions:



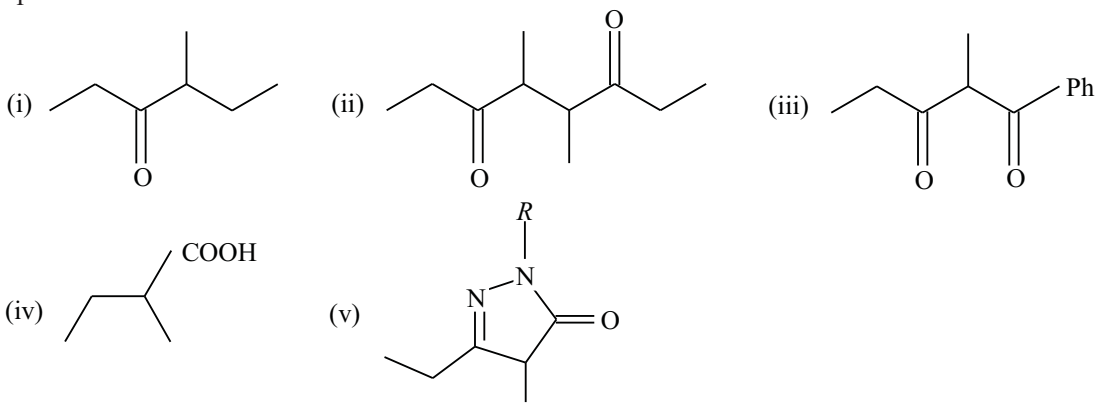
Problem 1186 Propose mechanism:



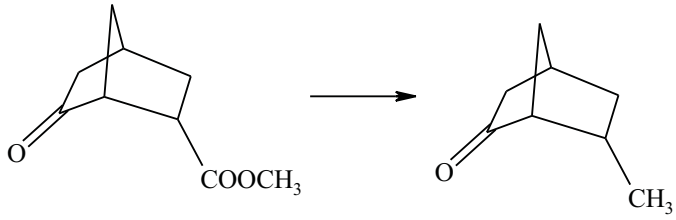
PROBLEM 1187 (a) Indicate a mechanism of the following reaction:



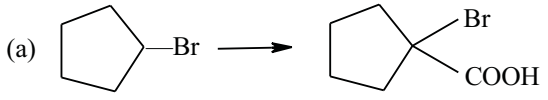
(b) Devise a sequence by which product of the reaction in part "a" converted into the following comopunds:

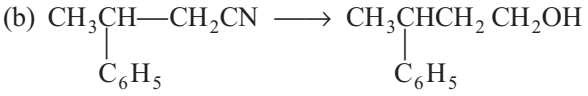


PROBLEM 1188 Bring about the following transformations:

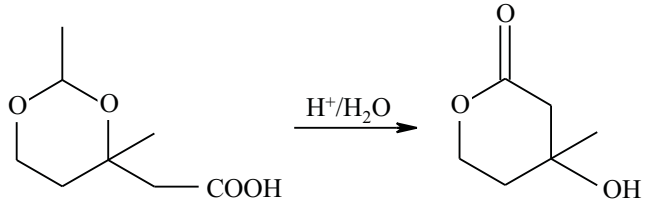


PROBLEM 1189 Bring about the following transformations:

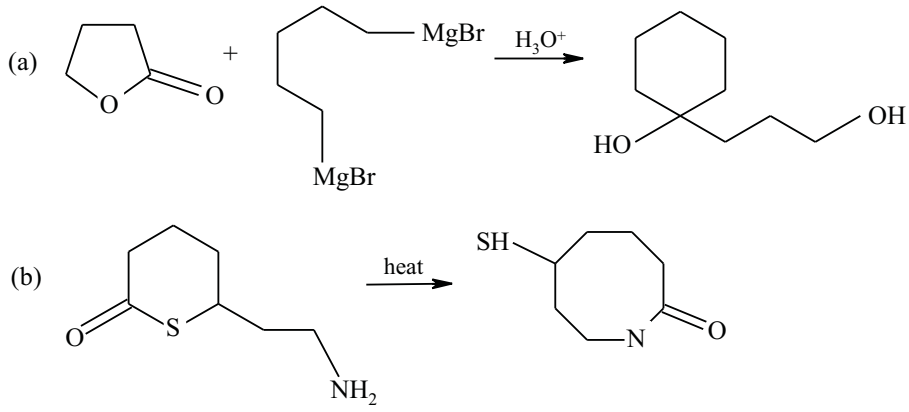




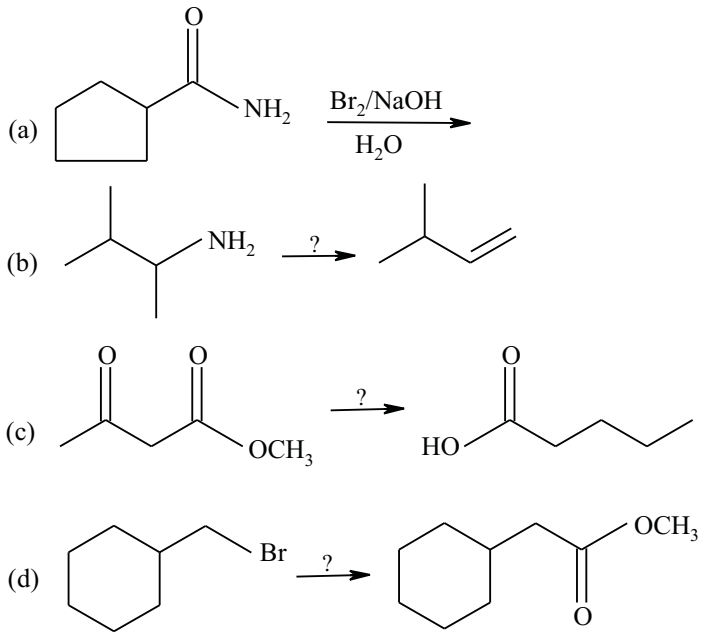
PROBLEM 1190 Propose mechanism:



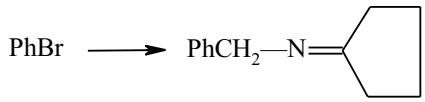
Problem 1191 Propose mechanism of the following reactions:



Problem 1192 Provide missing reagents/products in the following reactions:



Problem 1193 Bring about the following transformations:

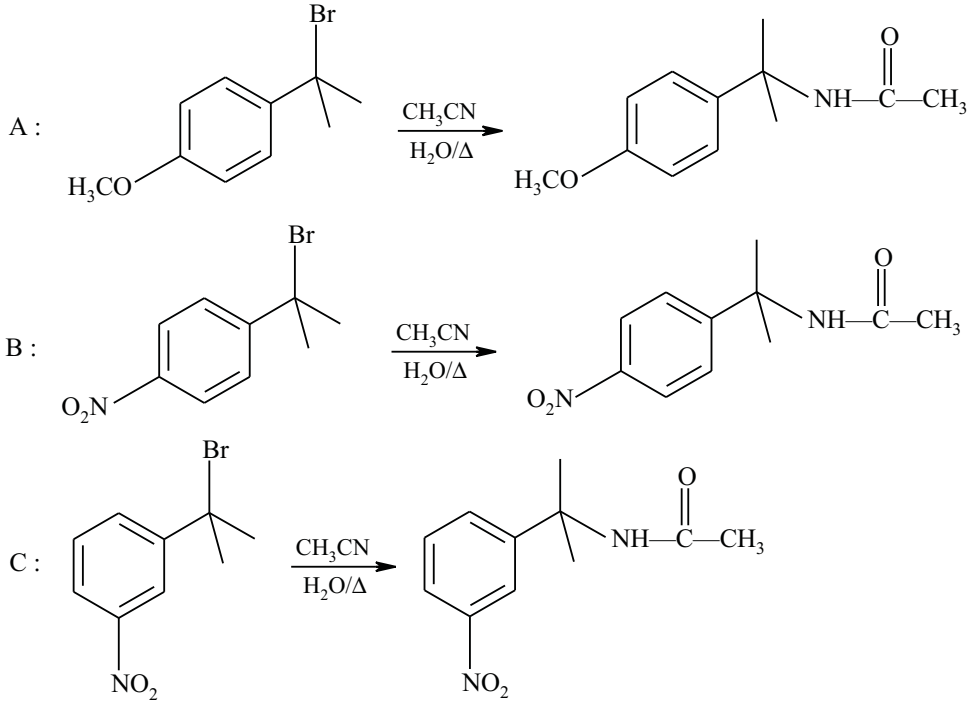


Problem 1194 A neutral organic compound A(C_4H_6) reacts with Br_2/CCl_4 solution to form a compound B($C_4H_6Br_2$). A on treatment with acidified permanganate solution yields C($C_4H_6O_3$). C gives an orange precipitate with 2,4-dinitrophenylhydrazine. C on refluxing with $NaHCO_3$ evolves a

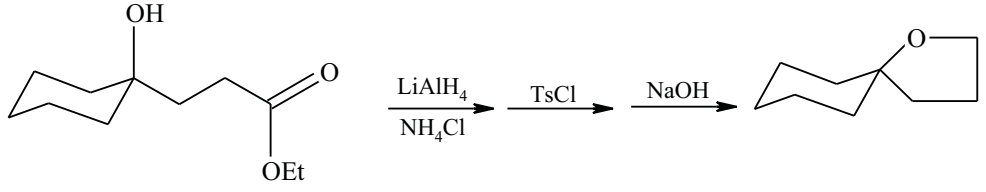
gas. Treating C with $NaBH_4$ gave a new compound D($C_4H_8O_3$) which also produces a gas with $NaHCO_3$ solution. Deduce a structure of A—D.

Problem 1195 2.81 g of an optically active diester A, containing only C, H and oxygen was saponified using 30 mL 1.0 M NaOH solution. Following saponification, the solution required 6 mL 1.0 M HCl solution to titrate unreacted base. The saponification products were an optically inactive diacid B, methanol and an optically active alcohol C. Alcohol C reacted with alkaline solution producing an yellow precipitate and C_6H_5COONa. Also, the diacid B reacted with Br_2 in CCl_4 to give a single, optically inactive product D. Ozonolysis of B gave only one product. Also, the diester A reacts with Br_2/CCl_4 to give a mixture of E and F, both optically active. Identify A to F.

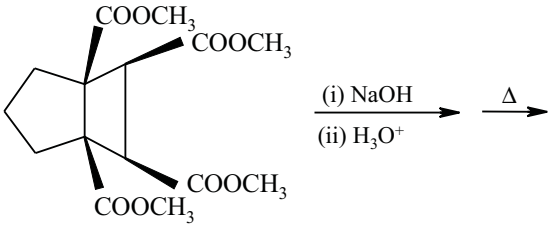
Problem 1196 The following three reactions occurs by a common mechanism. Write detailed mechanism for the reaction A. Then indicate, which reaction will be the fastest and which reaction will be the slowest and explain briefly, why?

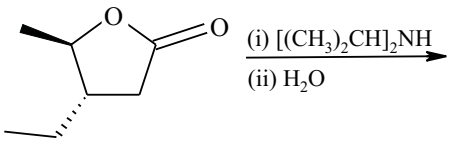


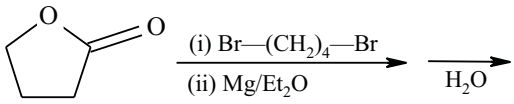
Problem 1197 Propose mechanism of the reaction:

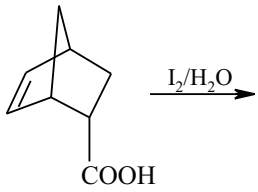


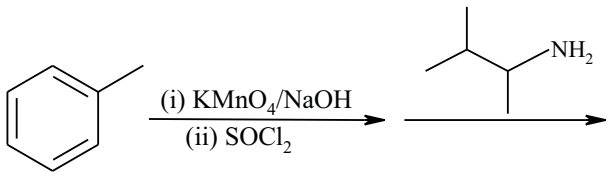
PROBLEM 1198 Complete the following reactions:

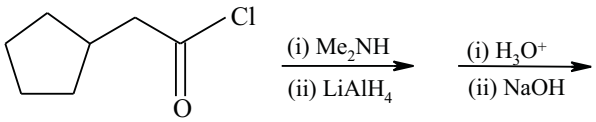
(a) 

(b) 

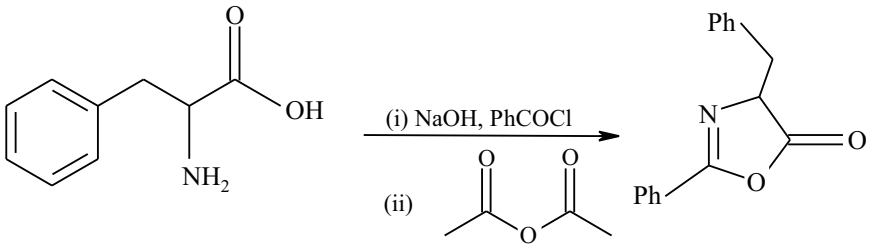
(c) 

(d) 

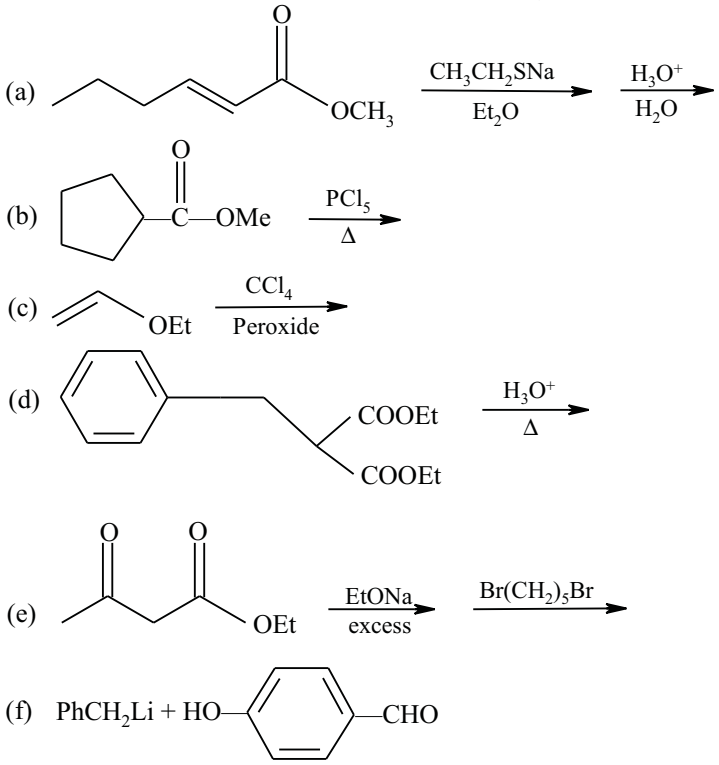
(e) 

(f) 

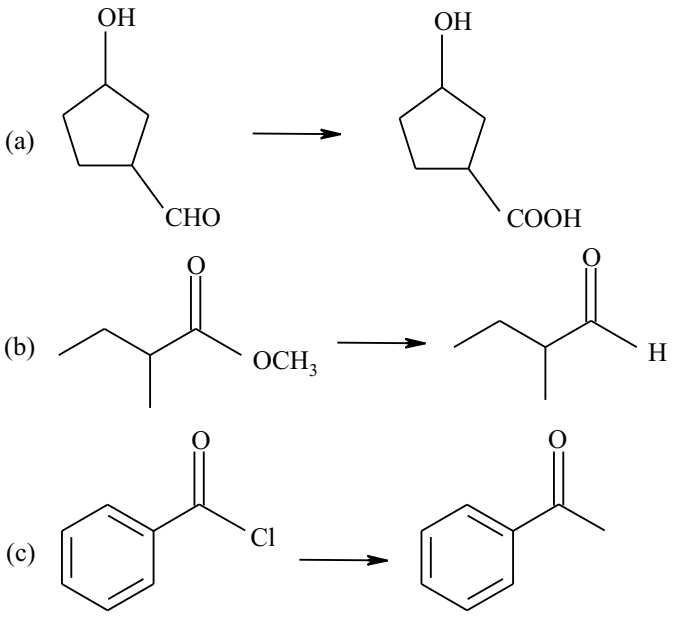
PROBLEM 1199 Propose mechanism of the reaction:

