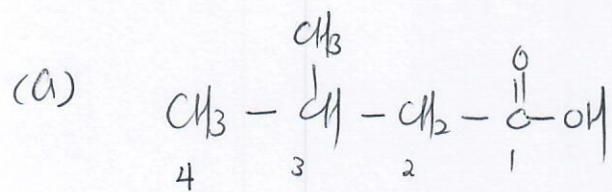
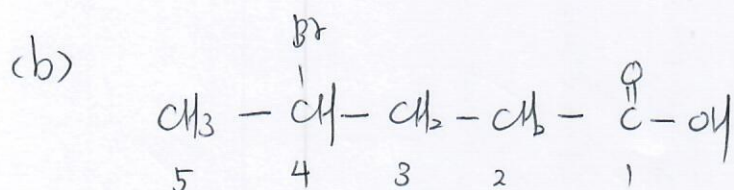


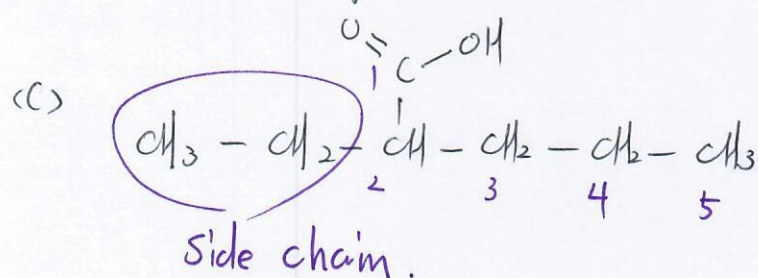
problem 20-1.



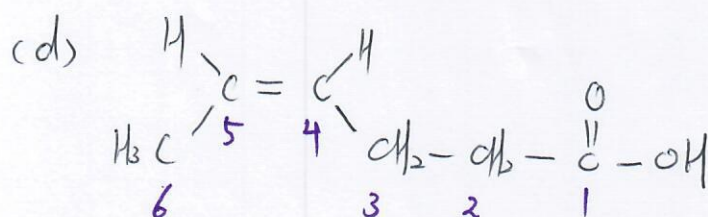
3-Methylbutanoic acid.



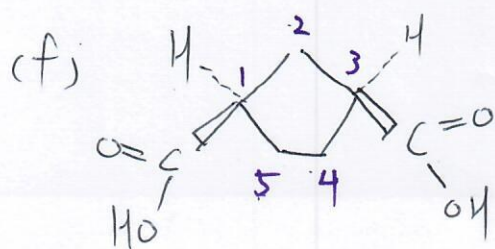
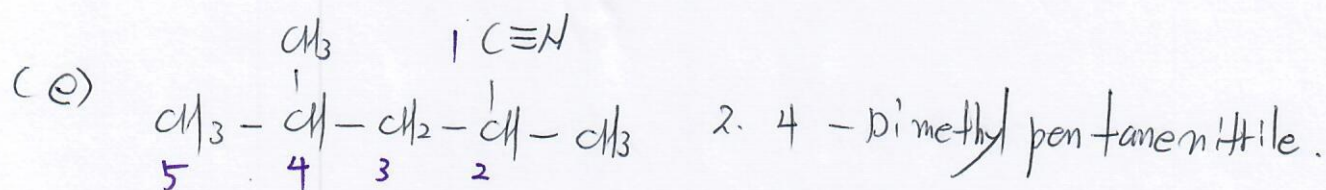
4-Bromopentanoic acid.



2-Ethylpentanoic acid.

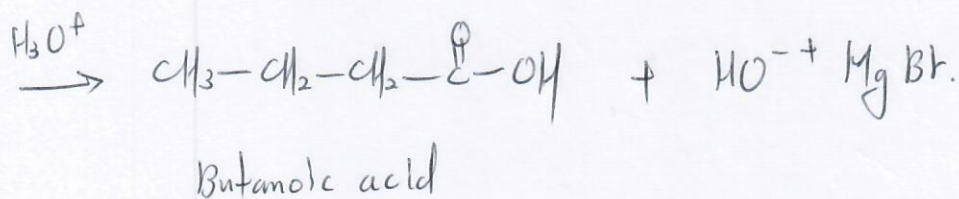
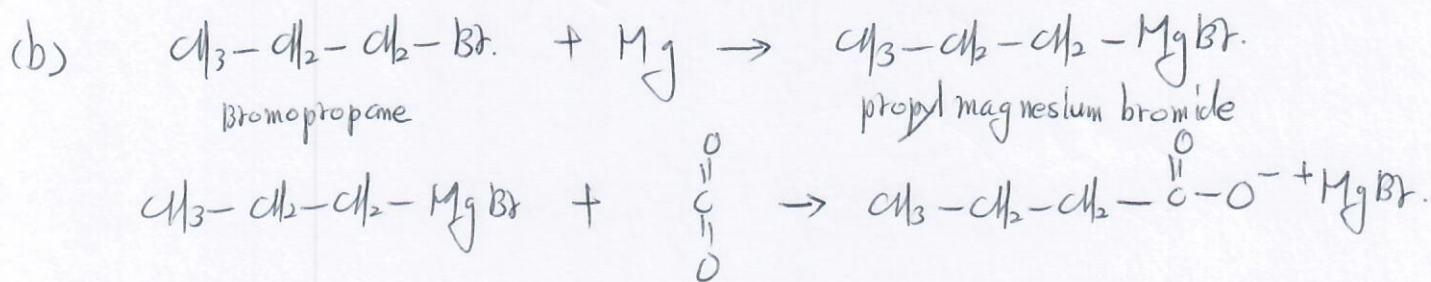
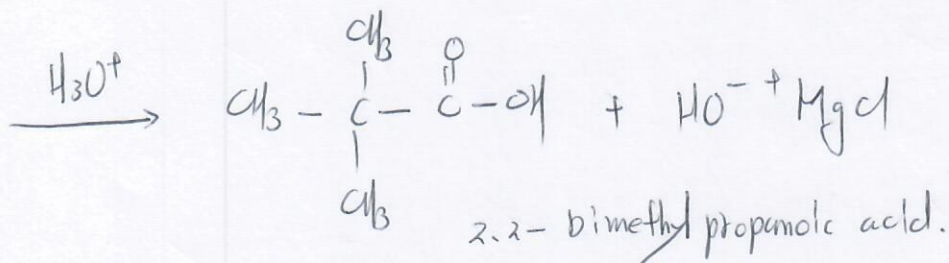
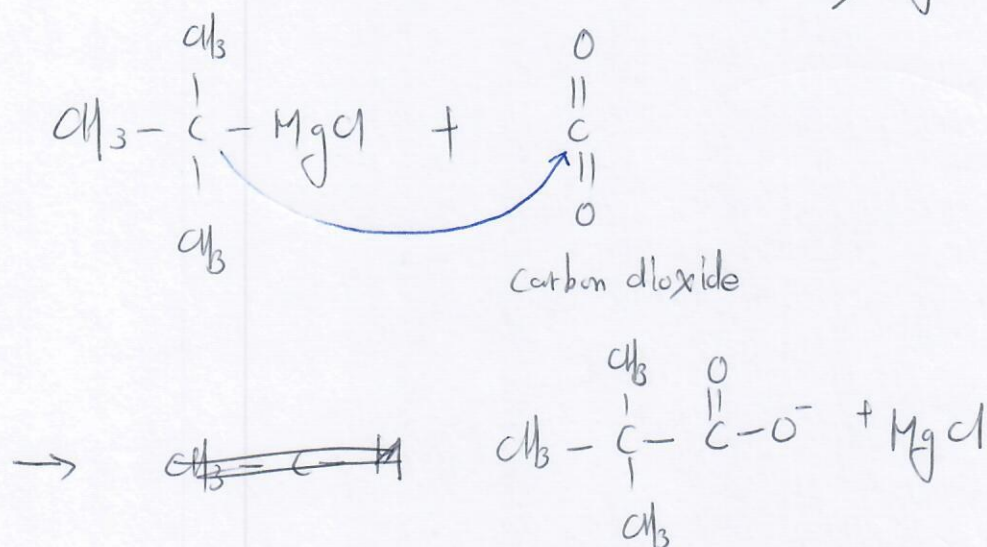
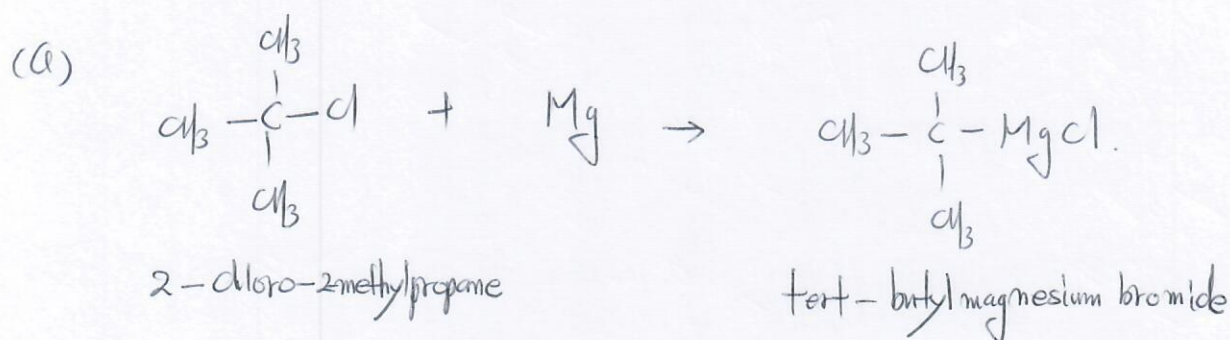


