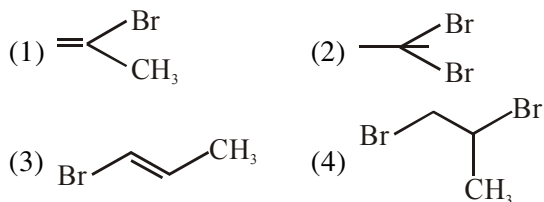
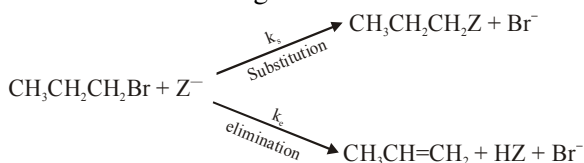


HALOGEN DERIVATIVE

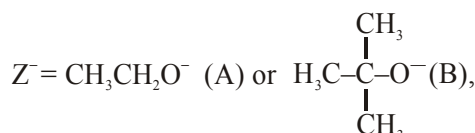
1. 1-methyl ethylene oxide when treated with an excess of HBr produces :



2. For the following reactions :

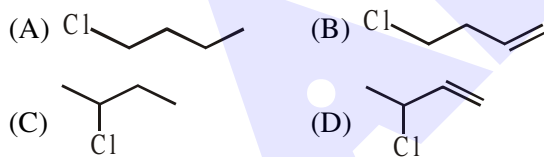


where



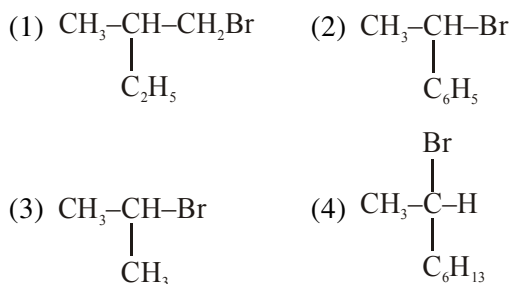
k_s and k_e , are , respectively, the rate constants for the substitution and elimination, and $\mu = \frac{k_s}{k_e}$, the correct options is -

- (1) $\mu_B > \mu_A$ and $k_e(\text{B}) > k_e(\text{A})$
 (2) $\mu_B > \mu_A$ and $k_e(\text{A}) > k_e(\text{B})$
 (3) $\mu_A > \mu_B$ and $k_e(\text{B}) > k_e(\text{A})$
 (4) $\mu_A > \mu_B$ and $k_e(\text{A}) > k_e(\text{B})$
3. The decreasing order of reactivity towards dehydrohalogenation (E_1) reaction of the following compounds is :

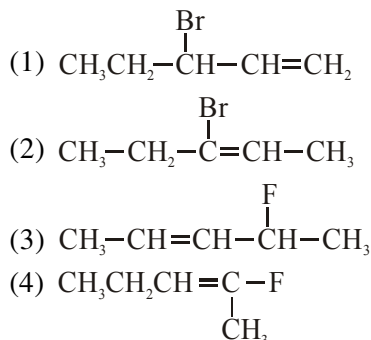


- (1) $\text{B} > \text{D} > \text{A} > \text{C}$ (2) $\text{B} > \text{D} > \text{C} > \text{A}$
 (3) $\text{D} > \text{B} > \text{C} > \text{A}$ (4) $\text{B} > \text{A} > \text{D} > \text{C}$

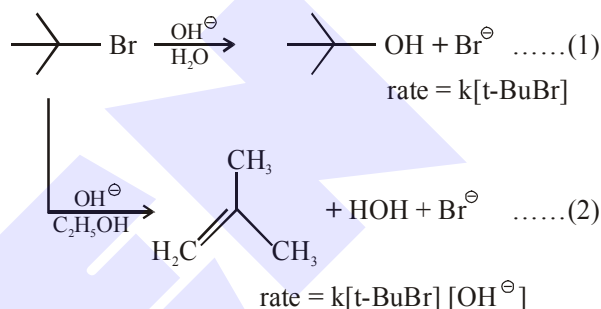
4. Which of the following compounds will show retention in configuration on nucleophilic substitution by OH^- ion ?



5. The major product obtained from E_2 -elimination of 3-bromo-2-fluoropentane is:

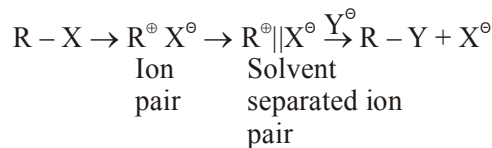


6. Consider the reaction sequence given below :



Which of the following statements is true :

- (1) Changing the concentration of base will have no effect on reaction (1)
 (2) Changing the concentration of base will have no effect on reaction (2)
 (3) Changing the base from OH^- to ^-OR will have no effect on reaction (2)
 (4) Doubling the concentration of base will double the rate of both the reactions.
7. The mechanism of $\text{S}_\text{N}1$ reaction is given as :



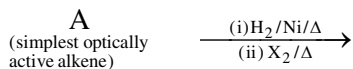
A student writes general characteristics based on the given mechanism as :

- (a) The reaction is favoured by weak nucleophiles
 (b) R^+ would be easily formed if the substituents are bulky
 (c) The reaction is accompanied by racemization
 (d) The reaction is favoured by non-polar solvents.