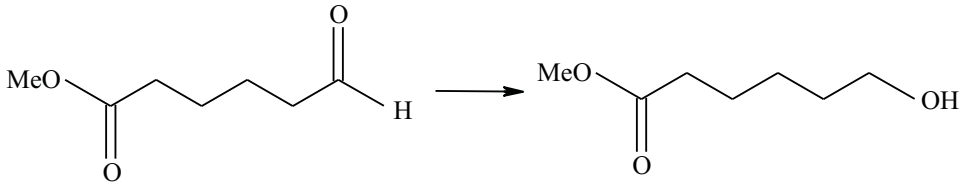


PROBLEM 1200 Provide products of the following reactions:

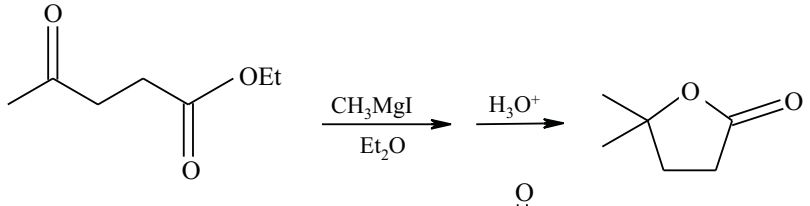


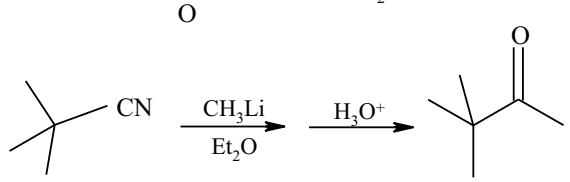
PROBLEM 1201 Provide selective reagents that will bring about the following transformations:



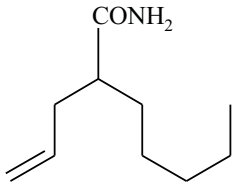
(d) 

Problem 1202 Propose mechanism of the following reactions:

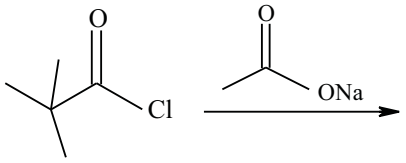
(a) 

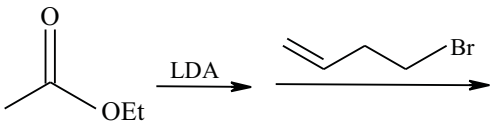
(b) 

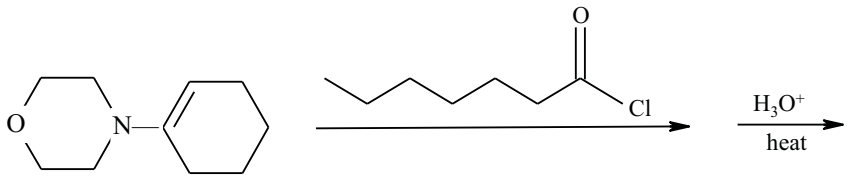
Problem 1203 Synthesize the following compound starting from diethylmalonate and other necessary reagents:

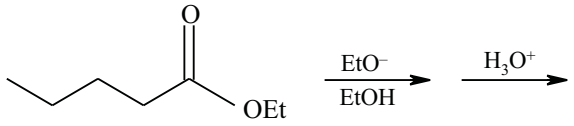


Problem 1204 Write product of the following reactions:

(a) 

(b) 

(c) 

(d) 

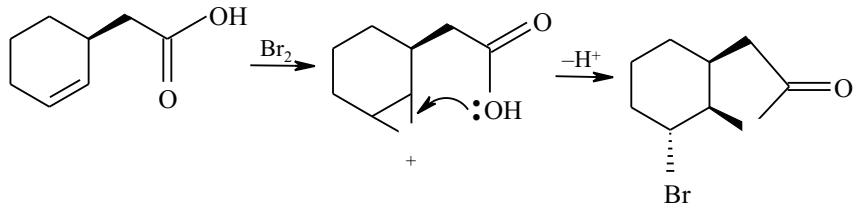
PROBLEM 1205 An organic compound A reacts with I_2 in basic medium to give a yellow precipitate. A on treatment with Br_2 in acetic acid medium gives B which readily undergoes reaction with cyanide ion to give C. C on reduction with $NaBH_4$ forms D–an optically active substance. Acid hydrolysis of D followed by treatment with acidic ethanol gives E. Gentle oxidation of E with pyridinium chlorochromate gives F, which on treatment with potassium ethoxide in ethanol followed by reaction with ethyl iodide and then heating the final product yields 1-phenyl-1-butanone. Identify A to F.

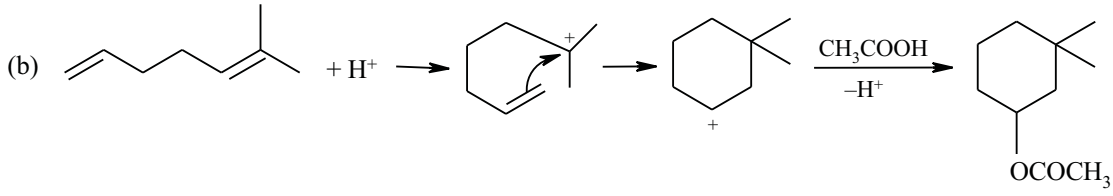
Solutions

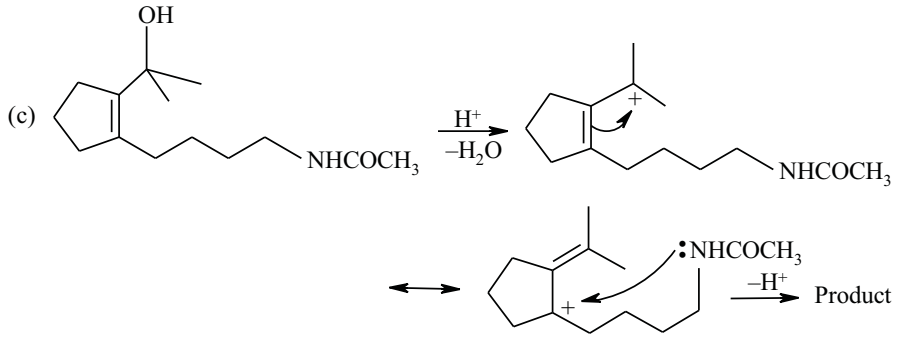
CARBOXYLIC ACID AND ITS DERIVATIVES

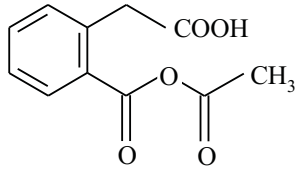
1130. Extraction of a solution of carboxylic acid and phenol in CCl_4 with aqueous solution of $NaHCO_3$ will bring carboxylic acid in aqueous phase as *R*COONa leaving phenol in organic phase.

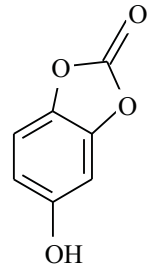
1131. *A* : 2-methylmalonic acid, *B* : Propanoic acid.

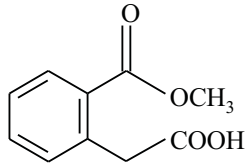
1132. (a) 

(b) 

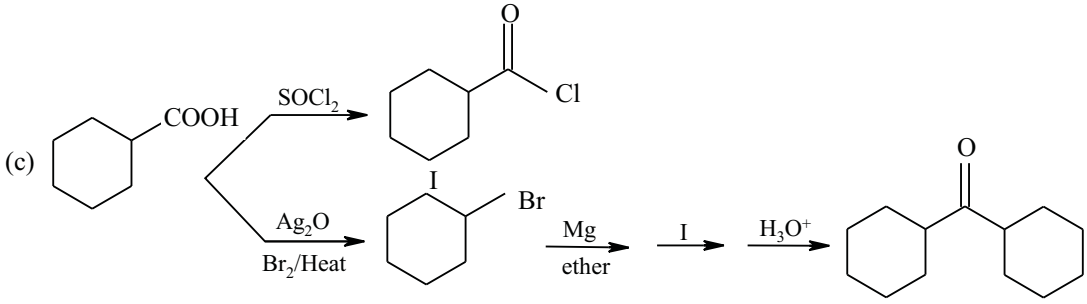
(c) 

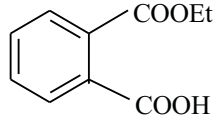
1133. (a) $PhCONHCH_3$ (b) 

(c) 

(d) 

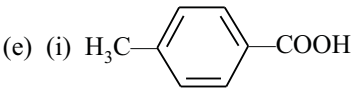
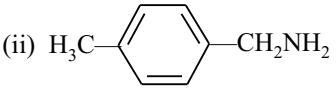
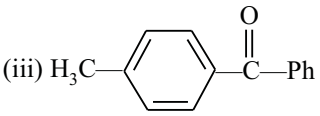
1134. (a) $\xrightarrow{HBr} \xrightarrow{NaCN} \xrightarrow[H_2SO_4]{dilute}$ (b) $\xrightarrow[Peroxide]{HBr} \xrightarrow{NaCN} \xrightarrow[H_2SO_4]{dilute}$

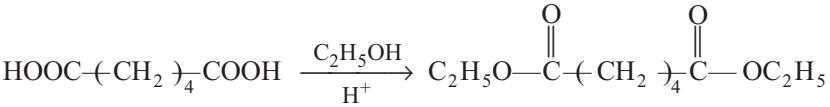
(c) 

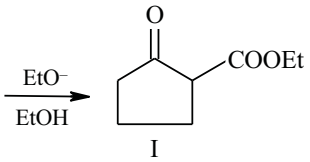
1135. (a) $CH_3OH + Na_2CO_3$ (b) 

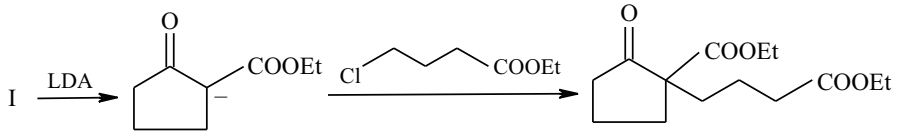
(c) Ph—CH(COPh)—COOEt

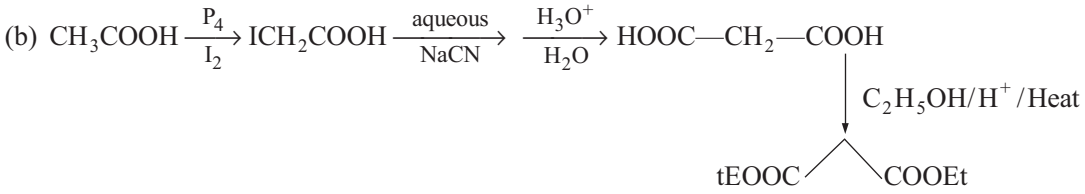
(d) $CH_3CH_2CH(COOEt)_2$

(e) (i)  (ii)  (iii) 

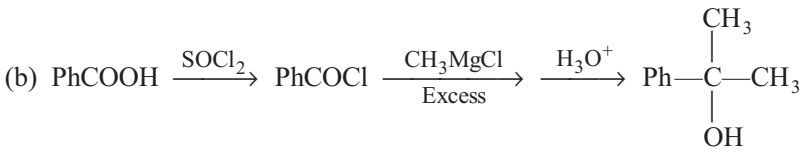
1136. (a) 

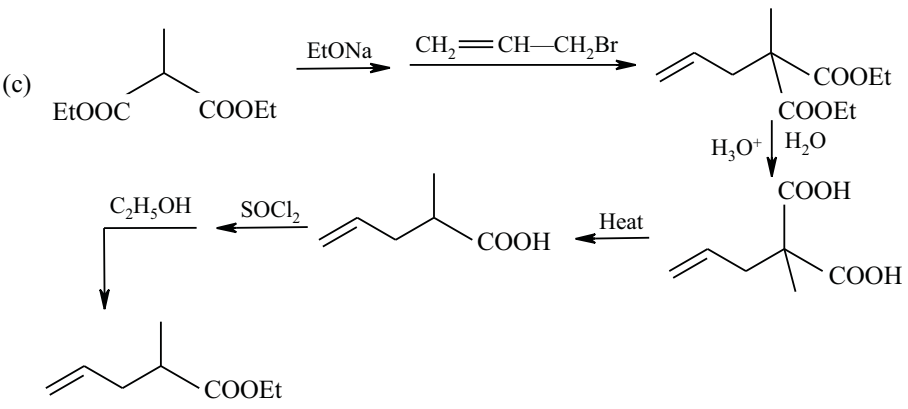




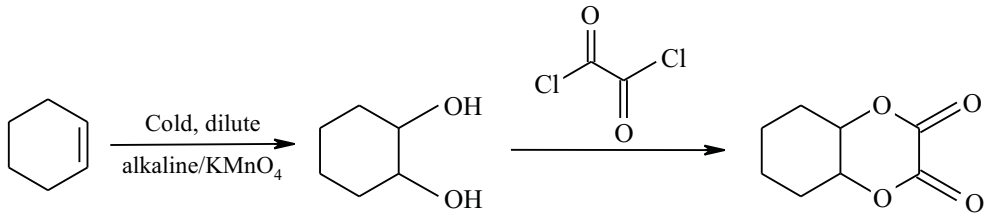
(b) 

1137. (a) 

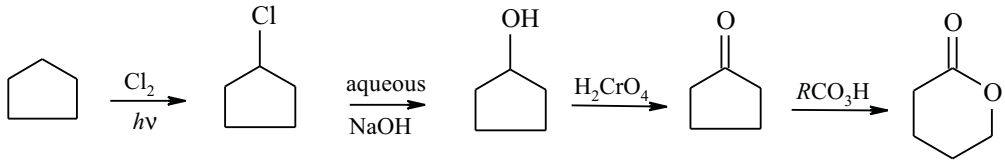
(b) 

(c) 

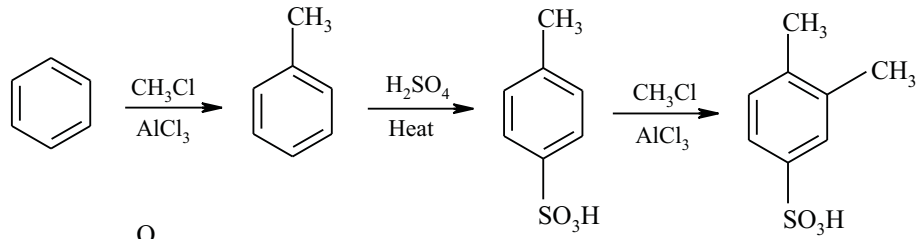
1138. (a)

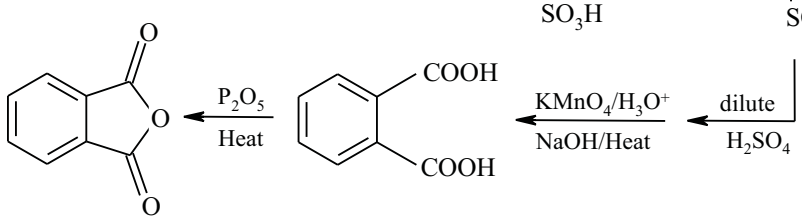


(b)

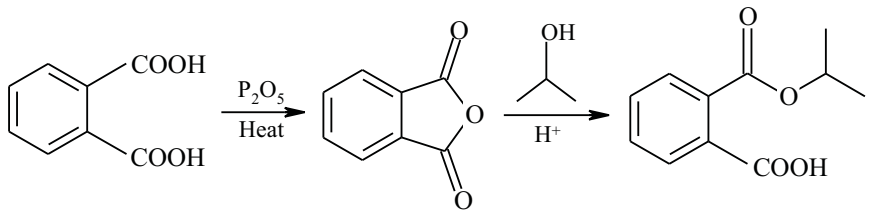


(c)

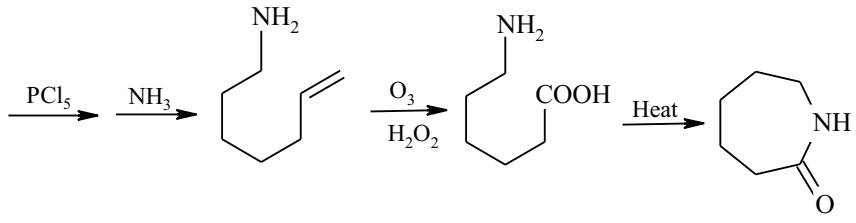




(d)