(Z) - 4-Hexenoic acid.



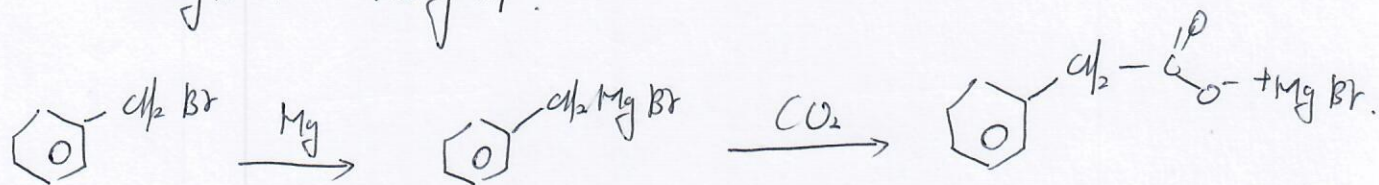
cis-1,3-cyclopentane dicarboxylic acid.

problem 20-10



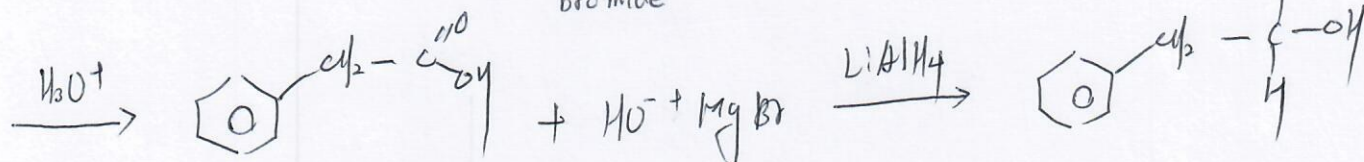
Problem 20-11.-1.

(a) Grignard Reagent.

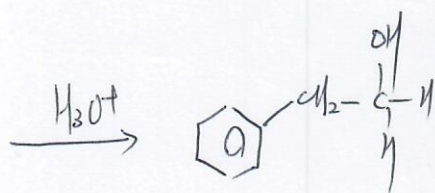
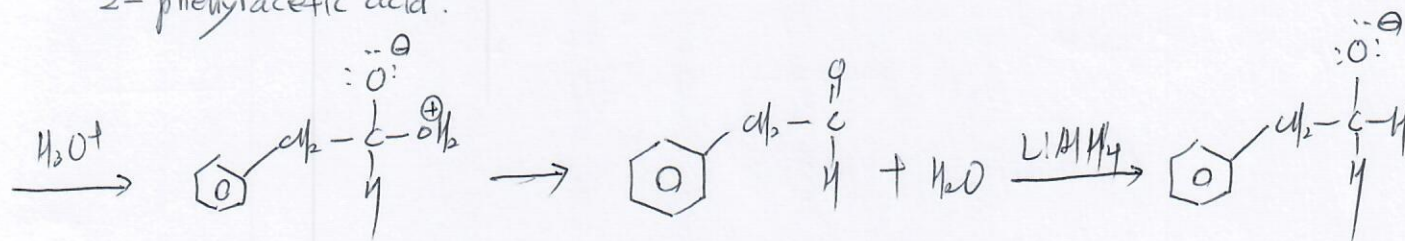


Bromomethylbenzene

Benzyl magnesium bromide



2-phenylacetic acid.