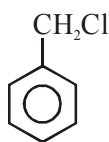
Which observations are correct ?

- (1) b and d (2) a and c
 (3) a, b and c (4) a and b

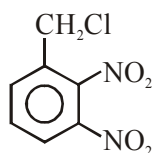
8. The total number of monohalogenated organic products in the following (including stereoisomers) reaction is _____.



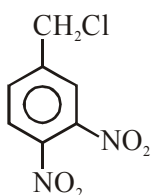
9. The decreasing order of reactivity of the following compounds towards nucleophilic substitution (S_N2) is :



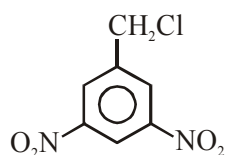
(I)



(II)



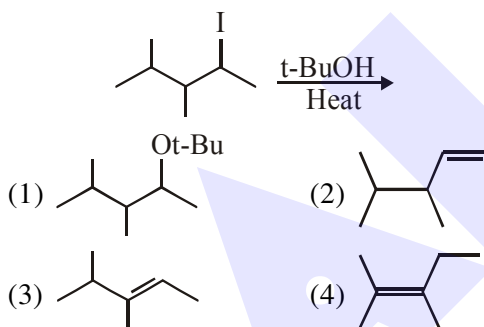
(III)



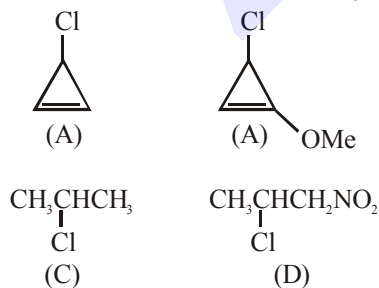
(IV)

- (1) (IV) > (II) > (III) > (I)
 (2) (II) > (III) > (IV) > (I)
 (3) (II) > (III) > (I) > (IV)
 (4) (III) > (II) > (IV) > (I)

10. The major product in the following reaction is :

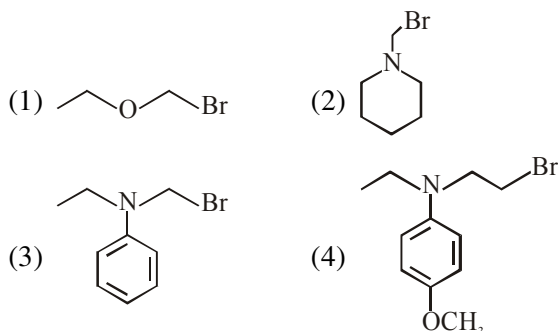


11. The decreasing order of reactivity of the following organic molecules towards $AgNO_3$ solution is :



- (1) (A) > (B) > (D) > (C)
 (2) (A) > (B) > (C) > (D)
 (3) (C) > (D) > (A) > (B)
 (4) (B) > (A) > (C) > (D)

12. Which of the following compounds will form the precipitate with aq. $AgNO_3$ solution most readily?

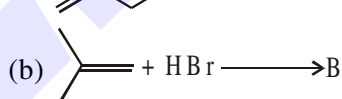
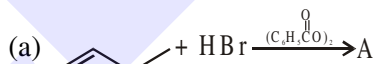


13. The major product formed in the following reaction is :



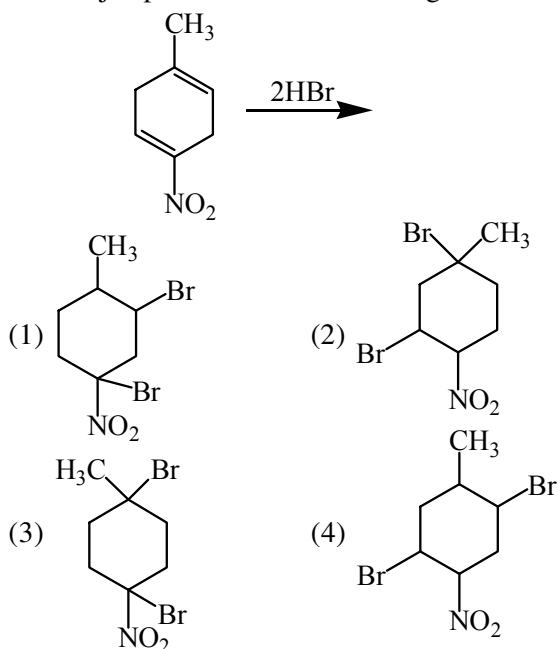
- (1) $CH_3CH_2CH_2C(Br)(CH_3)_2$
 (2) $Br(CH_2)_3CH(CH_3)_2$
 (3) $CH_3CH_2CH(Br)CH(CH_3)_2$
 (4) $CH_3CH(Br)CH_2CH(CH_3)_2$

