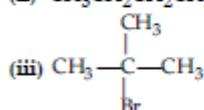
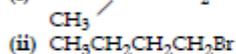
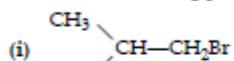


DPP(MCQ) TERM I CLASS XII
CHEMISTRY-HALOALKANES &
HALOARENES

1.

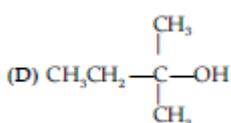
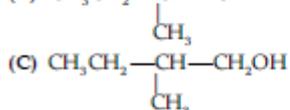
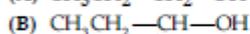
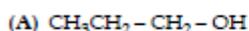
Arrange the following compounds in increasing order of their boiling points:



- (A) (ii) < (i) < (iii) (B) (i) < (ii) < (iii)
(C) (iii) < (i) < (ii) (D) (iii) < (ii) < (i)

2.

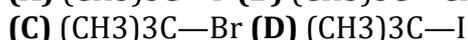
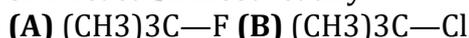
Which of the following alcohols will yield the corresponding alkyl chloride on reaction with concentrated HCl at room temperature?



3.

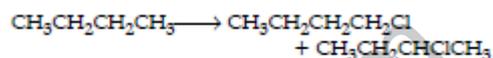
Which of the following alkyl halides will undergo

SN1 reaction most readily?



4.

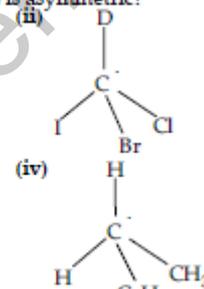
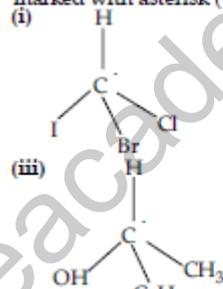
Which reagent will you use for the following reaction?



- (A) $\text{Cl}_2/\text{UV light}$
(B) $\text{NaCl} + \text{H}_2\text{SO}_4$
(C) Cl_2 gas in dark
(D) Cl_2 gas in the presence of iron in dark

5.

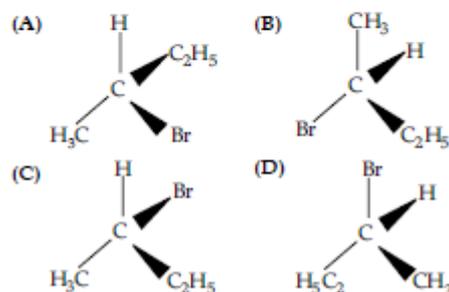
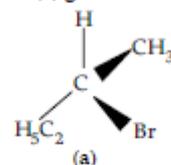
In which of the following molecules carbon atom marked with asterisk (*) is asymmetric?



- (A) (i), (ii), (iii), (iv) (B) (i), (ii), (iii)
(C) (ii), (iii), (iv) (D) (i), (iii), (iv)

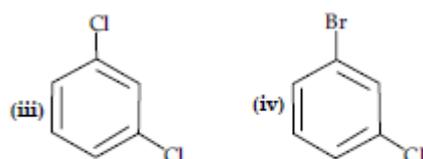
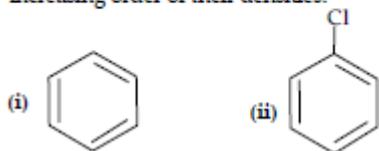
6.

Which of the following structures is enantiomeric with the molecule (a) given below?



14.

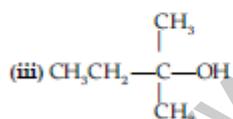
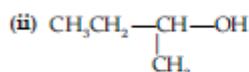
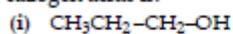
Arrange the following compounds in the increasing order of their densities.



