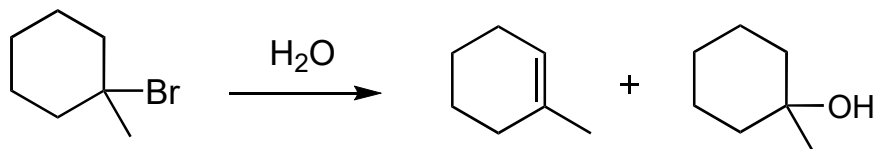
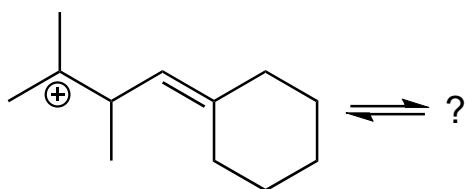


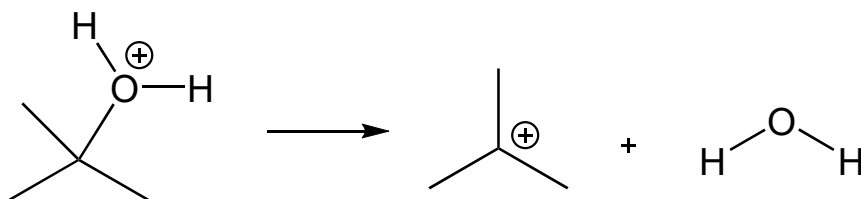
5A) (10 pts) Provide a complete mechanism to account for both products formed in the following reaction. Pay close attention to details, including lone pairs, formal charges and the use of curved arrows.



5B) (5 pts) Is the following carbocation expected to undergo a rearrangement? **Briefly explain why or why not.** If a rearrangement is expected, **draw the result of the rearrangement.**



5C) (10 pts) **Add any missing lone pairs** (all formal charges are shown), **add any missing curved arrow(s)** to show the mechanism for the forward reaction, **draw the transition state**, and **describe this step** (*i.e.*, identify the arrow-pushing pattern).



Describe step/pattern:

Draw the transition state for this mechanism step:



5D) (4 pts) If a reaction is *endothermic* and the system exhibits a *decrease in entropy*, determine whether or not it is spontaneous, and if the sign of ΔG is temperature dependent. **Briefly explain (or show your work).** **No work = no credit.**

Your answer:

- It is spontaneous only at high temperatures.
- It is spontaneous only at low temperatures.
- It is spontaneous at all temperatures.
- It is not spontaneous at any temperature.