14. The increasing order of the boiling points of the major products A, B and C of the following reactions will be :



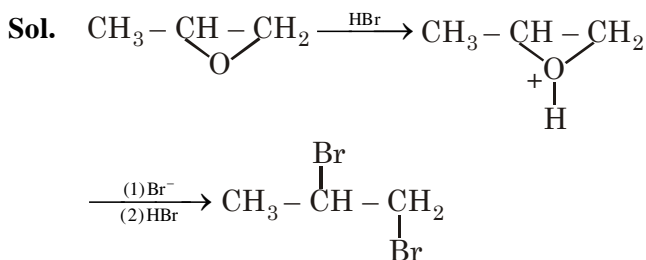
- (1) $C < A < B$ (2) $B < C < A$
 (3) $A < B < C$ (4) $A < C < B$

15. The major product of the following reaction is



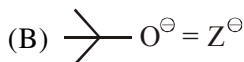
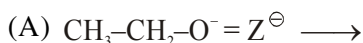
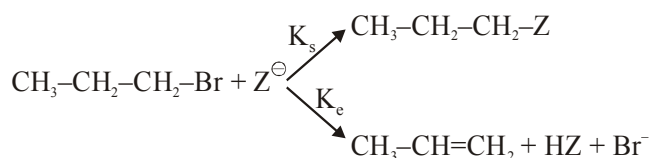
SOLUTION

1. NTA Ans. (4)



2. NTA Ans. (3)

Sol.



(B) with more steric crowding forms elimination product compared to substitution.

$\mu_e(\text{B}) > \mu_e(\text{A})$

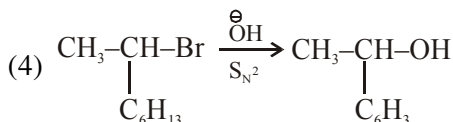
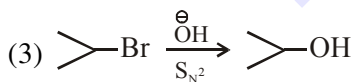
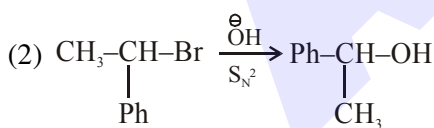
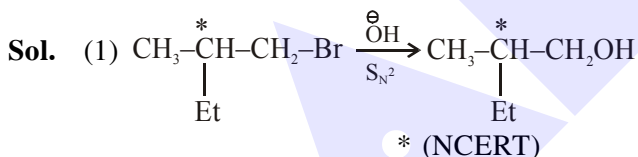
$\mu_B = \frac{K_s(\text{B})}{K_e(\text{A})} < \mu_A = \frac{K_s(\text{A})}{K_e(\text{A})}$

3. NTA Ans. (3)

Sol. Reactivity $\text{D} > \text{B} > \text{C} > \text{A}$

Carbocation formed from D is most stable
Carbocation formed from A is least stable

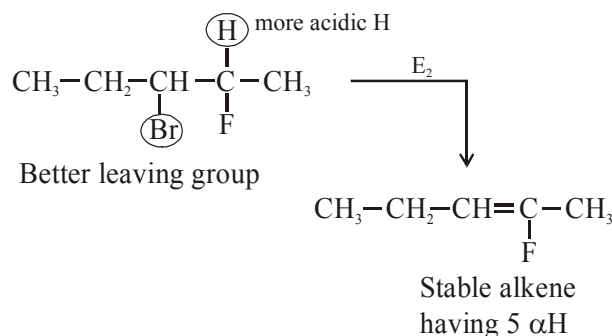
4. Official Ans. by NTA (1)



As language given, we have to go with option (1) as stereochemistry of chiral centre is not distorted.

5. Official Ans. by NTA (4)

Sol.