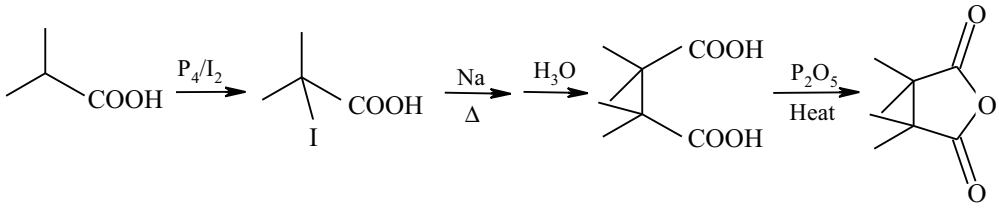
1139. (a) 6-hepten-1-ol

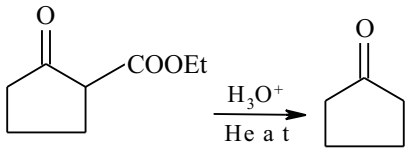


(b) $PhCH_2Br \xrightarrow{NaCN} \xrightarrow{NaBH_4} PhCH_2CH_2NH_2$

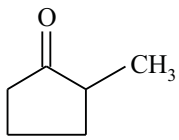
(c) $PhCHO + CH_3MgBr \xrightarrow{H_3O^+} Ph\underset{\underset{OH}{|}}{C}HCH_3 \xrightarrow[Heat]{H_2SO_4} PhCH{=}CH_2 \xrightarrow[Peroxide]{HBr} \xrightarrow{NaCN}$

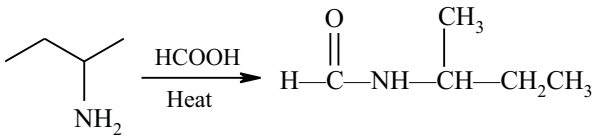
$PhCH_2CH_2CN$

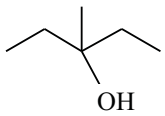
1140. (a) 

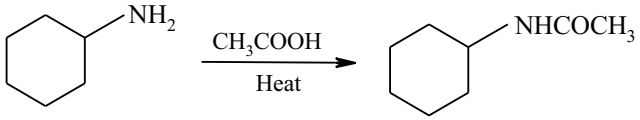
(b) $C_2H_5O{-}C{-}(CH_2)_4{-}COOC_2H_5 \xrightarrow[Et\ OH]{Et\ ONa}$ 

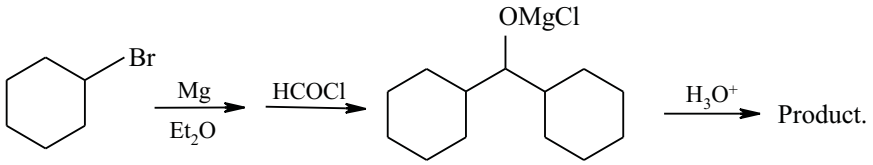
$\xrightarrow[Heat]{H_3O^+}$

$\xrightarrow{LDA}$ $\xrightarrow{CH_3I}$ 

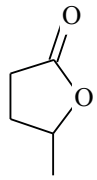
1141. (a) 

(b) $CH_3COOEt \xrightarrow[Excess]{C_2H_5MgBr} \xrightarrow{H_3O^+}$ 

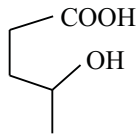
(c) 

(d) 

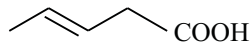
1142.



A



B



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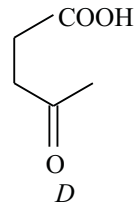
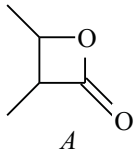


D

1143.



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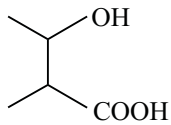

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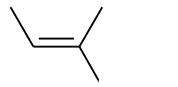

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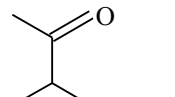

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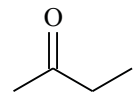
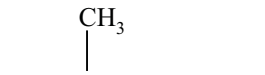


E

1144.



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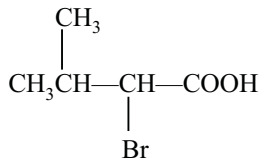
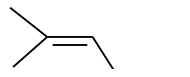
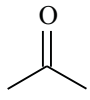


B



C

D



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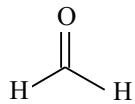
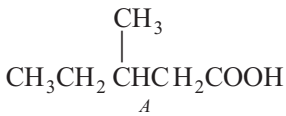


F

1145.



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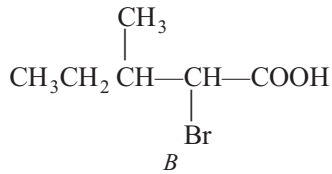

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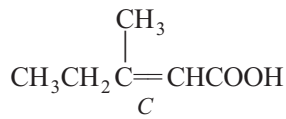
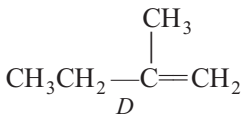
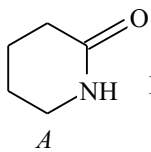


C

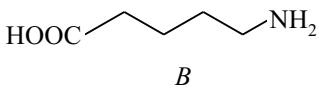


D

1146.



A



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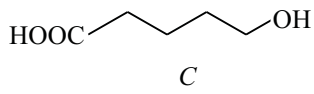

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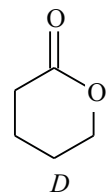
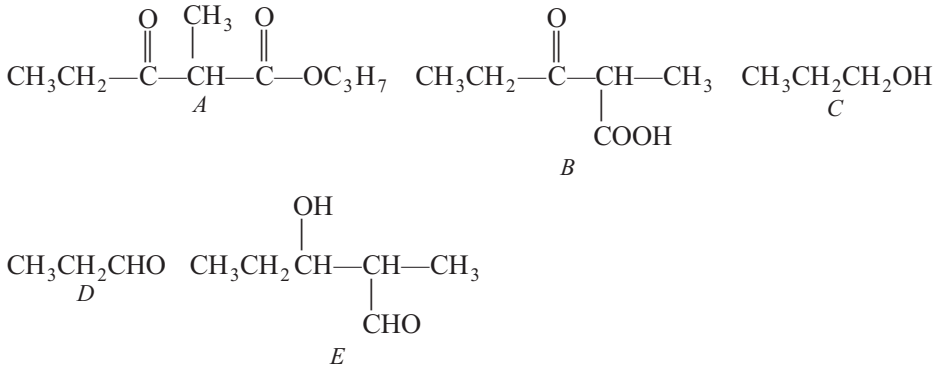
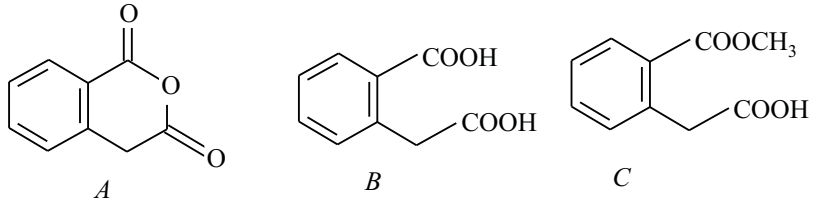
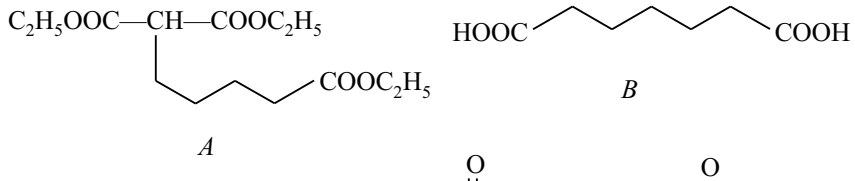
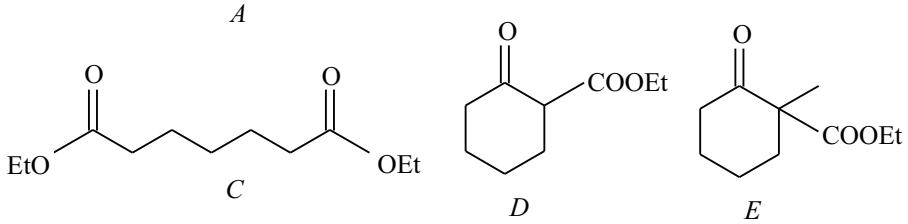


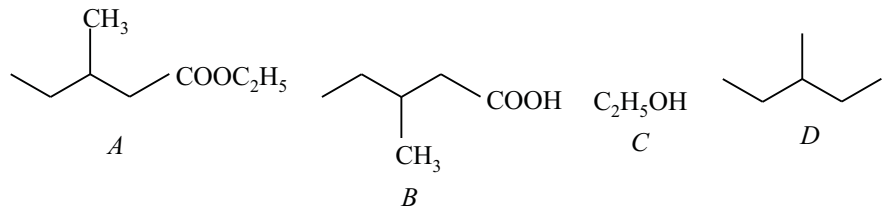
D

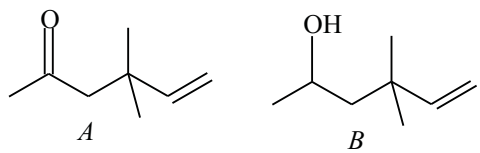
1147. 

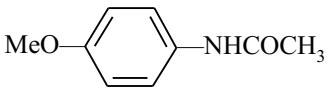
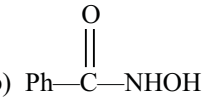
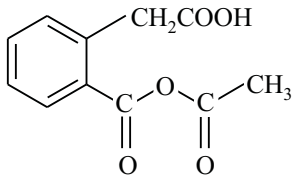
1148. 

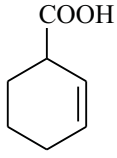
1149. 



1150. 

1151. 

1152. (a) 
(b) 
(c) 

(d) 
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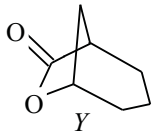
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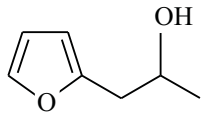
(e) 
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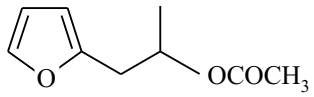
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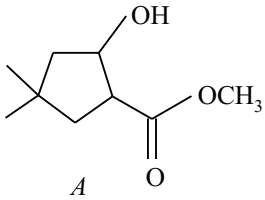
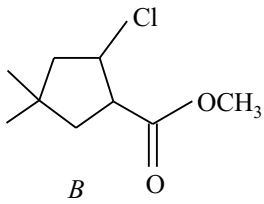
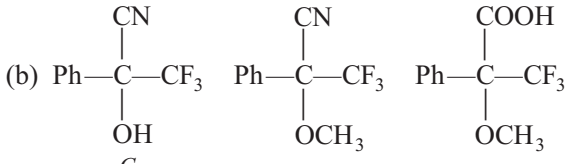
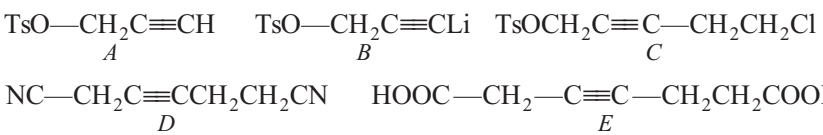
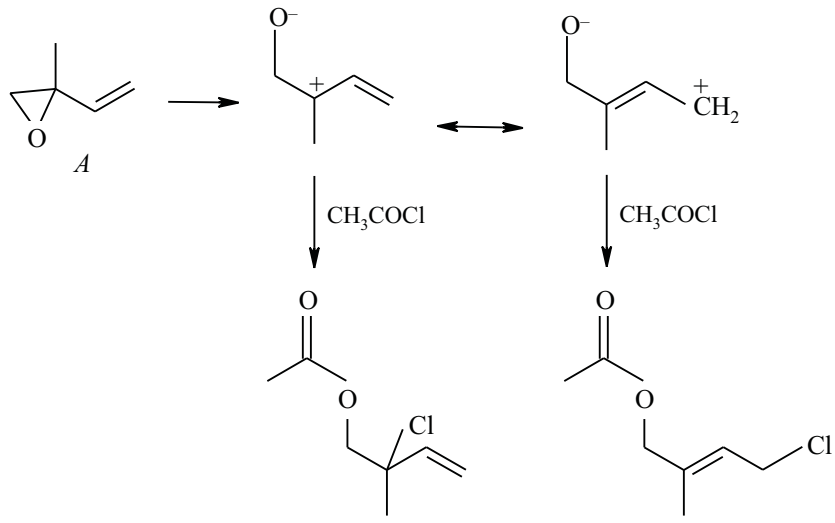
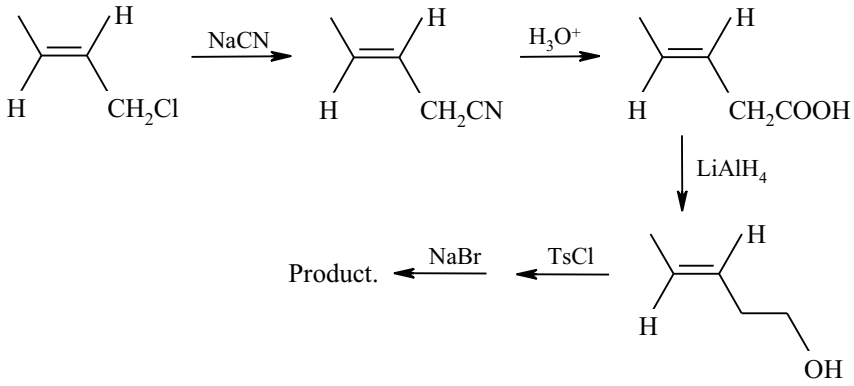
1153. (a) 
A

B

(b) 
C *D* *E*

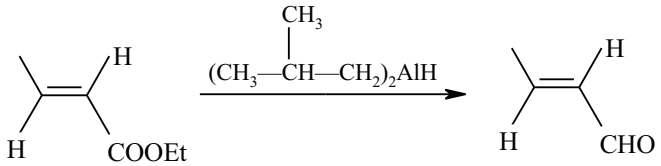
1154. 
A *B* *C* *D* *E*

1155. 
A

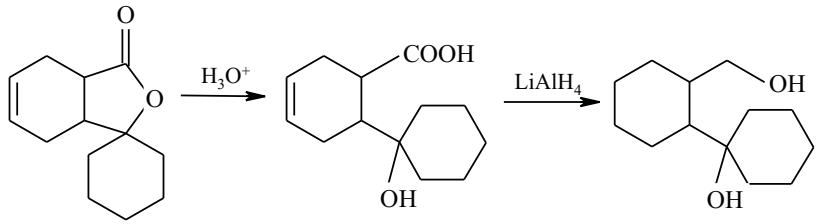
1156. (a)



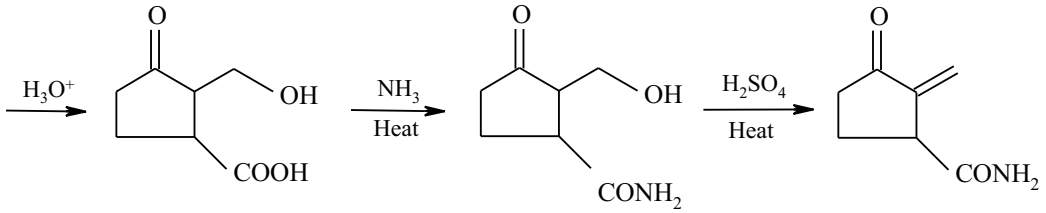
(b)



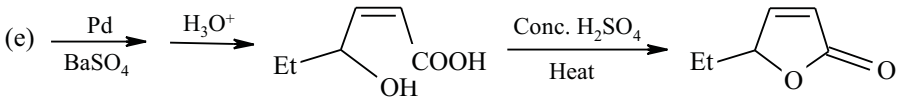
(c)



