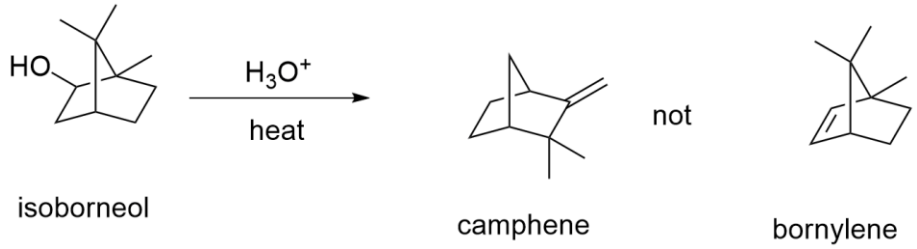
Acid Catalyzed Dehydration, E1, Rearrangements

1.

a. Acid-catalyzed dehydration of nepentyl alcohol $(CH_3)_3CCH_2OH$, yields 2-methyl-2-butene as the major product. Outline a mechanism showing all steps in its formation.

b. Acid-catalyzed dehydration of either 2-methyl-1-butanol or 3-methyl-1-butanol gives 2-methyl-2-butene as the major product. Write a mechanism that explains these results.

c. When the compound called isoborneol is heated with 9M sulfuric acid, the product of the reaction is the compound called camphene and not bornylene, as one might expect. Write a mechanism showing how camphene is formed.




2.

Draw out a step-by-step reaction mechanism for the transformation shown below. Include all intermediates, charges, and electron-pushing arrows needed for the transformation. Hint—sometimes unfavorable reaction steps can take place if they can get to a nice, stable intermediate or product in the end.