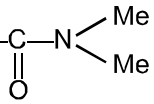
# TOPIC : Haloalkane & Haloarenes

**CLASS : XII$^{th}$ JEE/NEET- DPP** **Subject : CHEMISTRY**

## DPP - 01 Solvent, Electrophile, Nucleophile and Leaving group ability

**1.** Which of the following is aprotic solvent ?
(1) DMSO (2) $NH_3$ (3) $H_2O$ (4) $CH_3COOH$

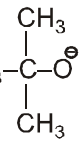
**2.** Which of the following is polar protic solvent ?
(1) $CH_3COCH_3$ (2) $CH_3COOH$ (3) $CH_3SOCH_3$ (4) 

**3.** Electrophiles are
(1) Electron deficent species (2) having vacant p or d-orbital
(3) Electron rich species (4) (1) & (2) both

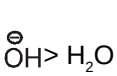
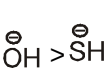
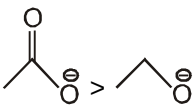
**4.** Which of the following is an electrophilic reagent ?
(1) $H_2O$ (2) $OH^-$ (3) $NO_2^+$ (4) None

**5.** Which of the following is not electrophile ?
(1) $CN^-$ (2) $H^+$ (3) $Br^+$ (4) $AlCl_3$

**6.** Which of the following statement is correct for nucleophile ?
(1) Electron rich species are called nucleophile.
(2) Nucleophiles are Lewis bases.
(3) Nucleophile donates long pair of electron to vacant orbital of carbon atom.
(4) All are correct.

**7.** Which one of the following has maximum nucleophilicity :
(1)  (2)  (3) $CH_3O^-$ (4) 

**8.** Which among the following species is an ambident nucleophile ?
(1) Ethene (2) Benzene (3) Cyanide ion (4) Acetone

**9.** The correct leaving group ability order is :
(1)  (2)  (3)  (4) 

**10.** According to Lewis concept of acids and bases, ethers are :
(1) Acidic (2) Basic (3) Neutral (4) Amphoteric

## DPP - 02 : Unimolecular nucleophilic substitution reaction of Alkyl Halide ($S_N1$)

**1.** Substitution reactions involve :
(1) Cleavage of a $\sigma$–bond and formation of a new $\sigma$–bond
(2) Cleavage of two $\sigma$–bond and formation of a new $\pi$ –bond
(3) Cleavage of a $\pi$–bond and formation of two new $\sigma$ –bond
(4) None of these

**2.** Which of the following reaction is a substitution reaction ?

(1) $CH_2 = CH_2 \xrightarrow{Ni/H_2} CH_3–CH_3$ (2) $\overset{Br}{\overset{|}{CH_2}}–\overset{Br}{\overset{|}{CH_2}} \xrightarrow{Zn} CH_2 = CH_2 + ZnBr_2$

(3) $CH_3 – I + \overset{\ominus}{OH} \longrightarrow CH_3OH + I^{\ominus}$ (4) $CH_3 – CHO \xrightarrow[H^{\oplus}]{KCN} CH_3 – \underset{CN}{\overset{H}{\underset{|}{\overset{|}{C}}}} –OH$

**3.** $S_N1$ reactions occur through the intermediate formation of-
(1) Carbocations (2) Carbanions (3) Free radicals (4) None of these

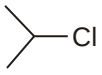
**4.** $S_N1$ reactions are favoured by -
(1) Non-polar solvents.
(2) Bulky groups on the carbon atom attached to the halogen atom.
(3) Small groups on carbon atom attached to the halogen atom.
(4) None of these.

**5.** Which of the following undergoes nucleophilic substitution by $S_N1$ mechanism :
(1) Ethyl chloride (2) Vinyl chloride (3) Benzyl chloride (4) Chloro benzene

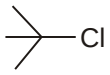
**6.** In an $S_N1$ reaction, the configuration of the product undergoes :
(1) inversion (2) racemization (3) retention (4) difficult to predict

**7.** Which of the following alkyl halide is most readily hydrolysed?
(1) $C_6H_5Cl$ (2) $(C_6H_5)_2CHCl$ (3) $C_6H_5CH_2Cl$ (4) $(C_6H_5)_3CCl$

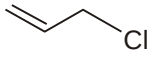
**8.** Correct order of rate of solvolysis of the following alkyl chlorides in 50% aqueous ethanol at 44.6°C is :



I



II

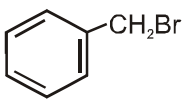


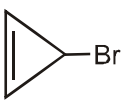
III

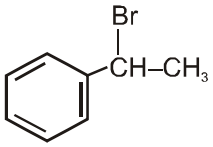
(1) III > II > I (2) III > I > II (3) I > III > II (4) I > II > III

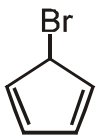
**9.** Following reaction $(CH_3)_3CBr + C_2H_5OH \longrightarrow (CH_3)_3COC_2H_5 + HBr$ is an example of :
(1) Elimination reaction (2) Free radical substitution
(3) Nucleophilic substitution (4) Electrophilic substitution

**10.** Which of the following will not give precipitate with aq. $AgNO_3$?

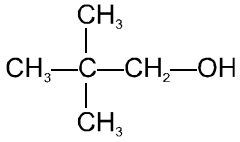
(1) 

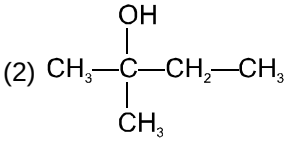

(2) 

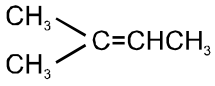

(3) 

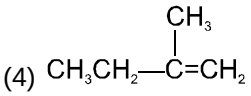

(4) 

**11.** Neopentyl bromide is allowed to react with aqueous acetone. The major product formed in the reaction is:

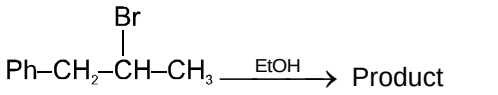
(1) 

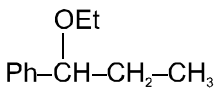
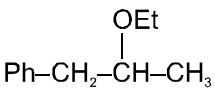
(2) 

(3) 

(4) 

**12.** What will be the major product of the following reaction ?



(1) 
(2) 
(3) Ph–CH=CH–$CH_3$
(4) Ph–$CH_2$–CH=$CH_2$

**13.** The rate of reaction of alkyl halides depends upon.
(1) Nature of alkyl group
(2) Nature of halogen atom
(3) Nature of both alkyl group and halogen atoms
(4) None of the above.

**14.** Aryl halides are less reactive towards nucleophilic substitution reactions as compared to alkyl halides due to
(1) The formation of less stable carbanion
(2) Longer carbon halogen bond
(2) The inductive effect
(4) $sp^2$–hybridized carbon attached to the halogen.

## DPP - 03 : Bimolecular nucleophilic substitution reaction of Alkyl Halide ($S_N2$)

**1.** Which one of the following statement is wrong about $S_N2$ reaction ?
(1) The rate of reaction is independent of the concentration of nucleophile.
(2) Nucleophile attacks the carbon from the side opposite to where the leaving group is attached.
(3) Only in one step the bond formation and bond breaking takes place.
(4) The rate of reaction $\propto$ [substrate] [nucleophile]

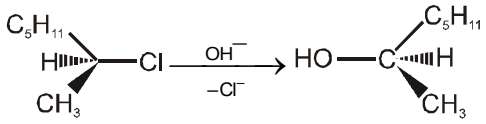
**2.** When the concentration of alkyl halide is tripled and the concentration of $\overset{\ominus}{OH}$ ion is reduced to half, the rate of $S_N2$ reaction increases by:
(1) 3 times (2) 2 times (3) 1.5 times (4) 6 times

**3.** Reaction of alkyl halides with ethanolic KCN predominantly gives :
(1) Alkyl carbylamines (2) Alkyl cyanides (3) Nitroalkanes (4) Alkyl nitrites

**4.** Reaction of methyl bromide with an alcoholic solution of silver cyanide predominantly gives :
(1) Acetonitrile (2) Methyl isocyanide (3) Methyl isocyanate (4) Methyl isothiocyanate

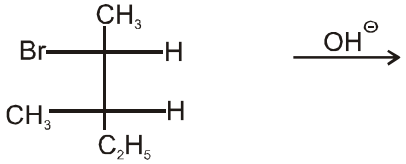
**5.** The least reactive alkyl chloride towards substitution reaction is :
(1) Methyl chloride (2) Allyl chloride (3) Ethyl chloride (4) Vinyl chloride

