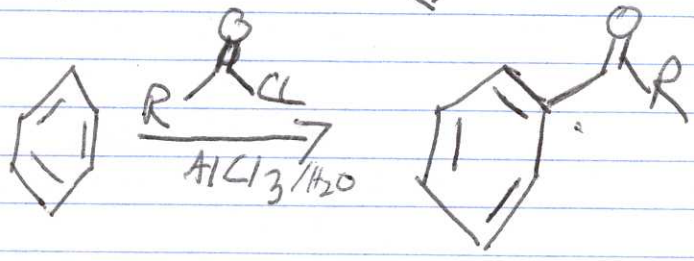
ACADEMIC SUPPORT CENTER
SUCCESS STARTS HERE.

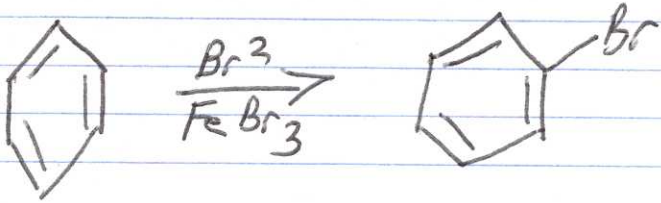
DAYTONA STATE COLLEGE

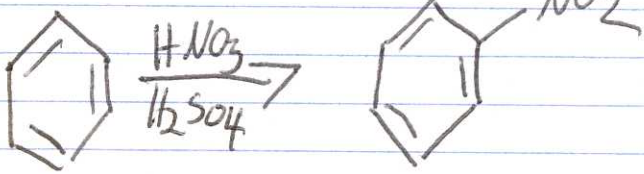
ORGANIC CHEMISTRY REACTION SHEETS

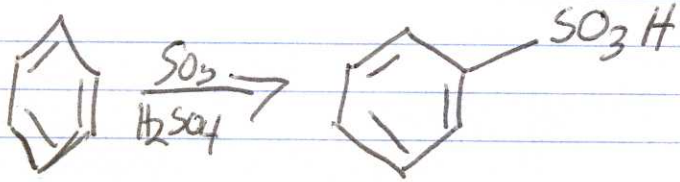
FOR ORGANIC CHEMISTRY I & II

(with rearrangement)