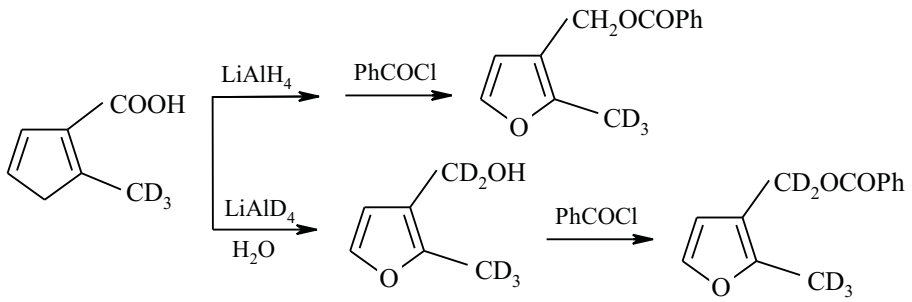
(d)

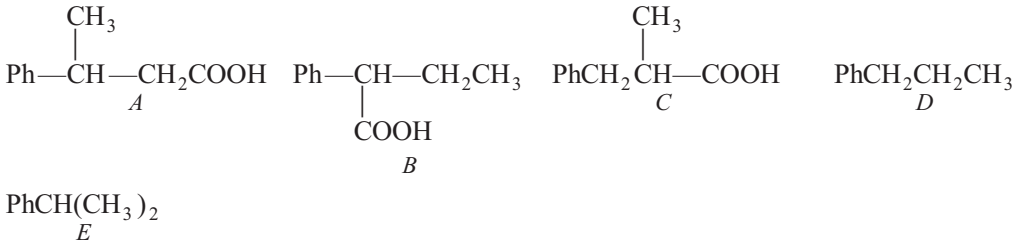


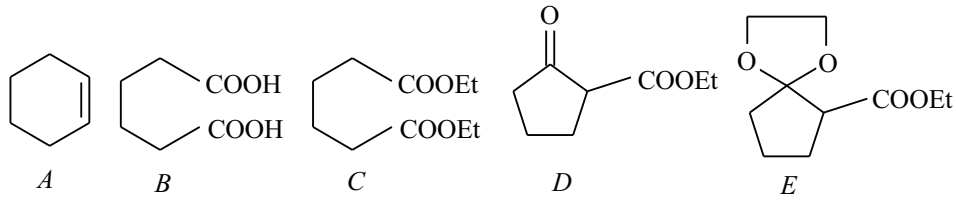
(e)

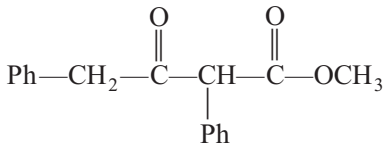
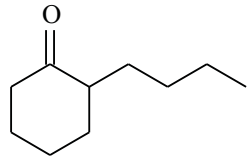


1157.

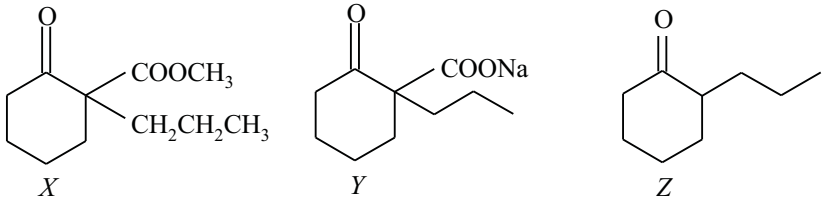


1158. 

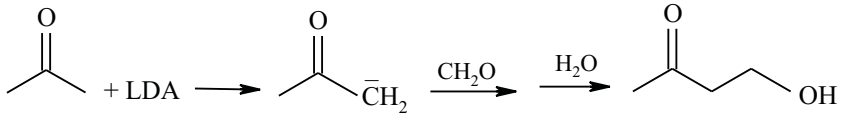
1159. 

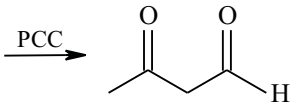
1160. (a)  (b) 

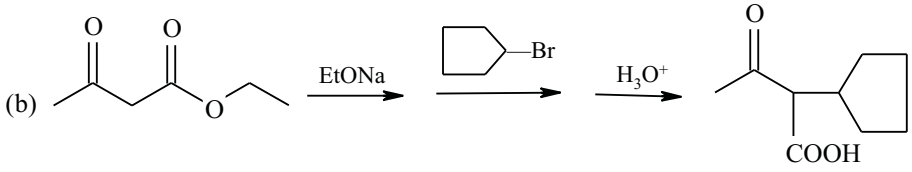
1161. (a) $HOOC—CH_2CH_2CH_2—\overset{18}{O}H$ (b) $H_2N—CH_2COO^-$ (c) $HOOC—CH_2CH_2CH_2CONH_2$

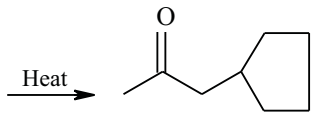
1162. (a) 

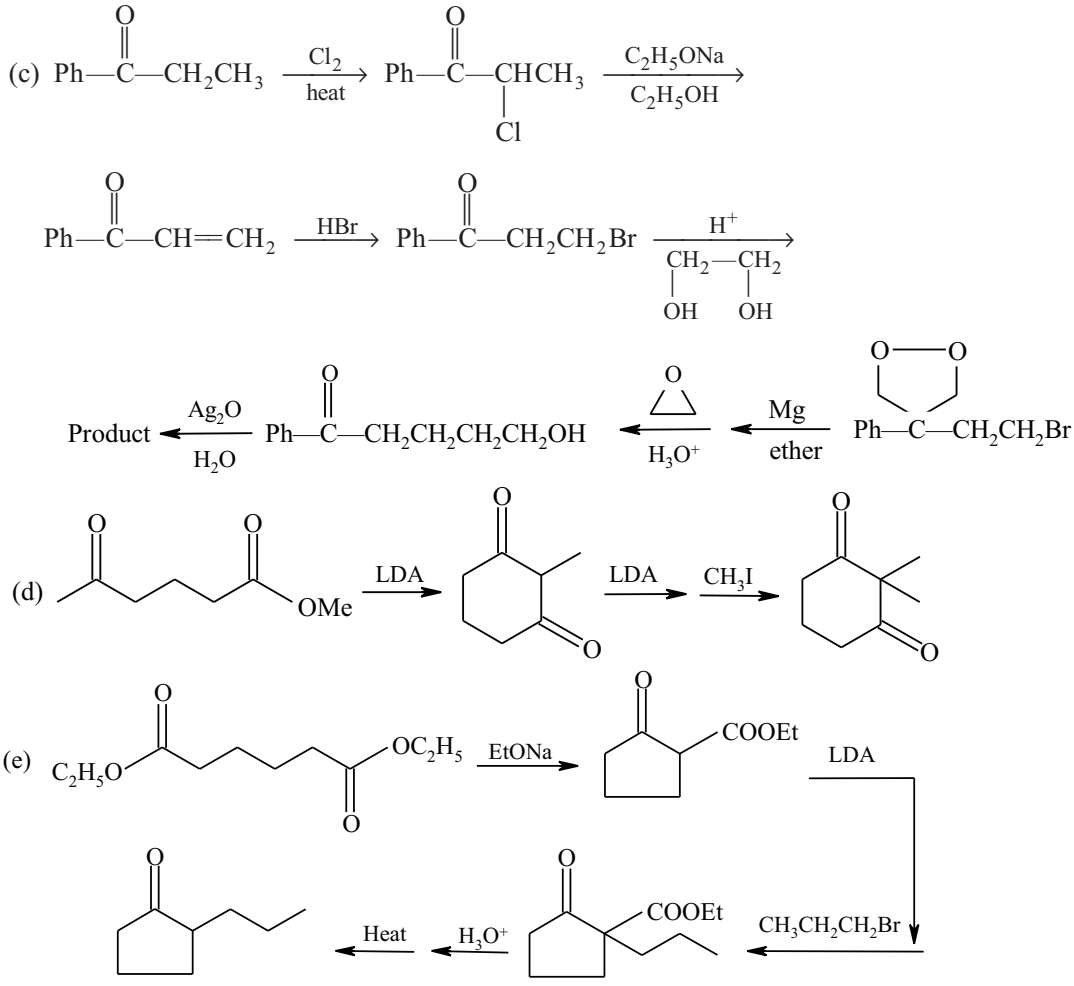
(b) $CH_3-(CH_2)_{10}-COOH$

1163. (a) 

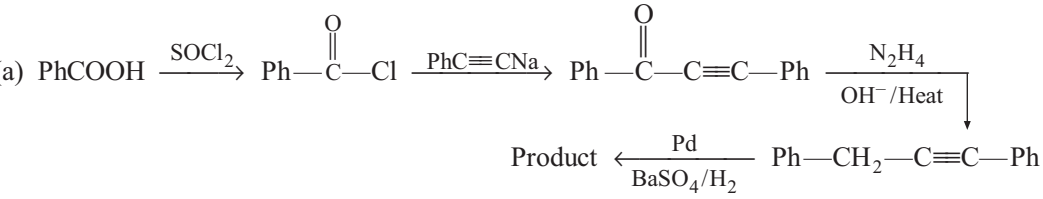


(b) 

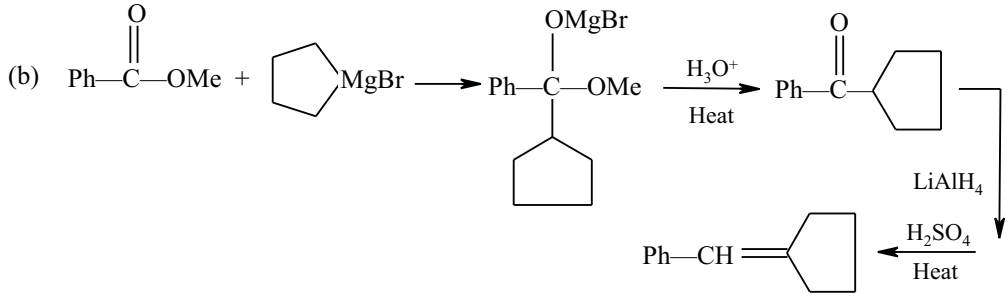


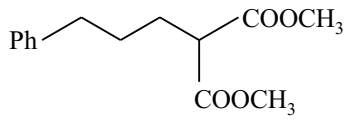


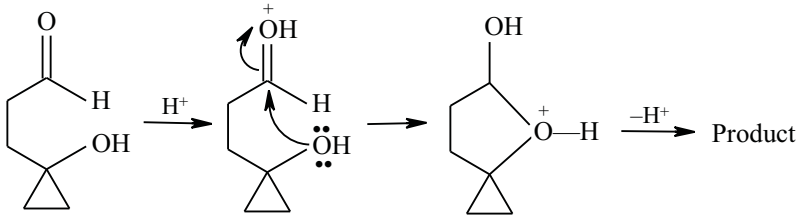
1164. (a)

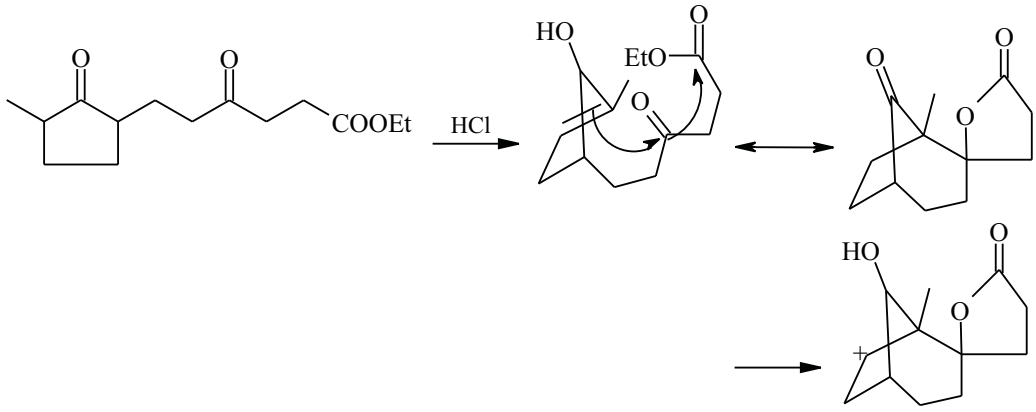


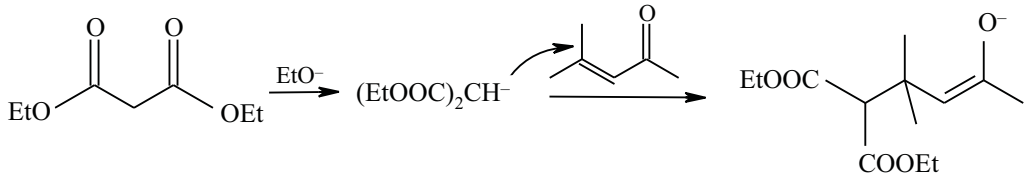
(b)

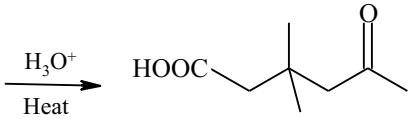


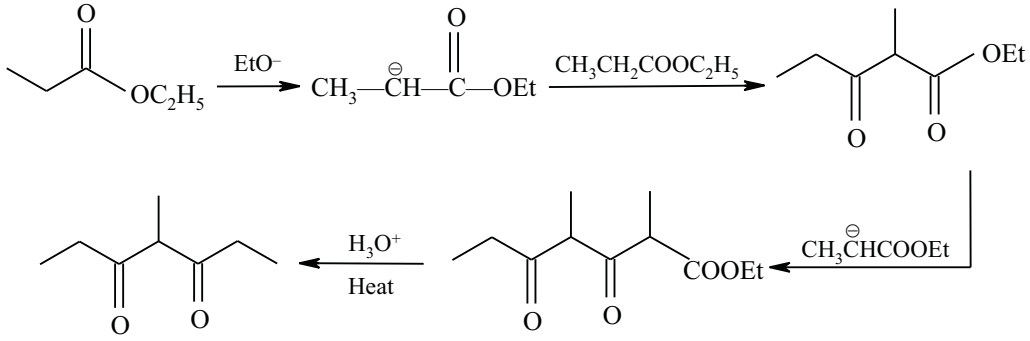
(c) C_2H_5ONa → $PhCH_2CH_2CH_2Br$ → 

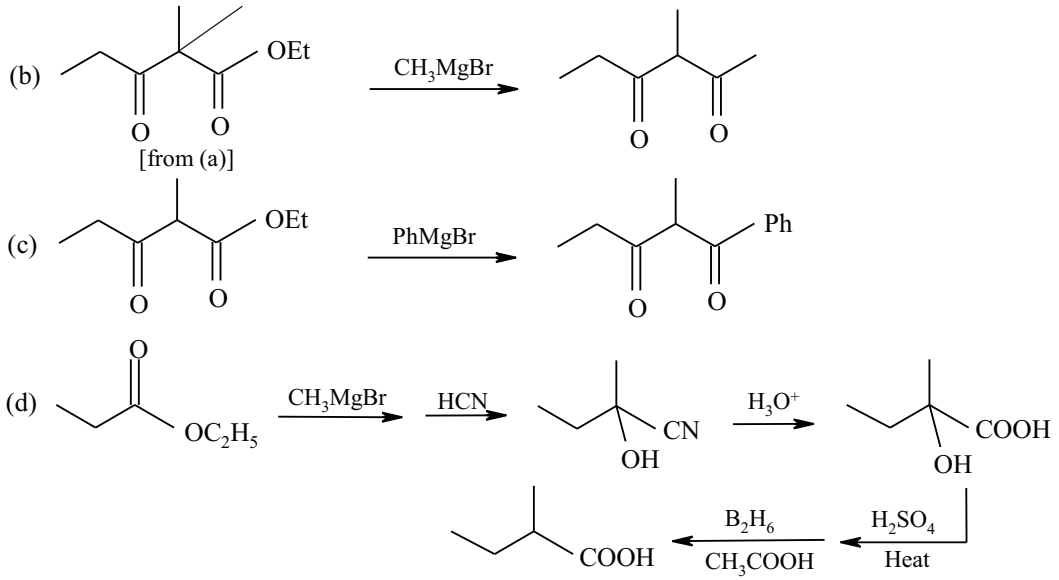
1165. (a) 

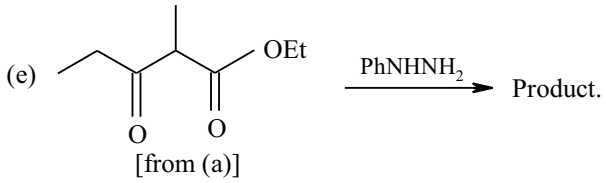
(b) 

1166. 

