WORKSHOP, Chapter 16 Reactions of Ethers and Epoxides

1. Identify the oxidation state of each carbon in the following functional groups. For each pairwise transformation, describe it as an oxidation, a reduction, or neither (there are 12 combinations to consider). For each transformation, indicate a reagent or sequence of reactions that would be appropriate to accomplish the transformation.

$$CH_2=CH_2$$
 CH_3CH_2OH $HOCH_2CH_2OH$ H_2C-CH_2

2. Each of the following Williamson ether synthesis reactions failed. Explain what went wrong and offer alternate synthetic approaches to form the target compounds.

i.
$$CH_2OH + DH$$
 Br H $C-O$

ii.
$$CH_3CH_2OH + H_3C - C - Br \longrightarrow CH_3CH_2O - C - CH_3$$

$$CH_3 CH_2O + CH_3CH_2O - C - CH_3$$

$$CH_3 CH_2O + CH_3CH_2O - C - CH_3$$

$$CH_3 CH_3 CH_3$$

3. Propose a reasonable mechanism for the reaction below, in which compound **A** is transformed to compound **B** by reaction with base. Use the arrow formalism to show the flow of electrons.

4. Design a synthesis of racemic 4-methyl-1-propoxypentan-2-ol. The only carbons you may use come from propane. You may use any reagents or conditions you have learned this year.

4-methyl-1-propoxypentan-2-ol