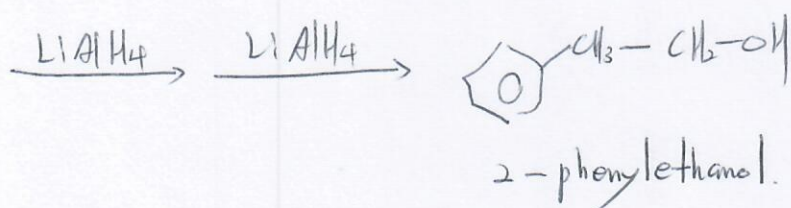
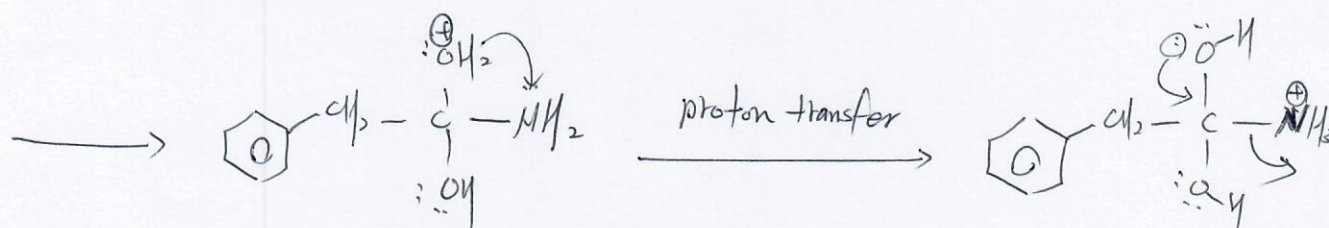
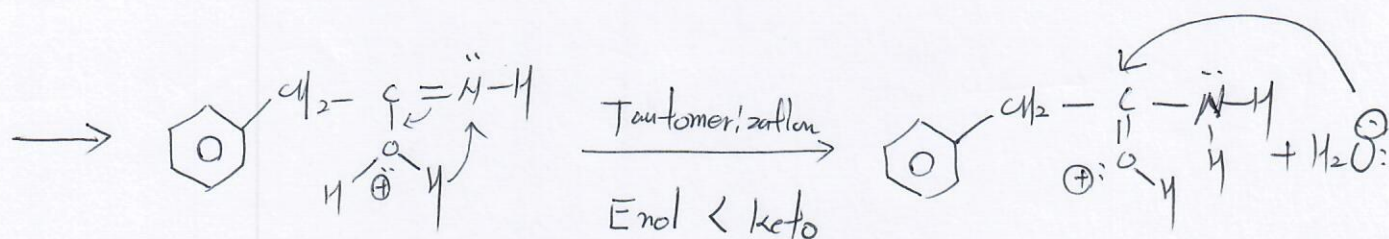
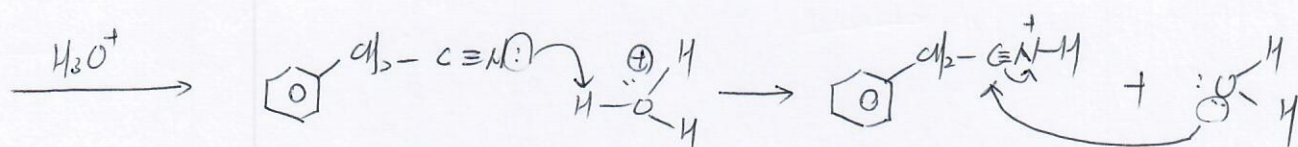
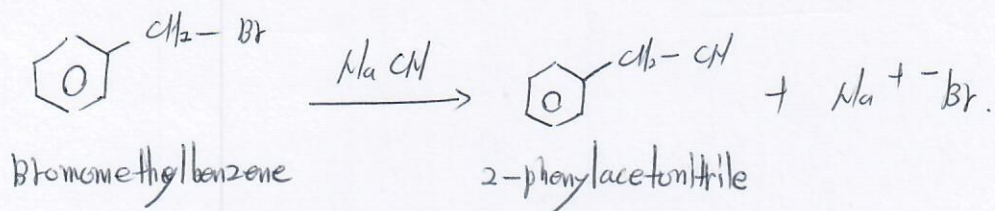


2-phenylethanol

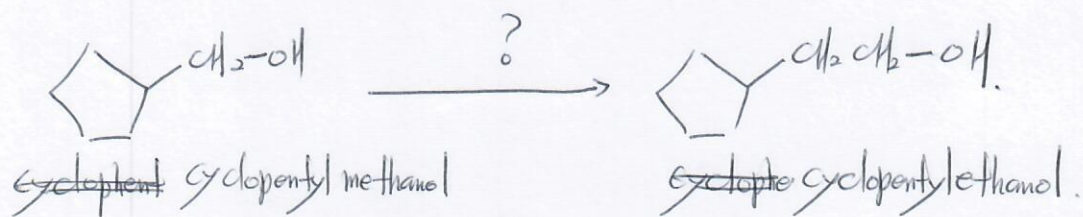
(b)

problem 20-11 - 2.

(b) Hydrolysis of ~~nitriles~~ nitriles.



problem 20-12-1.

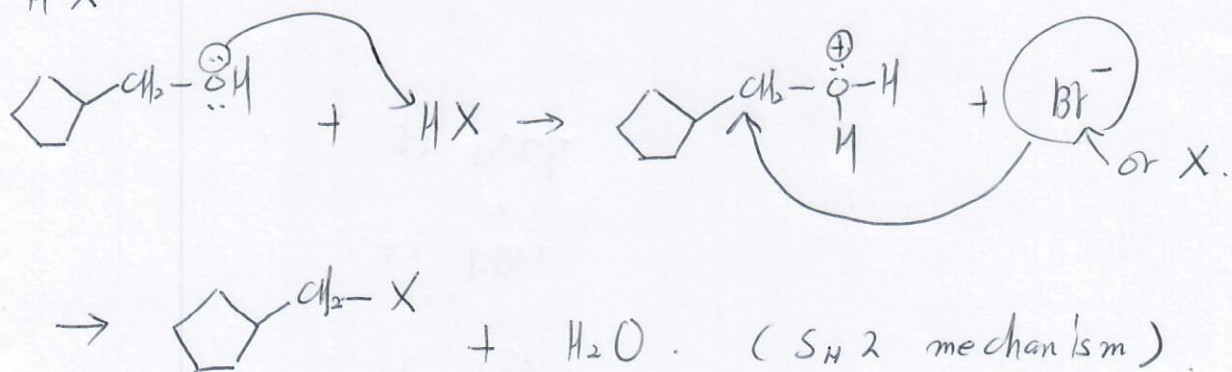


Q: How to increase or add the one methyl on this structure?

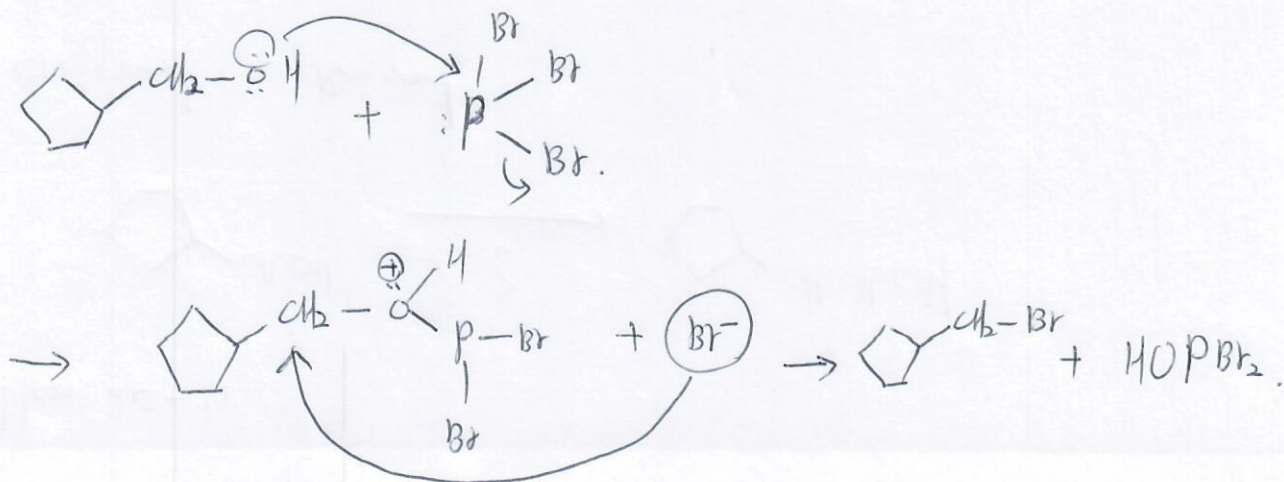
First step: convert the alcohol to alkyl halide.