6. Official Ans. by NTA (1)

Sol. Reaction 1 : $\text{S}_\text{N}1$

Reaction 2 : E_2

$\text{S}_\text{N}1$ is independent of concentration of nucleophile/base

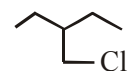
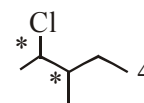
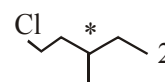
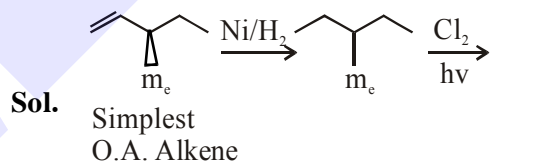
7. Official Ans. by NTA (2)

Sol. $\text{S}_\text{N}1$ favours

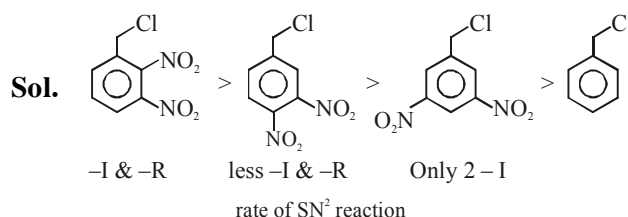
- (a) The reaction is favoured by weak nucleophiles
- (b) R^+ would be easily formed if the substituents are bulky

(c) The reaction is accompanied by racemization

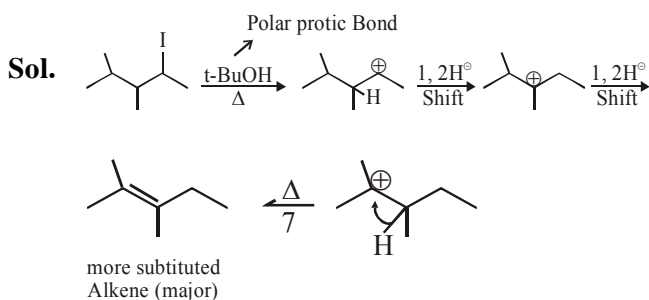
8. Official Ans. by NTA (8)



9. Official Ans. by NTA (2)

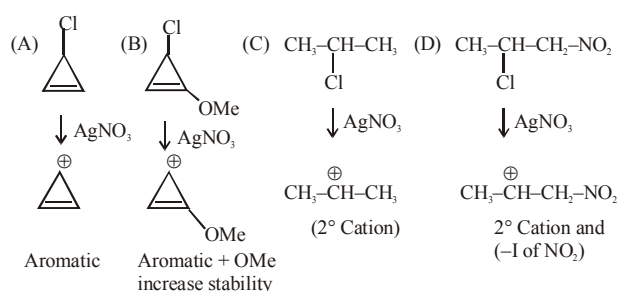


10. Official Ans. by NTA (4)

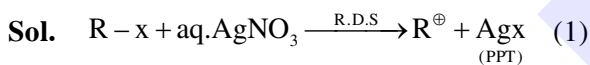


11. Official Ans. by NTA (4)

Sol.

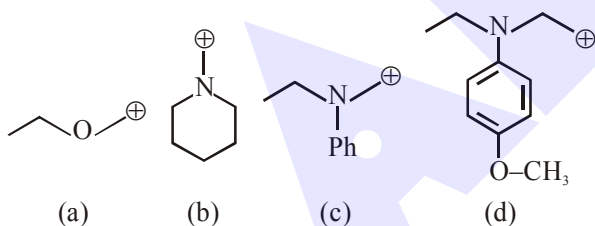
 \therefore Stability Cation $\text{B} > \text{A} > \text{C} > \text{D}$

12. Official Ans. by NTA (2)

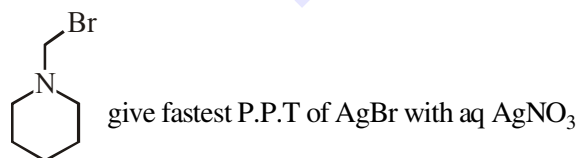


So rate of P.P.T formation of Agx depend's on stability of carbocation (R^+)

In given question formed carbocation will be

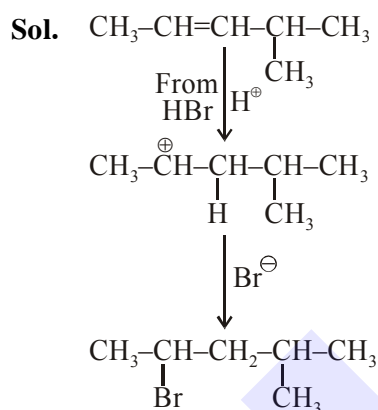


Most stable carbocation is (b) so



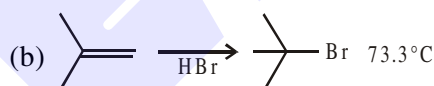
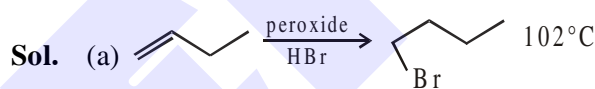
13. Official Ans. by NTA (1)

Official Ans. by ALLEN (4)



Addition of HBr according to M.R.

14. Official Ans. by NTA (2)



$$\text{B.P.} \propto \frac{1}{\text{Branching}} \quad \therefore a > c > b \text{ (order of B.P.)}$$

15. Official Ans. by NTA (2)