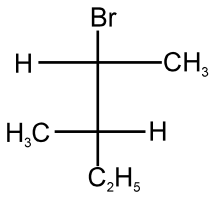
**6.** The reaction given is an example of :

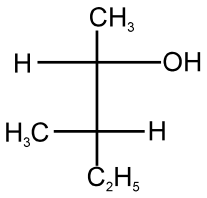


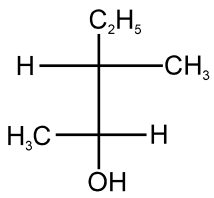
(1) $S_N1$ (2) $S_N2$ (3) E1 (4) E2

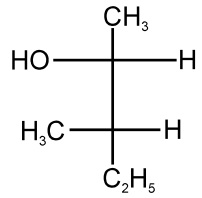
**7.** In the following reaction the most probable product will be :



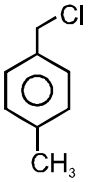

(1) 

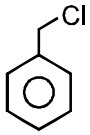

(2) 

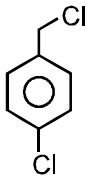

(3) 

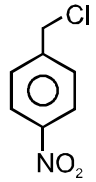

(4) 


**8.** Which of the following is most reactive towards $S_N2$ reaction ?

(1) 


(2) 


(3) 


(4) 

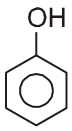

**9.** What is the final product of the given reaction :

$CH_3 - C \equiv CH \xrightarrow{Na} \xrightarrow{CH_3-CH_2-I}$ Product

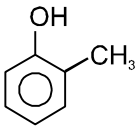
(1) $CH_2=CH-CH_2-CH_3$ (2) $CH_3-CH_2-C\equiv C-CH_2-CH_3$

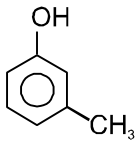
(3) $CH \equiv C - CH_2 - CH_2 - CH_3$ (4) $CH_3 - C \equiv C - CH_2 - CH_3$

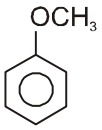
**10.** What is the final product of the given reaction ?

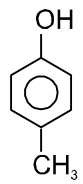



+ $CH_3I \xrightarrow[1\text{ eq.}]{KOH}$ Product

(1) 


(2) 


(3) 


(4) 


**11.** In $S_N2$ substitution reaction :

$R-Br + NaI \xrightarrow{Acetone} R-I + NaBr$

Which one of the following has the highest relative rate ?

(1) $(CH_3)_3C-CH_2Br$ (2) $CH_3CH_2Br$ (3) $CH_3CH_2CH_2Br$ (4) $(CH_3)_2CH-CH_2Br$

**12.** $S_N2$ mechanism proceeds through intervention of

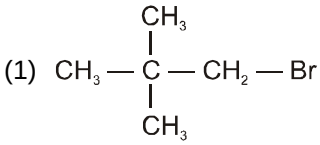
(1) Carbonium ion (2) Transition state (3) Free radical (4) Carbanion

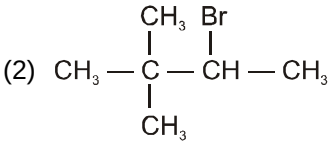
**13.** Isopropyl cyanide can be obtained by the reaction between :

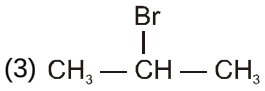
(1) $CH_3CH_2CH_2I$ and AgCN (2) $CH_3CHBrCH_3$ and KCN

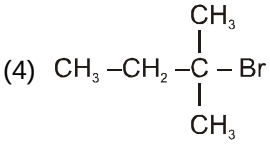
(3) $(CH_3)_2CHI$ and AgCN (4) $(CH_3)_2CHCl$ and HCN

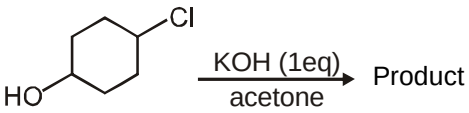
**14.** Which of the following alkyl halide will readily gives $S_N2$ reaction ?