- Three method
- 1) HX
 - 2) PBr_3
 - 3) SOCl_2 .

1) HX

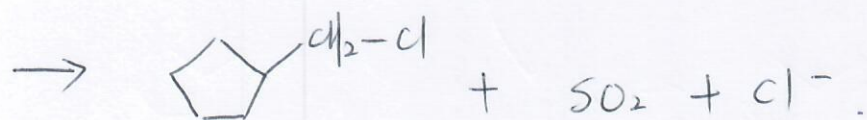
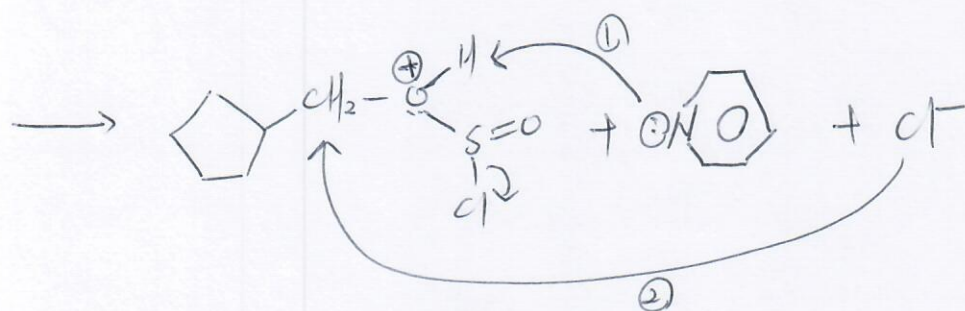
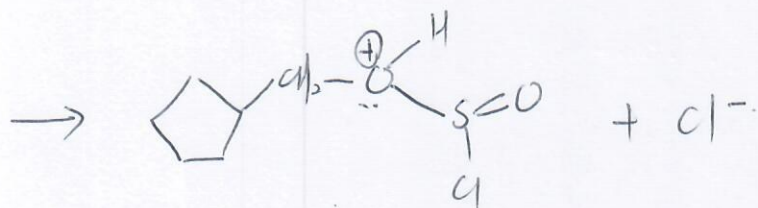
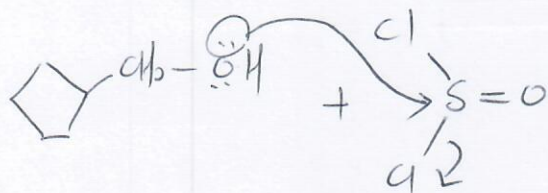


2) PBr_3

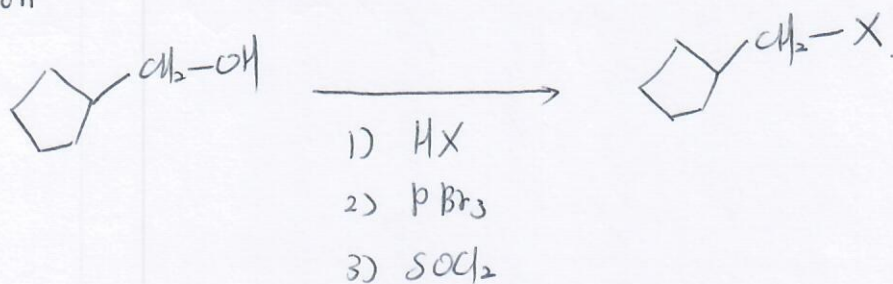


Problem 20-12-2

3) SOCl_2



Conclusion



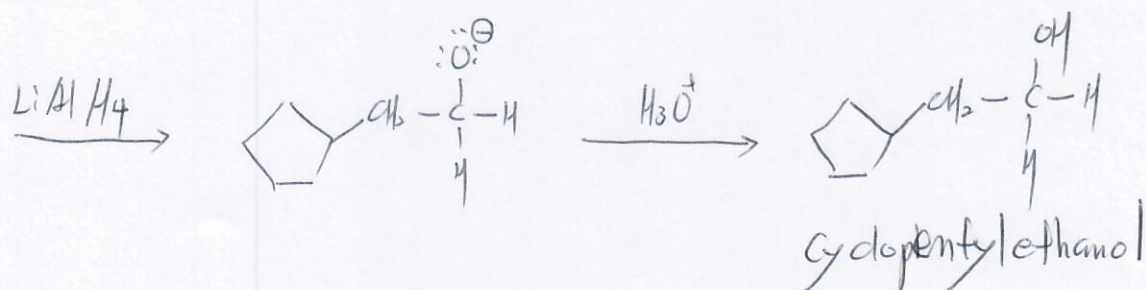
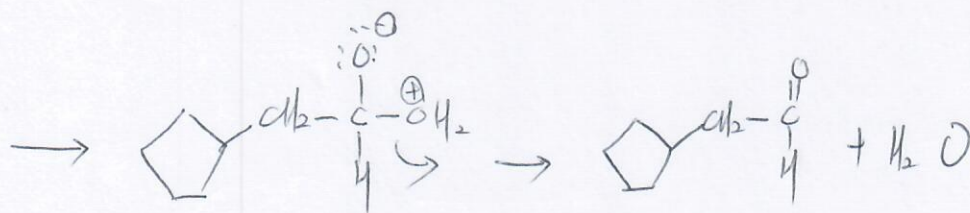
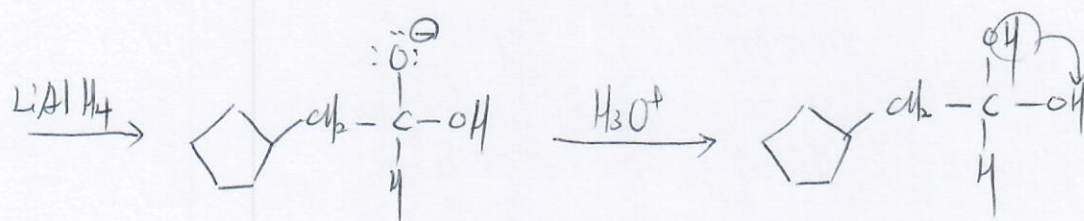
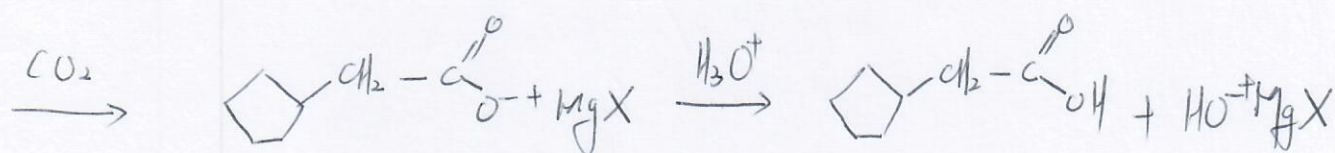
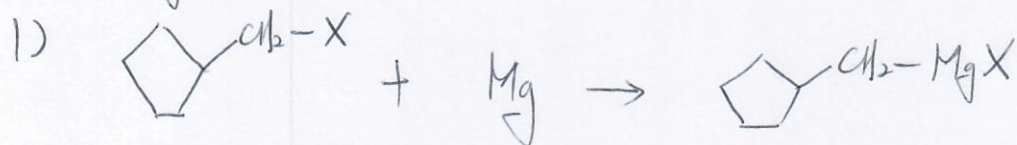
problem 20-12-3

Second step : convert the alkylhalide to alcohol.

