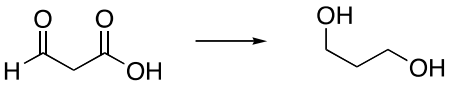
18A. Predict the product of redox reactions of carbonyl compounds with LAH, $NaBH_4$, Jones, PCC.

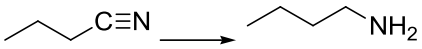
18A.1 Determine if the following are oxidation or reductions then determine the appropriate reagent.

a)

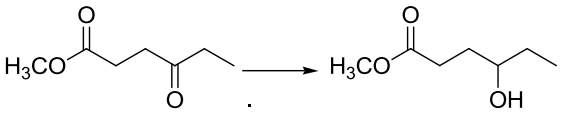


b)

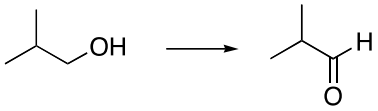
c)



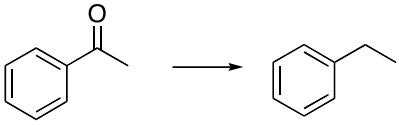
d)



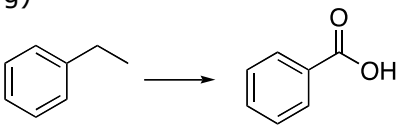
e)



f)

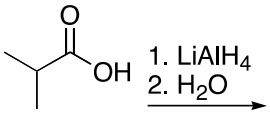


g)

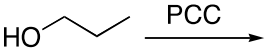


18A.2 Draw the product of the following reactions or write "NR" if no reaction.

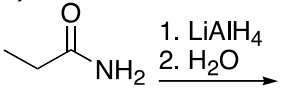
a)



b)



c)



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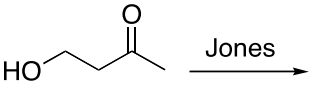

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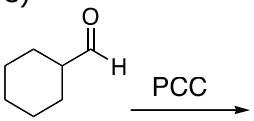

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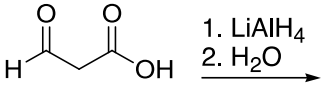
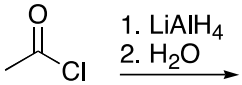
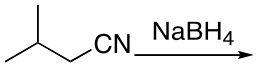


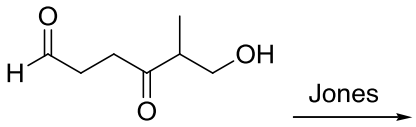
g)



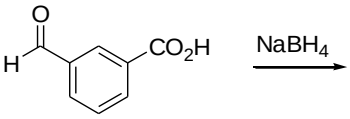
h)



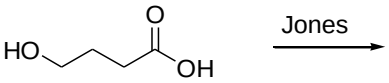
i)


O
H
OH
O
Jones

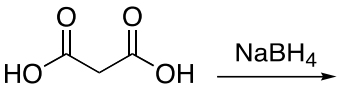
j)


O
H
CO2H
NaBH4

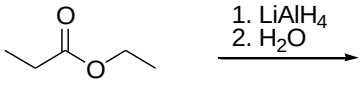
k)


HO
O
OH
Jones

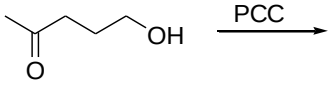
l)


O
O
HO
OH
NaBH4

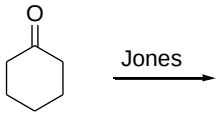
m)


O
O
1. LiAlH4
2. H2O

n)


OH
O
PCC

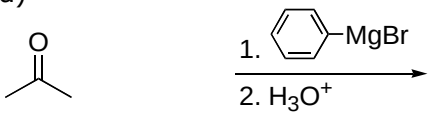
o)


O
Jones

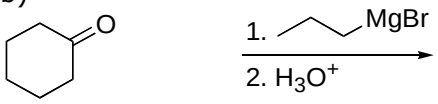
18B. Predict product of Grignard and organolithium reagents with ketones, aldehydes, acid chlorides, esters, and carbon dioxide.

