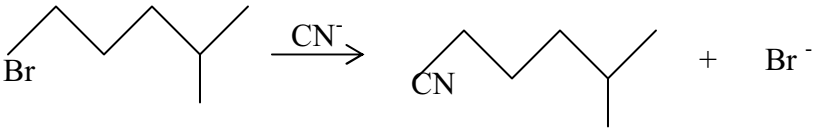
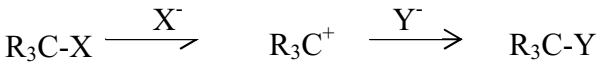
Review Problems: R-X

This is a review prepared by **Tim Holtze**, thank you to him for taking the time and effort to create this package.

1. Predict whether the following mechanism will be S_N1 or S_N2, state your reasons.



2. S_N1 reactions show 1st order kinetics. Explain what this statement means_____.
3. What choices for X and Y would ***most*** favour the following reaction:



4. The treatment of D-2-bromobutane with NaOH results in the production of a compound with L-configuration. The reaction has most likely taken place through which mechanism: S_N1 or S_N2. Justify your answer.
5. Would the following reactants use S_N1 or S_N2 as their mechanism in a reaction?

   $(CH_3)_3CX + NaOH_{(aq)}$ →

Justify your answer, and complete the mechanism for the reaction, giving the name of the product.

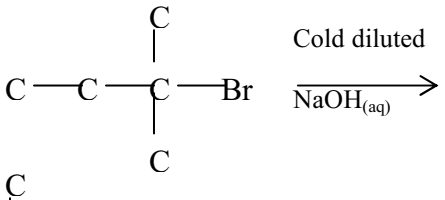
6. What are the conditions required for turning CH_3X → CH_3OH, and would the reaction occur via the mechanism S_N1 or S_N2?

_____

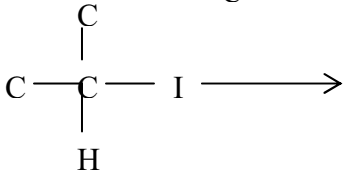
7. State the anion and, if necessary, medium required for converting the following reactants to the following products:
   a) C_2H_5Br → $C_2H_5OC_2H_5$
   b) C_2H_5CN → C_2H_5COOH
   c) C_2H_5Br → C_2H_6
   d) C_2H_5Br → $C_2H_5NH_2$

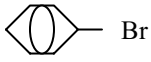
8. What are the mechanisms, rate determining steps, and products of the following reactions?

a)



b)



9. Why is a nucleophilic attack on  not possible?

Answers

1) 1º ∴ S_N2

2) ∴ slow step indicates only 1 molecule

3) X = I^-, Y = CN^-

4) S_N2

5) 3º ∴ S_N1

6) dilute, cold, aq OH^- , non-polar solvent

7) a) $^-OC_2H_5$ in a alcoholic solvent

b) CN^- in dilute aqueous acidic, H^+/ H_2O, medium.

c) Reduction using $LiAlH_4$

d) ammonia in alcoholic medium

8) (a) S_N1, 2,2 dimethyl propanol,

(b) via either S_N1 or S_N2 since it is secondary , product: propan-2-ol

9) since lone pair on the halogen also participates in the delocalization of the benzene, thus C- X bond is stronger, also electron density on the carbon is increase, therefore, the electrophilic carbon is less likely to be attacked by the nucleophilic.