- (A) (i) < (ii) < (iii) < (iv)
(B) (i) < (iii) < (iv) < (ii)
(C) (iv) < (iii) < (ii) < (i)
(D) (ii) < (iv) < (iii) < (i)

15.

The order of reactivity of following alcohols with halogen acids is:



- (A) (i) > (ii) > (iii) (B) (iii) > (ii) > (i)
(C) (ii) > (i) > (iii) (D) (i) > (iii) > (ii)

16.

The conversion of an alkyl halide into an alcohol by aqueous NaOH is classified as

- (A) a dehydrohalogenation reaction
(B) a substitution reaction
(C) an addition reaction
(D) a dehydration reaction

In these questions, a statement of assertion followed by a statement of reason is given.

Choose the correct

answer out of the following choices.

- (a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

17.

Assertion : Boiling point of alkyl halides increases with increase in molecular weight.

Reason : Boiling point of alkyl halides is in the order $\text{RI} > \text{RBr} > \text{RCl} > \text{RF}$.

18.

Assertion : The presence of nitro group facilitates nucleophilic substitution reactions in aryl halides.

Reason : The intermediate carbanion is stabilised due to the presence of nitro group.

19.

Assertion : Bromobenzene upon reaction with Br_2/Fe gives 1, 4-dibromobenzene as the major product.

Reason : In bromobenzene, the inductive effect of the bromo group is more dominant than the mesomeric effect in directing the incoming electrophile.

20.

Assertion : *n*-Butyl bromide has higher boiling point than isobutyl bromide.

Reason : The branching of the chain makes the molecule more compact and therefore decreases the surface area.

21.

Assertion : Carbon-halogen bond in aryl halide has partial double bond character.

Reason : Aryl halides undergo nucleophilic substitution easily.

22.

Assertion : *p*-Dichlorobenzene has higher melting point than *o*-dichlorobenzene.

Reason : Stronger the van der Waals' forces of attraction, higher is the melting point

23.

Assertion : Haloalkanes show H-bonding.

Reason : Haloalkanes are insoluble in water

24.

Assertion : Vinyl chloride is less reactive than alkyl chloride.

Reason : Stability of alkyl halide decreases as the strength of C-X bond decreases.

25.

Assertion : Nucleophilic substitution reaction on an optically active alkyl halide gives a mixture of enantiomers.

Reason : The reaction occurs by SN2 mechanism.

26.

Assertion : Electron withdrawing groups in aryl halides decrease the reactivity towards nucleophilic substitution.

Reason : 2,4-Dinitrochlorobenzene is more reactive than chlorobenzene.

27.

Assertion : *p*-Dichlorobenzene is less soluble in organic solvents than the corresponding *o*-isomer.

Reason : *o*-Dichlorobenzene is polar while *p*-dichlorobenzene is not.

28.

Assertion : Tertiary haloalkanes are more reactive than primary haloalkanes towards elimination reactions.

Reason : The +I-effect of the alkyl groups weakens the C - X bond.

29.

Assertion : Benzyl chloride is more reactive than *p*-chlorotoluene towards aqueous NaOH.

Reason : The C - Cl bond in benzyl chloride is more polar than C - Cl bond in *p*-chlorotoluene

30.

Assertion : 2-Chloro-3-methylbutane on treatment with alcoholic potash gives 2-methylbut-2-ene as major product.

Reason : The reaction occurs according to Saytzeff rule.

31.

Assertion : Isopropyl chloride is less reactive than CH₃Br in SN2 reactions.

Reason : SN2 reactions are always accompanied by inversion of configuration.

32.

Read the passage given below and answer the following questions :

Nucleophilic substitution reactions are of two types; substitution nucleophilic bimolecular (SN2)

and substitution nucleophilic unimolecular (SN1) depending on molecules taking part in determining the rate of reaction.