Two methode. 1) ~~Grignard~~ Grignard Reagent.

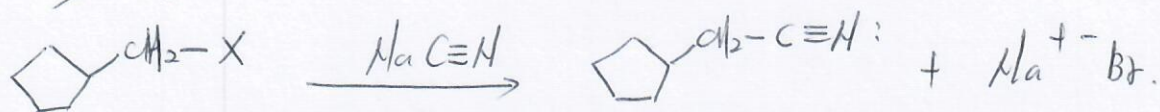
2) Hydrolysis of Nitriles.

Grignard Reagent.

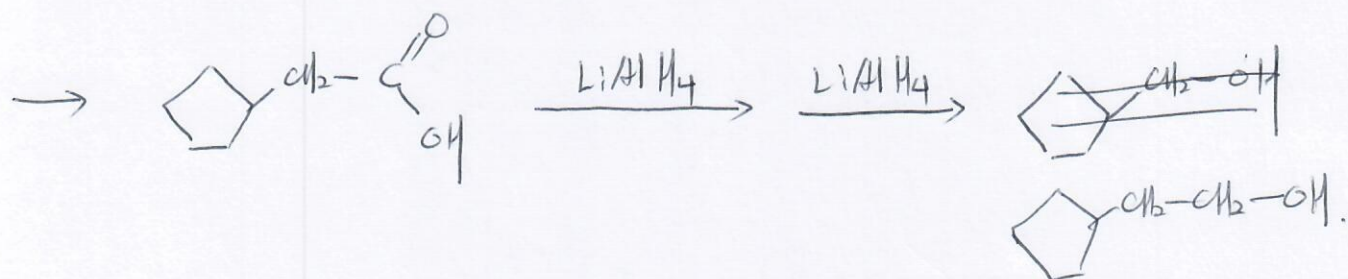
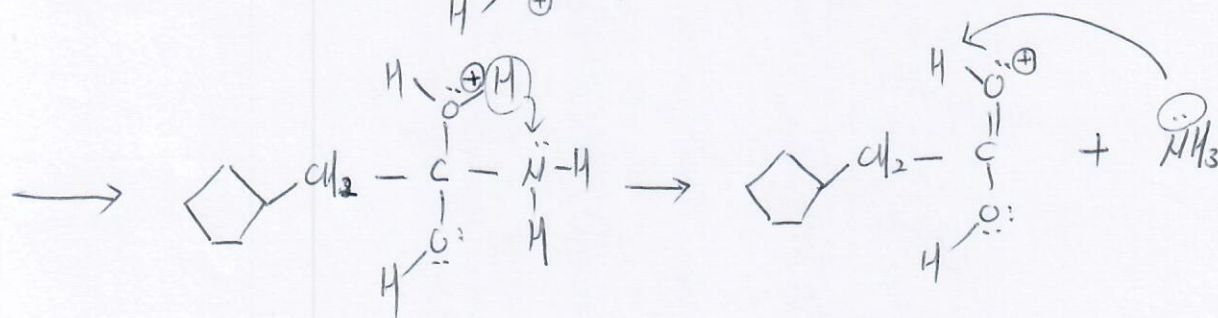
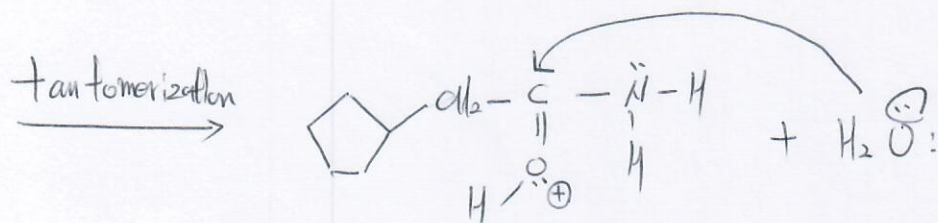
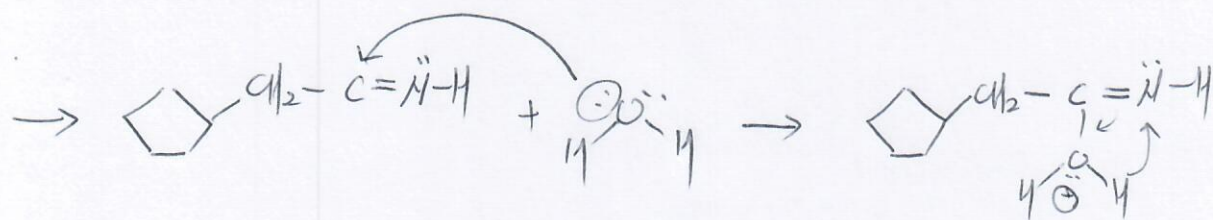
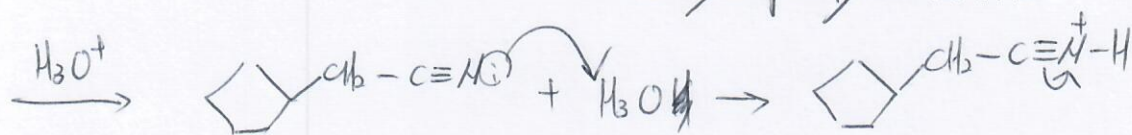


Problem 20-12-4.

2) Hydrolysis of Nitriles.