(1) 

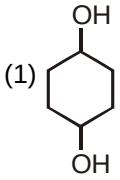
(2) 

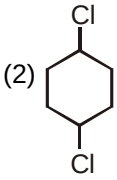
(3) 

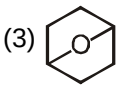
(4) 

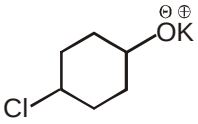
**15.** 

The product is :

(1) 

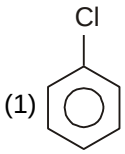
(2) 

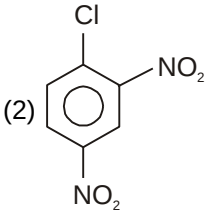
(3) 

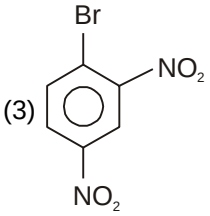
(4) 

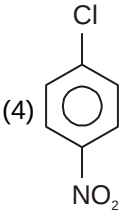
## DPP - 04 : Aryl Halide ($S_N2Ar$)

**1.** In which case $S_N2$ Ar reaction is fastest ?

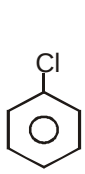
(1) 

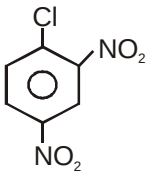
(2) 

(3) 

(4) 

**2.** The correct order of increasing reactivity of C–Cl bond towards nucleophile substitution reaction in the following compounds is


(I)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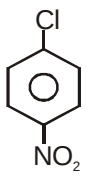
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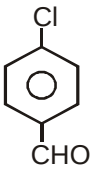
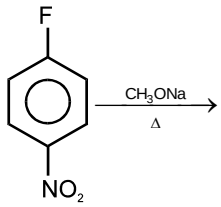
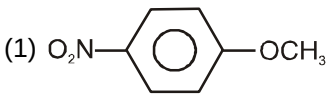
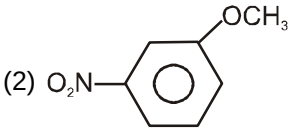
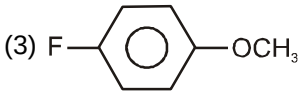

(IV)

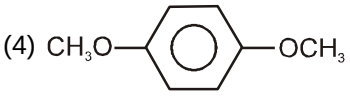
(1) III < II < I < IV (2) I < IV < III < II (3) II < III < I < IV (4) IV < III < I < II

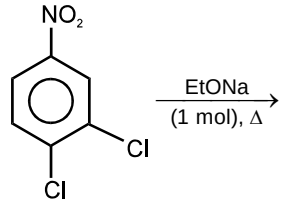
**3.** 

(1) 

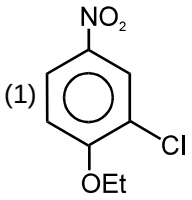
(2) 

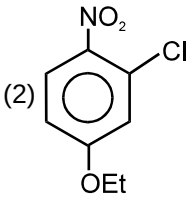
(3) 

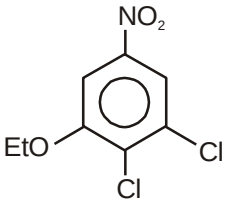
(4) 

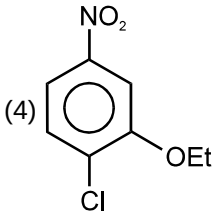
**4.** 

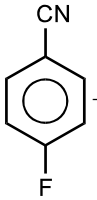
$\xrightarrow[(1\text{ mol}),\ \Delta]{\text{EtONa}}$ The product is :

(1) 

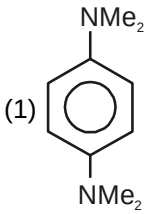

(2) 

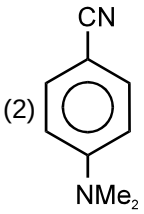

(3) 

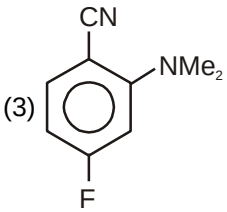

(4) 

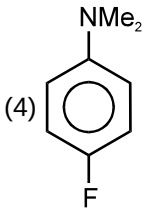

**5.** 

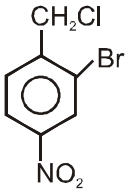
$\xrightarrow[Cu_2O,\ \Delta]{(CH_3)_2\ NH}$ The product is

