

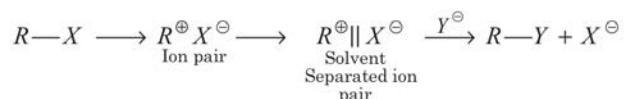
ULTIMATE KCET CRASH COURSE 2026

CHEMISTRY

DPP: 1

Haloalkanes and Haloarenes

Q1 The mechanism of S_N1 reaction is given as :



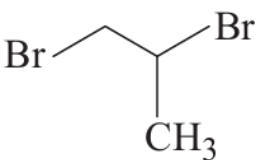
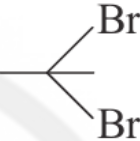
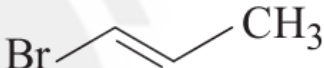
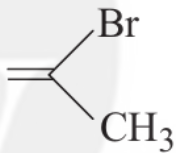
A student writes general characteristics based on the given mechanism as :

- (A) The reaction is favoured by weak nucleophiles.
 (B) R^{\oplus} would be easily formed if the substituents are bulky.
 (C) The reaction is accompanied by recombination.
 (D) The reaction is favoured by non-polar solvents.

Which observations are correct?

- (A) (A) and (B)
 (B) (A) and (C)
 (C) (A), (B) and (C)
 (D) (B) and (D)

Q2 1-methyl ethylene oxide when treated with an excess of HBr produces :

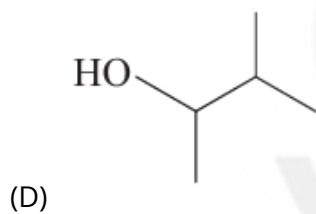
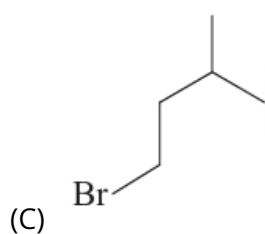
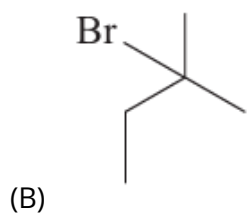
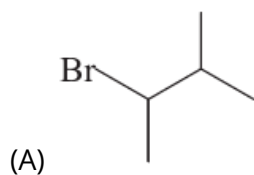
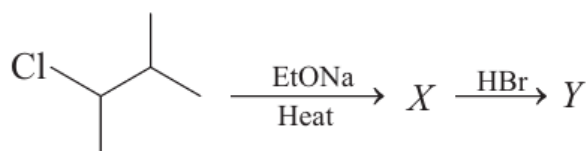
- (A) 
- (B) 
- (C) 
- (D) 

Q3 Which one of the following is likely to give a precipitate with $AgNO_3$ solution?

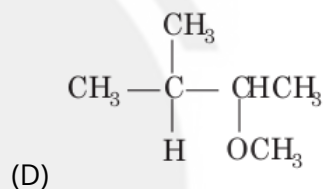
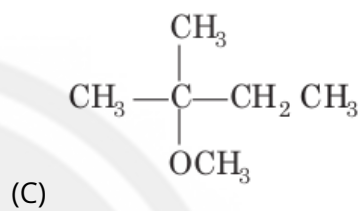
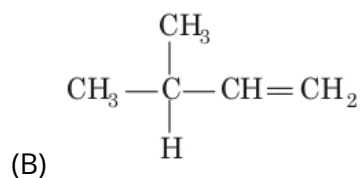
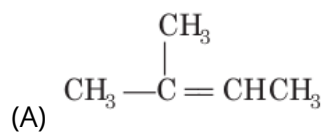
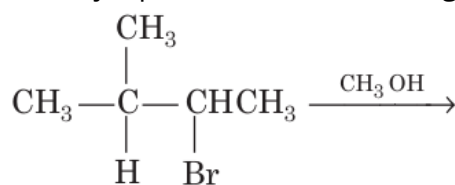
- (A) $CH=CH-Cl$
 (B) CCl_4
 (C) $CHCl_3$
 (D) $(CH_3)_3 CCl$



