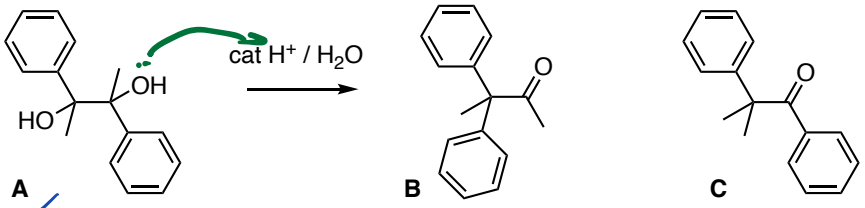
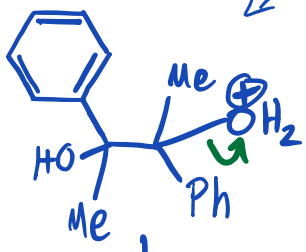
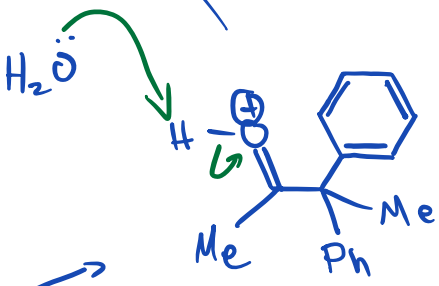
10 pts. **3a**. When compound **A** is treated under the conditions below, the main ketone obtained is compound **B**. Provide a *mechanism* **AND** *explanation* that accounts for the fast formation of **B** over the slower reaction toward **C**.

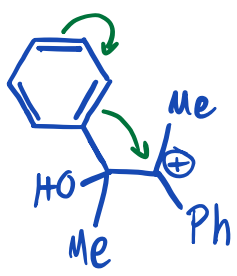
*Hint:* think about electrophilic aromatic substitution and ask yourself, why is a 1,2-Ar shift faster than a 1,2-Me shift?

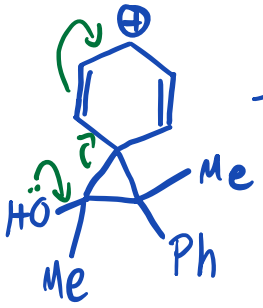


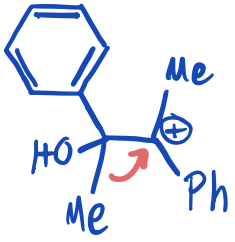

Toward B

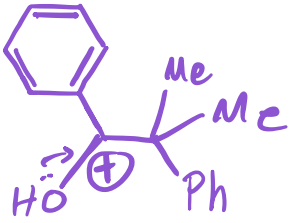


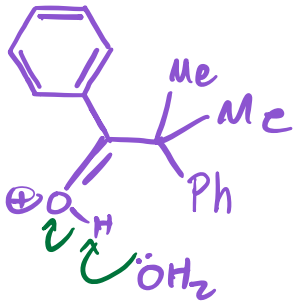




← The charge of the migrating Ph group is more delocalized in this phenonium ion.

Toward C



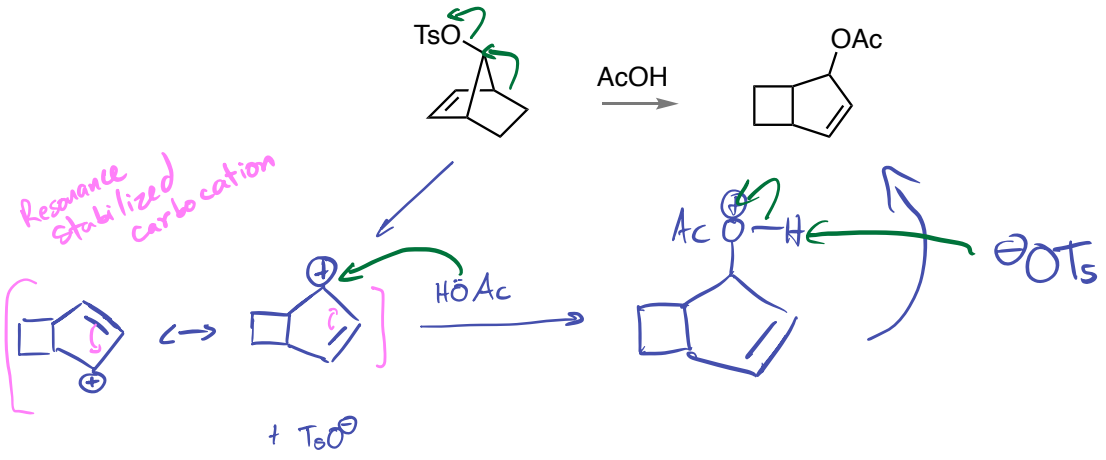




→ C

the ⊕ on the migrating Me group can not be delocalized. Therefore, it's less favored than phenonium ion.

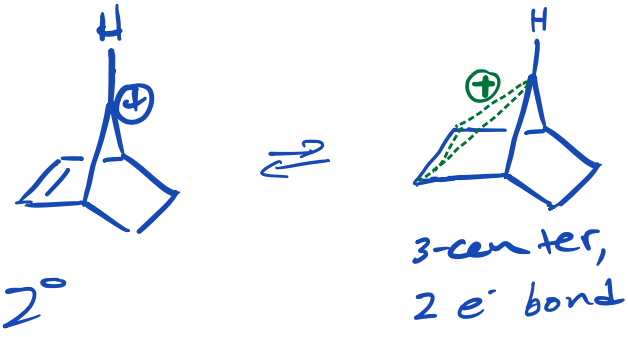
*7 pts*. **2a.** We learned that tosylates don't generally solvolyze to form carbocations. However, in the reaction below, the tosylate **solvolyzes to yield a resonance-stabilized carbocation in the first step**. Propose the mechanism that accounts for the formation of the product below.




Tosylates don't generally solvolyze to yield 2° carbocations. However, in this exception, the tosylate is "kicked out" because the reactant directly yields a resonance-stabilized carbocation.

← not resonance stabilized 2° R⊕ and some angle strain

*3 pts*. **2b.** The expected **carbocation** from an **$S_N1$-type of mechanism is not formed**. Draw the structure of the expected carbocation and provide a suitable explanation as to why this is less favored than the one in the mechanism above.




2°

3-center, 2 e⁻ bond

While this particular carbocation can form a 3-center, 2 e⁻ bond as shown above, neither is as stable as a resonance-stabilized cation.