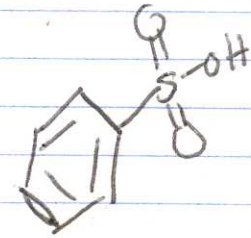




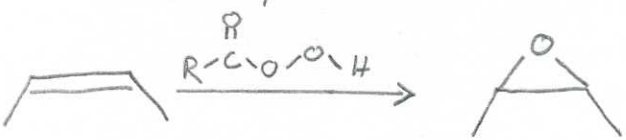


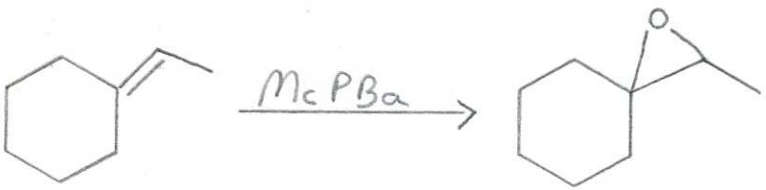


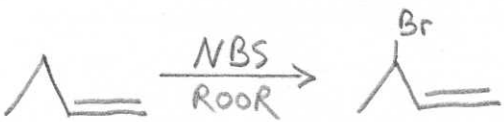
or

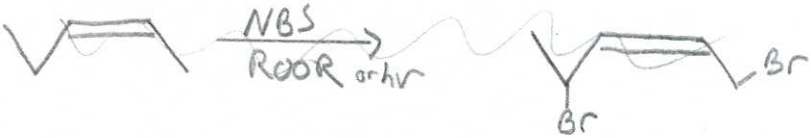


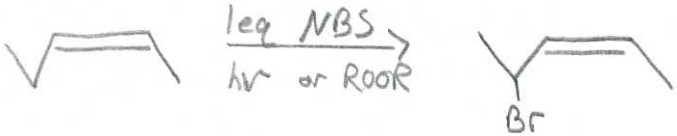
Epixidation



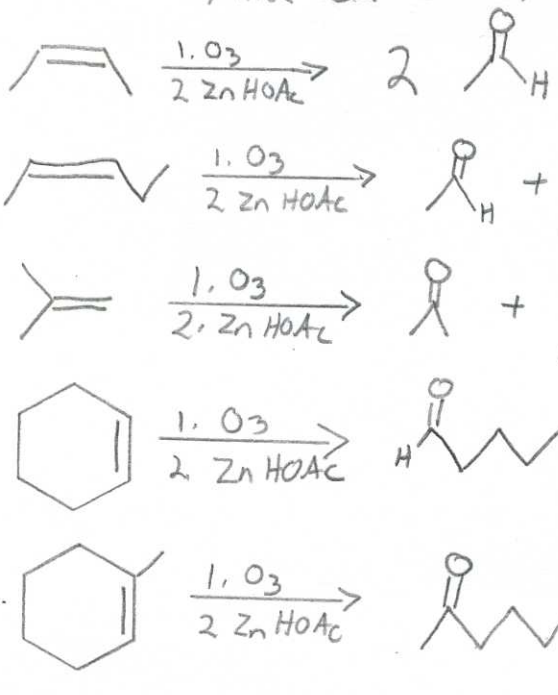




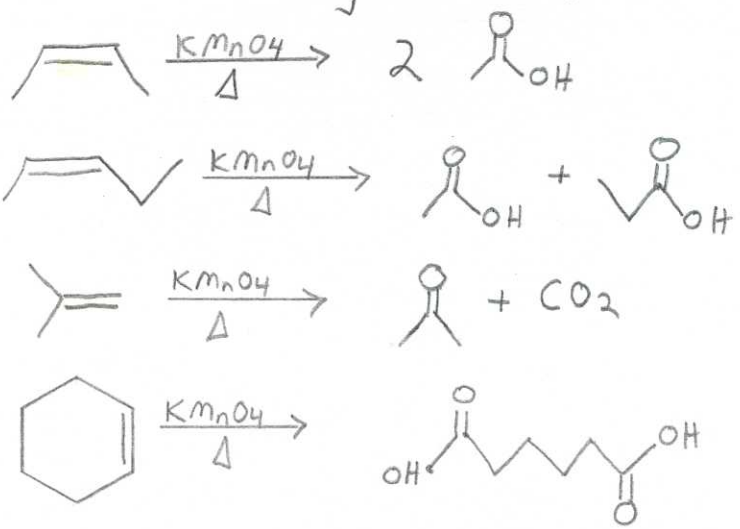




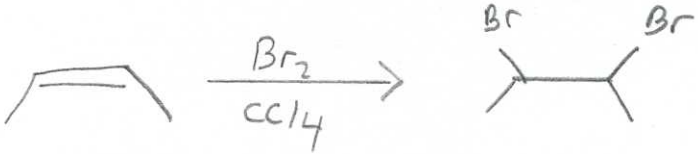
Mild Oxidation - Ozonolysis

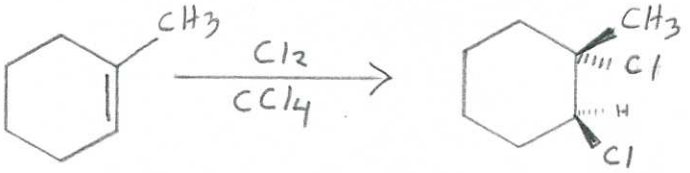


Strong Oxidation

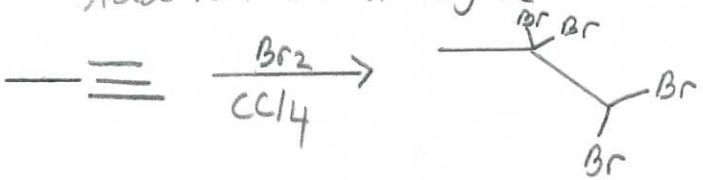


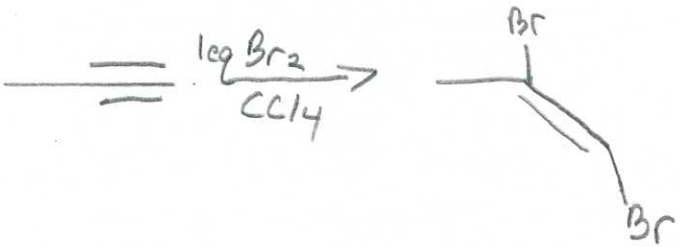
Addition Of Halogen to alkene



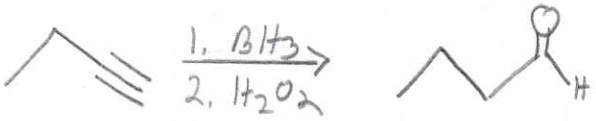


Addition of Halogen to Alkyne

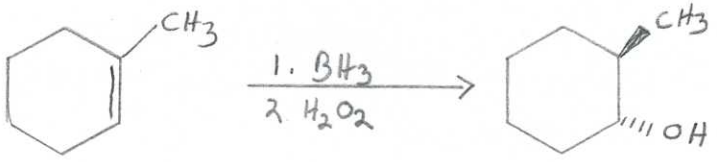




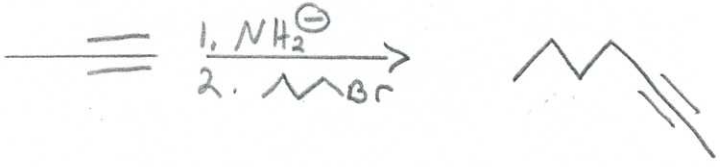
Hydroboration of Alkynes



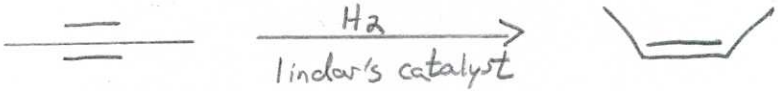
Hydroboration of Alkenes



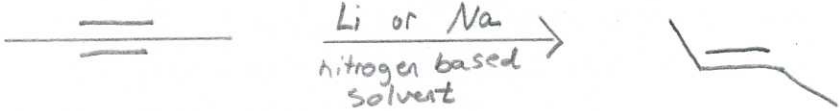
Alkylation



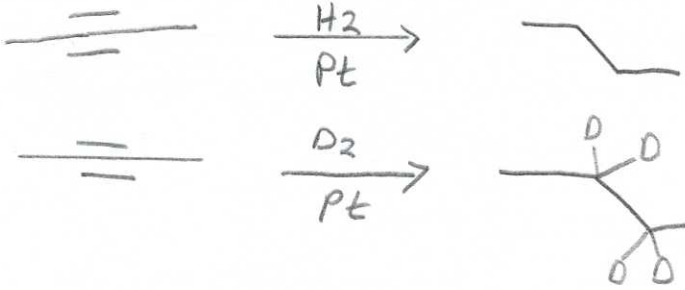
Reduction - Synthesis of cis-Alkenes