(1) 

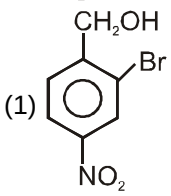

(2) 

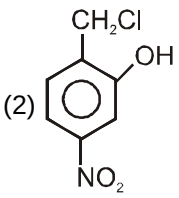

(3) 

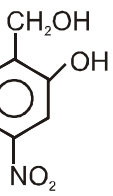

(4) 

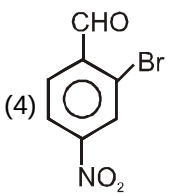

**6.** 

$\xrightarrow{\text{NaOH (1eq.)}}$ Product is :

(1) 


(2) 


(3) 


(4) 


**7.** Aryl halides are less reactive towards nucleophilic substitution reaction as compared to alkyl halide due to :

(1) The formation of less stable carbonium ion
(2) C–X bond has partial double character in aryl halides
(3) Longer carbon-halogen bond
(4) The inductive effect

## DPP - 05 : Unimolecular Elimination Reaction of Alkyl Halide (E1)

**1.** Elimination reaction generally occurs with the formation of :

(1) One sigma bond (2) one pi bond

(3) one sigma and one pi bond (4) None of the above

**2.** Which of the following reaction is an elimination reaction ?

(1) $CH_3–CH_2–CH_2–OH \xrightarrow{PCl_5} CH_3–CH_2–CH_2–Cl$

(2) $CH_3–CH=CH_2 \xrightarrow{HCl} CH_3–\underset{\displaystyle Cl}{\underset{|}{CH}}–CH_3$

(3) $CH_3–\underset{\displaystyle Cl}{\underset{|}{CH}}–CH_3 \xrightarrow{\text{Alc. KOH}} CH_3–CH=CH_2$

(4) $CH_3–\underset{\displaystyle O}{\underset{||}{C}}–OH \xrightarrow{CH_3OH} CH_3–\underset{\displaystyle O}{\underset{||}{C}}–OCH_3$

**3.** Which one of the following compound is most reactive for E1 reaction ?

(1) $CH_3–CH_2–\underset{\displaystyle CH_3}{\underset{|}{\overset{\displaystyle Br}{\overset{|}{C}}}}–CH_3$ (2) $CH_3–CH_2–\underset{\displaystyle CH_3}{\underset{|}{\overset{\displaystyle Br}{\overset{|}{C}}}}–C_6H_5$

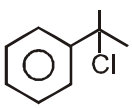
(3) $CH_3–CH_2–\underset{\displaystyle CH_3}{\underset{|}{\overset{\displaystyle Br}{\overset{|}{C}}}}–C_2H_5$ (4) $CH_3–CH_2–\overset{\displaystyle Br}{\overset{|}{CH}}–CH_3$

**4.** $CH_3–CH_2–\underset{\displaystyle Br}{\underset{|}{\overset{\displaystyle CH_3}{\overset{|}{C}}}}–CH_2–CH_3 \xrightarrow[\Delta]{CH_3OH}$ P (Major elimination product)

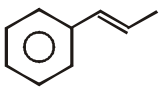
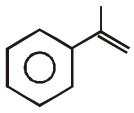
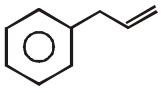
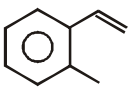
The major elimination (E-1) product P is :

(1) $CH_3–CH=C\begin{matrix}CH_2–CH_3\\CH_2–CH_3\end{matrix}$ (2) $CH_2=CH\begin{matrix}CH_2–CH_3\\CH_2–CH_3\end{matrix}$

(3) $CH_2=CH_2$ (4) $CH_3—CH=\underset{\displaystyle CH_3}{\overset{|}{C}}—CH_2—CH_3$

**5.**  $\xrightarrow{EtOH/\Delta}$ P (Major elimination product)

P is

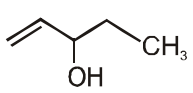
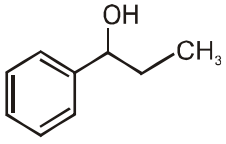
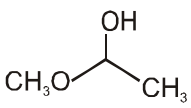
(1)  (2)  (3)  (4) 