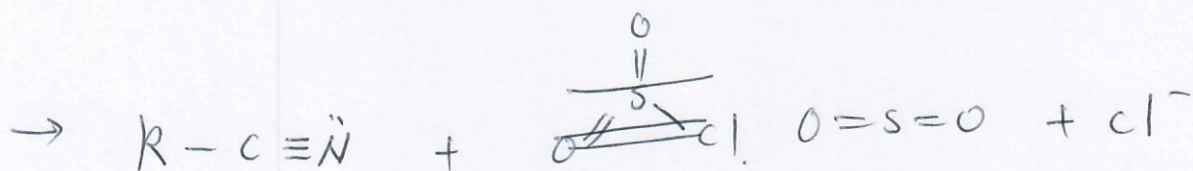
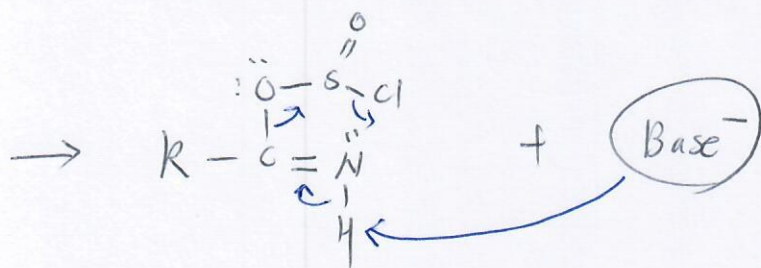
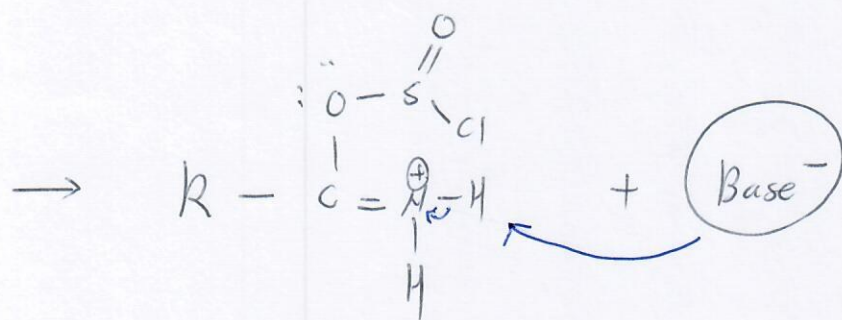
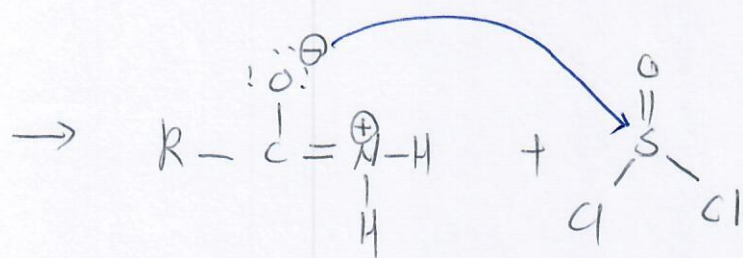
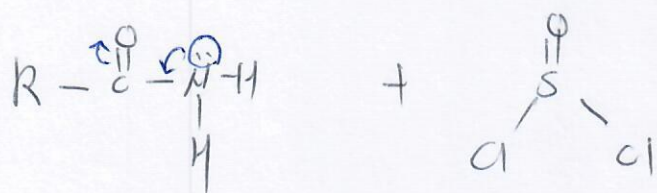


2-cyclopentylacetonitrile.

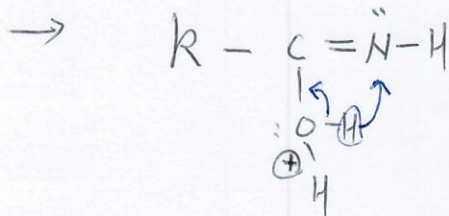
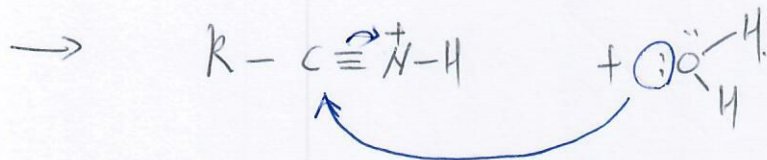
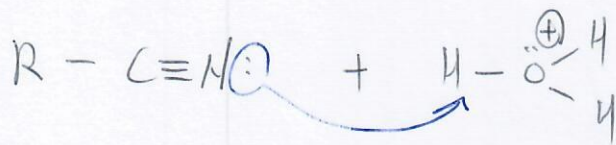


It needs several steps to add one carbon.

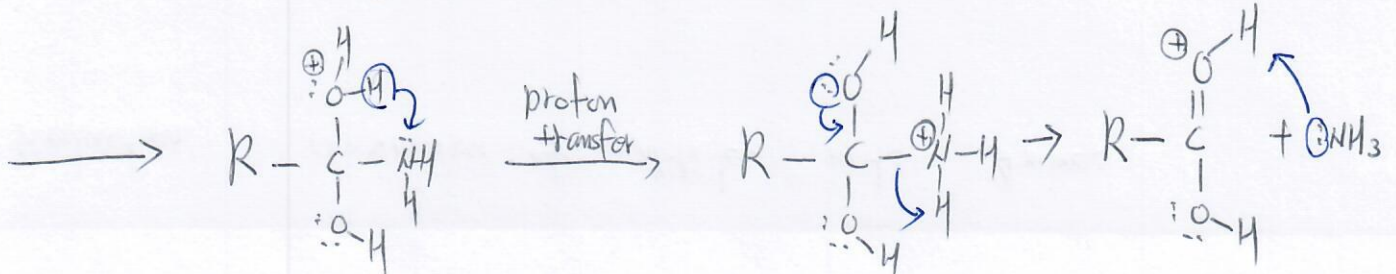
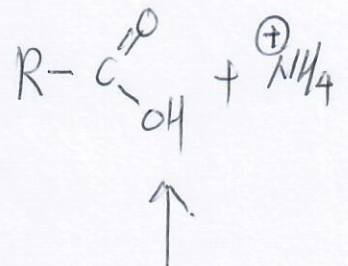
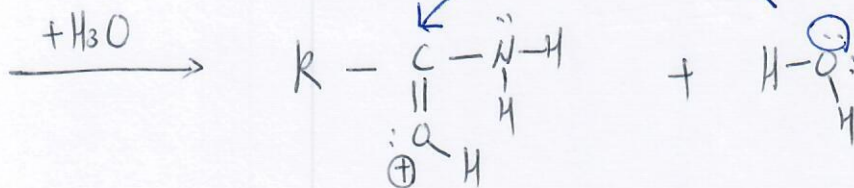
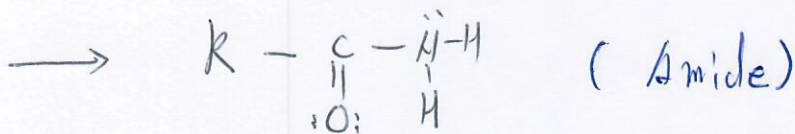
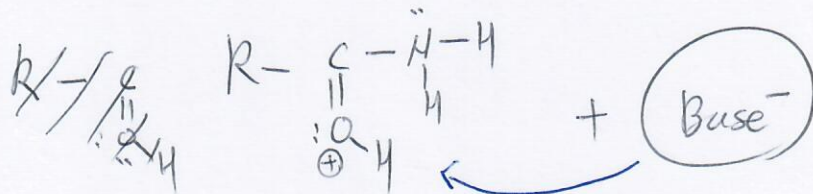
Preparation of Nitriles.



