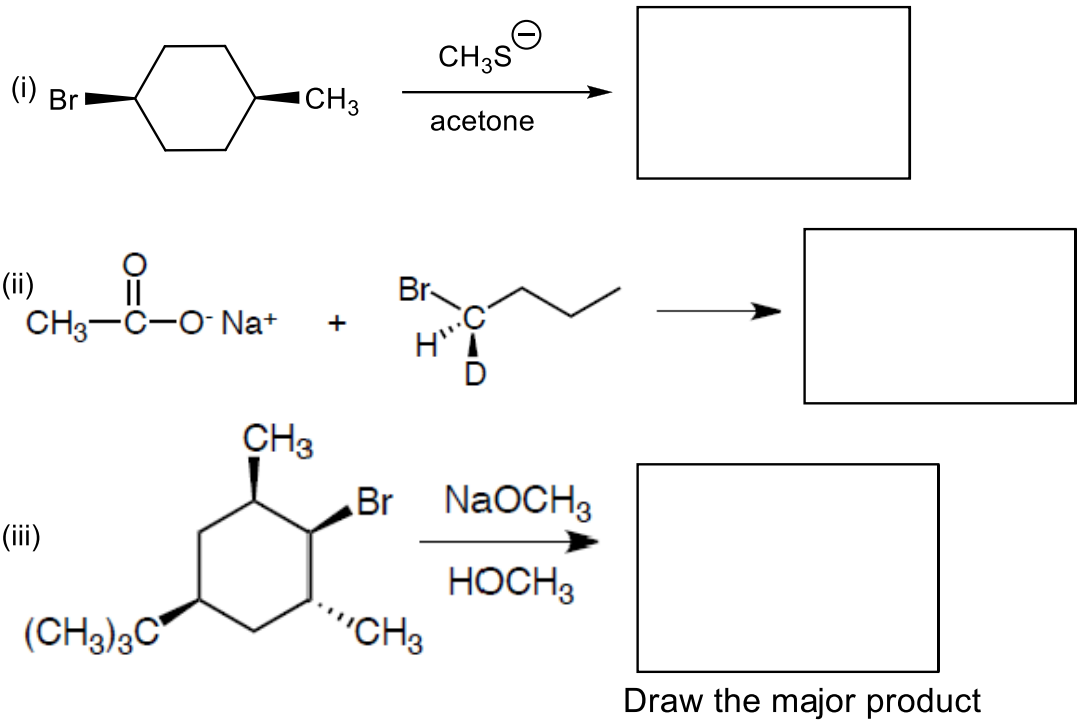
CHM102A
Tutorial 6

Topics covered in lectures-12, 13 to be discussed in Tutorial 6

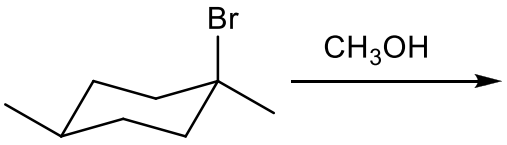
- Nucleophilic substitution reactions: S_N1, S_N2: Basic features with examples, reaction profile, stereochemistry, factors affecting S_N1, S_N2 reactions, effect of substrate, nucleophile, solvent, stability of carbocations, comparison between S_N1, S_N2.
- Elimination reactions: E1, E2, Zaitsev rule, mechanism, energy-profile, regioslectivity, factors affecting E2/E1 reactions, comparison between S_N1/S_N2 and E1/E2, stereochemistry of E2 reactions, E2 reactions, dehydohalogenation in six-membered rings, E1cB reaction.

1. Rank the species below in order of increasing nucleophilicity in hydroxyl solvents: $CH_3CO_2^-$, CH_3S^-, HO^-, H_2O

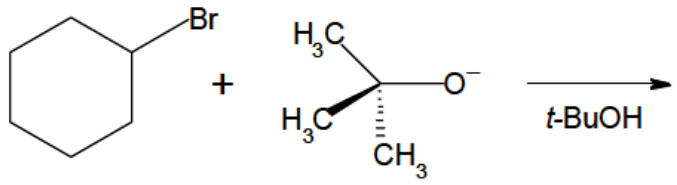
2. Draw the structures of organic products formed with correct stereochemistry at the stereogenic centre (if any) in the following reactions.



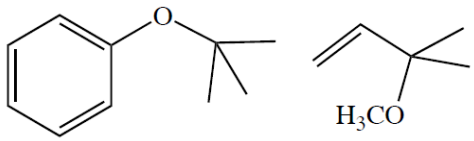
3. What product(s) would you expect from the following solvolyis reaction? Designate the type of reaction mechanism.



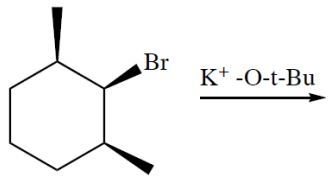
4. For the following reaction, draw the product(s) of the major reaction(s). Clearly indicate any relevant stereochemistry.

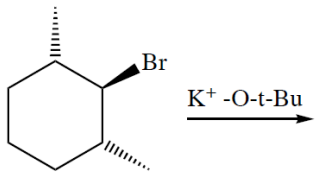


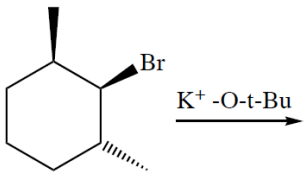
5. Deduce substrate and corresponding nucleophile to prepare following molecules using S_N1 reaction?



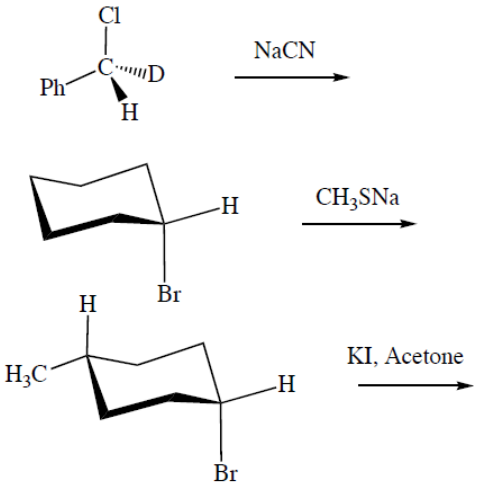
6. Given that the following three molecules have the absolute configurations given, show how each reactant gives a different outcome by E2.







7. Indicate the stereochemical outcome of the following S_N2 reactions. Assume that all chiral centers are optically pure. Do these reactions all give racemic mixtures?



8. What are the products of following E2 reactions: