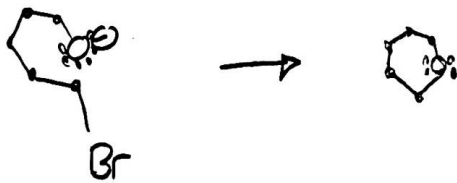
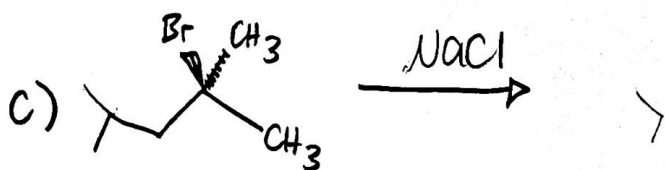
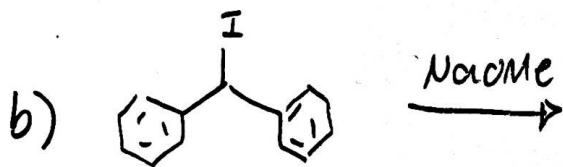
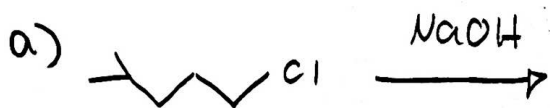


① The following reaction yields the product shown  
draw the reaction arrows



② Classify the following reactions as  $S_N1$  or  $S_N2$  and draw the products



③ For the last structure 2 c) is there a chiral center present? why or why not?



- show all chiral centers on the molecule  $\leftarrow$
- define the chiral centers R vs S
- is this molecule E or Z?
- pick a bond axis (anyone) and make a Newman diagram projection