uc3m | Universidad Carlos III de Madrid

OpenCourseWare (2023)

CHEMISTRY II

Verónica San Miguel Arnanz

Teresa Pérez Prior

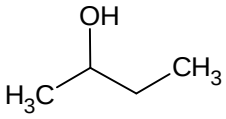
Berna Serrano Prieto

Department of Materials Science and Engineering and Chemical Engineering

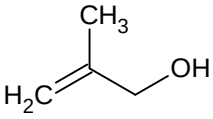
EXERCISES OF ORGANIC COMPOUNDS WITH OTHER FUNCTIONALITIES

Exercise 1. Propose the Grignard reagent and the carbonyl compound required to prepare the following alcohols:

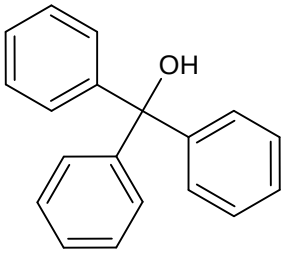
a)



b)



c)



Exercise 2. Indicate the products which result from reaction of 1-methylcyclohexanol with the following reagents: a) HBr, b) H_2SO_4, and c) $Na_2Cr_2O_7$.

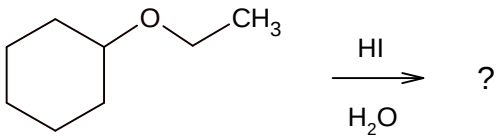
Exercise 3. Indicate how you would prepare the following ethers using a Williamson synthesis:

a) Benzyl isopropyl ether

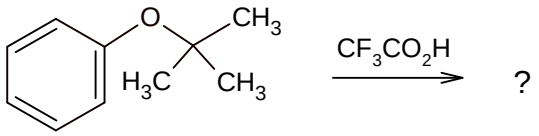
b) Ethyl 2,2-dimethyl propyl ether

Exercise 4. Which products would be obtained from the following ether cleavage reactions?

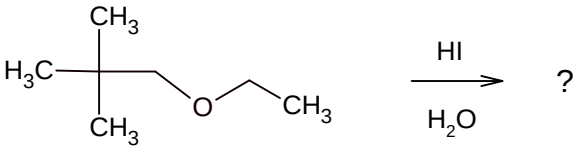
a)



b)



c)



Exercise 5. Predict the products of the reaction of phenylacetaldehyde with the following reagents:

a) $NaBH_4$ followed by H_3O^+

b) Dess–Martin reagent

Exercise 6. Indicate the reagents required to synthesize the following compounds by using a Grignard reaction:

a) 1-Butanol

b) 1-Phenylcyclohexanol

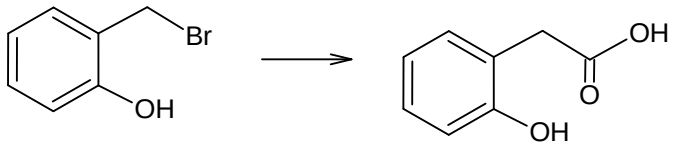
c) Diphenylmethanol

Exercise 7. Justify which of these two acids, lactic acid and acetic acid, will be stronger.

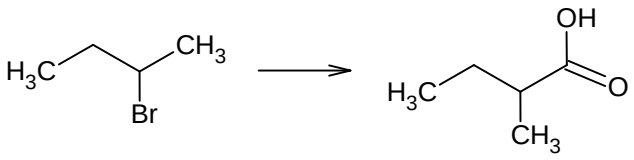
Exercise 8. Rank the following compounds in order of increasing acidity: *p*-Nitrobenzoic acid, acetic acid, and benzoic acid.

Exercise 9. Indicate which method, Grignard carboxylation or nitrile hydrolysis, is more appropriated to carry out the following reactions:

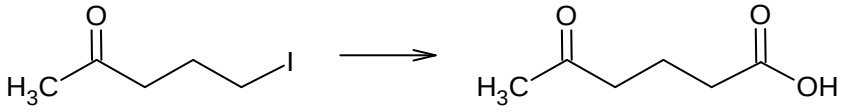
a)



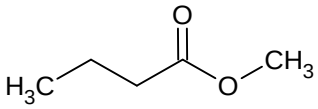
b)



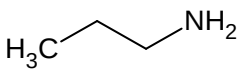
c)

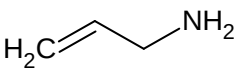


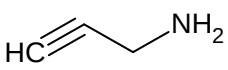
Exercise 10. How might you prepare the following ester from the corresponding carboxylic acid?



Exercise 11. Explain the decreasing pK_a values of the following (protonated) amines:

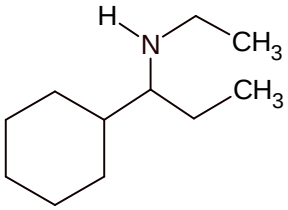






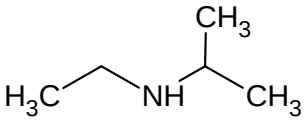
pK_a	10.7	9.5	8.2

Exercise 12. What product would you expect from Hofmann elimination of the following amine?



Exercise 13. Indicate the precursors used to prepare the following amines by means of reductive amination reaction.

a)



b)

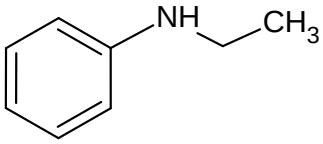


IMAGE CREDITS

- Images of all exercises were made by authors.