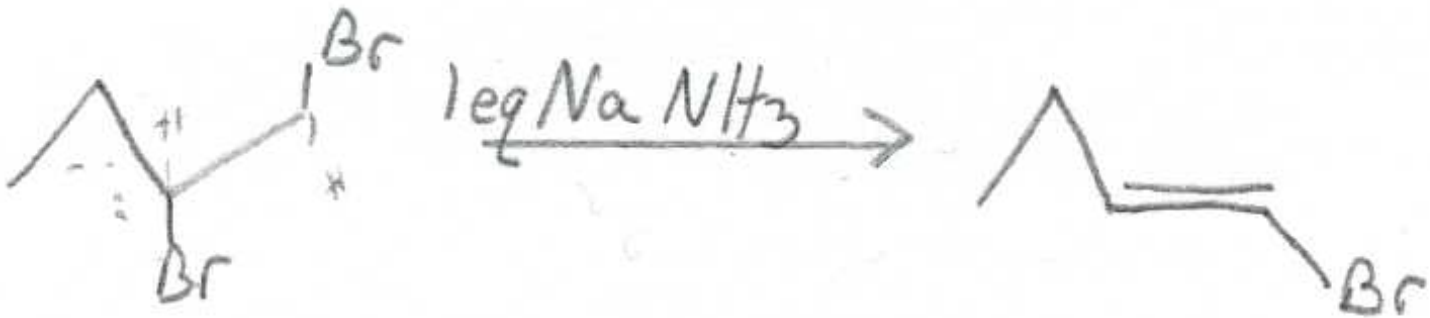
Reduction - Synthesis of trans-alkenes

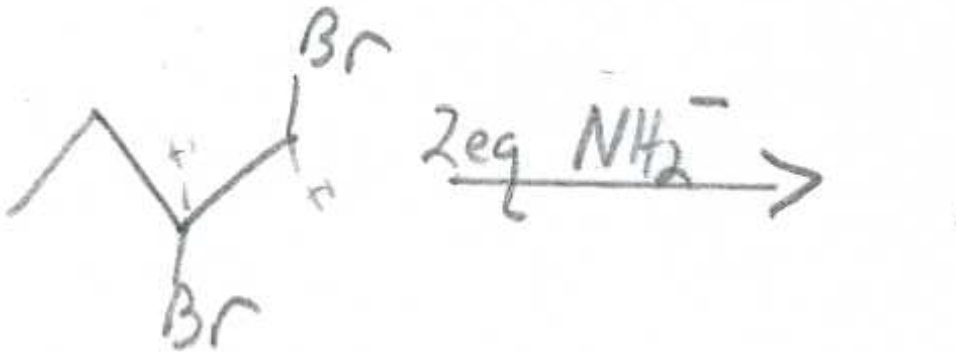


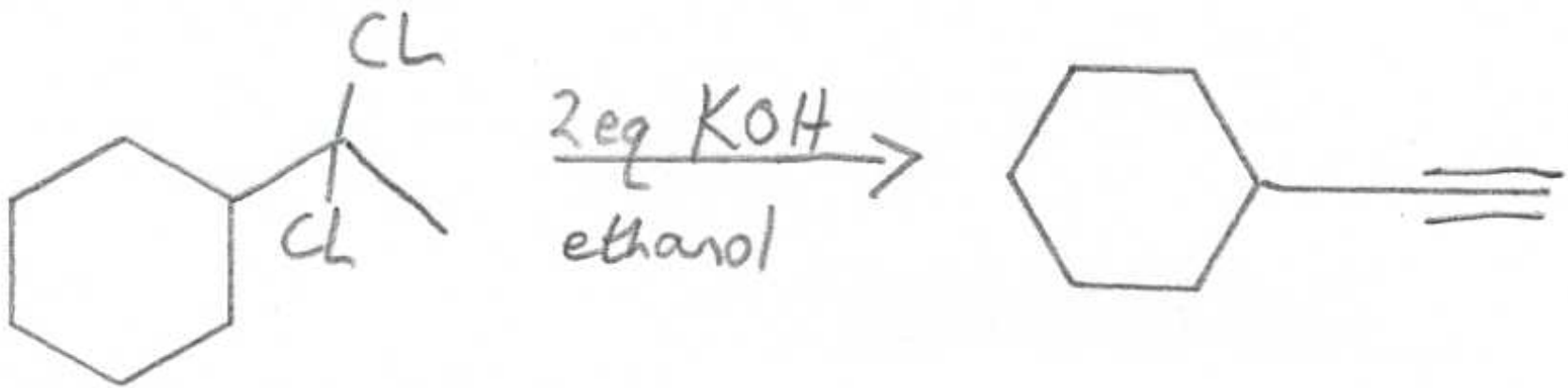
Reduction of Alkynes (general)

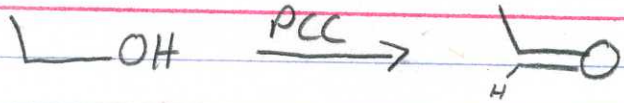


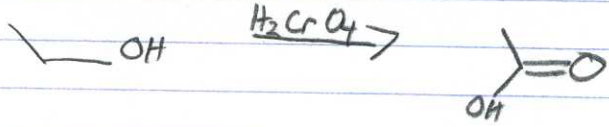
Preparation of Alkynes

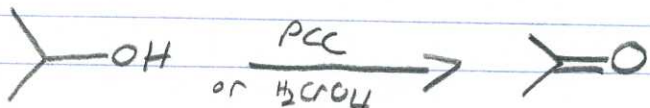


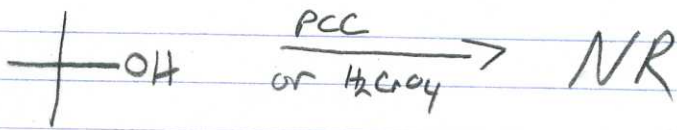


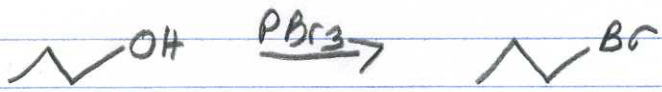


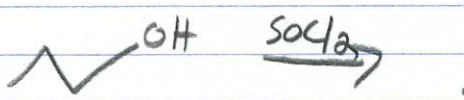

OH
PCC
H

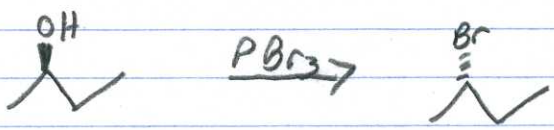

OH
H_2CrO_4
OH


OH
PCC
or H_2CrO_4

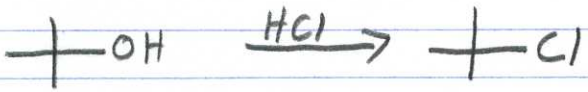

OH
PCC
or H_2CrO_4
NR


OH
PBr_3
Br

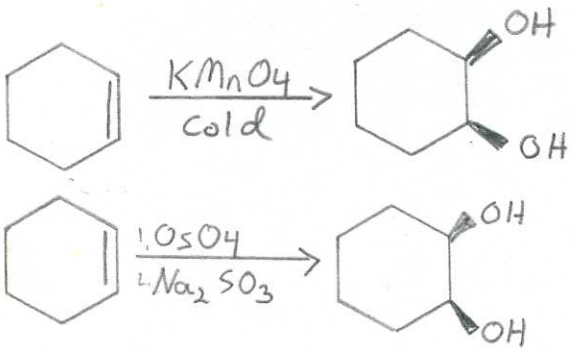

OH
$SOCl_2$
Cl


OH
PBr_3
Br

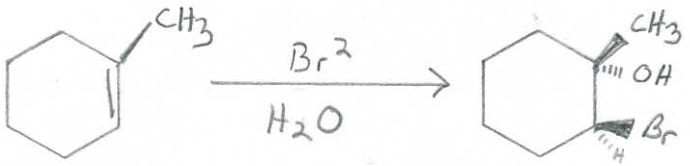

OH
$SOCl_2$
Cl


OH
HCl
Cl

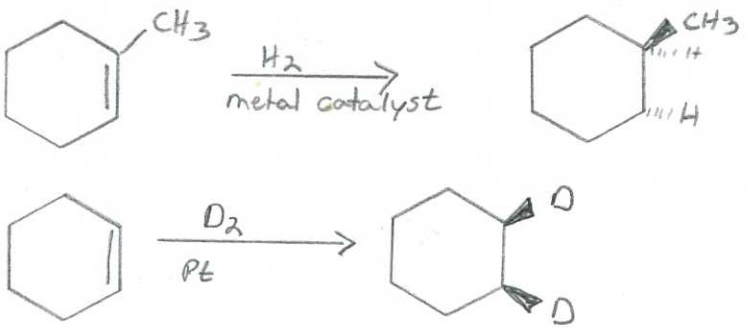
Syn 1,2 Dihydroxylation

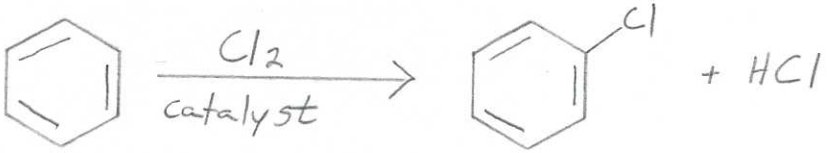


Halohydrin Formation

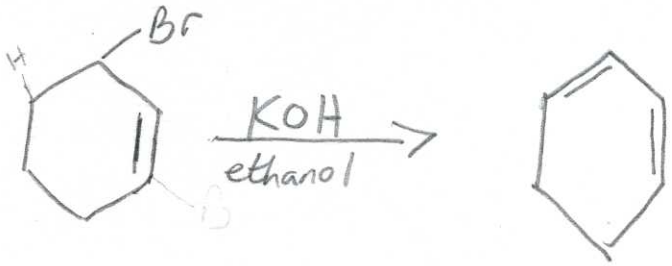


Hydrogenation - Reduction (syn)