18B.1 Predict the products for the following:

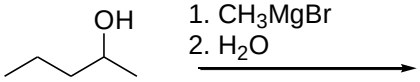
a)



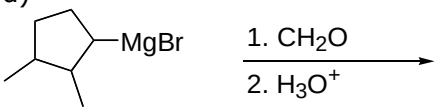
b)



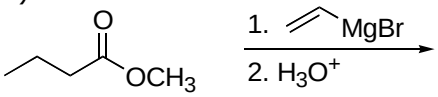
c)



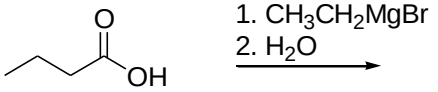
d)



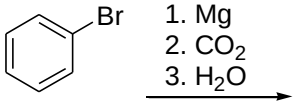
e)



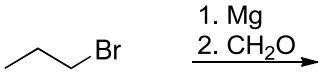
f)



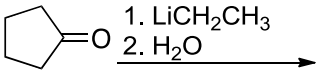
g)



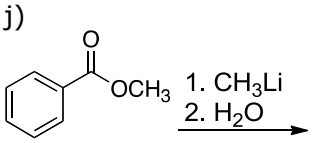
h)



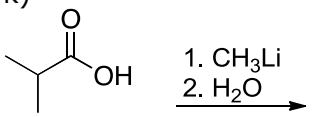
i)



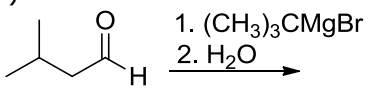
j)



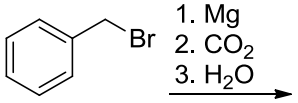
k)



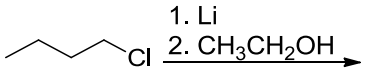
l)



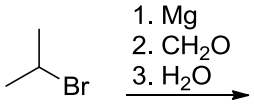
m)



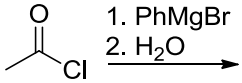
n)



o)

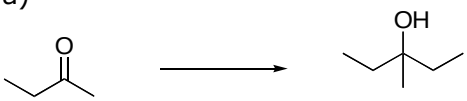


p)

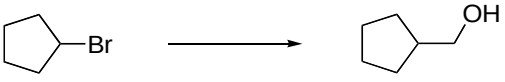


18B.2 Propose reagents for each of the following transformations.

a)



b)



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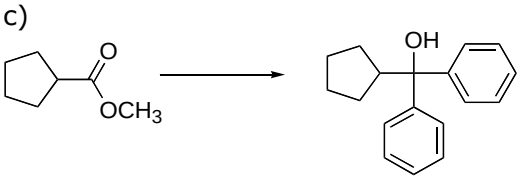

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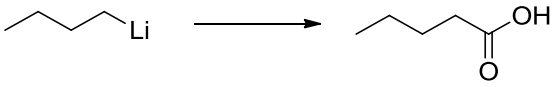

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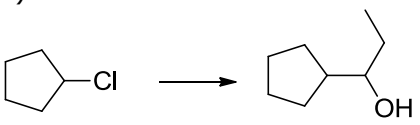

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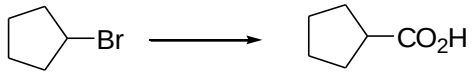
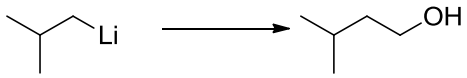
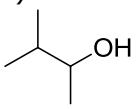


g)

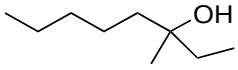


18B.3 Propose at least two ways to synthesize each of the following molecules using the grignard reaction.

a)

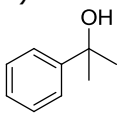


b)



c)

d)



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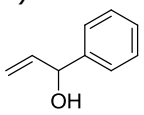
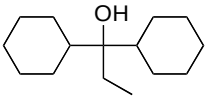
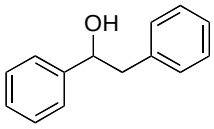


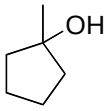
f)



g)



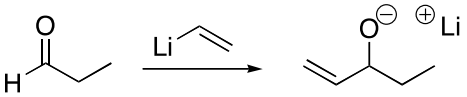
h)



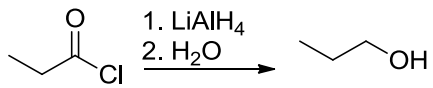
18C. Draw the mechanism of hydride reduction and Grignard or organolithium addition to aldehydes, ketones, acid chlorides and esters