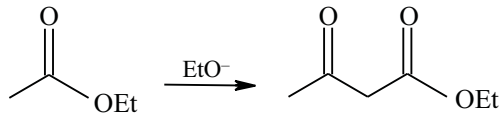


1167. (a) 

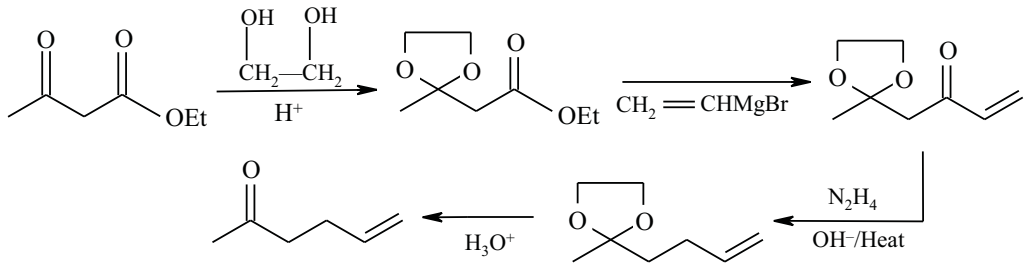

(b)
OEt
O
O
[from (a)]
CH3MgBr
O
O
(c)
OEt
O
O
PhMgBr
Ph
O
O
(d)
O
OC2H5
CH3MgBr
HCN
CN
OH
H3O+
COOH
OH
B2H6
CH3COOH
H2SO4
Heat
COOH

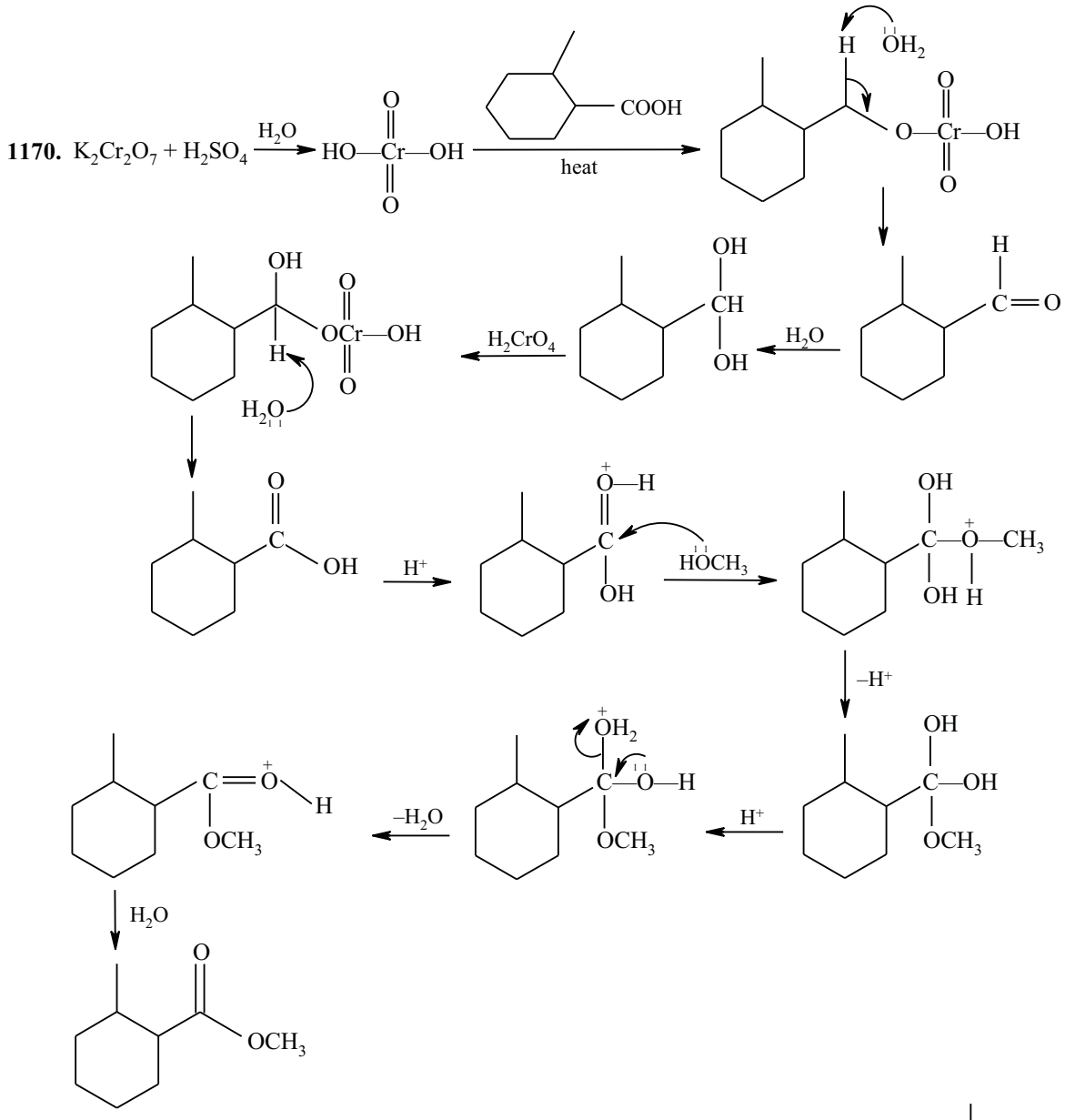

(e)
OEt
O
O
[from (a)]
PhNHNH2
Product.

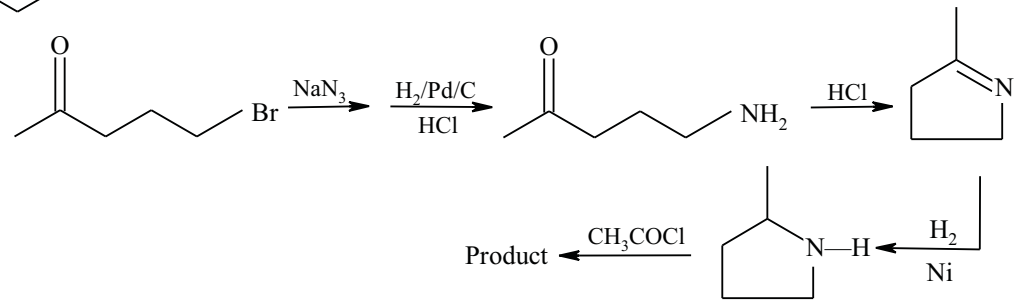
1168. (a)


O
OEt
EtO−
O
O
OEt

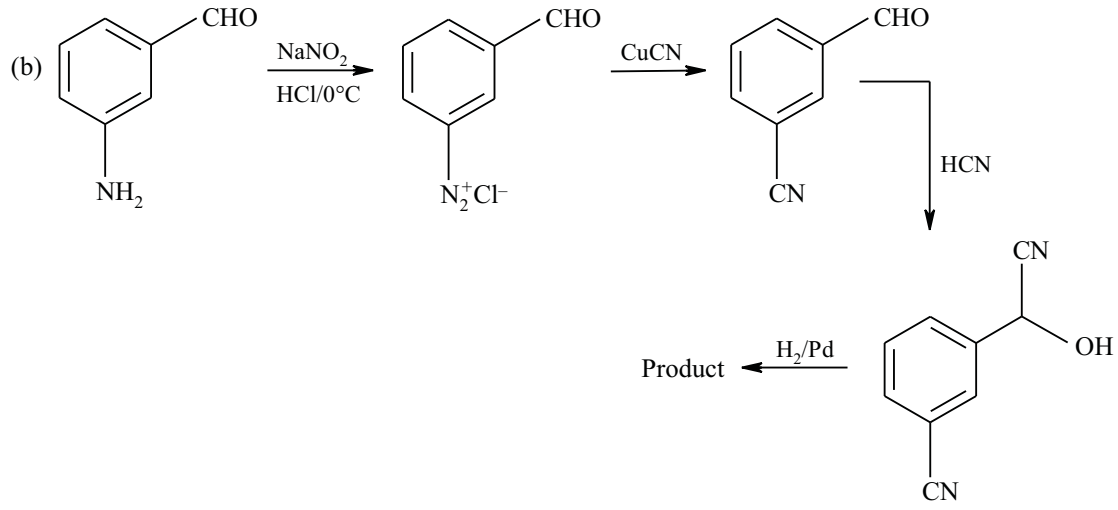
(b)


O
O
OEt
OH
OH
CH2—CH2
H+
O
O
O
OEt
CH2 = CHMgBr
O
O
O
N2H4
OH−/Heat
O
O
O
H3O+
O

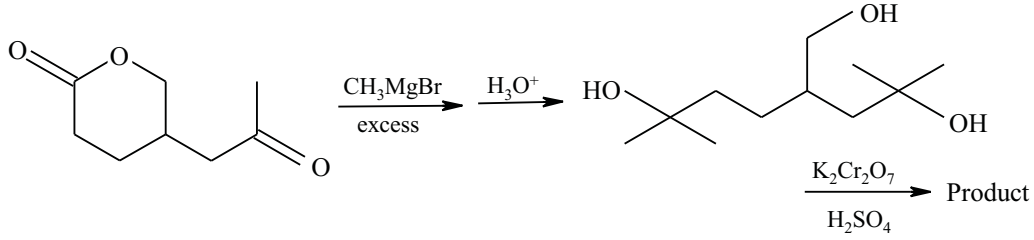
1170. 
K2Cr2O7 + H2SO4
H2O
HO—Cr—OH
COOH
heat
H
OH2
O—Cr—OH
H2CrO4
H2O
OH
CH
C=O
OCr—OH
H2O
C—OH
H+
HOCH3
C—O—CH3
–H+
OH2
C—O—H
–H2O
H+
OCH3
H2O

1171. (a) 
Br
NaN3
H2/Pd/C
HCl
NH2
HCl
N
Product
CH3COCl
N—H
H2
Ni

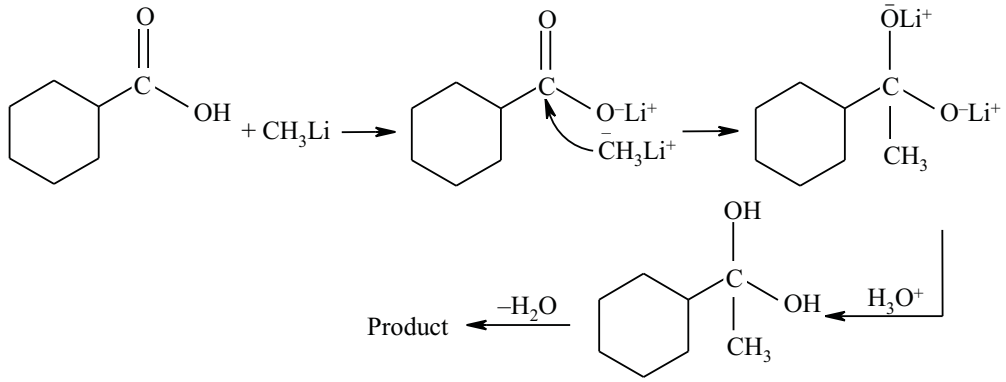
(b)

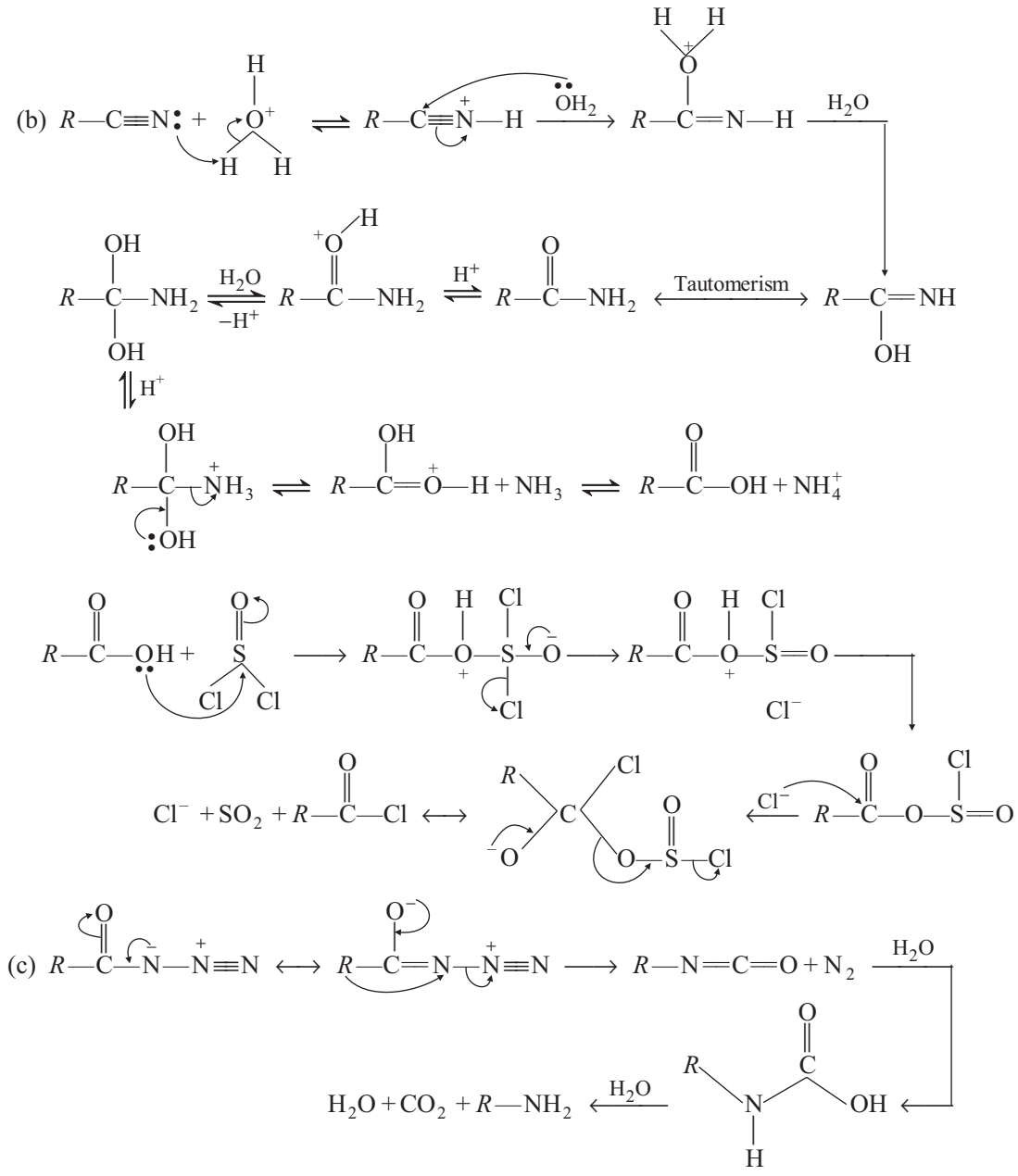


1172. $CH_3OH \xrightarrow{PBr_3} CH_3Br \xrightarrow[ether]{Mg} CH_3MgBr$

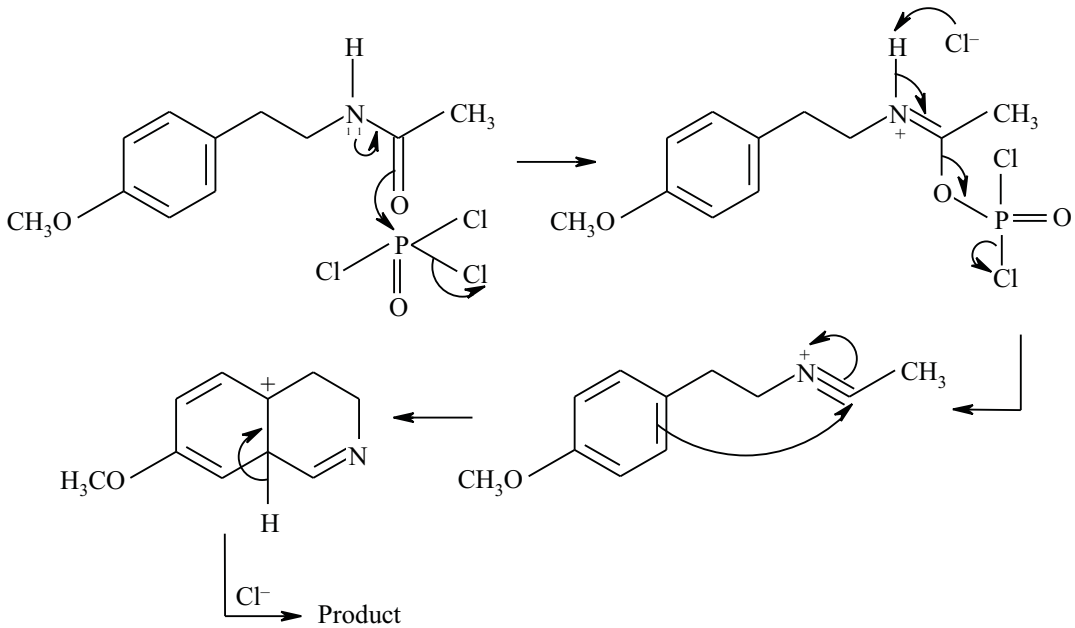


1173. (a)