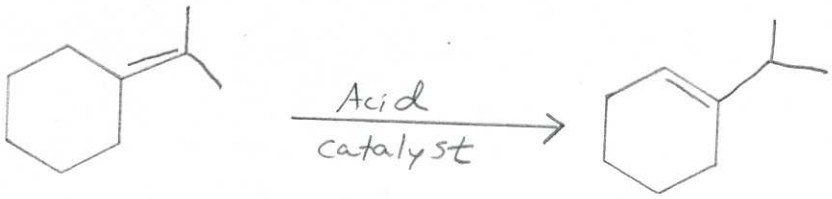


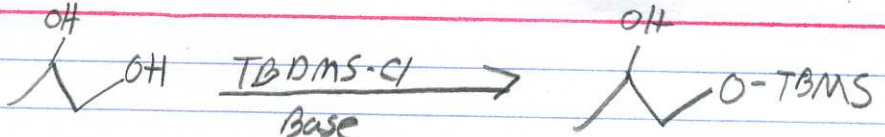


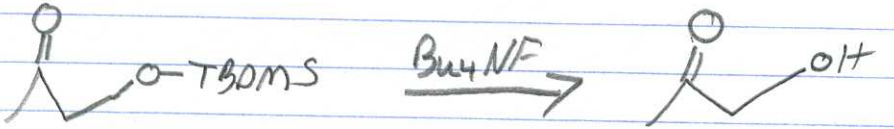
Elimination

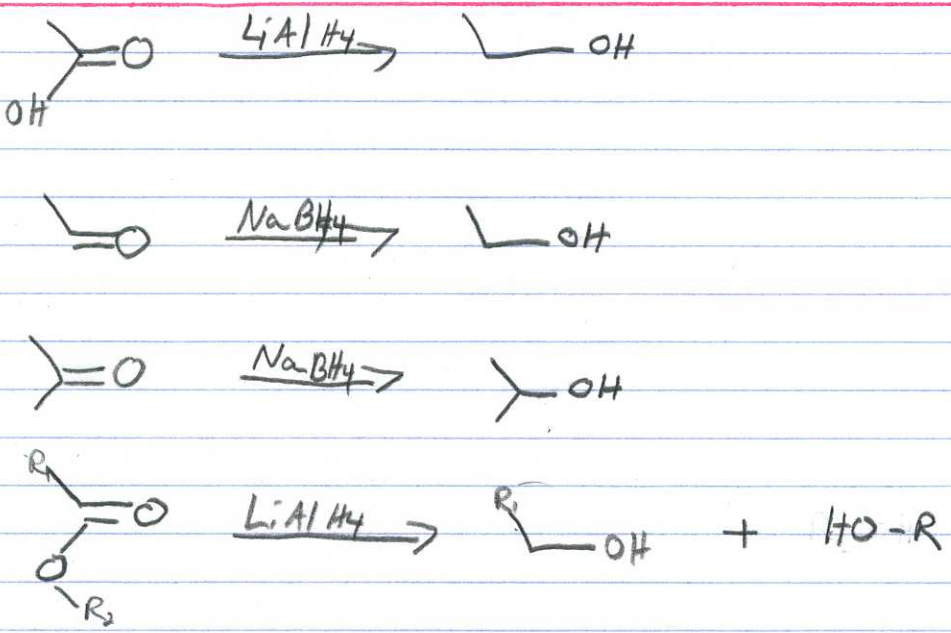


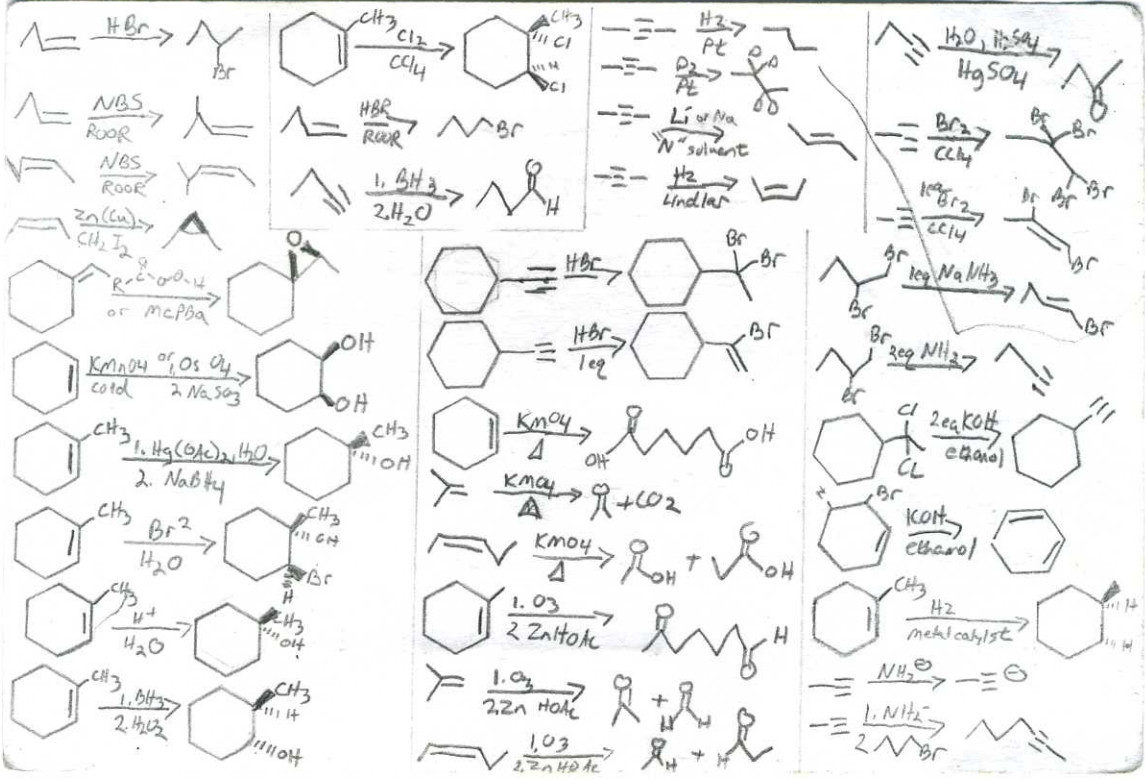
Rearrangement



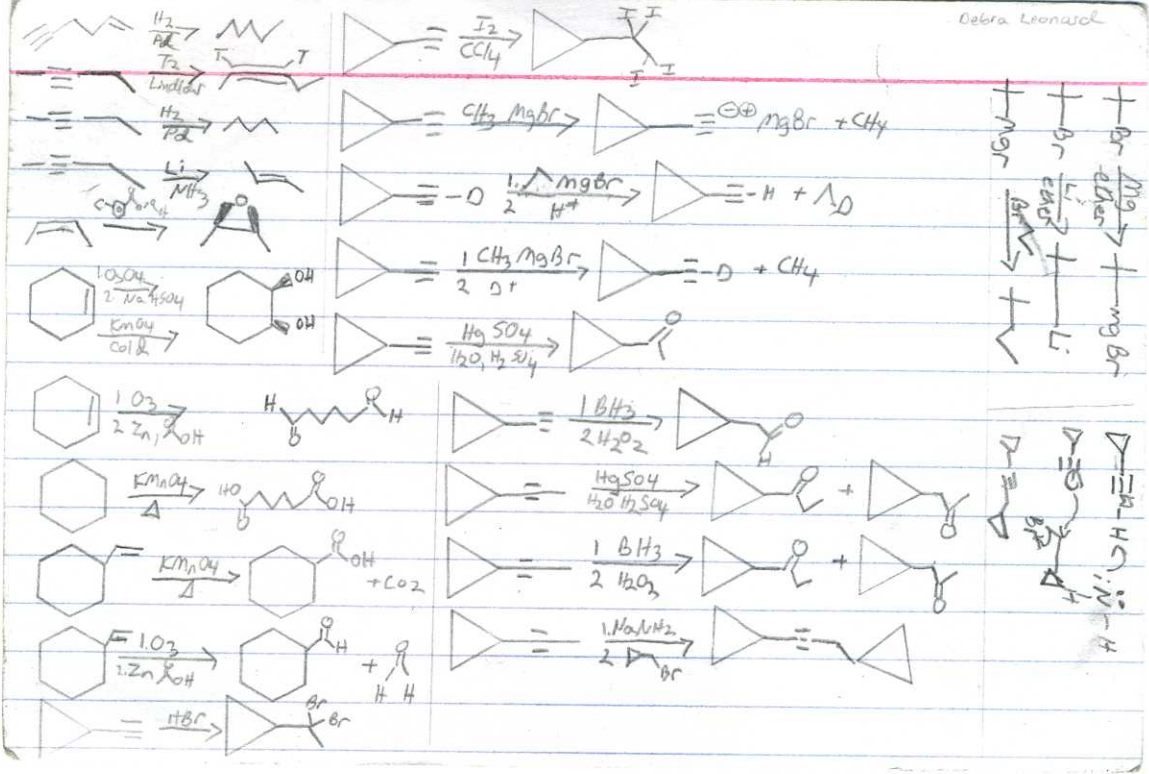

OH
OH
TBDMS-Cl
Base
OH
O-TBMS


O-TBDMS
Bu4NF
OH

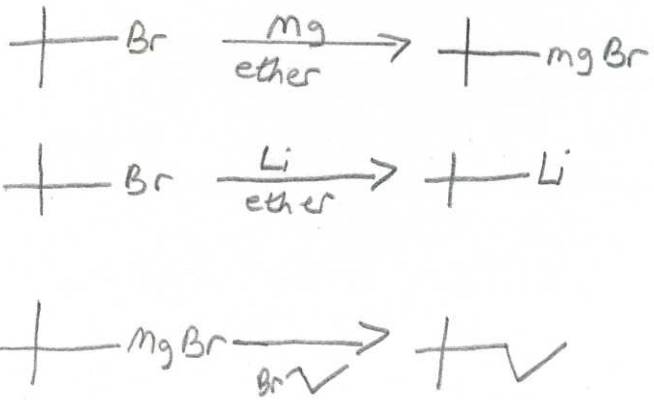

LiAlH4
NaBH4
NaBH4
LiAlH4
+ HO-R


HBr
NBS
ROOR
NBS
ROOR
Zn(Cu)
CH2I2
R-C(=O)-OOH
or mCPBA
KMnO4 or OsO4
cold
2 NaSO3
1. Hg(OAc)2, H2O
2. NaBH4
Br2
H2O
H+
H2O
1. BH3
2. H2O2
Cl2
CCl4
HBr
ROOR
1. BH3
2. H2O2
H2
Pt
D2
Pt
Li or Na
NH3 solvent
H2
Lindlar
H2O, H2SO4
HgSO4
Br2
CCl4
1eq Br2
CCl4
HBr
HBr
1eq
KMnO4
Δ
KMnO4
Δ
+ CO2
KMnO4
Δ
+
1. O3
2 Zn HOAc
1. O3
2. Zn HOAc
+
1. O3
2. Zn HOAc
+
1eq NaNH2
2eq NH2-
2eq KOH
ethanol
KOH
ethanol
H2
metal catalyst
NH2-
1. NH2-
2