18C.1 Provide a mechanism for the following transformations. Draw any intermediates and use curved arrows to show electron flow

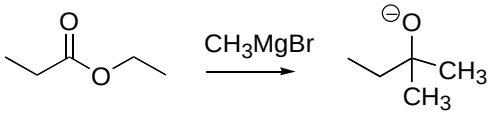
a)



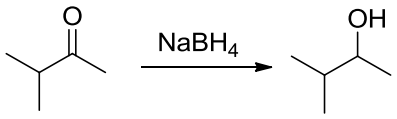
b)



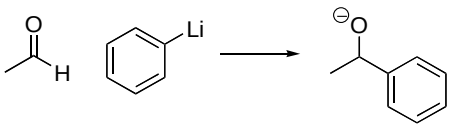
c)



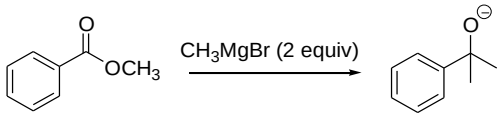
d)



e)



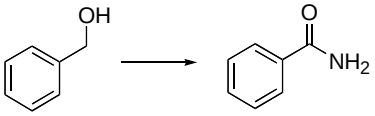
f)



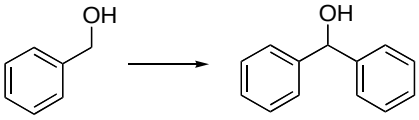
18D. Use redox, organometallic reactions and silyl protecting groups as part of a multistep synthesis

18D.1 Propose a multistep synthesis for the following transformations

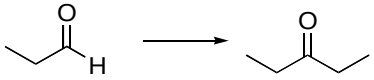
a)



b)



c)



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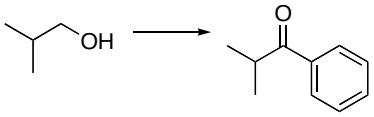

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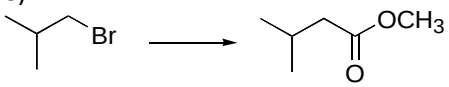

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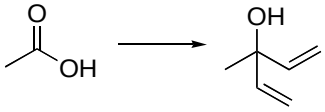

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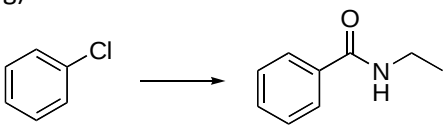

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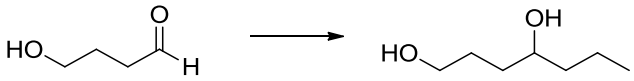

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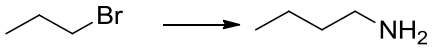

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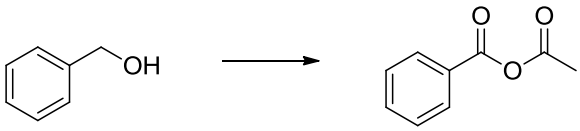

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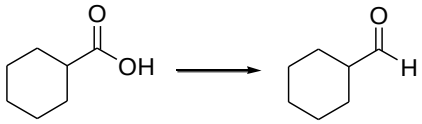

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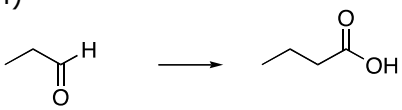

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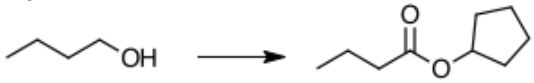
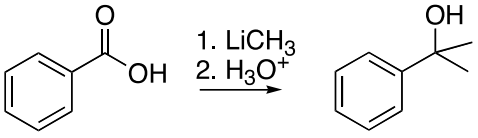


18D.2 Explain why the following syntheses are flawed and propose a working synthesis.

a)



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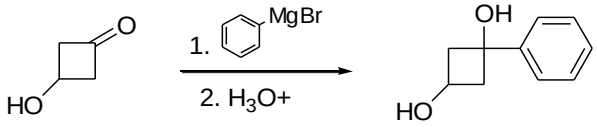

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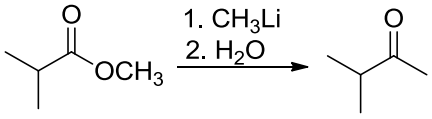

d)