**6.** Select the correct reactivity order of dehydrohelogenation reaction for the following halides with alcoholic KOH.

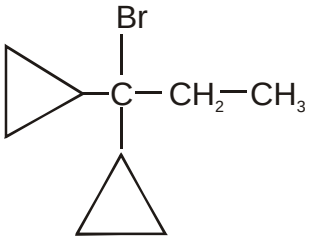
(i) $CH_3CH_2CH_2CH_2–Br$ (ii) $CH_3–CH(Br)–CH(CH_3)_2$ (iii) $CH_3–CH(Br)–CH_2Ph$

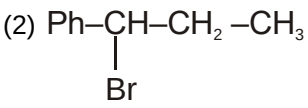
(1) i > ii > iii (2) i > iii > ii (3) iii > ii > i (4) ii > iii > i

**7.** Substrate that readily do not show E1 reaction

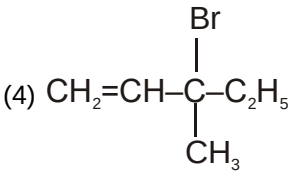
(1) $CH_3–\underset{\displaystyle H}{\underset{|}{\overset{\displaystyle H}{\overset{|}{C}}}}–OH$ (2)  (3)  (4) 

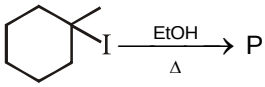
**8.** Which one the following will be the most reactive for E1 reaction

(1) 

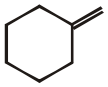
(2) 

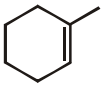
(3) Br–CH=CH–$CH_2$–$CH_3$

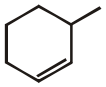
(4) 

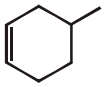
**9.** 

P is -

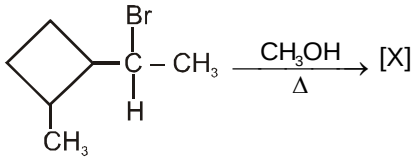
(1) 

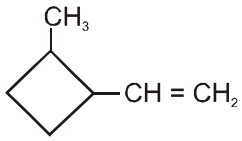
(2) 

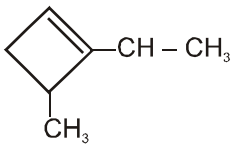
(3) 

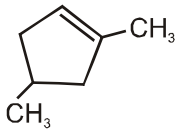
(4) 

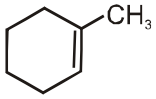
**10.** [X] as the major product among the elimination products is :



(1) 

(2) 

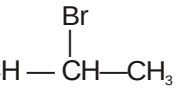
(3) 

(4) 

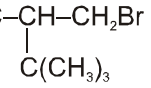
## DPP - 06 : Bimolecular Elimination Reaction of Alkyl Halide (E2)

**1.** Most reactive alkyl halide towards E2 mechanism is :

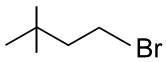
(1) $(CH_3)_3$ C–$CH_2$Br

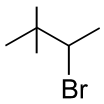
(2) 

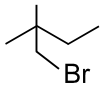
(3) $(CH_3)_3$C–$CH_2CH_2$Br

(4) 

**2.** Which of the following cannot undergo E2 reaction ?

(1) 

(2) 

(3) 

(4) none of these

**3.** 1–Chlorobutane on reaction with alcoholic potash gives :

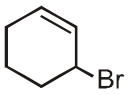
(1) 1–Butanol (2) 2–Butene (3) 1–Butene (4) 2–Butanol

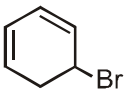
**4.** A mixture of 1-chlorobutane and 2-chlorobutane when treated with alcoholic KOH gives -

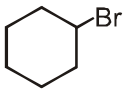
(1) 1-Butene (2) 2-Butene

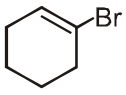
(3) Isobutylene (4) Mixture of 1-butene + 2-butene

**5.** Which of the following give fastest reaction with alcoholic KOH?

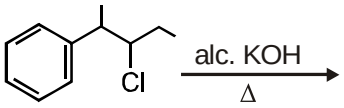
(1) 