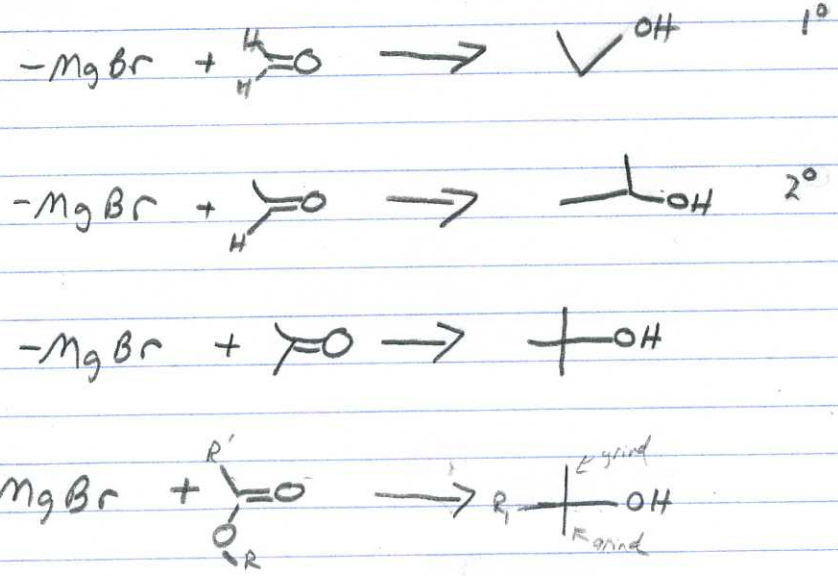
Debra Leonard

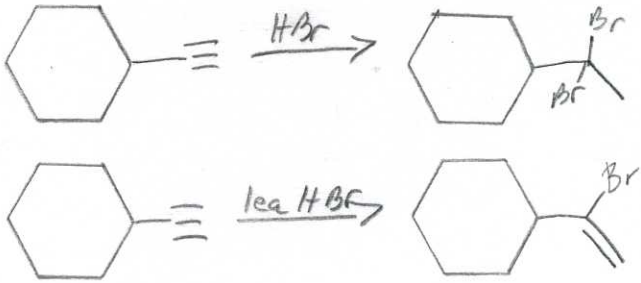


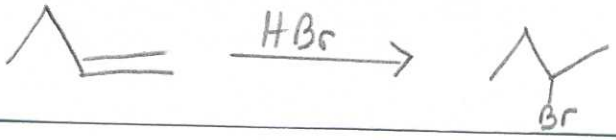
Grignard



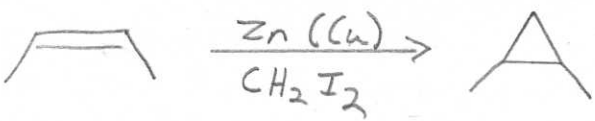
Grignard

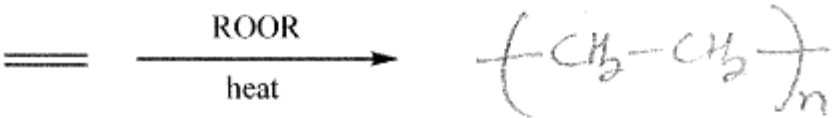




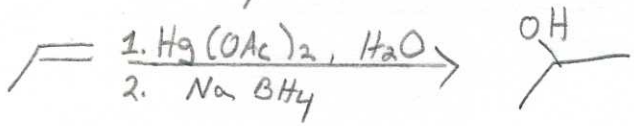


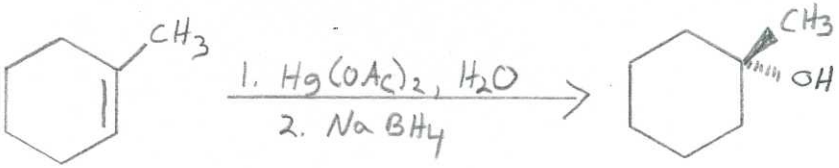
Simmon-Smith Cyclopropane Sythesis



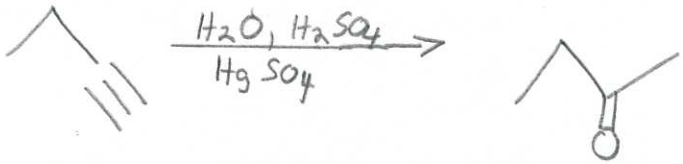

ROOR
heat
CH2–CH2
n

Oxymercuration of Alkene

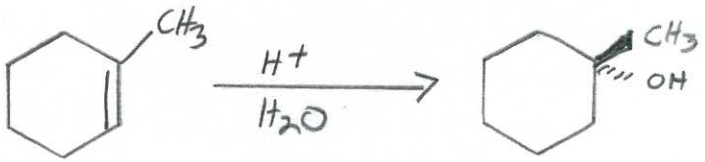


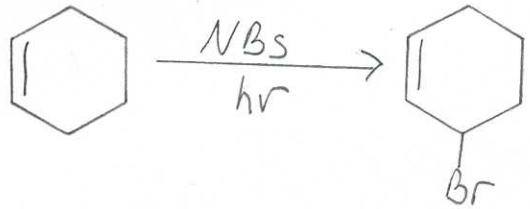


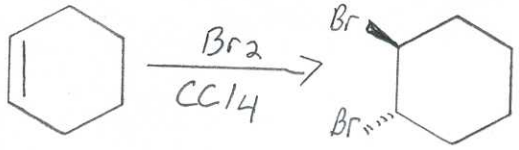
Oxymercuration of Alkyne

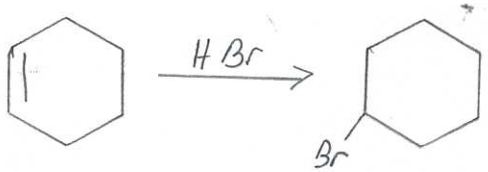


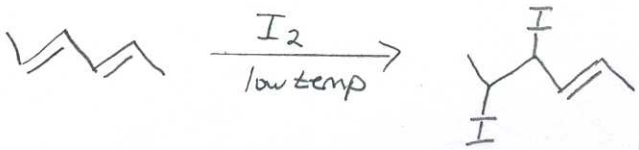
Acid-Catalyzed Hydration

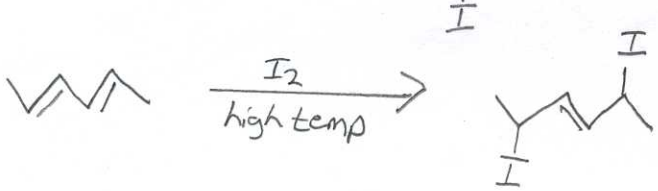


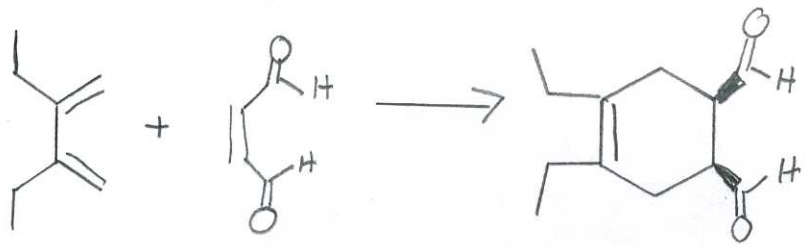


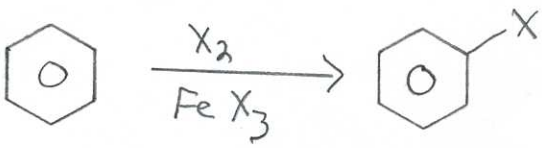




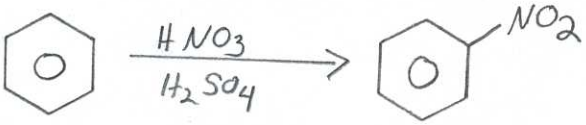


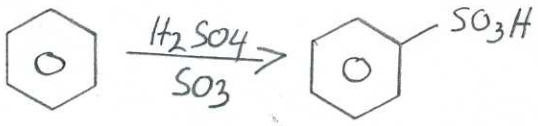


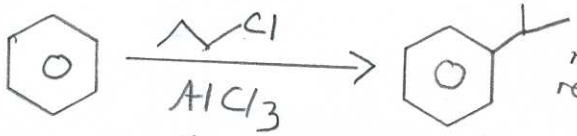




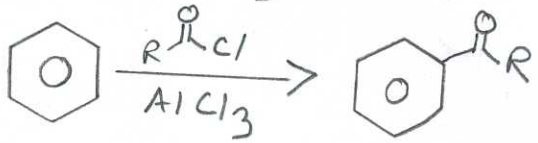
x= Br or Cl

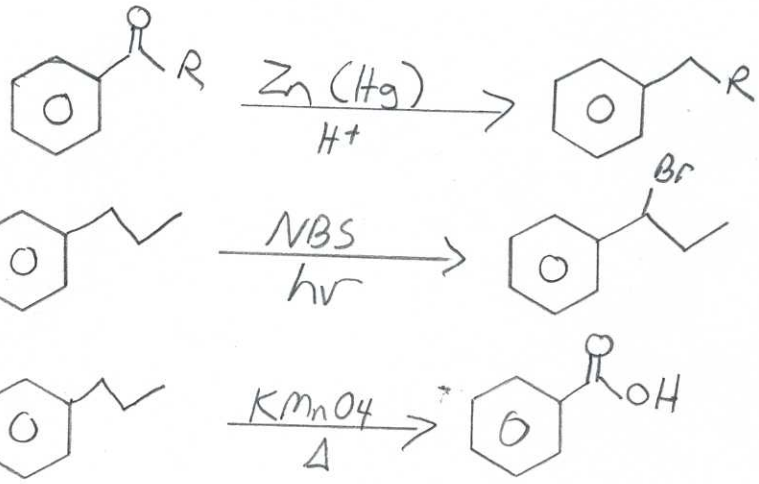


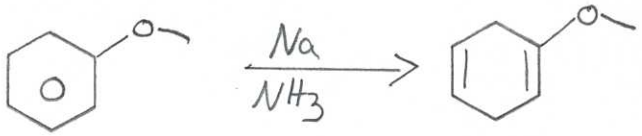




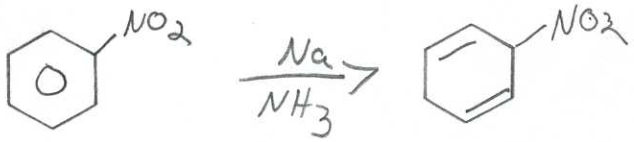
note rearrangement



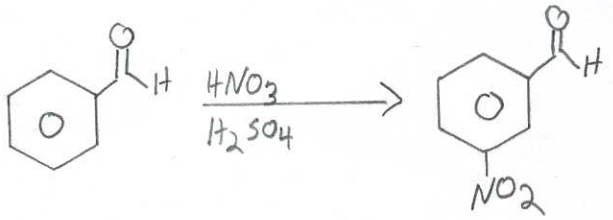




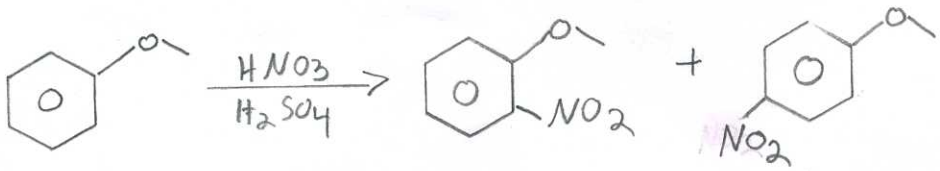
electron donating Group



electron withdrawing Group

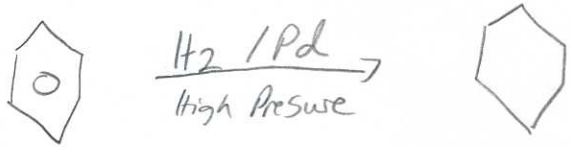


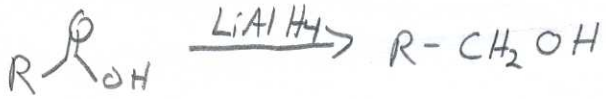
electron withdrawaling group m

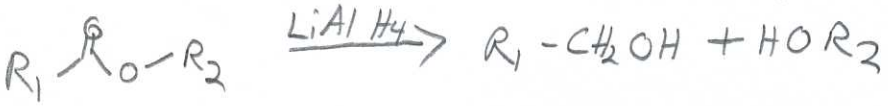


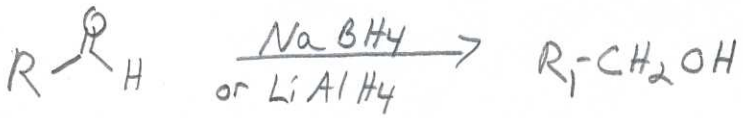
electron donating group o, p

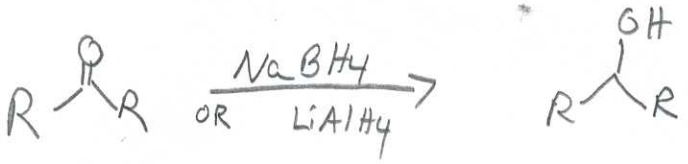
group with lone pairs no reaction with Friedal-crafts

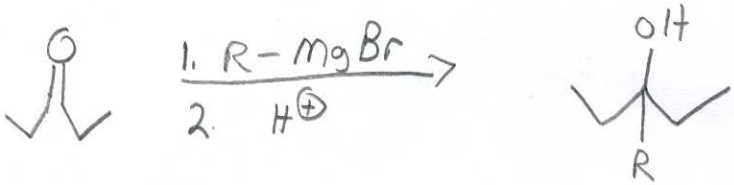


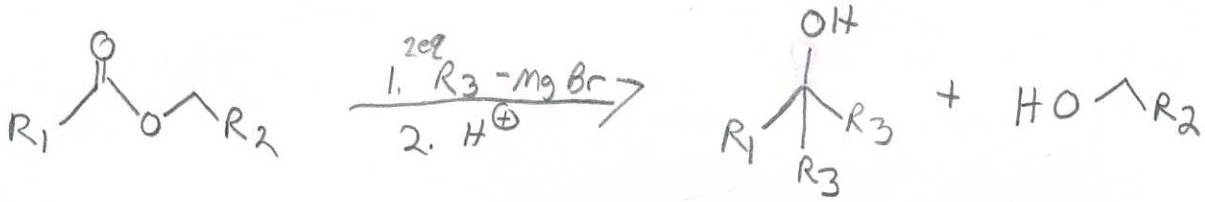




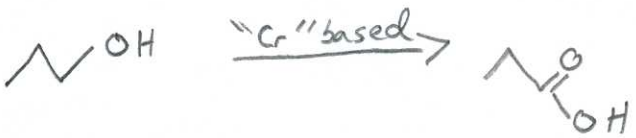


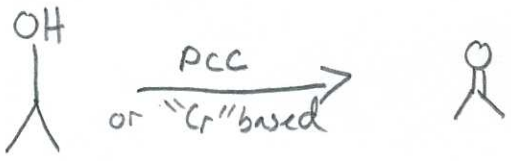


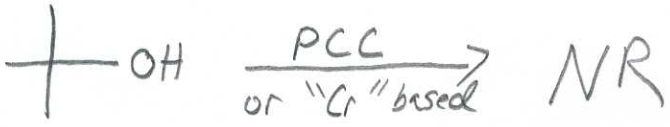




Acid-Base chemistry due to acidic proton

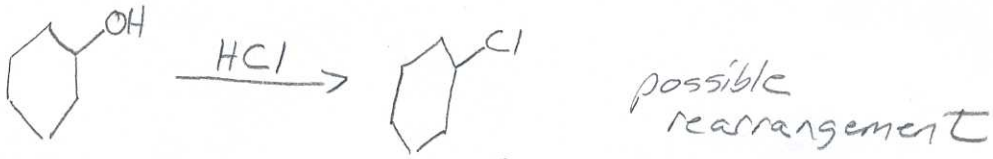




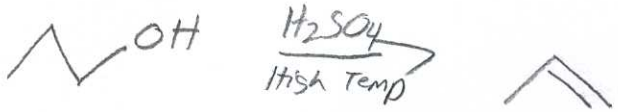


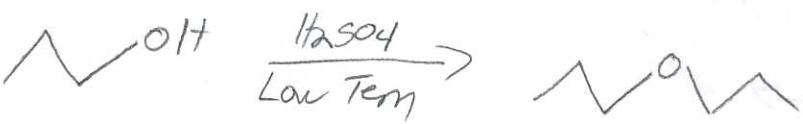
$CH_3CH_2CH_2OH \xrightarrow{PBr_3} CH_3CH_2CH_2Br$

$CH_3CH_2CH_2OH \xrightarrow{SOCl_2} CH_3CH_2CH_2Cl$



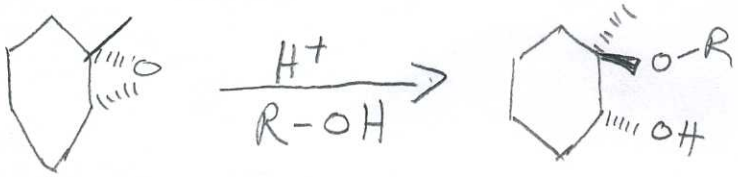
possible rearrangement

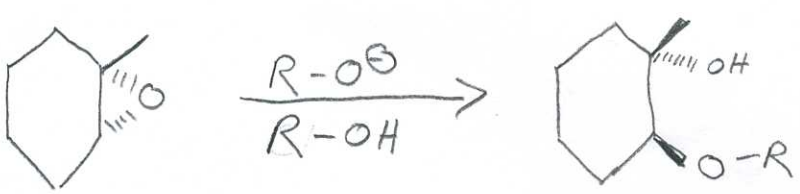


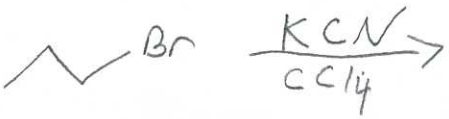


$R_1\text{-}OH \xrightarrow[R_2\text{-}LG]{NaH} R_1\text{-}O\text{-}R_2$

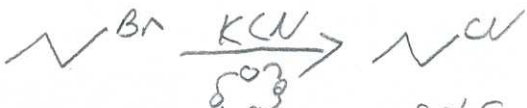
$R_1\text{-}O\text{-}R_2 \xrightarrow{2\,eq\,(HBr)} R_1Br + BrR_2$



