

## SHORT QUESTIONS

**Q.1 What is order of reactivity of HX with ethene?**

**Ans.** Ethene reacts with HX to form ethyl halide.



The order of reactivity of HX is given below.

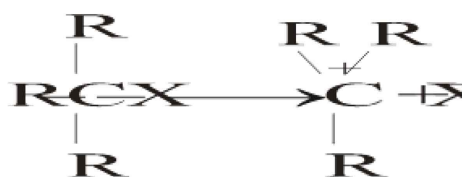


**Q.2 What is substrate?**

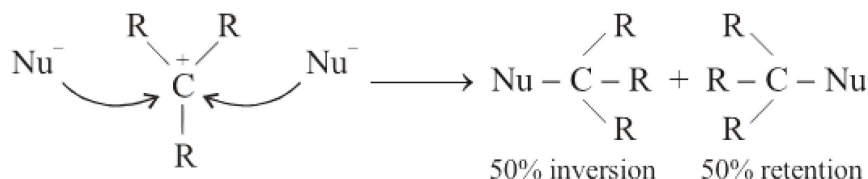
**Ans.** The molecule at which another substance attacks is called substrate. For example, when a nucleophile attacks on RX, the alkyl halide is substrate. When enzyme reacts with any species, it is also called substrate.

**Q.3 In tertiary alkyl halides, S<sub>N</sub>1 reaction takes place but not S<sub>N</sub>2 reaction why?**

**Ans.** In tertiary alkyl halide, a nucleophile cannot attack directly at the electrophilic centre due to steric hindrance. First of all ionization of alkyl halide takes place and carbocation is formed.



Now nucleophile can attack from either side of carbon plane.



**Q.4 Why reaction of ethylbromide with OH<sup>-</sup> nucleophile is S<sub>N</sub>2?**

**Ans.** Reaction of ethyl bromide with OH<sup>-</sup> is S<sub>N</sub>2 because it is bimolecular reaction. The rate of reaction depends upon the concentration of nucleophile as well as substrate.



$$\text{Rate} = K[\text{CH}_3\text{CH}_2\text{Br}][\text{OH}^-]$$

**Q.5 Secondary alkyl halides undergo S<sub>N</sub>1 or S<sub>N</sub>2 reactions, while primary alkyl halides have S<sub>N</sub>2 and tertiary alkyl halides have S<sub>N</sub>1 reactions, why?**

**Ans.** In secondary alkyl halides two alkyl group are attached with α-carbon.

X  
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The reaction kinetic depends upon the size of alkyl group and nature of solvent used.

If alkyl groups have higher size,  $S_N1$  reaction takes place due to steric hindrance. This reaction takes place in two steps. Polar solvent also favours  $S_N1$  mechanism. If alkyl groups have smaller size than  $S_N2$  reaction takes place in single step. Non-polar solvent also favours the  $S_N2$  mechanism.

**Q.6 First step of  $E_1$  and  $S_N1$  mechanism is same but second is different. Explain it.**

**Ans.** In  $E_1$  or  $S_N1$  first step is formation of carbocation.

