

Problem Set No. 5 (21.5.2013)

1. The additions of bromine to (*E*)- and (*Z*)-3-hexene are stereospecific! Give the structures of the products and explain the results!

2. Suggest two alternative methods to enantioselectively prepare (*R*)-1-phenylpropan-1-ol!

3. a) The reaction of D-proline with phosgene in the presence of NEt_3 provides a bicyclic compound which can be transformed into the *R*-configured CBS catalyst in one step (give all steps and reagents)!

b) Do a reduction of α -chloroacetophenone with this catalyst! Which face of this ketone will be attacked in preference, *Re* or *Si*?

c) By treatment with base the resulting product will form an epoxide! Write down this reaction and give the configuration of the resulting product!

4. Reduce methyl 4-oxopentanoate with baker's yeast and treat the resulting product with acid to provide a γ -lactone!

5. The diastereoselective addition of cyanide using cyano(trimethyl)silane (in the presence of a catalytic amount of Lewis base) to (*R*)-2-benzyloxypropanal follows the Felkin-Anh rule. Draw the major product and assign the absolute configuration of the two stereogenic centers!