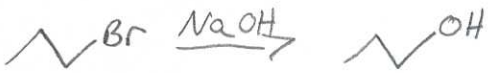


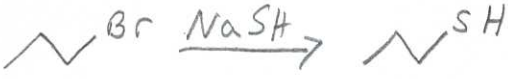


slower

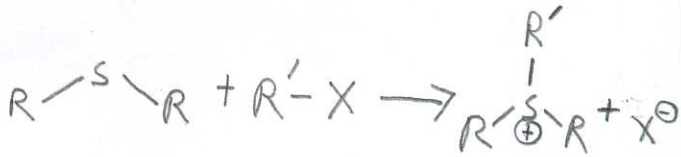


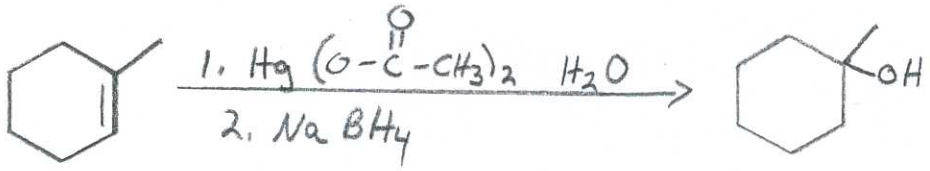
faster

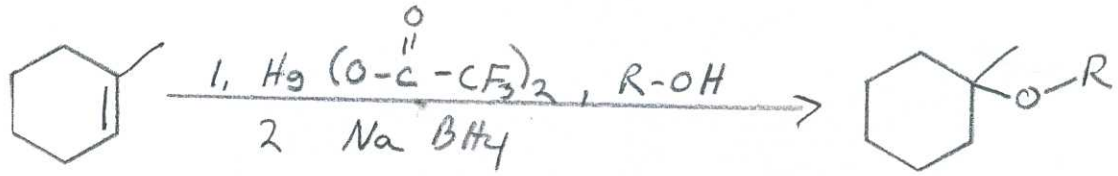


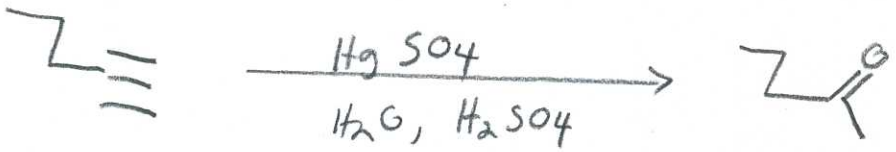


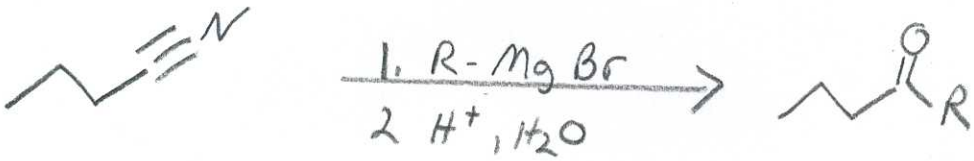
$R_1\text{-}SH \xrightarrow[R_2Br]{NaOH} R_1\text{-}S\text{-}R_2$