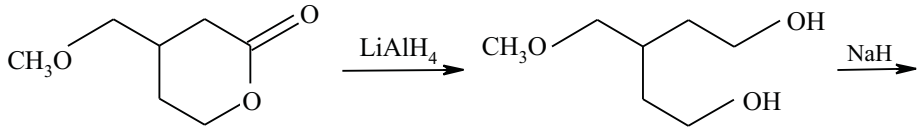



(b)
Tautomerism
(c)

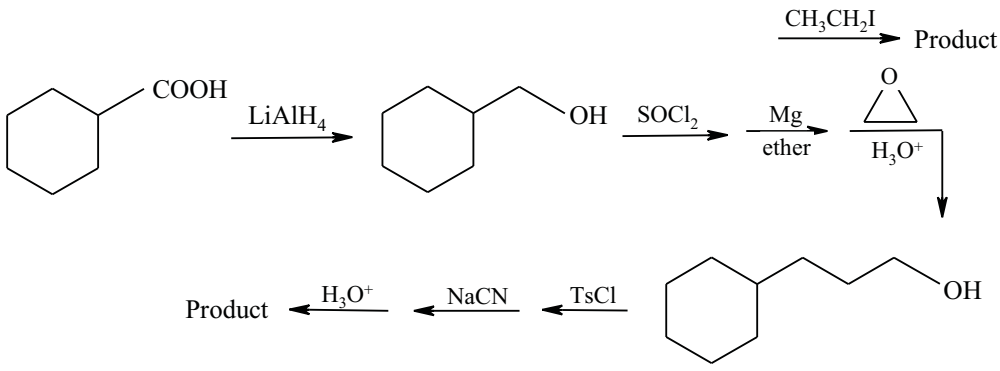
1174.



1175. (a)

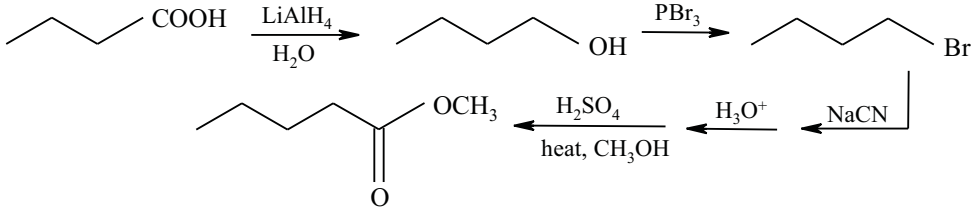


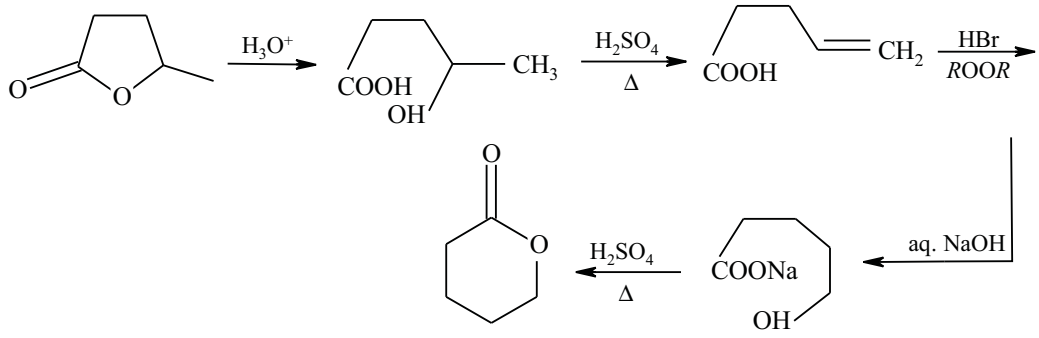
(b)



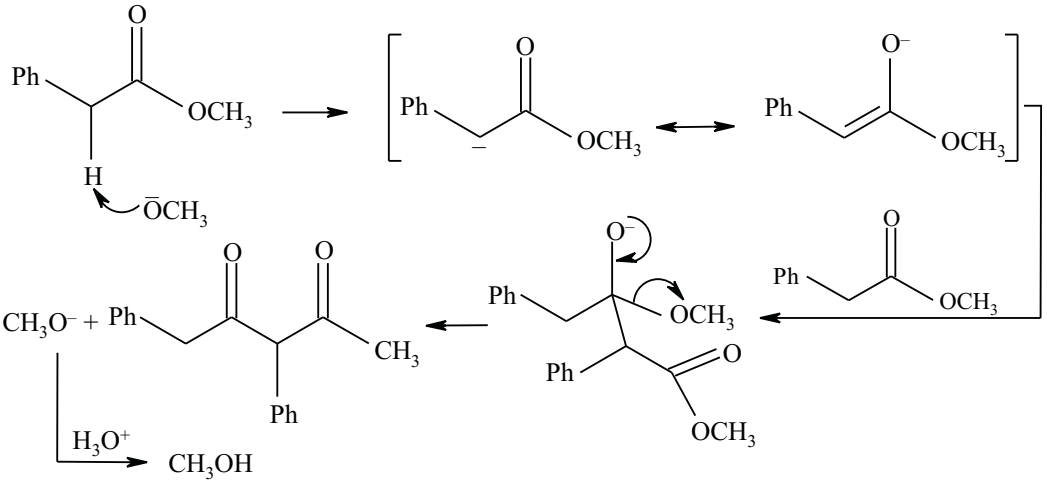
1176. (a) II > III > IV > I, (b) I > II > III > IV, (c) III > II > I.

1177. (a)

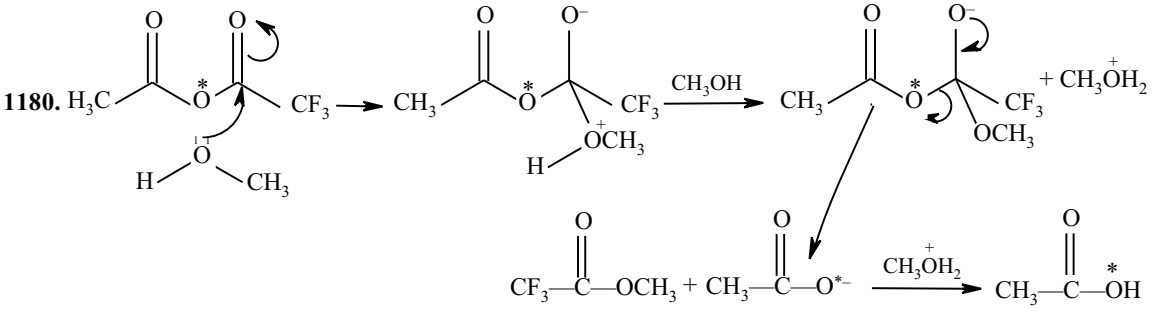


(b) 

1178. (a) *A* will hydrolyse first, (b) Rate will increase, (c) Rate will decrease, (d) Rate will decrease.

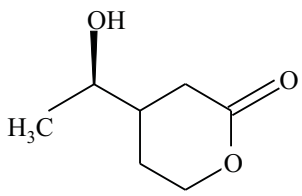
1179. 

$$\Delta H = (\text{BE})_{\text{Reactants}} - (\text{BE})_{\text{Products}} = 91 + 99 - (85 + 102) = 3 \text{ kcal}$$

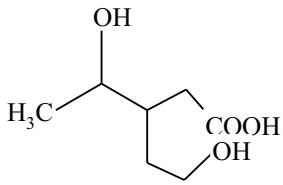
1180. 

Necleophile attack at more electrophilic. C

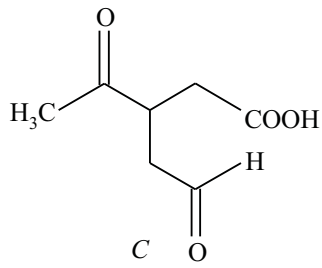
1181.



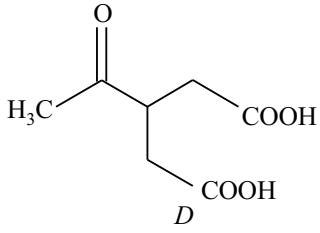
A



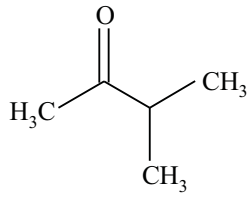
B



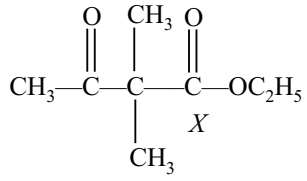
C



D



E



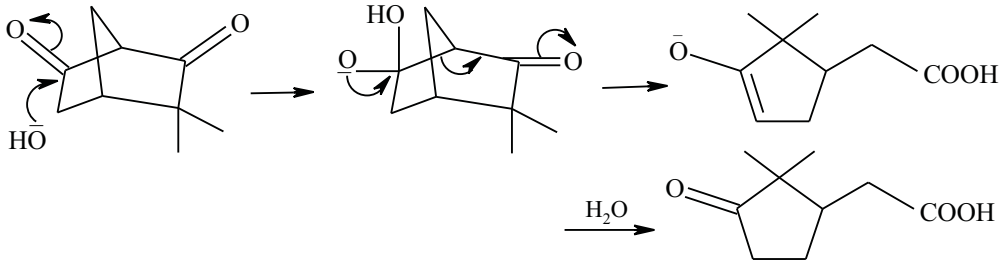
X

1182. *A* : $C_6H_5COOCH_2CH_3$; *B* : CH_3CH_2OH; *C* : CH_3CHO; *D* : C_6H_5COOH.

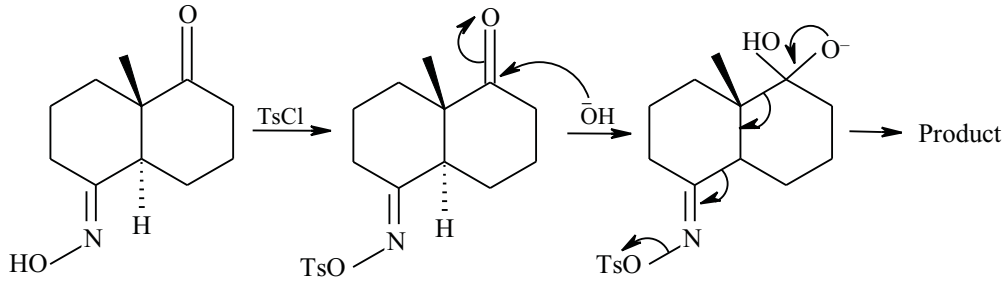
1183. $C_6H_5CH{=}CH{-}COOH$ (*A*) $C_6H_5CHBrCHBrCOOH$ (*B*) $C_6H_5CH(OH)CH(OH)COOH$ (*C*)

$C_6H_5COCOCOOH$ (*D*) $C_6H_5COCOCOCl$ (*E*) $C_6H_5COCOCONH_2$ (*F*)

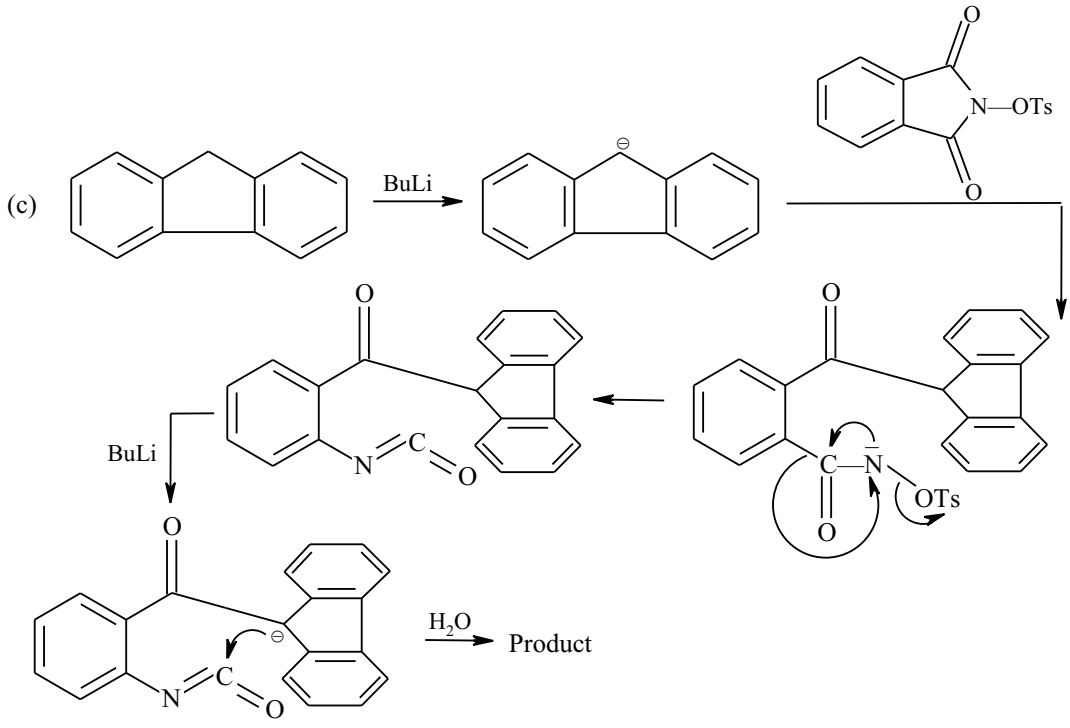
1184. (a)



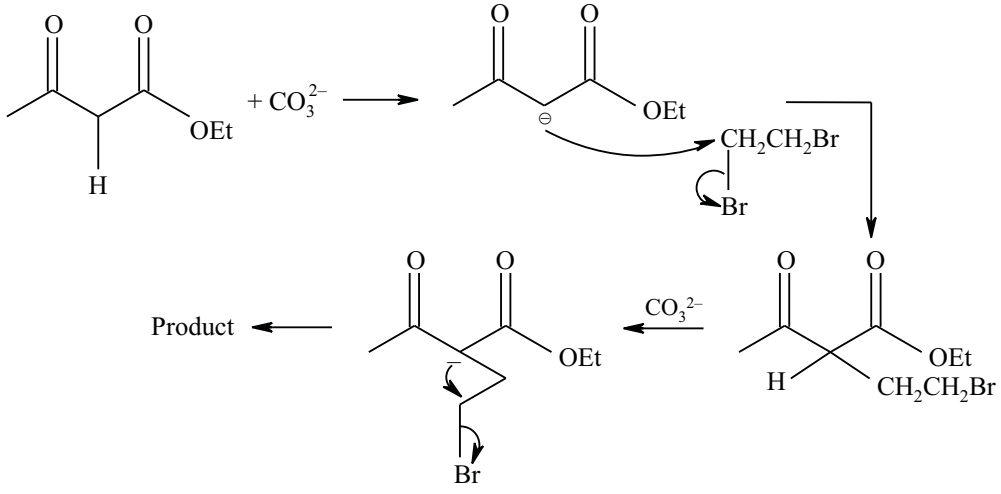
(b)

