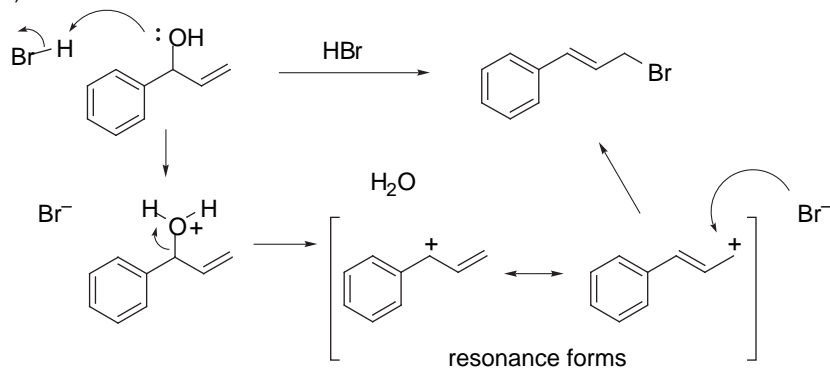
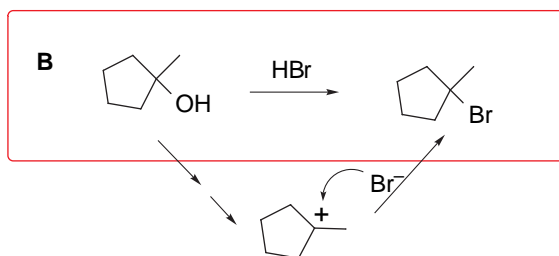
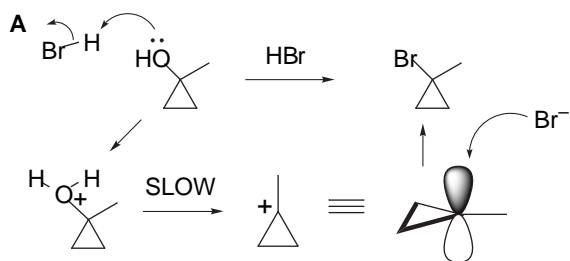


1) Provide a mechanism



2) Which reaction is faster (**A** or **B**)? Why?

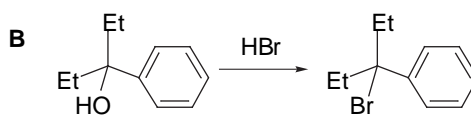
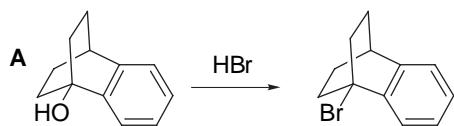


Severe distortions are *not* required in order to put a cyclopentane in a planar arrangement with 120° angles. This is the faster reaction

Remember: carbocation formation is rate determining!
The ideal geometry for a carbocation is planar with 120° angles.
Thus, the carbocation formation is slow because it is severely distorted by the 60° angle of the cyclopropane ring.

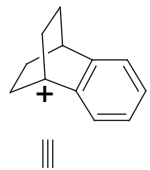
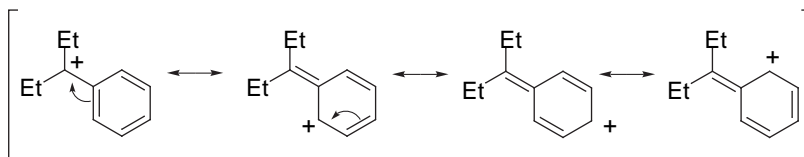
3) Which reaction is faster (**A** or **B**)? Why?

The arrow pushing is the same as for question 2. The rate differences again relate to carbocation stability.