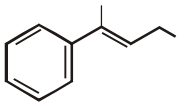
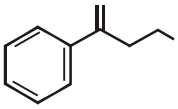
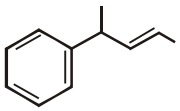
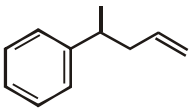
(2) 

(3) 

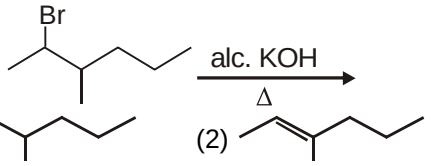
(4) 

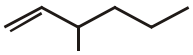
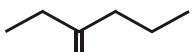
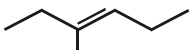
**6.** Major product of the reaction given below is :



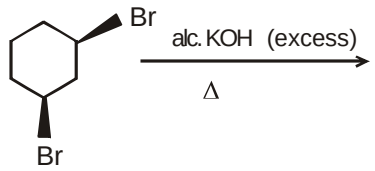

(1)  (2)  (3)  (4) 

**7.** Major product of the given reaction is :

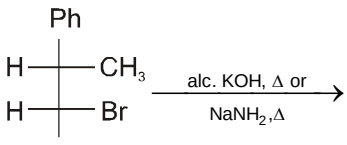



(1)  (2)  (3)  (4) 

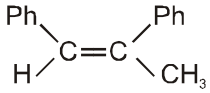
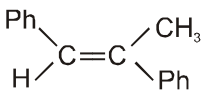
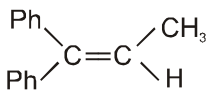
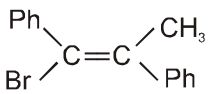
**8.** The most probable product is the following reaction :

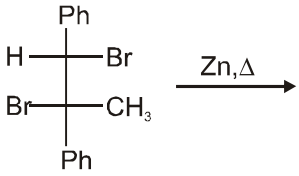



(1)  (2)  (3)  (4) 

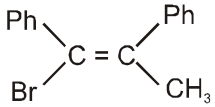
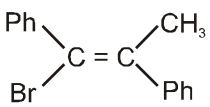
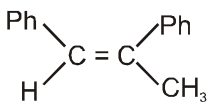
**9.** 

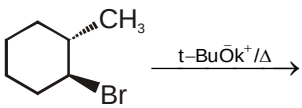
major product is :

(1)  (2)  (3)  (4) 

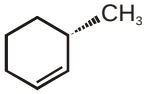
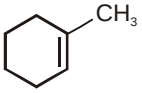
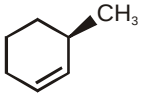
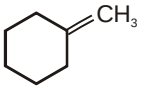
**10.** 

Product is :

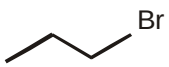
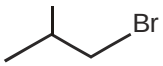
(1)  (2)  (3)  (4) Ph–C≡C–$CH_2$–Ph

**11.** 

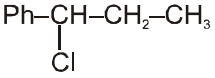
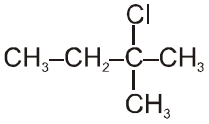
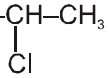
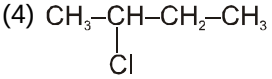
porduct X

(1)  (2)  (3)  (4) 

**12.** Most reactive alkyl halide torwards E2 reaction is –

(1)  (2)  (3)  (4) 

**13.** Which one of the following compound is least reactive towards $EtO^-/EtOH$ ?

(1)  (2)  (3)  (4) 

**14.** Correct statement for E2 Reaction is :

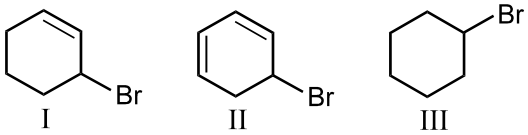
(1) It is a two step process.

(2) It is an unimolecular reaction

(3) Strong base favours

(4) Carbanion is formed during the reaction

**15.** Arrange the following in decreasing order of stability of their transition state during elimination by strong base



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

**16.** For the reaction $CH_3CH(X)CH_2CH_3 \xrightarrow[\Delta]{\text{alc. KOH}} CH_3–CH=CH–CH_3 + CH_2=CH–CH_2–CH_3$

(1) $CH_3–CH=CH–CH_3$ predominates. (2) $CH_2=CH–CH_2–CH_3$ predominates.