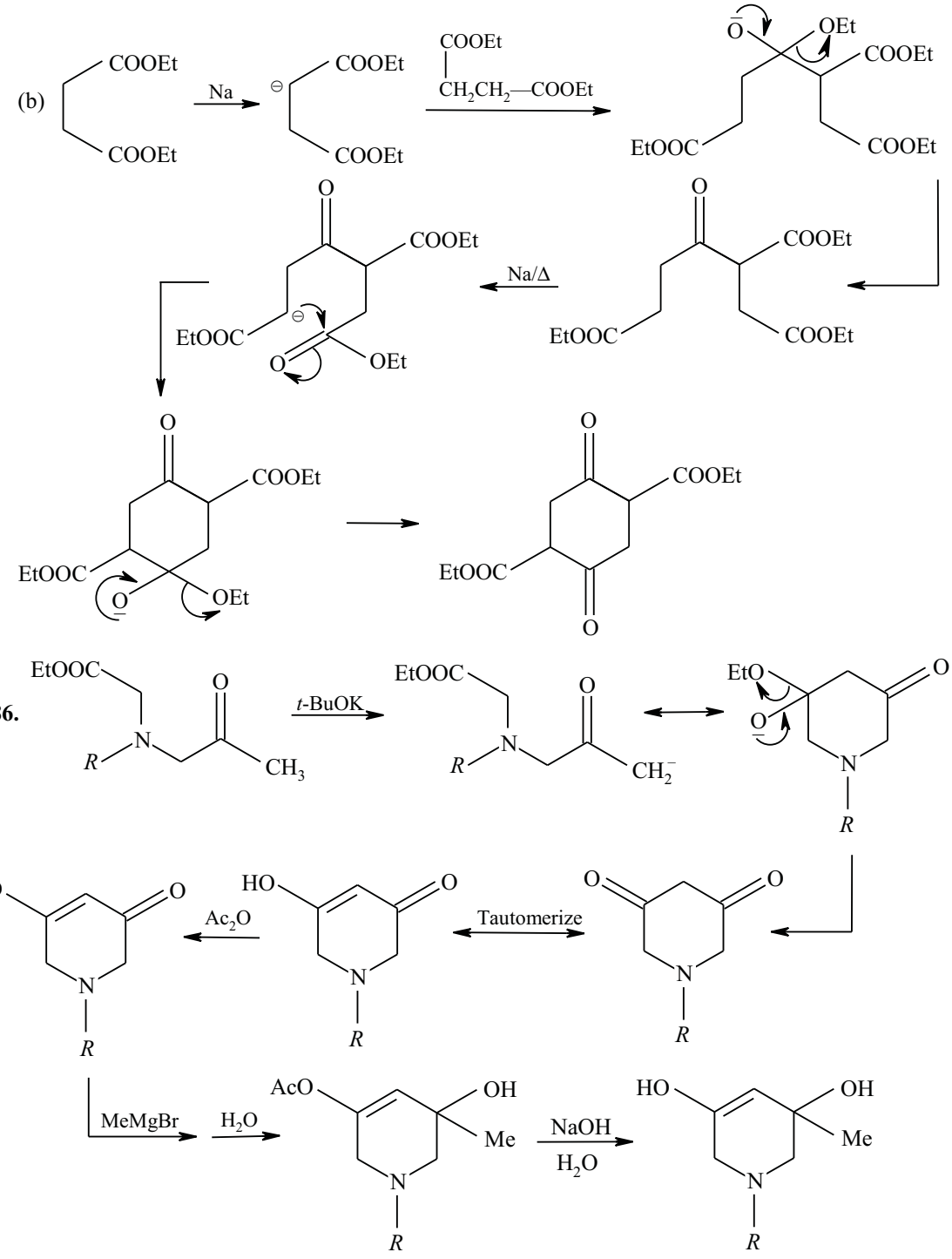


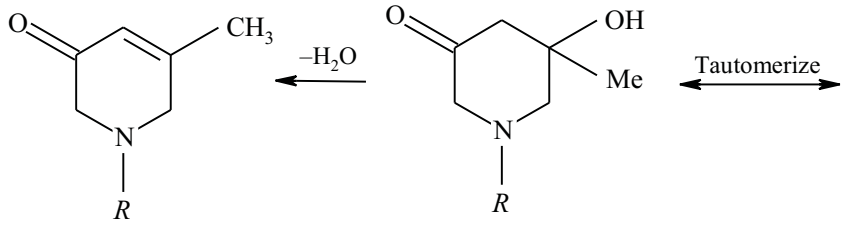
(c)


BuLi
N—OTs
BuLi
N
C
O
C—N
OTs
H2O
Product

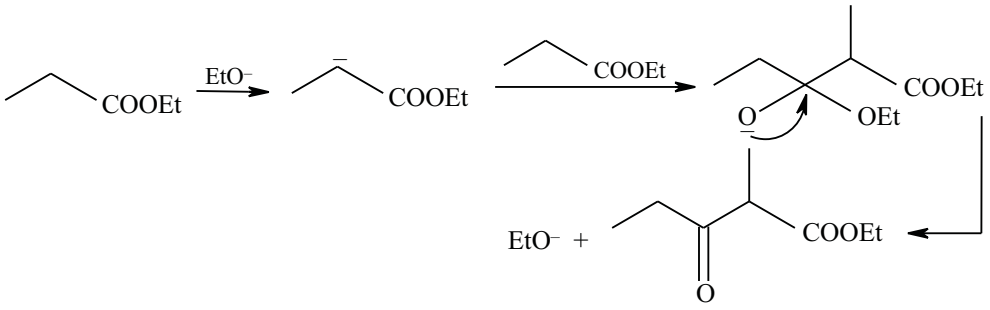
1185. (a)


+ CO3 2–
OEt
H
CH2CH2Br
Br
CO3 2–
Product
OEt
Br

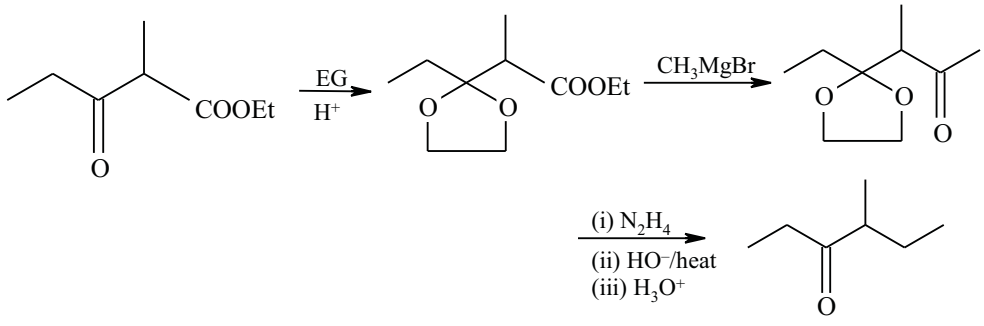

(b)
COOEt
COOEt
Na
COOEt
CH2CH2—COOEt
OEt
EtOOC
Na/Δ
1186.
t-BuOK
CH3
CH2
EtO
AcO
Ac2O
HO
Tautomerize
MeMgBr
H2O
OH
Me
NaOH
R


O
CH3
–H2O
OH
Me
Tautomerize
N
R

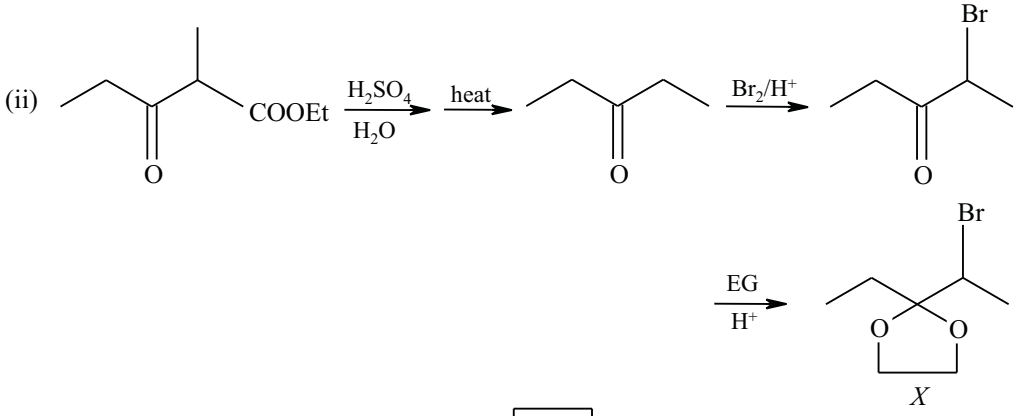
1187. (a)

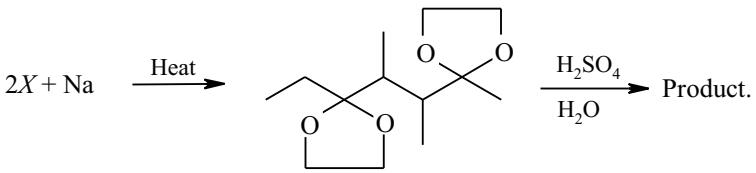

COOEt
EtO–
COOEt
COOEt
O
OEt
EtO– +
COOEt
O

(b) (i)

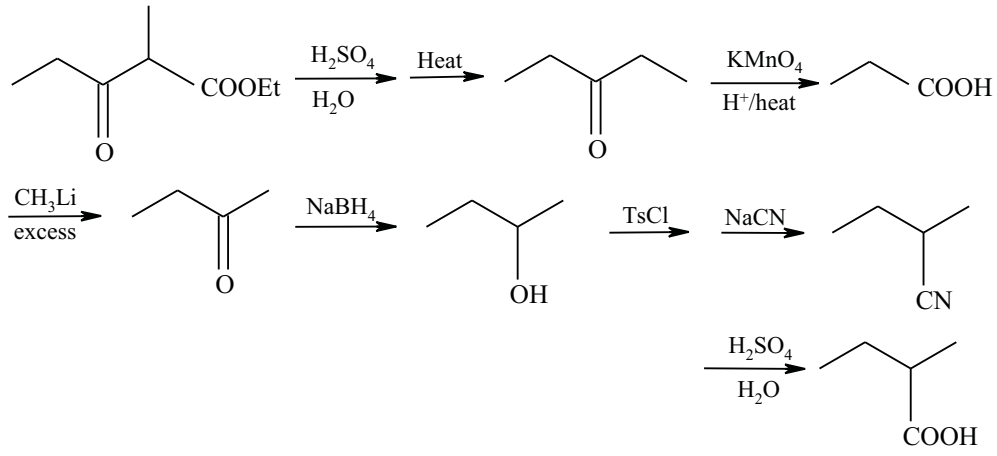

COOEt
O
EG
H+
COOEt
O
O
CH3MgBr
O
O
O
(i) N2H4
(ii) HO–/heat
(iii) H3O+
O

(ii)

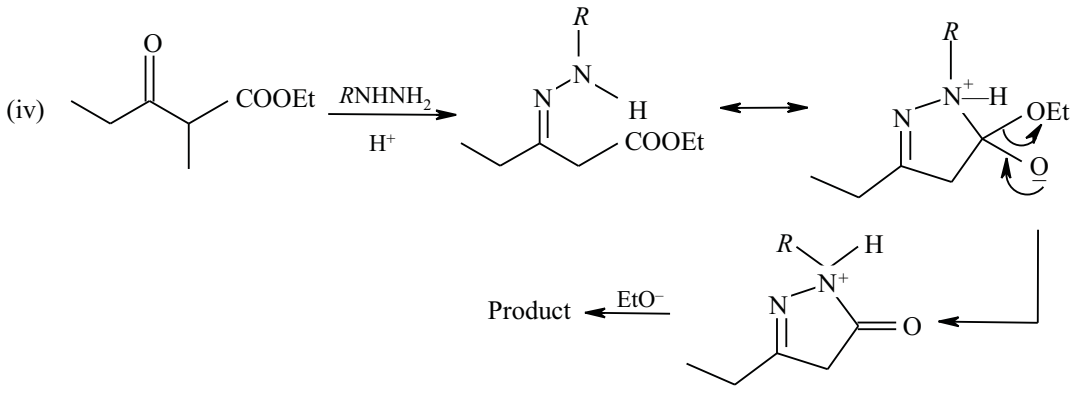

COOEt
O
H2SO4
H2O
heat
O
Br2/H+
Br
O
EG
H+
Br
O
O
X


2X + Na
Heat
O
O
O
O
H2SO4
H2O
Product.

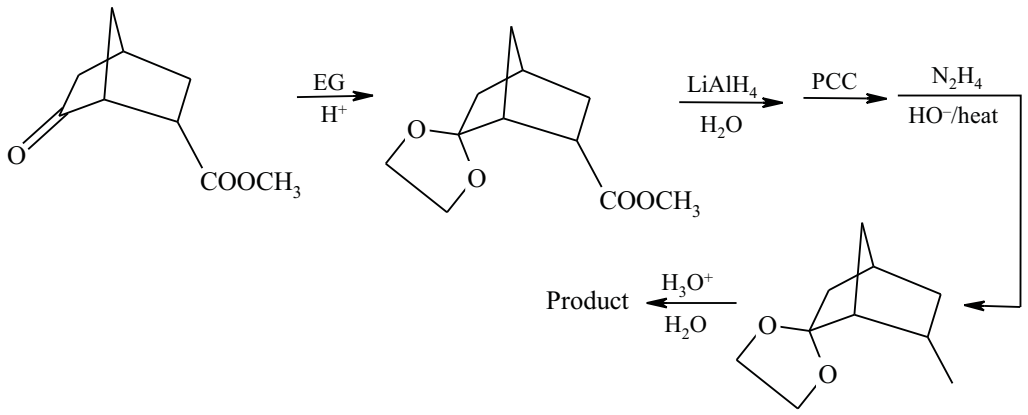
(iii)



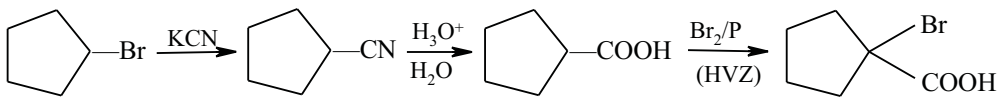
(iv)



1188.

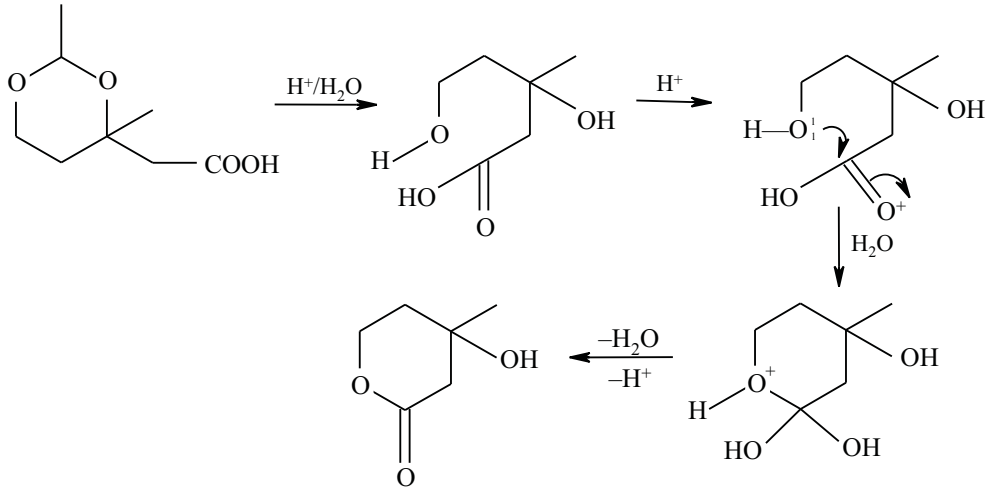


1189. (a)

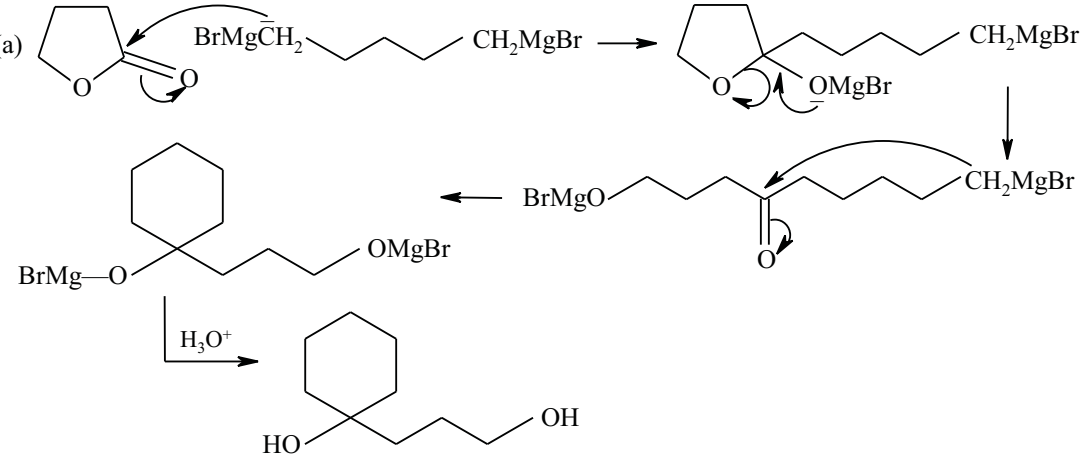


(b) $CH_3CH(C_6H_5)CH_2CN \xrightarrow[H_2O]{H_3O^+} \xrightarrow{LiAlH_4}$ Product

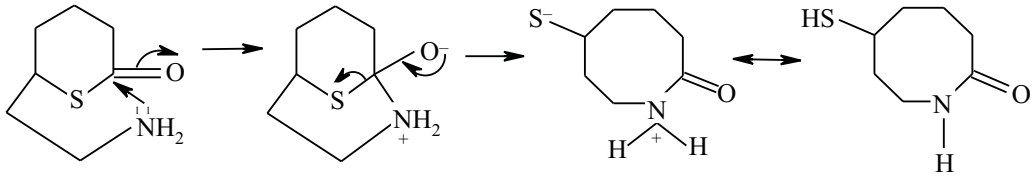
1190.