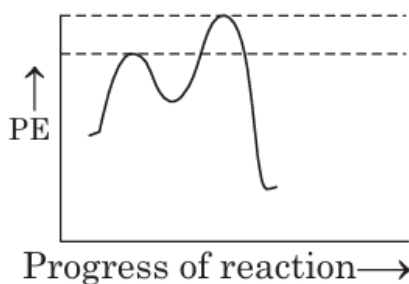
Q4 The major product Y in the following reaction is (2019 Main, 10 April II)



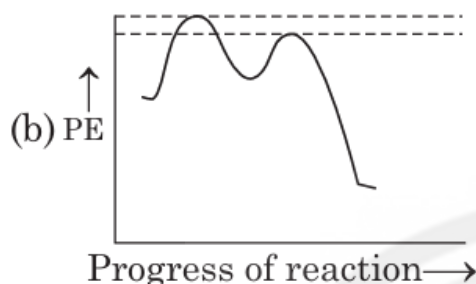
Q5 The major product of the following reaction is:



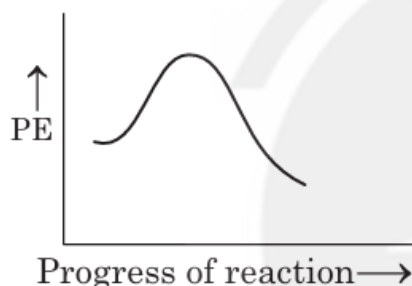
Q6 Which of the following potential energy (PE) diagrams represents the S_N1 reaction?



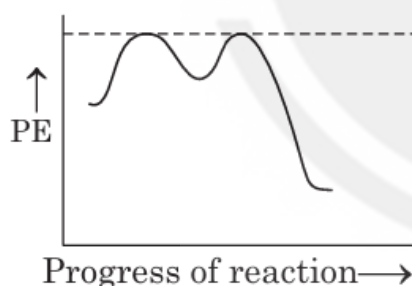
(A)



(B)



(C)



(D)

Q7 The increasing order of reactivity of the following halides for the S_N1 reaction is



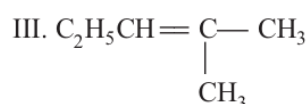
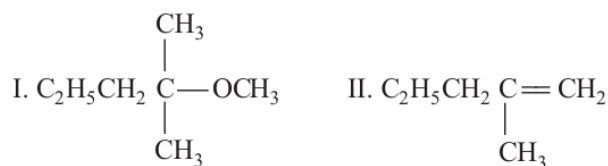
(A) (III) < (II) < (I)

(B) (II) < (I) < (III)

(C) (I) < (III) < (II)

(D) (II) < (III) < (I)

Q8 2-chloro-2-methylpentane on reaction with sodium methoxide in methanol yields (2016 Main)



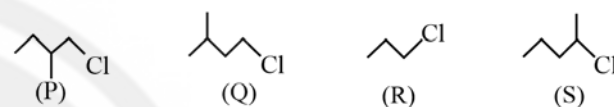
(A) Both I and III

(B) Only III

(C) Both I and II

(D) All of these

Q9 Arrange the following in decreasing order of S_N2 reaction:



(A) $P > Q > R > S$

(B) $R > P > Q > S$

(C) $Q > R > P > S$

(D) $R > Q > P > S$

Q10 Alkyl halides on treatment with a suspension of Ag_2O moist in ether gives:

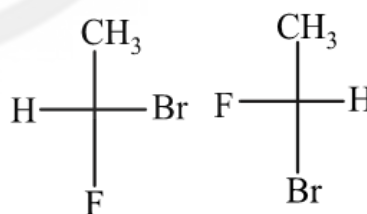
(A) Alkanol

(B) Alkanal

(C) Alkanes

(D) Alkoxy alkane

Q11 Consider the following representation they are:



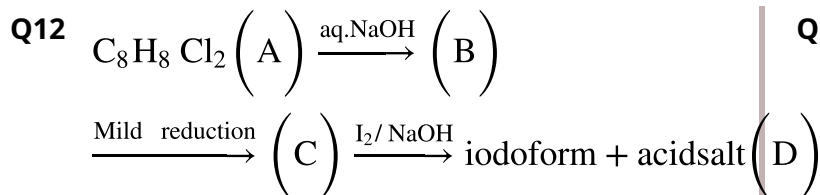
(A) enantiomers

(B) diastereomers

(C) conformational isomers

(D) identical

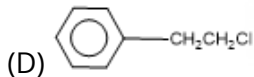
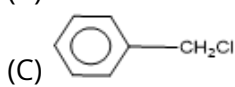
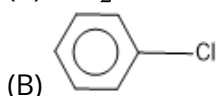
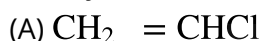




In the given sequence of reaction, what would be the structure of (A) ?