(3) Both are formed in equal amounts. (4) The product ratio depends upon the type of X.

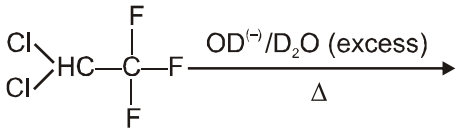
## DPP - 07 : Unimolecular Elimination Reaction with respect of conjugate Base (E1cB)

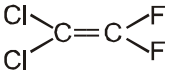
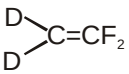
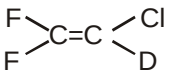
**1.** D-exchange is observed in :

(1) E1 (2) E2 (3) E1cB (4) none of these

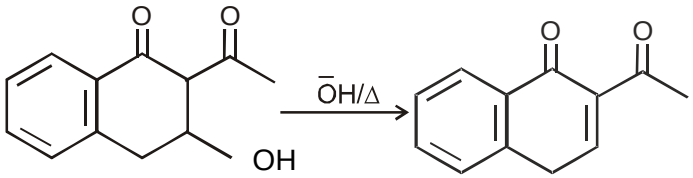
**2.** Reaction intermediate of E1cB reaction is :

(1) Carbocation (2) Carbanion (3) Benzyne (4) Free radical

**3.**  possible product is/ are :

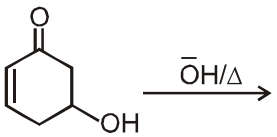
(I)  (II) $Cl_2CD–CF_3$ (III)  (IV) 

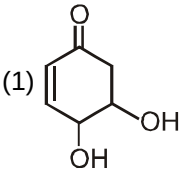
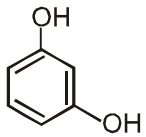
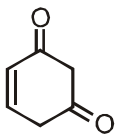
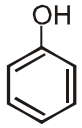
(1) I & II (2) I & III (3) I only (4) I & IV

**4.** 

The above reaction is example of :

(1) E 2 (2) E 1 (3) $S_N2$ (4) E1cB

**5.**  Product is :

(1)  (2)  (3)  (4) 

# Answers

## DPP – 01

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1.** | (1) | **2.** | (2) | **3.** | (4) | **4.** | (3) | **5.** | (1) | **6.** | (4) | **7.** | (1) |
| **8.** | (3) | **9.** | (3) | **10.** | (2) | | | | | | | | |

## DPP – 02

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1.** | (1) | **2.** | (3) | **3.** | (1) | **4.** | (2) | **5.** | (3) | **6.** | (2) | **7.** | (4) |
| **8.** | (1) | **9.** | (3) | **10.** | (4) | **11.** | (2) | **12.** | (1) | **13.** | (3) | **14.** | (4) |

## DPP – 03

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1.** | (1) | **2.** | (3) | **3.** | (2) | **4.** | (2) | **5.** | (4) | **6.** | (2) | **7.** | (2) |
| **8.** | (4) | **9.** | (4) | **10.** | (3) | **11.** | (2) | **12.** | (2) | **13.** | (2) | **14.** | (3) |
| **15.** | (3) | | | | | | | | | | | | |

## DPP – 04

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1.** | (3) | **2.** | (2) | **3.** | (1) | **4.** | (1) | **5.** | (2) | **6.** | (1) | **7.** | (2) |

## DPP – 05

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1.** | (2) | **2.** | (3) | **3.** | (2) | **4.** | (4) | **5.** | (2) | **6.** | (3) | **7.** | (1) |
| **8.** | (1) | **9.** | (2) | **10.** | (3) | | | | | | | | |

## DPP – 06

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1.** | (2) | **2.** | (3) | **3.** | (3) | **4.** | (4) | **5.** | (2) | **6.** | (1) | **7.** | (2) |
| **8.** | (1) | **9.** | (1) | **10.** | (3) | **11.** | (1) | **12.** | (3) | **13.** | (3) | **14.** | (3) |
| **15.** | (1) | **16.** | (1) | | | | | | | | | | |

## DPP – 07

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|---|---|---|---|---|---|---|---|---|---|
| **1.** | (3) | **2.** | (2) | **3.** | (1) | **4.** | (4) | **5.** | (4) |