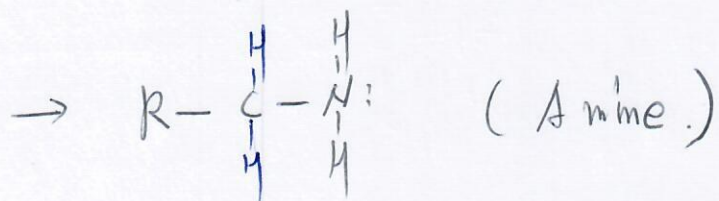
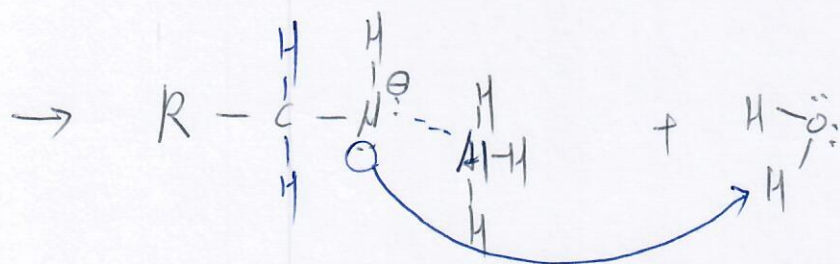
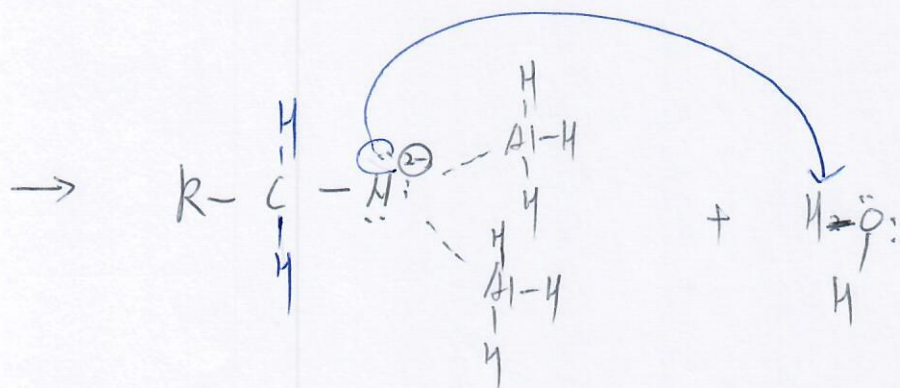
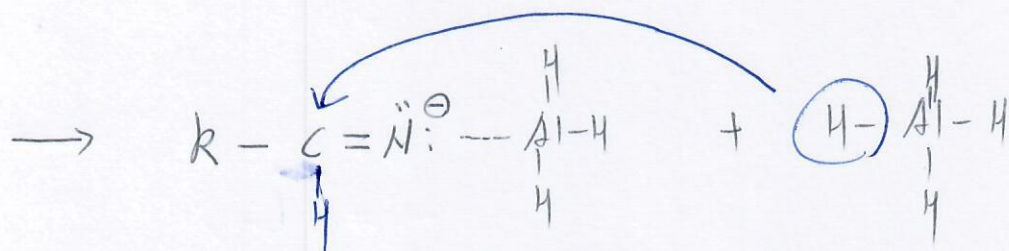
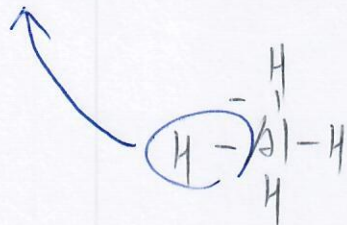
Hydrolysis: conversion of Nitriles into Amines



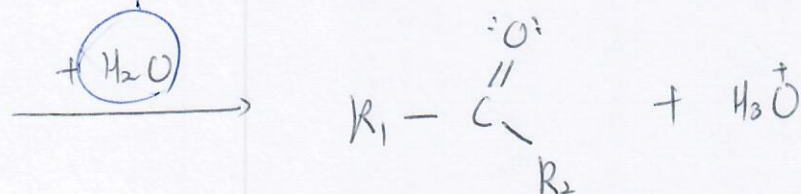
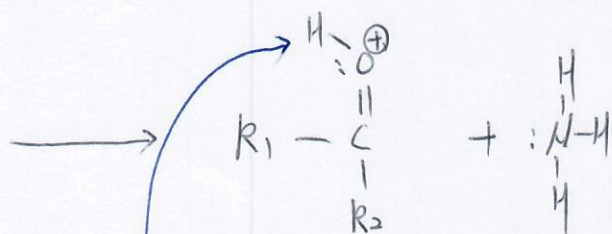
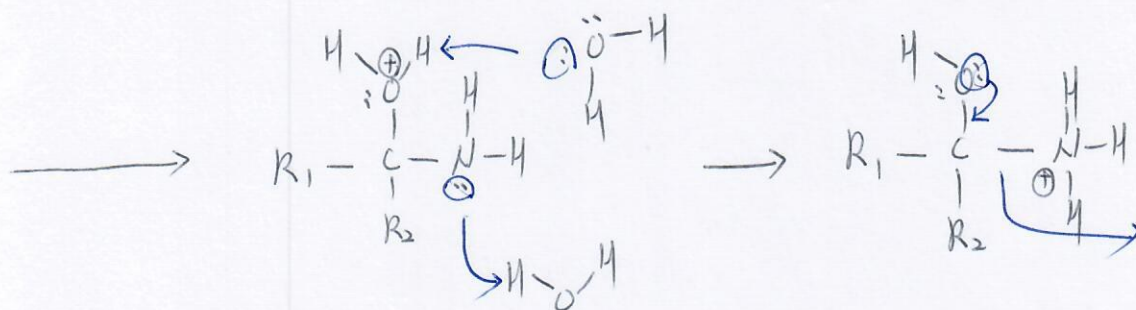
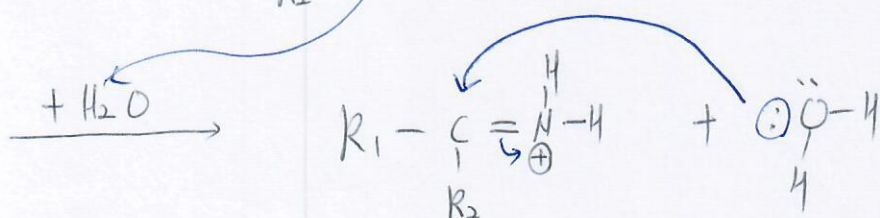
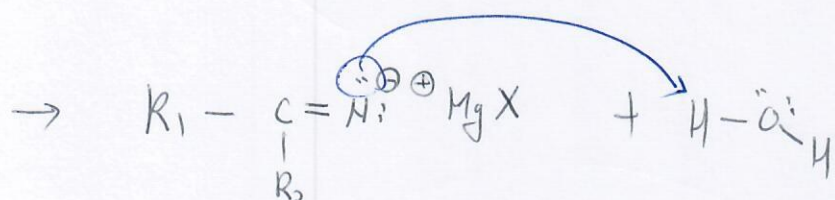
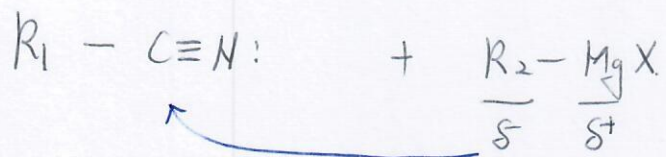
Tautomerization