- (A) $PhCOCH_3$ (B) $PhCH(OH)CH_3$
 (C) $PhCOONa$ (D) $PhC(Cl)_2CH_3$

Q13 Which one of the following chlorohydrocarbons readily undergoes solvolysis?



Q14 The reaction of toluene with Cl_2 in presence of $FeCl_3$ gives predominantly

- (A) Benzoyl chloride
 (B) Benzyl chloride
 (C) o-and p-chlorotoluene
 (D) m-chlorotoluene

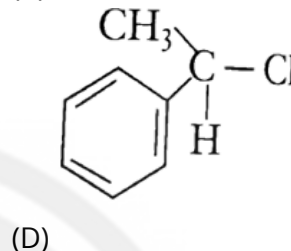
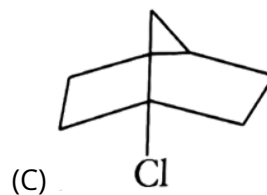
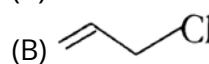
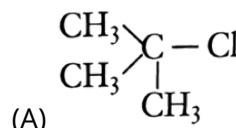
Q15 The compound C_7H_8 undergoes the following reactions $C_7H_8 \xrightarrow{3 Cl_2 / \Delta} A \xrightarrow{Br_2 / Fe} B \xrightarrow{Zn / HCl} C$.
 The product C' is

- (A) p-bromotoluene
 (B) 3-bromo-2, 4, 6-trichlorotoluene
 (C) o-bromotoluene
 (D) m-bromotoluene

Q16 Toluene reacts with a halogen in the presence of iron (III) chloride giving ortho and para halo compounds. The reaction is:

- (A) Electrophilic elimination reaction.
 (B) Electrophilic substitution reaction.
 (C) Free radical addition reaction.
 (D) Nucleophilic substitution reaction.

Q17 Which one of the following compounds is inactive towards S_N1 reaction ?



Q18 Match the List-I with List-II.

List-I (Compounds)		List-II (Common name)	
A	CH_2Cl_2	I	Chloroform
B	$CHCl_3$	II	Methylene chloride
C	$CH_3CH_2CH(Cl)CH_3$	III I	o-Chlorotoluene
D		I V	Sec-Butyl chloride

Choose the **correct** answer from the options given below;

- (A) A-II, B-I, C-IV, D-III
 (B) A-IV, B-II, C-I, D-III
 (C) A-II, B-I, C-III, D-IV
 (D) A-IV, B-II, C-III, D-I

Q19 Butane nitrile may be prepared by heating

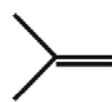
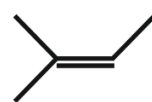
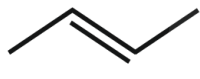
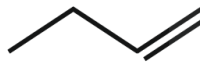
- (A) propyl alcohol with KCN
 (B) butyl alcohol with KCN
 (C) butyl chloride with KCN
 (D) propyl chloride with KCN



- Q20** The best method for the conversion of an alcohol into an alkyl chloride is by treating the alcohol with
- (A) PCl_5
 (B) SOCl_2 in presence of pyridine
 (C) Dry HCl in the presence of anhydrous ZnCl_2
 (D) PCl_3

- Q21** Aryl halides can not be prepared by the reaction of aryl alcohols with PCl_3 , PCl_5 or SOCl_2 because
- (A) phenols are highly stable compounds.
 (B) carbon-oxygen bond in phenols has a partial double bond character.
 (C) carbon-oxygen bond is highly polar
 (D) all of these

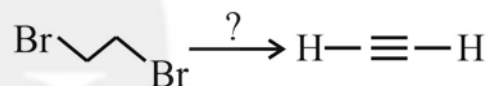
- Q22**
- $$\text{CH}_3 - \underset{\text{H}}{\overset{\text{CH}_3}{\text{C}}} - \text{CH}_2\text{Br} \xrightarrow[\Delta]{\text{Alc.KOH}} \text{Alkene. Alkene is;}$$