Reactivity of alkyl halide towards SN1 and SN2 reactions depends on various factors such as steric hindrance, stability of intermediate or transition

state and polarity of solvent. SN2 reaction mechanism is favoured mostly by primary alkyl halide then secondary and then tertiary. This order is reversed in case of SN1 reactions.

The following questions are multiple choice questions. Choose the most appropriate answer :

(i) Which of the following is most reactive towards nucleophilic substitution reaction?
(a) C₆H₅Cl (b) CH₂CHCl (c) ClCH₂CH₂CH₂ (d) CH₃CH₂CHCl

(ii) Isopropyl chloride undergoes hydrolysis by
(a) SN1 mechanism (b) SN2 mechanism
(c) SN1 and SN2 mechanism (d) neither SN1 nor SN2 mechanism.

(iii) The most reactive nucleophile among the following is
(a) CH₃O⁻ (b) C₆H₅O⁻ (c) (CH₃)₂CHO⁻ (d) (CH₃)₃CO⁻

(iv) Tertiary alkyl halides are practically inert to substitution by SN2 mechanism because of

(a) insolubility (b) instability (c) inductive effect (d) steric hindrance.

OR

Which of the following is the correct order of decreasing SN2 reactivity?

(a) RCH₂X > R₂CHX > R₃CX (b) R₃CX > R₂CHX > RCH₂X
(c) R₂CHX > R₃CX > RCH₂X (d) RCH₂X > R₃CX > R₂CHX

33.

Read the passage given below and answer the following questions :

When haloalkanes with β-hydrogen atom are boiled with alcoholic solution of KOH, they

undergo elimination of hydrogen halide resulting in the formation of alkenes. These reactions are called β-elimination reactions or

dehydrohalogenation reactions. These reactions follow Saytzeff's rule. Substitution and elimination reactions often compete with each other. Mostly bases behave as nucleophiles and therefore can engage in substitution or elimination reactions depending upon the alkyl halide and the reaction conditions.

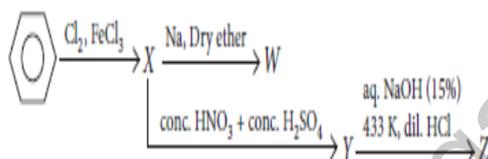
The following questions are multiple choice questions. Choose the most appropriate answer :

- (i) Among the following the most reactive towards alcoholic KOH is
 (a) $\text{CH}_2=\text{CHBr}$ (b) $\text{CH}_3\text{COCH}_2\text{CH}_2\text{Br}$
 (c) $\text{CH}_3\text{CH}_2\text{Br}$ (d) $\text{CH}_3\text{CH}_2\text{CH}_2\text{Br}$
- (ii) The general reaction, $\text{R}-\text{X} \xrightarrow{\text{aq. OH}^-} \text{ROH} + \text{X}^-$, is expected to follow decreasing order of reactivity as in
 (a) $t\text{-BuI} > t\text{-BuBr} > t\text{-BuCl} > t\text{-BuF}$ (b) $t\text{-BuF} > t\text{-BuCl} > t\text{-BuBr} > t\text{-BuI}$
 (c) $t\text{-BuBr} > t\text{-BuCl} > t\text{-BuI} > t\text{-BuF}$ (d) $t\text{-BuF} > t\text{-BuCl} > t\text{-BuI} > t\text{-BuBr}$
 ($t\text{-Bu}$ = tertiary Butyl group)
- (iii) Reaction of t -butyl bromide with sodium methoxide produces
 (a) sodium t -butoxide (b) t -butyl methyl ether
 (c) iso -butane (d) iso -butylene.
- (iv) In the elimination reactions, the reactivity of alkyl halides follows the sequence
 (a) $\text{R}-\text{F} > \text{R}-\text{Cl} > \text{R}-\text{Br} > \text{R}-\text{I}$ (b) $\text{R}-\text{I} > \text{R}-\text{Br} > \text{R}-\text{Cl} > \text{R}-\text{F}$
 (c) $\text{R}-\text{I} > \text{R}-\text{F} > \text{R}-\text{Br} > \text{R}-\text{Cl}$ (d) $\text{R}-\text{F} > \text{R}-\text{I} > \text{R}-\text{Br} > \text{R}-\text{Cl}$
- OR
- The ease of dehydrohalogenation of alkyl halide with alcoholic KOH is
 (a) $3^\circ < 2^\circ < 1^\circ$ (b) $3^\circ > 2^\circ > 1^\circ$
 (c) $3^\circ < 2^\circ > 1^\circ$ (d) $3^\circ > 2^\circ < 1^\circ$