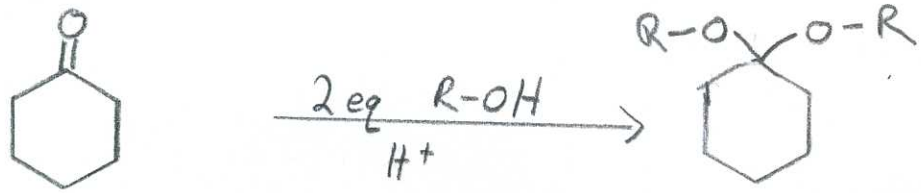


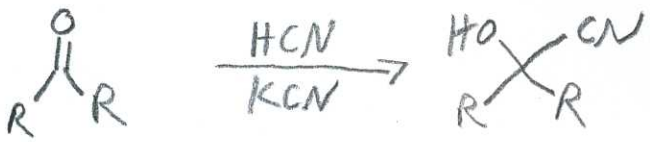

1. Hg(O-C(=O)-CH3)2 H2O
2. NaBH4
OH


1. Hg(O-C(=O)-CF3)2, R-OH
2 NaBH4
O
R

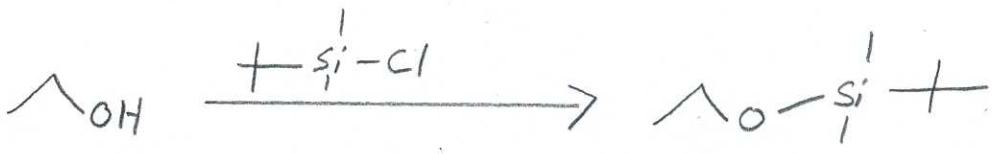

HgSO4
H2O, H2SO4
O

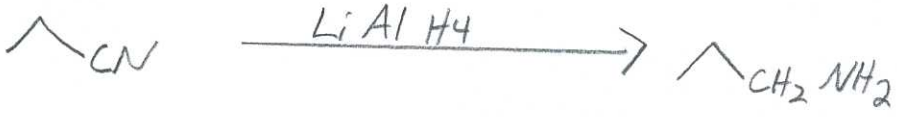

N
1. R-MgBr
2 H+, H2O
O
R

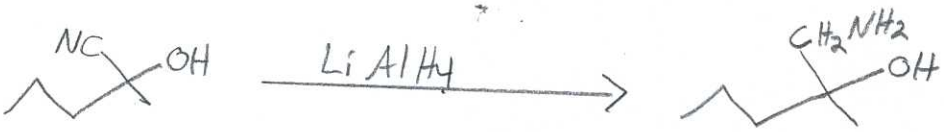

2eq R-OH
H+
R-O
O-R

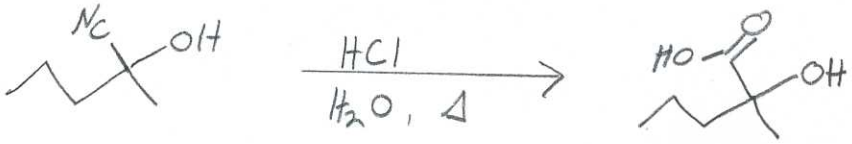

HCN
KCN
HO
CN
R
R
R
R

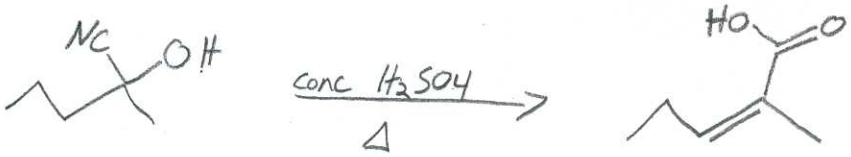

H+
H2O
+ 2 CH3OH

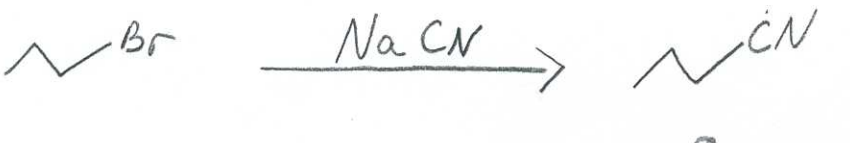


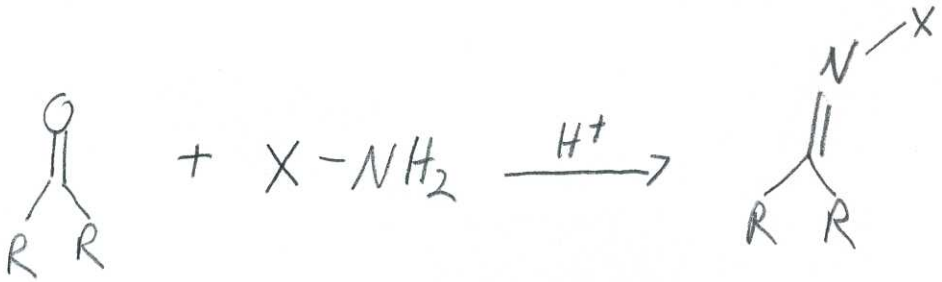


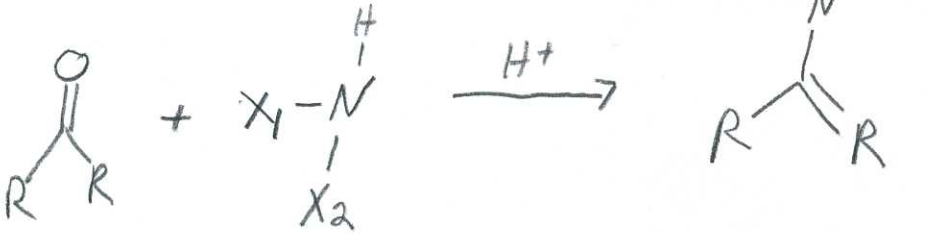


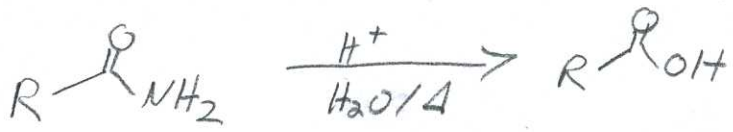


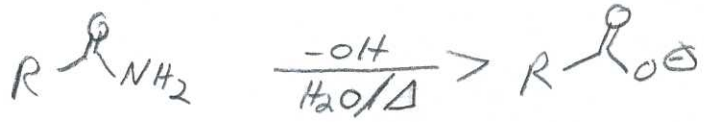


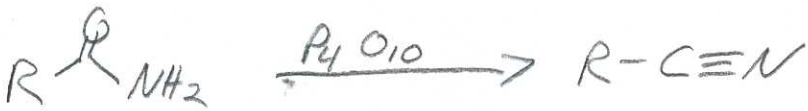


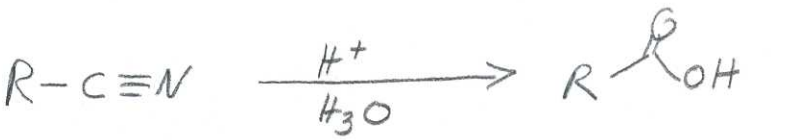


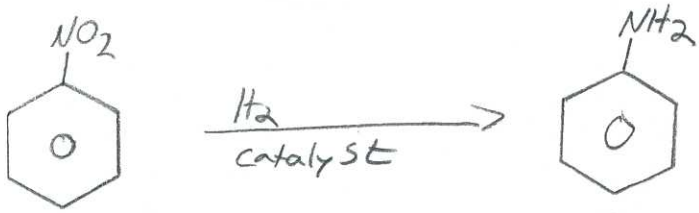


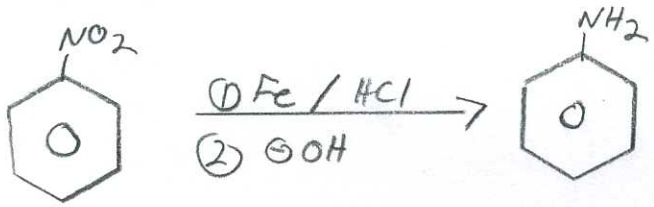


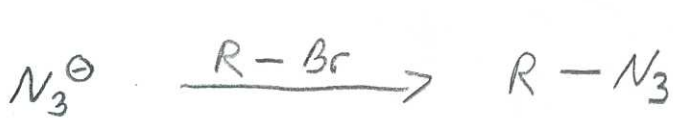


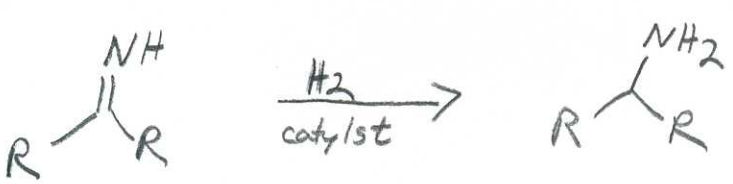


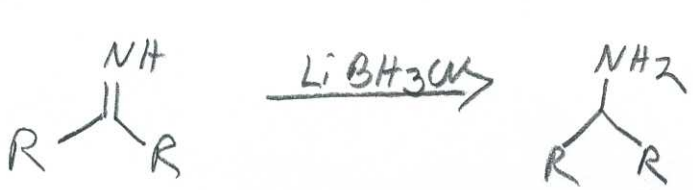


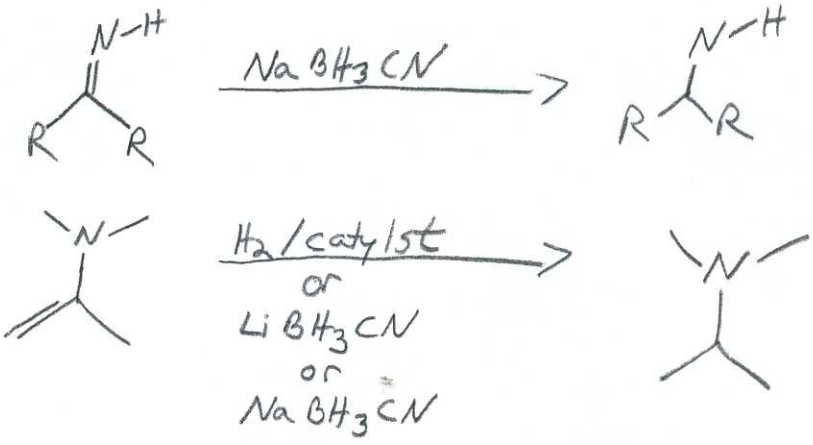




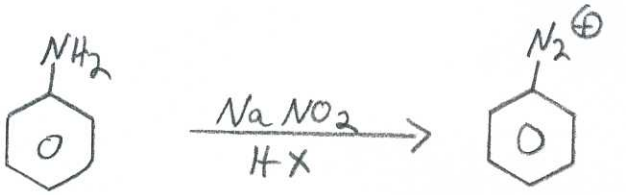


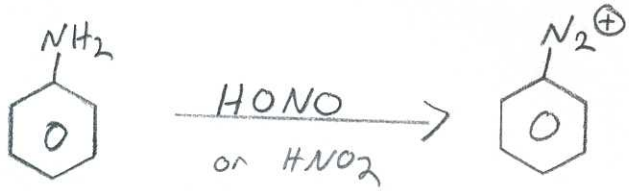


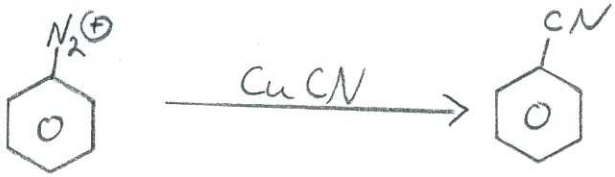


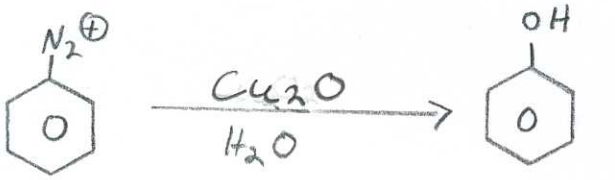

N–H
R
R
NaBH3CN
N–H
R
R

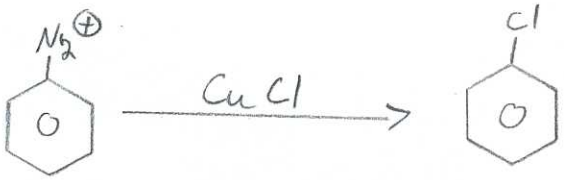
N
H2/catalyst
or
LiBH3CN
or
NaBH3CN
N

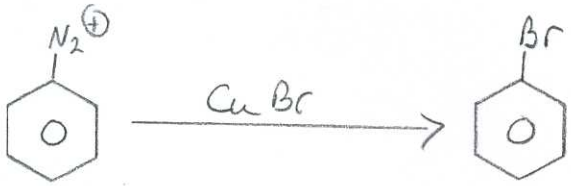

NH2
NaNO2
HX
N2⊕


NH2
HONO
or HNO2