- (A) 
- (B) 
- (C) 
- (D) 

- Q23** Which statement is correct?
- (A) $\text{C}_2\text{H}_5\text{Br}$ reacts with alcoholic KOH to form $\text{C}_2\text{H}_5\text{OH}$
 (B) $\text{C}_2\text{H}_5\text{Br}$ when treated with metallic sodium gives ethane
 (C) $\text{C}_2\text{H}_5\text{Br}$ when treated with sodium ethoxide forms diethyl ether
 (D) $\text{C}_2\text{H}_5\text{Br}$ with AgCN forms ethyl cyanide

- Q24** An organic compound 'A' forms 'B' with sodium metal and again 'A' forms 'C' with PCl_5 but 'B' and 'C' form diethylether. Therefore 'A', 'B' and 'C' are respectively
- (A) $\text{C}_2\text{H}_5\text{OH}$, $\text{C}_2\text{H}_5\text{ONa}$, $\text{C}_2\text{H}_5\text{Cl}$
 (B) $\text{C}_2\text{H}_5\text{Cl}$, $\text{C}_2\text{H}_5\text{ONa}$, $\text{C}_2\text{H}_5\text{OH}$
 (C) $\text{C}_2\text{H}_5\text{OH}$, C_2H_6 , $\text{C}_2\text{H}_5\text{Cl}$
 (D) $\text{C}_2\text{H}_5\text{OH}$, $\text{C}_2\text{H}_5\text{Cl}$, $\text{C}_2\text{H}_5\text{ONa}$

- Q25** The reagents for the following conversions is/are:



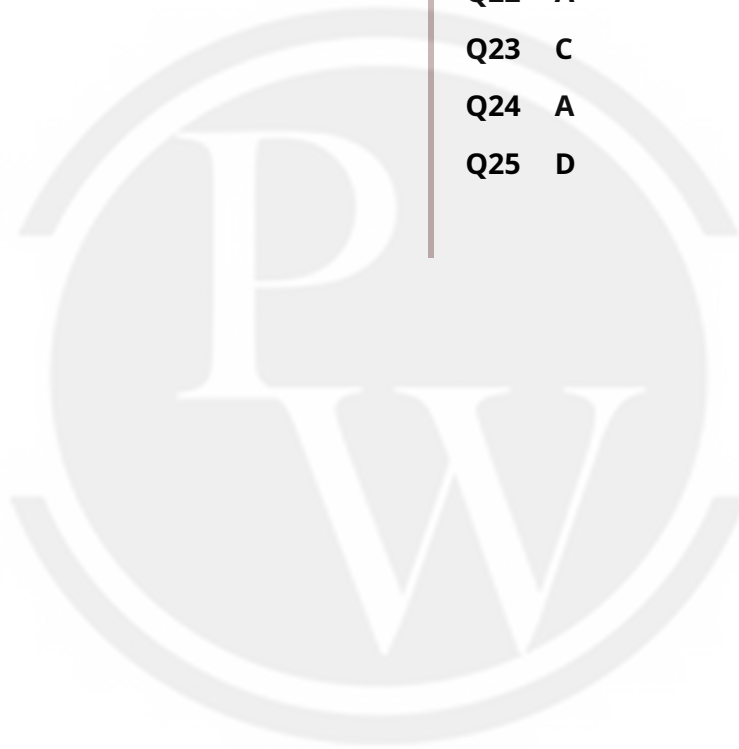
- (A) Alcoholic KOH
 (B) $\text{Zn} | \text{CH}_3\text{OH}$
 (C) aq. KOH followed by NaNH_2
 (D) Alcoholic KOH followed by NaNH_2



Answer Key

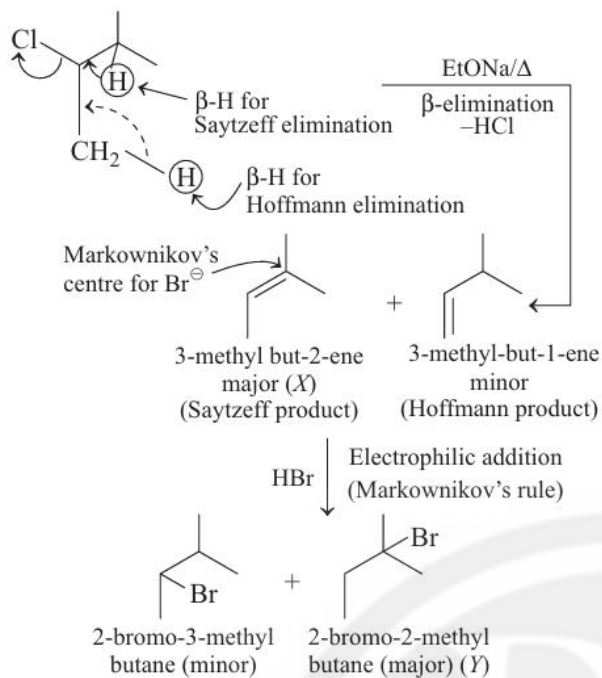
Q1 C
Q2 A
Q3 D
Q4 B
Q5 C
Q6 B
Q7 B
Q8 D
Q9 D
Q10 D
Q11 D
Q12 D
Q13 C

Q14 C
Q15 D
Q16 B
Q17 C
Q18 A
Q19 D
Q20 B
Q21 B
Q22 A
Q23 C
Q24 A
Q25 D

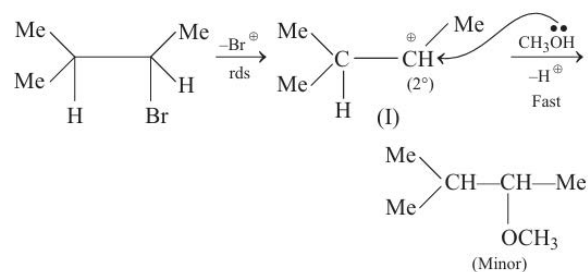


Q4 Text Solution:

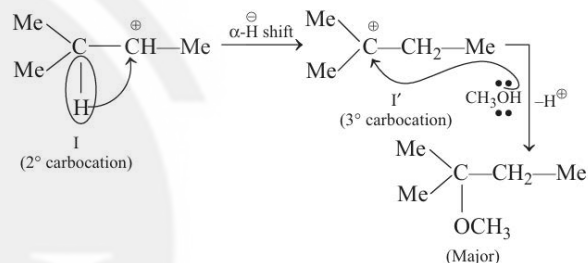
The given reaction takes place as follows :

**Video Solution:****Q5 Text Solution:**

In the given question, the substrate is a 2° -halide (bromide) and the medium, CH_3OH (as well as a poor nucleophile) is protic in nature, So, the reaction will follow mainly $\text{S}_{\text{N}}1$ pathways *via* the formation of a carbocation intermediate (I).

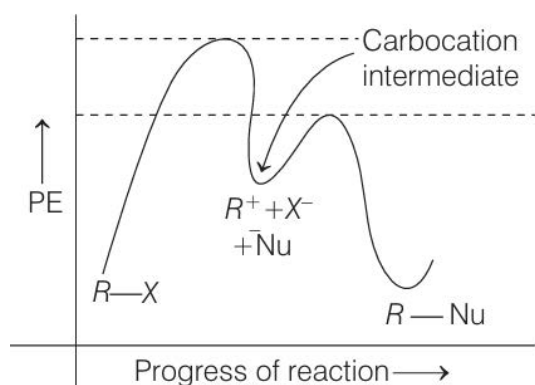


The intermediate, I can be rearranged in to the more stable form I' (3°) by α -hydride shift. I' will give the major product.

**Video Solution:**

Q6 Text Solution:

The potential energy (PE) diagram for S_N1 reaction is



S_N1 reaction has two steps. In the first step, the carbon halogen bond breaks heterolytically, with the halogen retaining the previously shared pair of electron. In the second step, the nucleophile reacts rapidly with the carbocation formed in the first step.

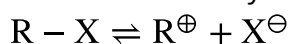
In the above graph, the alkyl halide is the only species that participates in the ratelimiting step. Here, the rate of reaction depends on the concentration of the alkyl halide and does not depend on the concentration of nucleophile.

Video Solution:**Q7 Text Solution:**

(i) The rate of S_N1 reaction depends only upon the concentration of the alkyl halide.

(ii) S_N1 reaction proceeds through the formation of carbocation.

The reactivity is decided by ease of dissociation of alkyl halide.

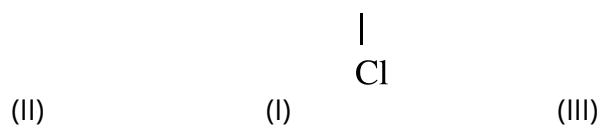
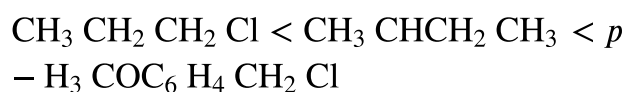


Higher the stability of R^{\oplus} (carbocation), higher would be the reactivity towards S_N1 reaction.

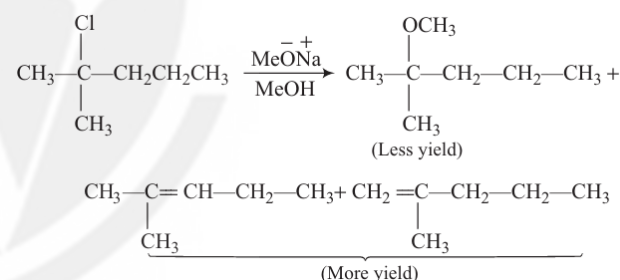
$p - H_3CO - C_6H_4 - CH_2^{\oplus}$ is the most stable carbocation due to resonance and then

$CH_3CHCH_2CH_3$ (2° carbocation) while $CH_3CH_2CH_2$ (1°) is least stable.

Thus, the correct increasing order of the reactivity of the given halides towards the S_N1 reaction is

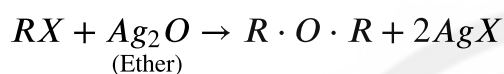
**Video Solution:****Q8 Text Solution:**

Key Idea Strong nucleophile ($\bar{O}Me$) in polar solvent (MeOH) gives elimination products over substitution products but all products are possible in different yields.

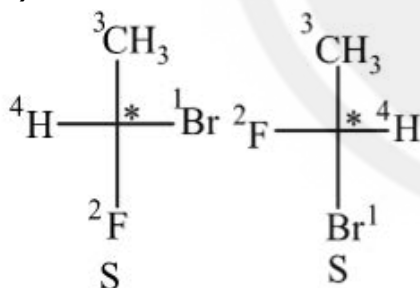
**Video Solution:**

Q9 Text Solution:

S_N2 reactions involve the formation of intermediate transition state, thus less hindered alkyl halide readily undergoes S_N2 reaction.

Video Solution:**Q10 Text Solution:****Video Solution:****Q11 Text Solution:**

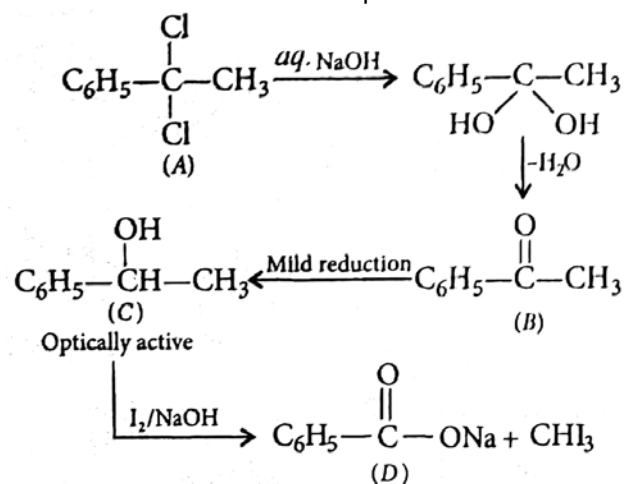
(D)



Both are identical

[New NCERT Class 12th Page No. 176]**Video Solution:****Q12 Text Solution:**

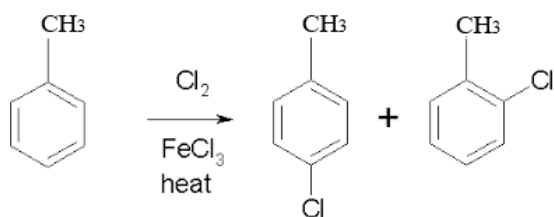
Overall reactions can be represented as :

**Video Solution:****Q13 Text Solution:**

Solvolysis of haloalkanes follows first order kinetics. During this process an intermediate carbocation is formed. Therefore, the benzyl chloride which gives more stable carbocation undergoes solvolysis readily.

Video Solution:

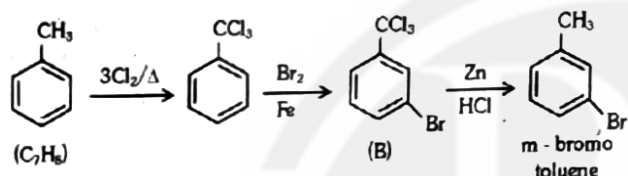
Q14 Text Solution:



Video Solution:



Q15 Text Solution:



Video Solution:



Q16 Text Solution:

It is an example of electrophilic substitution reaction.

Video Solution:



Q17 Text Solution:

Bridge head carbocation formed in S_N1 reaction is unstable due to high torsional strain

Video Solution:



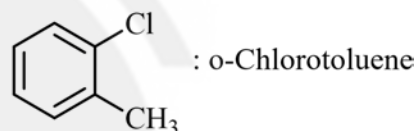
Q18 Text Solution:

(1)

CH_2Cl_2 : Methylene chloride

CHCl_3 : Chloroform

$\text{CH}_3\text{CH}_2\text{CH}(\text{Cl})\text{CH}_3$: sec-butyl chloride

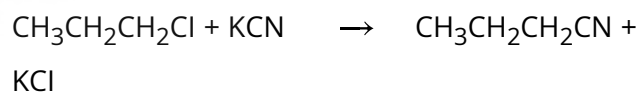


[NEW NCERT 12th Part-II Page No. 189]

Video Solution:



Q19 Text Solution:

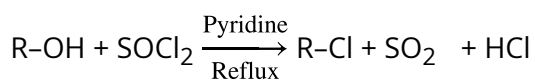


Propyl chloride

Butanenitrile

Video Solution:



Q20 Text Solution:

This is the best method for preparing alkyl chloride from alcohols. The advantage of this method over using phosphorus chlorides is that the by products of the above reaction, i.e., SO_2 and HCl are gases which can easily escape from the reaction mixture.

Video Solution:**Q21 Text Solution:**

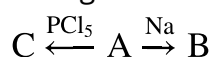
This method is not applicable for the preparation of aryl halides because the C - O bond in phenol has a partial double bond character and is difficult to break being stronger than a single bond.

Video Solution:**Q22 Text Solution:**

Base removes β -H from the secondary carbon adjacent to the $-\text{CH}_2\text{Br}$, giving the alkene $\text{CH}_2=\text{C}(\text{CH}_3)_2$.

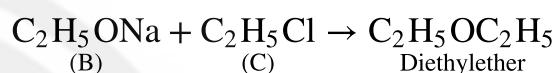
Video Solution:**Q23 Text Solution:****Video Solution:****Q24 Text Solution:**

The given reaction can be summarized as

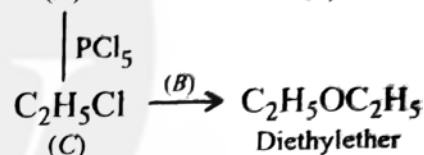
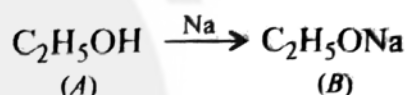


$\text{B} + \text{C}$ Diethylether

Thus 'B' and 'C' could be $\text{C}_2\text{H}_5\text{ONa}$ and $\text{C}_2\text{H}_5\text{Cl}$.

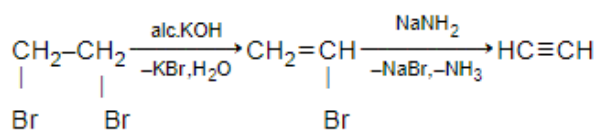


As 'B' is formed by reaction of 'A' with sodium metal thus 'B' is $\text{C}_2\text{H}_5\text{ONa}$ and 'A' is $\text{C}_2\text{H}_5\text{OH}$.

**Video Solution:**

Q25 Text Solution:

Simple alkyl halides are dehydrohalogenated by using a strong base such as alc. KOH. But vinyl halides require much stronger base such as NaNH_2 for dehydrohalogenation

**Video Solution:**[Android App](#)[iOS App](#)[PW Website](#)