Problem Set 7

1. Name the following alcohols using IUPAC rules. Remember to denote stereochemistry if appropriate!!

(3S,4S)-4-chloro-6-methyl-3-heptanol

5-tert-butyl-3-isopropylcycloheptanol

(3S,5R)-4-ethyl-5-methyl-3-heptanol

2. Draw structures of the following alcohols.

(1R,3R)-3-bromocyclopentanol

5-sec-butyl-6-fluoro-2-methyl-1-nonanol

cyclobutanol

3. Draw all possible products of the following dehydration reaction. If more than one product can be formed, label the MAJOR isomer.

In the space below, draw out the complete mechanism to account for formation of the MAJOR product. Also, what is the alternative set of reagents we can use to dehydrate an alcohol?

 alternate reagents?

POCl₃, pyridine
4. Reactions that proceed via a carbocation intermediate (S_N1 and E1) can give unexpected products. Please consider the following example:

How? When you form a carbocation intermediate, they can rearrange to form a more stable carbocation.

Mechanism:

5. Propose a mechanism for formation of the following products:
6. The following reaction is a "ring expansion" rearrangement. Please account for both products.

\[
\text{pentane-2,4-diol} + H_3PO_4 \rightarrow \text{pentene} + \text{pentene}
\]

7. Provide a mechanism for the following transformation:

\[
\text{cyclopentanol} + H_2SO_4 \rightarrow \text{pentene}
\]

8. Provide a mechanism for the following hydride shift:
9. Draw the major organic product in the box for each reaction.