N2⊕

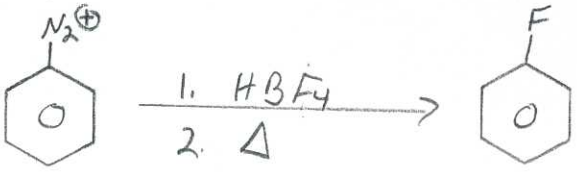

N2⊕
CuCN
CN

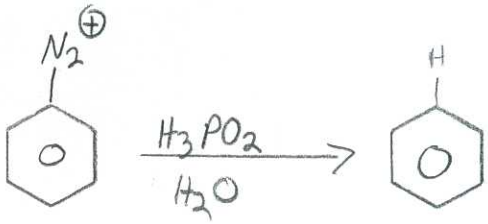

N2⊕
Cu2O
H2O
OH

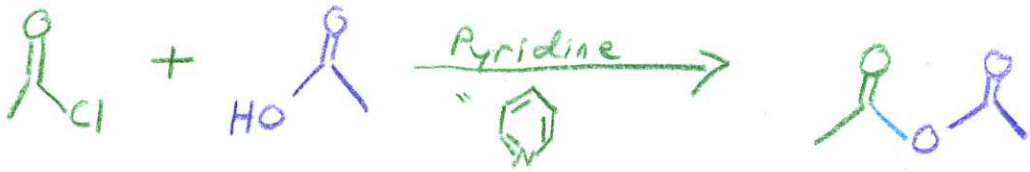

N2⊕
CuCl
Cl


N2⊕
CuBr
Br


N2⊕
KI
I

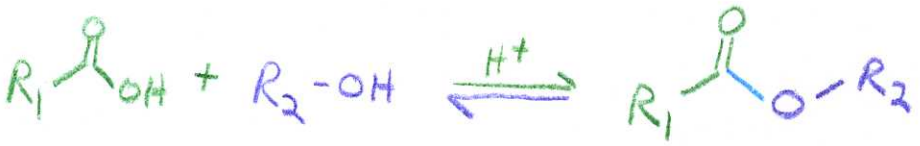

N2⊕
1. HBF4
2. Δ
F


N2⊕
H3PO2
H2O
H


Cl
HO
Pyridine
N
O


R-OH
O
O-R
HO


R1
O
R2
H2O
R1
OH
HO
R2

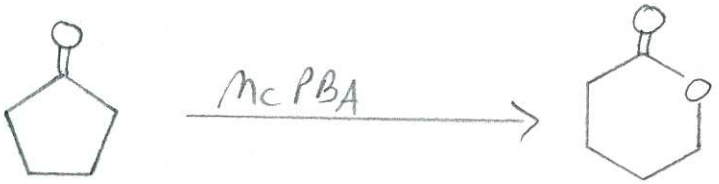

R1
OH
R2-OH
H+
R1
O-R2

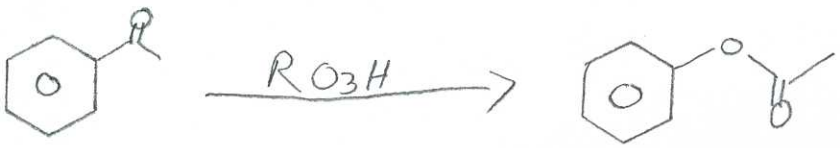

R1
O-R2
NaOH
R1
O⊖
Na⊕
HO-R2

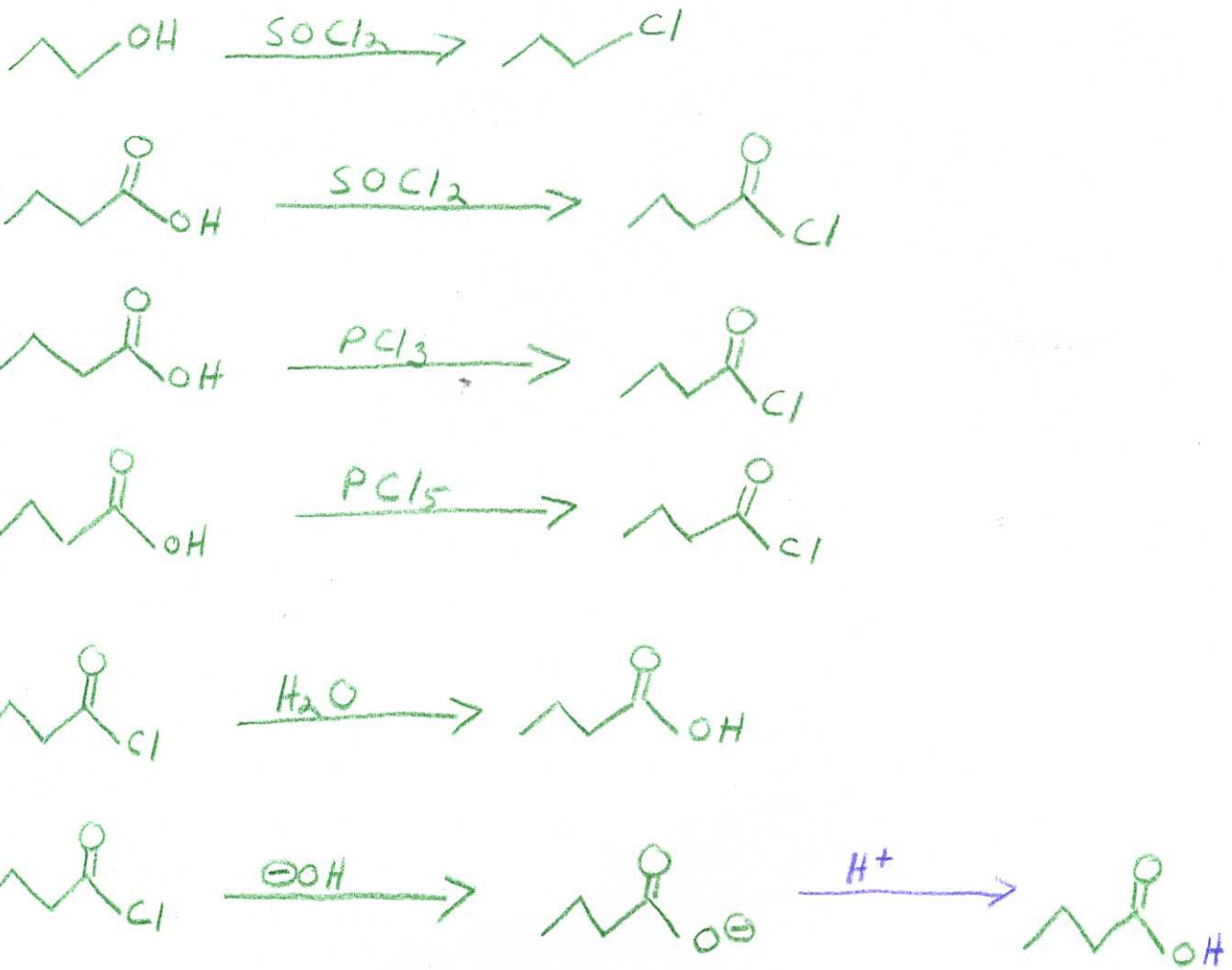

R
OH
Base
R
O⊖

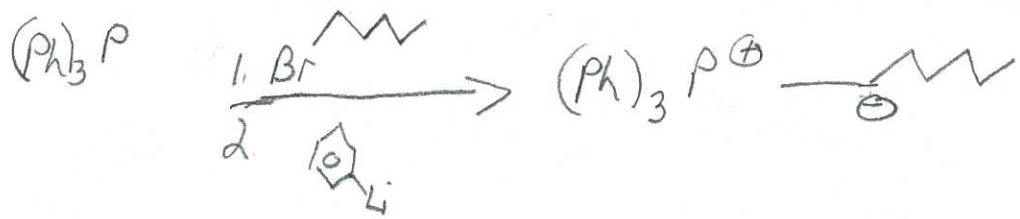

R
H
Ag2O or
Tollens
R
OH


R-MgBr
1. CO2
R
O⊖
2. H+
R
OH


mCPBA

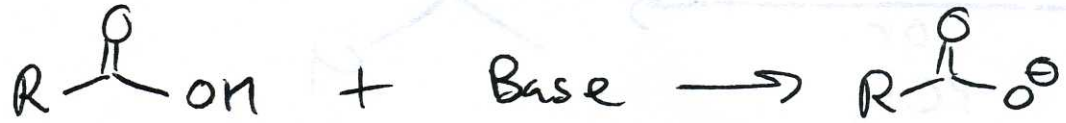

RO3H
O
O

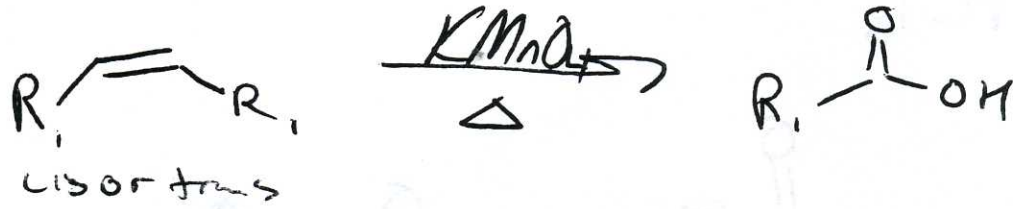

OH
SOCl2
Cl
OH
SOCl2
Cl
OH
PCl3
Cl
OH
PCl5
Cl
Cl
H2O
OH
Cl
⊖OH
O⊖
H+
OH
Cl
Na⊕ ⊖O
O
Cl
R-OH
Base
O-R
Cl
NH3
NH2
Cl
R-NH2
N-R
H
R1
R2 >NH
N-R2
R1
Cl

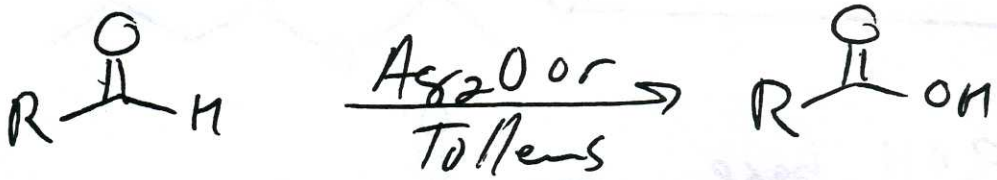

(Ph)3P
1. Br
2.
Li
(Ph)3P⊕
⊖

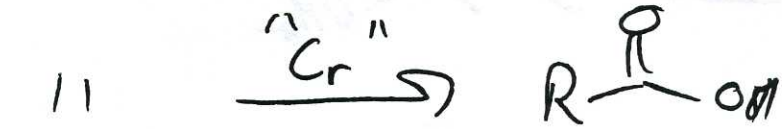

(Ph)3P⊕
⊖C R
C
R

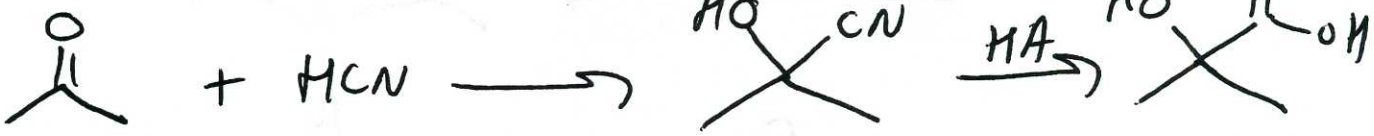
Rxns 20/21 - must know

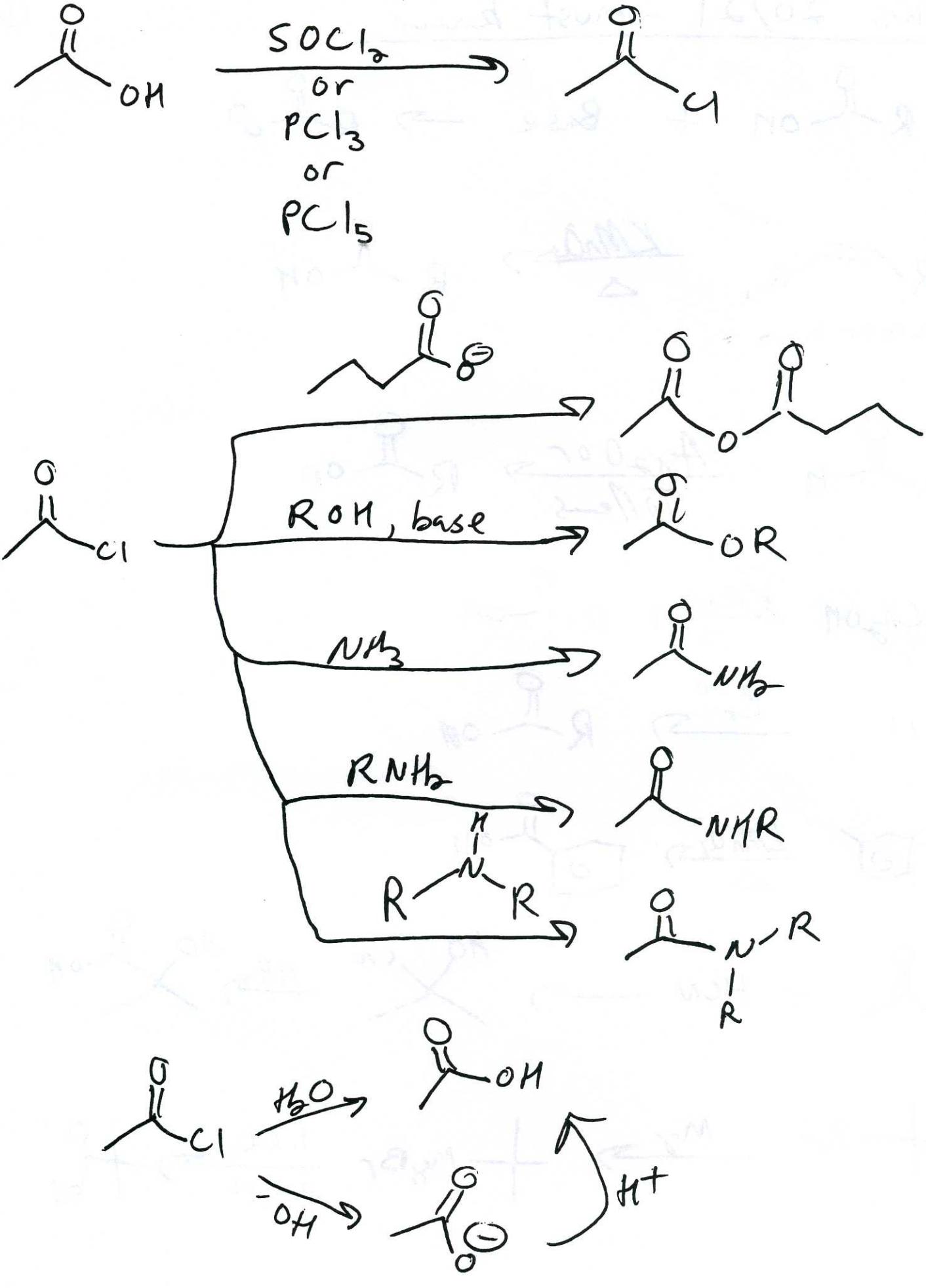











SOCl2
or
PCl3
or
PCl5
ROH, base
NH3
RNH2
R
N
R
H2O
-OH
H+

DAYTONA STATE COLLEGE

Questions

Class notes taken by

D. Leonard (Learning Specialists)

The Academic Support Center @ Daytona State College

http://www.daytonastate.edu/asc/ascsciencehandouts.html