

Chem 0310, Winter, 2009
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Exam 3, Monday, March 30, 10:00-10:50 am, Study Summary

Be sure to know the new reactions in Chapters 8 and 9. You will be asked to write products or reactions and to show how starting materials can be converted to products.

Chapter 8 Alcohols

Trivial and IUPAC names of simple alcohols. (21, 22)

Hydrogen bonding, acidity and basicity of alcohols, inductive effects. (27, 28)

Preparation of alcohols: S_N2 reactions of acetate and (sometimes) hydroxide, S_N1 reactions of water (33)

Oxidation/reduction in general (can you tell when an oxidation or reduction has occurred?). Oxidations of alcohols with PCC, dichromate (conditions and products only). (32, 34, 41, 42)

Reductions of aldehydes and ketones with sodium borohydride and lithium aluminum hydride; products and mechanism.

The Grignard reaction. Synthesis and structure of Grignard and organolithium reagents. Additions to aldehydes and ketones; products and mechanisms. (35, 37-40)

Reactions to know (p 321): 1-7

Chapter 9 Reactions of Alcohols and Ethers

Acid/base reactions of alcohols (25, 26)

Dehydration of alcohols: the E1 reaction (conditions, products, mechanism). Importance of cation stability. 1,2-Shifts of hydride and alkyl groups. (27, 28, 32)

Reactions of alcohols with HX (conditions, products, mechanism), SOCl₂, RSO₂Cl, PBr₃ (conditions and products only). (29-31, 33-36)

Ethers. Trivial and IUPAC Names of ethers. (37)

Williamson ether synthesis, reactions of ethers with HX. (39-41)

Epoxides. Formation from halohydrins, reaction under S_N1 and S_N2 conditions (products and mechanism). (42, 48-50)

Multi-step reactions. Can you assemble simple 2-3 step reaction sequences to make products with the current set of reactions? (CH 8, 45-50, CH 9, 43, 60)

Reactions to know (p 374): 1-13

Chapter 10: NMR Spectroscopy

There will be one NMR question on the test. You will be asked to propose a structure from NMR spectra and a formula, or to assign the resonances of a spectrum to a structure.

Interpreting basic ¹³C NMR spectra. Chemical shifts of alkanes, substituted alkanes, alkenes, and alkynes. Symmetry and the number of resonances in a spectrum.

Interpreting basic ^1H NMR spectra. Chemical shifts of alkanes, substituted alkanes, alkenes, and alkynes. Deriving information from integration and first-order spin-spin coupling (splitting).

Solving NMR problems (25-41)