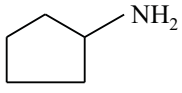
1191. (a)



(b)



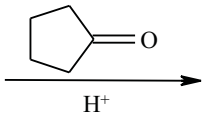
1192. (a)



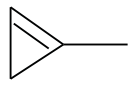
(b) CH_3I (excess); Ag_2O/heat,

(c) $CH_3ONa; CH_3CH_2CH_2Br$; $NaOH/H_2O$; heat,
(d) $Mg/Et_2O; CO_2/H_3O^+; CH_3OH/H^+$.

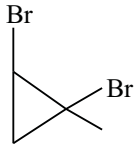
1193. $PhBr \xrightarrow[Et_2O]{Mg} \xrightarrow[H_3O^+]{CO_2} PhCOOH \xrightarrow{SOCl_2} \xrightarrow{NH_3} Ph{-}\overset{\overset{O}{\|}}{C}{-}NH_2 \xrightarrow{LiAlH_4}$



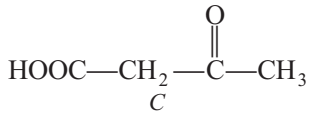
1194.



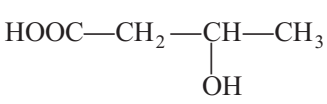
A



B

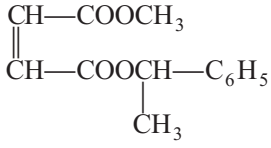


C

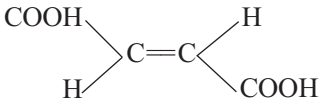


D

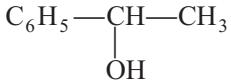
1195



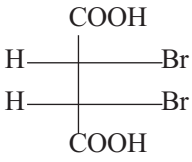
A



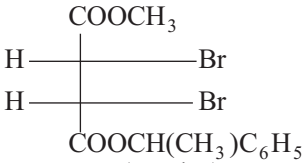
B



C

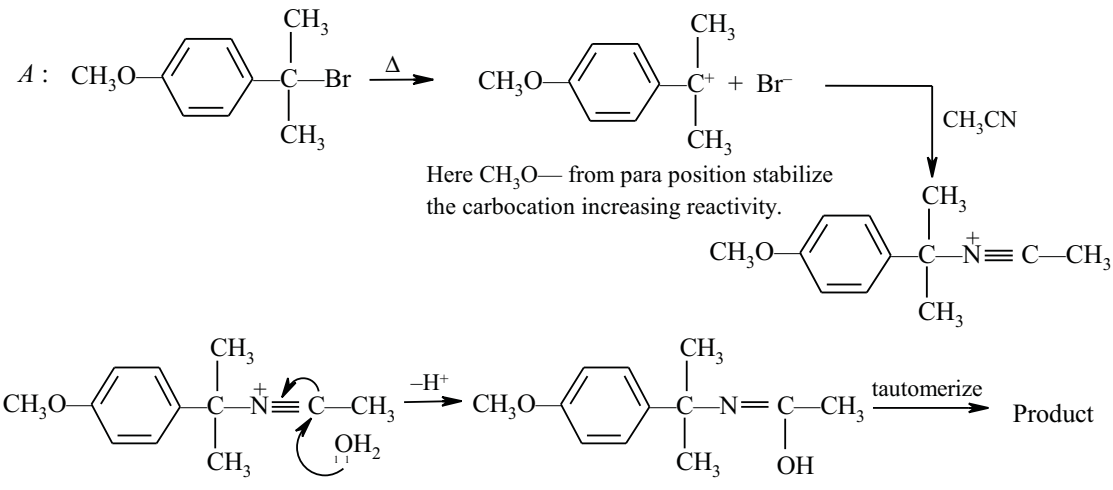


D



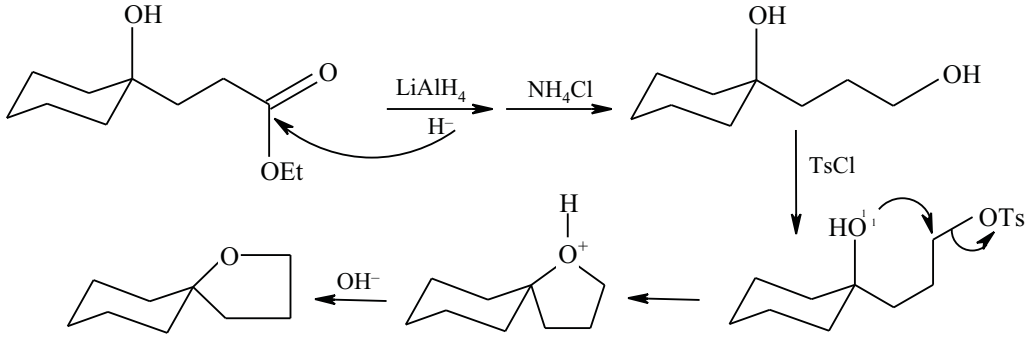
(*E* and *F*)

1196. All the three reaction involves SN–1 reaction of tertiary halide as:

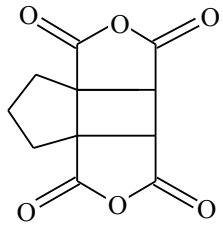


The above mechanism reveal that electron donating group will increase the reactivity and electron withdrawing group will decrease the reactivity. Therefore, reaction *A* will be the fastest and reaction *B* will be the slowest.

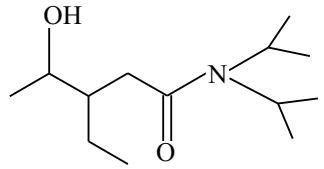
1197.



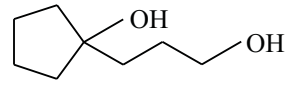
1198. (a)



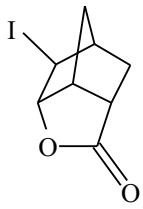
(b)



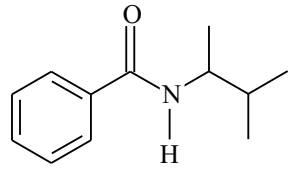
(c)



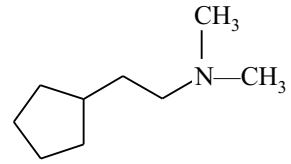
(d)



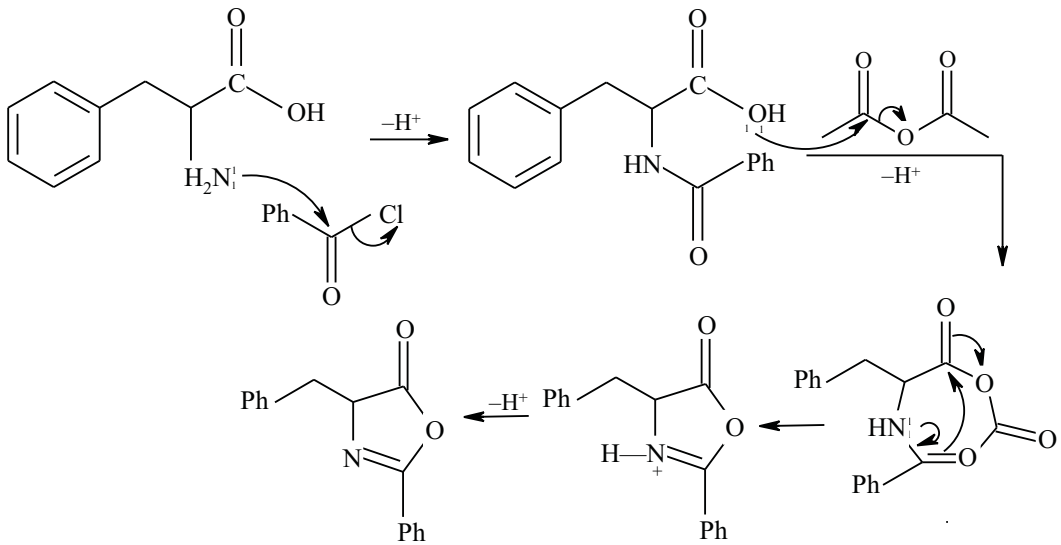
(e)

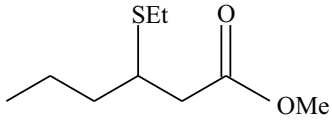


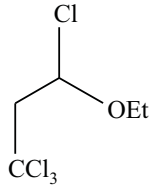
(f)

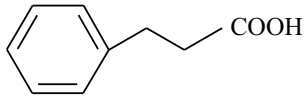


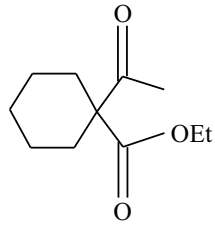
1199.

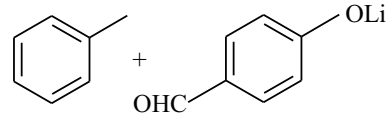


1200. (a) 

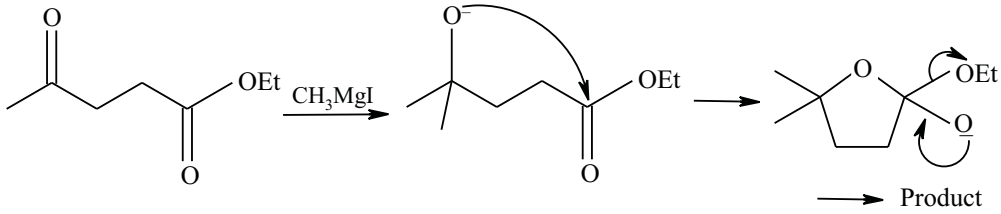
(b) no reaction (c) 

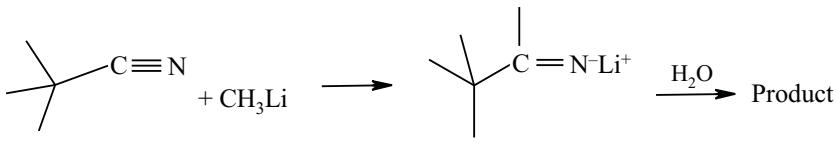
(d) 

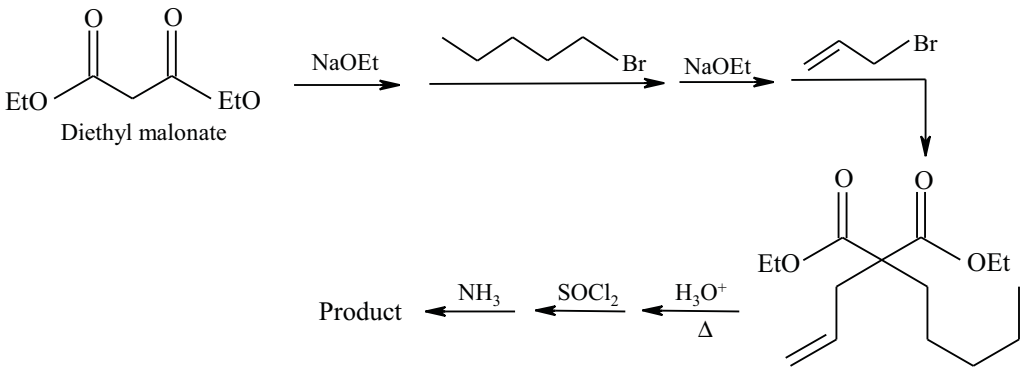
(e) 

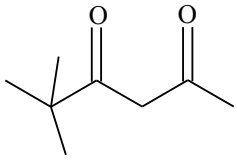
(f) 

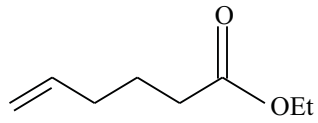
1201. (a) Ag_2O/H_2O, (b) $\{(CH_3)_3CO\}_3Al$, (c) CH_3MgCl; PCC, (d) $NaBH_4$.

1202. (a) 

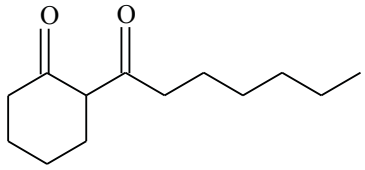
(b) 

1203. 

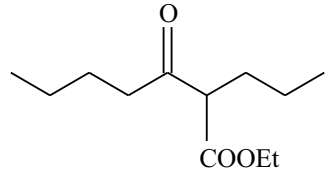
1204. (a) 

(b) 

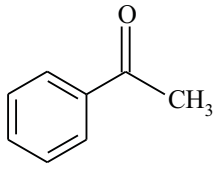
(c)



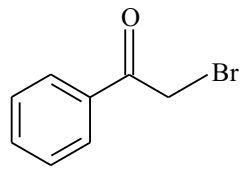
(d)



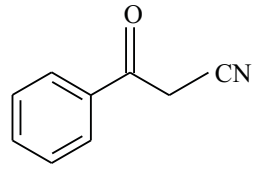
1205.



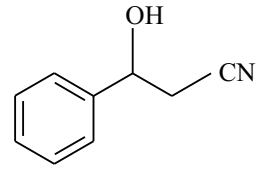
A



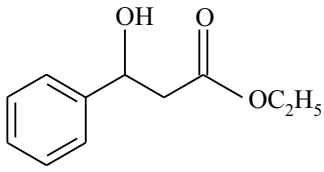
B



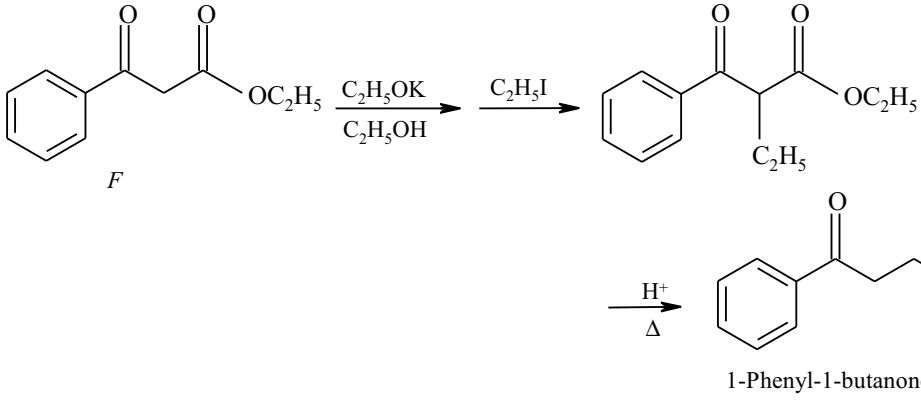
C



D



E



1-Phenyl-1-butanone