5A) (14 pts) 1) Provide a **complete mechanism** for the following **S_N2** substitution reaction.
Pay close attention to details (lone pairs, formal charges and the use of curved arrows).

2) Draw a **transition state**
for the reaction above:

3) What would happen to the rate of the reaction above if the concentration of NaOH was doubled?
place answer in the box: ☐

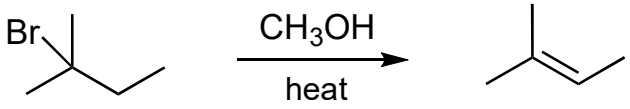
a) rate is 4x faster b) rate is 2x faster c) rate doesn't change d) rate is 1/2 e) rate is 1/4

4) What is the role of NaOH in the reaction above? Place answer in the box: ☐

a) acid b) base c) leaving group d) electrophile e) nucleophile

---

5B) (6 pts) Provide a **complete mechanism** for the following elimination reaction. Pay close attention to details including lone pairs, formal charges and the use of curved arrows.



5C) (6 pts) Synthesize the following target molecule by nucleophilic substitution.
Provide a suitable starting material and any necessary reagents needed.