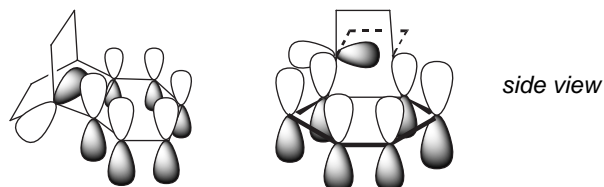


The carbocation intermediate is resonance stabilized (with the benzene ring— see below). This is the faster reaction

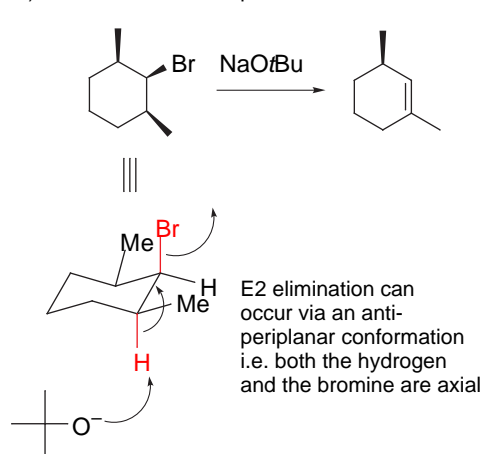
Such resonance structures do not apply for the cation below



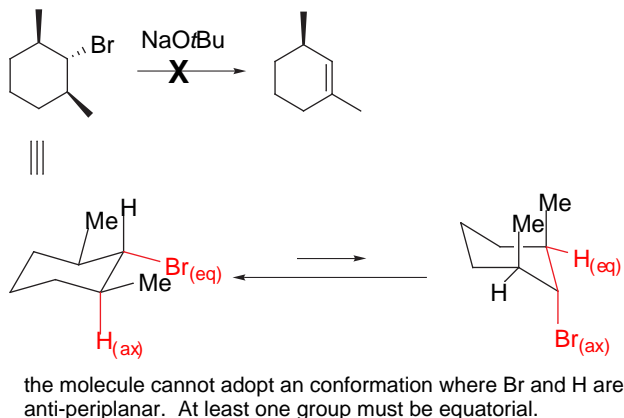
the π orbital of the carbocation cannot overlap with the π system of the benzene ring. No resonance stabilization



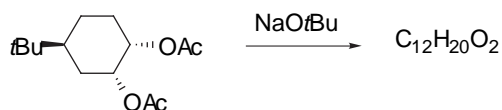
4) Provide a detailed explanation



but

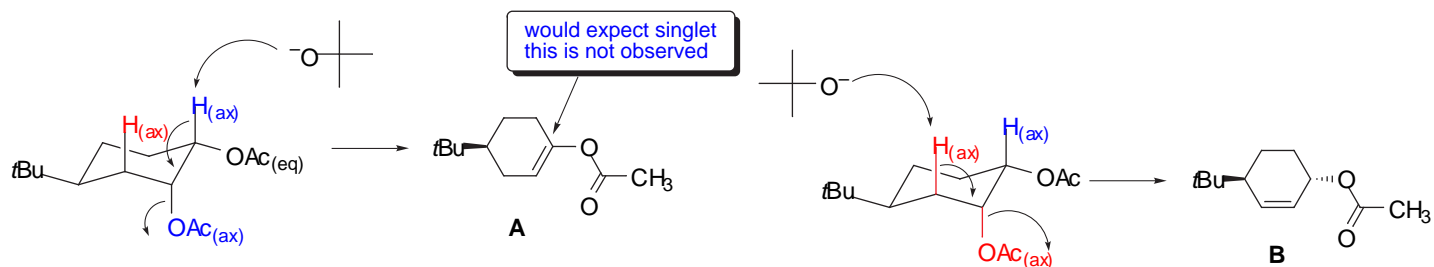


5) Draw the product of the following reaction. Explain your assignment and provide a mechanism.



The most stable conformer has t-Bu in the axial position. Two anti-periplanar E2 eliminations are possible to give structures **A** and **B**.

| ^{13}C NMR: | ^1H NMR: |
|----------------------|-------------------|
| 21.4 (q) | 0.90 (s, 9H) |
| 22.6 (t) | 1.40 (m, 1H) |
| 28.9 (t) | 1.85 (m, 2H) |
| 29.2 (q, 3 carbons) | 2.10 (s, 3H) |
| 32.9 (s) | 2.15 (m, 2H) |
| 45.9 (d) | 5.25 (m, 1H) |
| 70.5 (d) | 5.60 (m, 1H) |
| 128.1 (d) | 5.80 (m, 1H) |
| 133.0 (d) | |
| 170.9 (s) | |



We need to use the spectral data to pick the right product. We can tell right away by looking at the ^{13}C NMR that **A** is not correct—we would expect one of the alkene carbons to be a singlet. The complete assignments are below:

