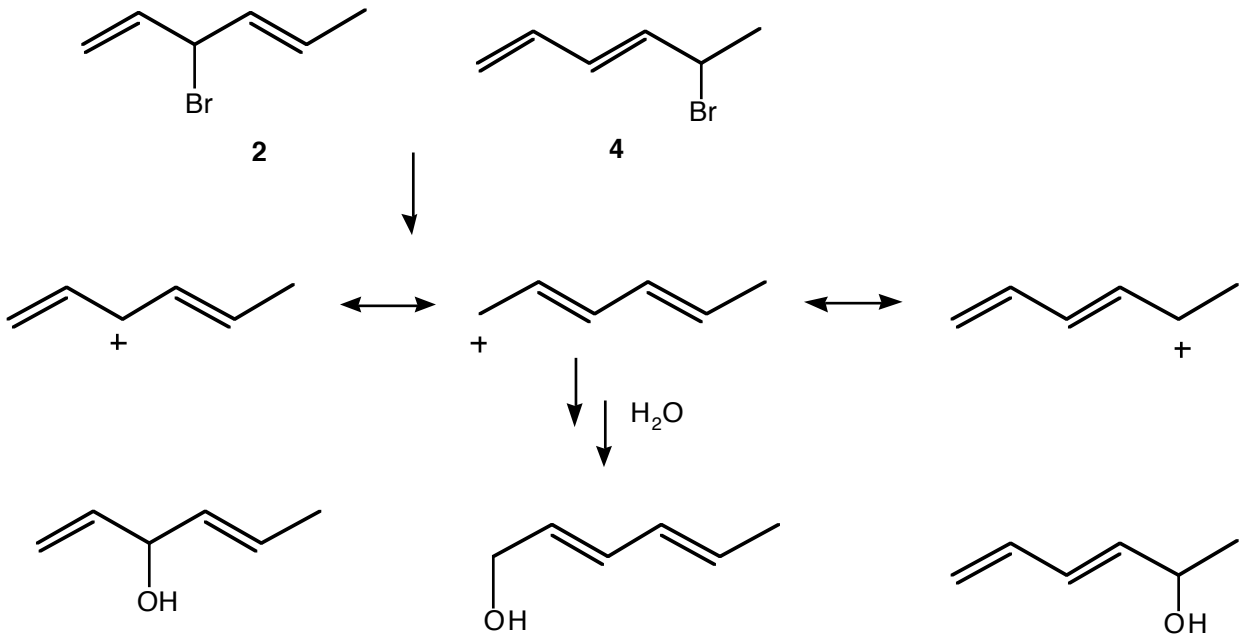
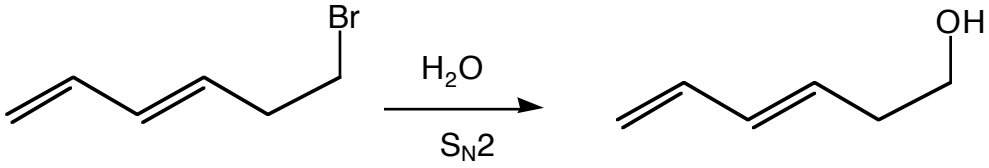
Answers to Problem 54, Chemistry 301X - 2006

Two of these bromides (**2** and **4**) ionize to give the same resonance-stabilized carbocation. Reaction will be at the three different carbons sharing the positive charge, and three different alcohols will result.



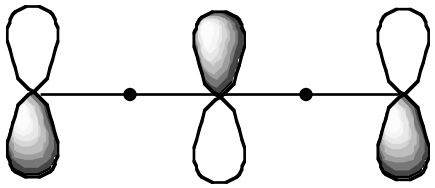
Another, **3**, will slowly react through the S_N2 mechanism to give another alcohol.



3

Neither the S_N2 nor the S_N1 reaction will take place at an sp^2 carbon, so bromide **1** does not react.

For the pentadienyl cation, $\Psi 3$ is the LUMO, as there are only four electrons:



Thus, addition of the nucleophile water through a filled nonbonding HOMO, can take place at carbons 1, 3, and 5, but not at 2 or 4.