

Problem Set 3
S343 Summer 2009

This problem set will help prepare you for quiz 3.

Problems from “Techniques in Organic Chemistry”

Technique 16: Questions 1, 3, 4, 6

Technique 11: Questions 3, 4

Questions based on dihydroxylation lab:

1. What is the stereochemical relationship between cis-cyclohexane-1,2-diol and trans-cyclohexane-1,2-diol?
2. Which of these mixtures could be separated by TLC?
 - a. (1R,2R) cyclohexane-1,2-diol and (1S,2R) cyclohexane-1,2-diol
 - b. (1R,2R) cyclohexane-1,2-diol and (1S,2S) cyclohexane-1,2-diol
3. How can TLC be used as a technique to eliminate possible mechanisms of a reaction?

Questions based on Project 6.2 (Synthesis of 2-chloro-2-methylbutane) lab:

1. Draw a mechanism for the formation of 2-chloro-2-methylbutane from 2-methyl-2-butanol and HCl. What type of reaction mechanism is this?
2. Why did you have to be cautious about CO₂ forming when you washed the crude reaction mixture with saturated sodium bicarbonate solution?
3. What was the purpose of doing a distillation in this reaction?
4. Could gas chromatography be used to determine the purity of your final 2-chloro-2-methylbutane product? Explain.

Additional questions:

1. What are the advantages and disadvantages of fractional distillation versus simple distillation? When would you use each one?
2. Draw the apparatus used in simple distillation. Label all pieces and give their purpose.