Reduction : Conversion of Nitriles into Amines



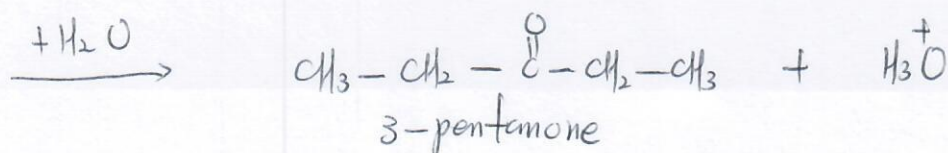
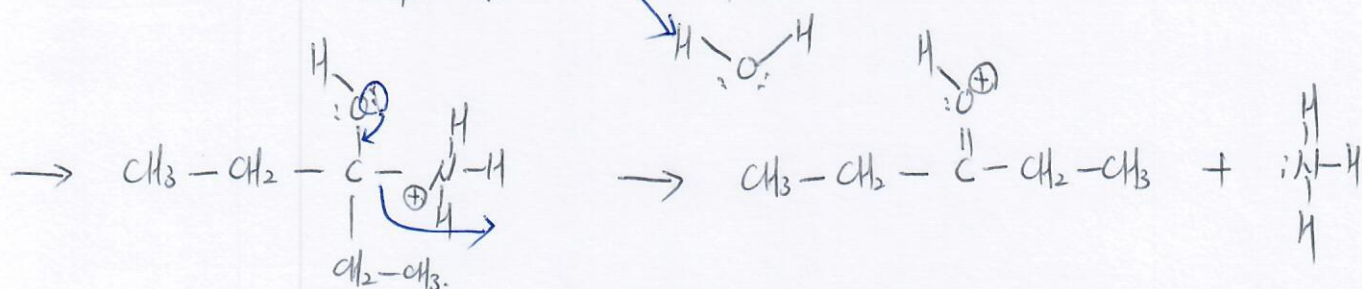
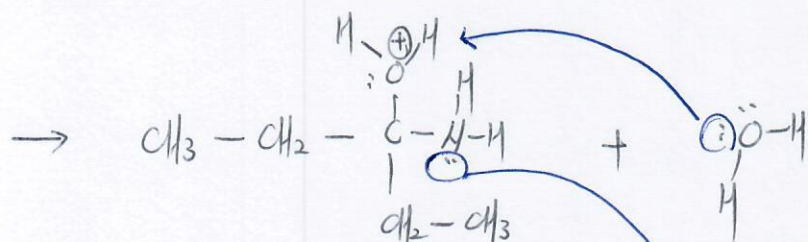
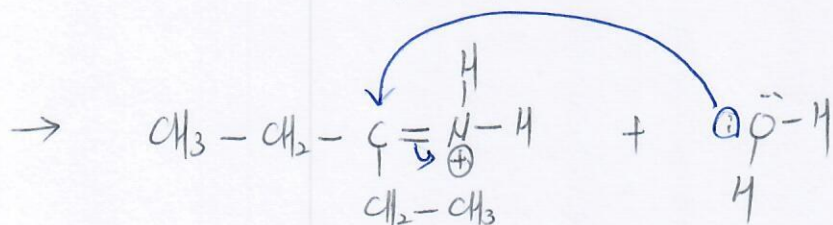
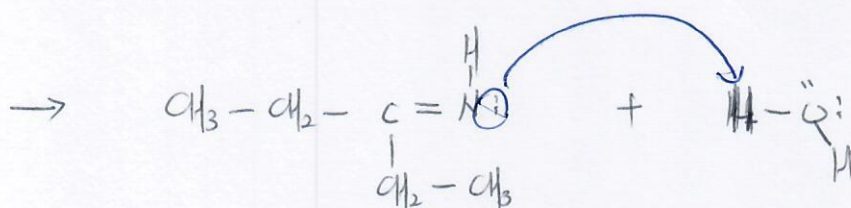
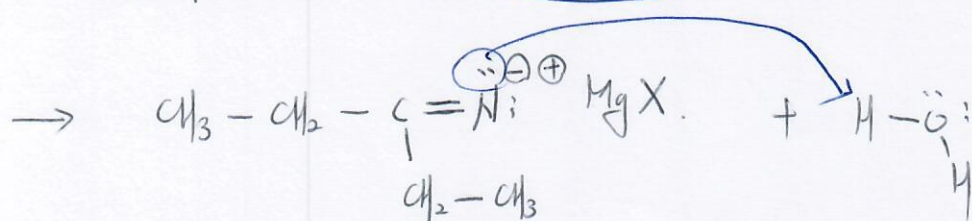
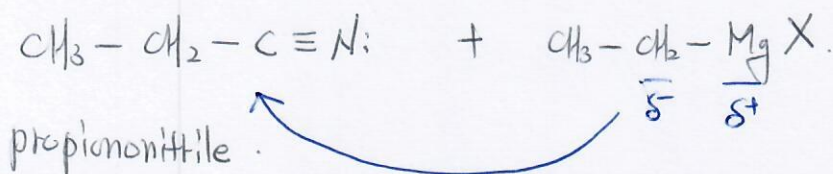
Reaction of Nitriles with Grignard Reagents.



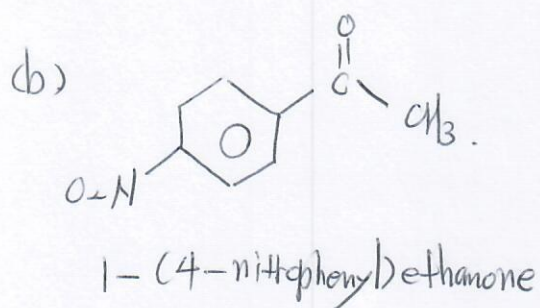
Problem 20-13-1

(a) Nitrile \rightarrow ketone.

"Reaction of nitriles with Grignard ~~reaction~~ reagents."

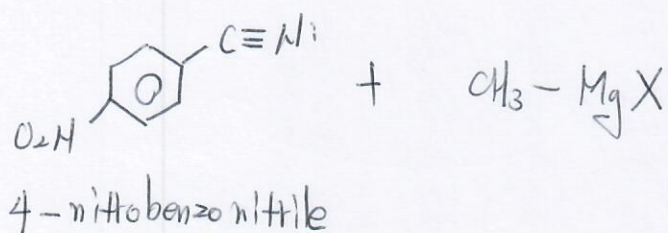


Problem 20-13-2.

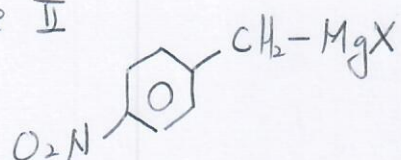


Nitrile \rightarrow ketone.
 "Reaction of nitriles with Grignard Reagents".

Case I



Case II



+ $\text{:N}\equiv\text{CH}$. \rightarrow This one make
 Hydrogen cyanide the aldehyde.

Case III



problem 20-14.