34.

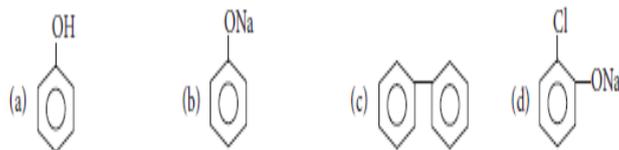
Read the passage given below and answer the following questions :

Consider the given sequence of reactions :



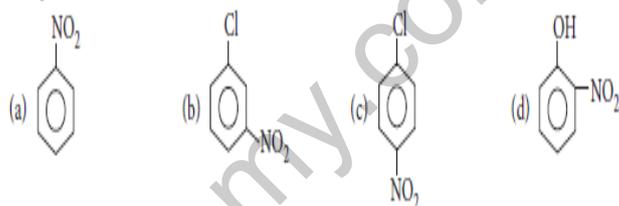
The following questions are multiple choice questions. Choose the most appropriate answer :

(i) Identify W.



OR

Compound Y is



(ii) When X reacts with CH_3COCl in presence of anhyd. AlCl_3 , the reaction is known as

- (a) Fittig reaction (b) Ullmann reaction
 (c) Wurtz-Fittig reaction (d) Friedel-Crafts acylation reaction.

(iii) When X is treated Ni-Al/NaOH the product obtained is

- (a) benzene (b) phenol (c) p -chlorophenol (d) triphenyl.

(iv) Compound Z is

- (a) phenol (b) p -chlorophenol (c) p -nitrophenol (d) nitrobenzene.

35.

Read the passage given below and answer the following questions :

Haloarenes are less reactive than haloalkanes. The low reactivity of haloarenes can be attributed to

- resonance effect
- sp^2 hybridisation of C-X bond
- polarity of C-X bond
- instability of phenyl cation (formed by self-ionisation of haloarene)
- repulsion between the electron rich attacking nucleophiles and electron rich arenes.

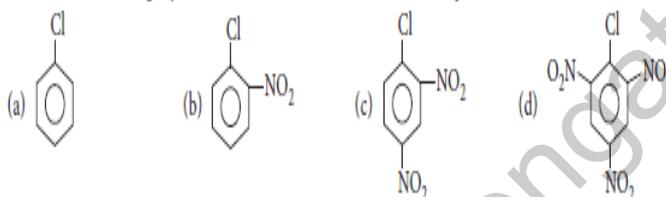
Reactivity of haloarenes can be increased or decreased by the presence of certain groups at certain position for example, nitro ($-NO_2$) group at *o/p* positions increases the reactivity of haloarenes towards nucleophilic substitution reactions.

The following questions are multiple choice questions. Choose the most appropriate answer :

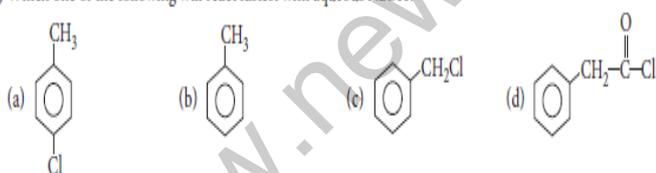
(i) Aryl halides are less reactive towards nucleophilic substitution reaction as compared to alkyl halides due to

- (a) the formation of less stable carbonium ion (b) resonance stabilisation
(c) larger carbon-halogen bond (d) inductive effect.

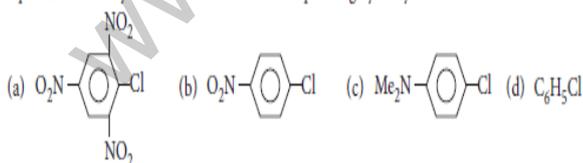
(ii) Which of the following aryl halides is the most reactive towards nucleophilic substitution?



(iii) Which one of the following will react fastest with aqueous NaOH?



(iv) Which chloro derivative of benzene among the followings would undergo hydrolysis most readily with aqueous sodium hydroxide to furnish the corresponding hydroxy derivative?



OR

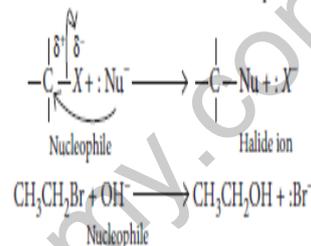
The reactivity of the compounds (i) MeBr, (ii) $PhCH_2Br$, (iii) MeCl, (iv) $p-MeOC_6H_4Br$ decreases as

- (a) (i) > (ii) > (iii) > (iv) (b) (iv) > (ii) > (i) > (iii)
(c) (iv) > (iii) > (i) > (ii) (d) (ii) > (i) > (iii) > (iv)

36.

Read the passage given below and answer the following questions :

In haloalkanes, when a nucleophile stronger than the halide ion approaches the positively charged carbon atom of an alkyl halide, the halogen atom along with its bonding electron pair gets displaced and a new bond with the carbon and the nucleophile is formed. These reactions are called nucleophilic substitution reactions.



In these reactions the atom or group of atoms which loses its bond from carbon and takes on an additional pair of electrons is called leaving group. Halide ions are good leaving groups. Some important nucleophilic substitution reactions of haloalkanes with common nucleophiles are given in the table below.

	Reagent	Nucleophile (Nu^-)	Substitution product $R-Nu$	Class of main product
1.	NaOH or KOH or moist Ag_2O	OH^-	ROH	Alcohol
2.	H_2O	H_2O	ROH	Alcohol
3.	NaI	I^-	$R-I$	Alkyl iodide
4.	$R'NH_2$	$R'NH_2$	RNR'	Sec. amine
5.	KCN	$C\equiv N^-$	RCN	Nitrile (cyanide)
6.	KNO_2	$O=N-O^-$	$R-O-N=O$	Alkyl nitrite

In these questions (Q. No. i-iv), a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.

(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.

(c) Assertion is correct statement but reason is wrong statement.

(d) Assertion is wrong statement but reason is correct statement.

(i) Assertion : Alkyl halides are hydrolysed to alcohols by moist silver oxide.

Reason : RCl is hydrolysed to ROH easily but reactions slow down on addition of KI.

(ii) Assertion : Alkyl halides form alkenes when heated above 300°C.

Reason : CH₃CH₂I reacts slowly with strong base as compared to CD₃CH₂I.

(iii) Assertion : RBr reacts with AgNO₂ to give nitroalkane.

Reason : Silver nitrite (AgNO₂) is an ionic compound, therefore the negative charge on nitrogen is the attacking site.

(iv) Assertion : The nucleophilic substitution of vinyl chloride is difficult than ethyl chloride.

Reason : Vinyl group is electron donating group.

OR

Assertion : 2-Bromobutane on reaction with sodium ethoxide in ethanol gives 1-butene as the major product.

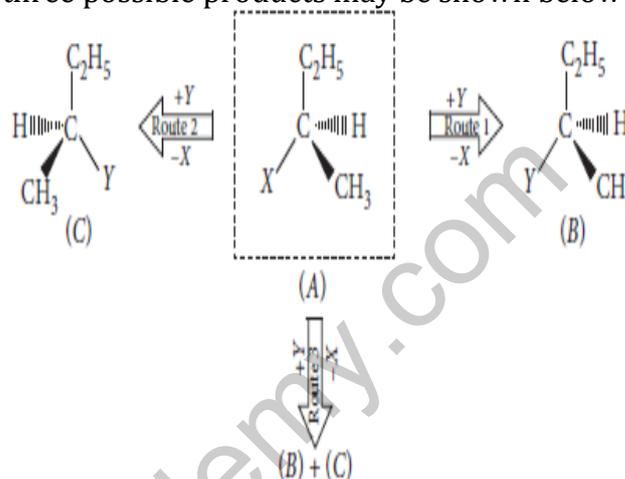
Reason : 1-Butene is less stable than 2-butene.

37.

Read the passage given below and answer the following questions :

When a chemical reaction involves bond cleavage or bond formation at an asymmetric

carbon atom, three different products may be formed. For example, during the substitution of a group X by Y in the following reaction, the three possible products may be shown below :



(i) If B is the only product, the process is called retention of configuration because B has the same configuration as the starting reactant (A).

(ii) If C is the only product, the process is called inversion of configuration because C has the configuration opposite to the starting reactant (A).

(iii) If an equimolar mixture of B and C (i.e., a 50 : 50 mixture) is formed, then the process is called racemisation and the product is optically inactive because one isomer will rotate the light in the direction opposite to one another.

In these questions (Q. No. i-iv), a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.

(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.

(c) Assertion is correct statement but reason is wrong statement.

(d) Assertion is wrong statement but reason is correct statement.

(i) Assertion : A reaction is said to be stereospecific if a particular stereoisomer of

the reactant produces a specific stereoisomer of the product.

Reason : Bromination of *cis*-2-butene gives *meso*-2, 3-dibromobutane which is stereospecific.

(ii) Assertion : Addition of Br₂ to *cis*-but-2-ene is stereoselective.

Reason : SN₂ reactions are stereospecific as well as stereoselective.

(iii) Assertion : Optically active 2-iodobutane on treatment with NaI in acetone undergoes racemization.

Reason : Repeated Walden inversions on the reactant and its product eventually gives a racemic mixture.

(iv) Assertion : SN₂ reaction of an optically active alkyl halide with an aqueous solution of KOH always gives an alcohol with opposite sign of rotation.

Reason : SN₂ reactions always proceed with inversion of configuration.

OR

Assertion : Nucleophilic substitution reaction of an optically active alkyl halide gives a mixture of enantiomers.

Reason : The reaction occurs by SN₁ mechanism.

38.

Read the passage given below and answer the following questions :

The order of reactivity towards SN₁ reaction depends upon the stability of carbocation in the first step. Greater the stability of the carbocation, greater will be its ease of formation from alkyl halide and hence faster

will be the rate of the reaction. As we know, 3° carbocation is most stable, therefore, the *tert*-alkyl that halides will undergo SN₁ reaction very fast. For example, it has been observed that the reaction (CH₃)₃CBr with OH⁻ ion to give 2-methyl-2-propanol is about 1 million times as fast as the corresponding reaction of the methyl bromide to give methanol.

The primary alkyl halides always react predominantly by SN₂ mechanism. On the other hand, the tertiary alkyl halides react predominantly by SN₁ mechanism. Secondary alkyl halides may react by either mechanism or by both the mechanisms without much preference depending upon the nature of the nucleophile and solvent.

In these questions (Q. No. i-iv), a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.

- (a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

(i) Assertion : Low concentration of nucleophile favours SN₁ mechanism.

Reason : 2° alkyl halides are less reactive than 1° towards SN₁ reactions.

(ii) Assertion : Polar solvent slows down SN₂ reactions.

Reason : CH₃-Br is less reactive than CH₃Cl.

(iii) Assertion : Benzyl bromide when kept in acetone- water it produces benzyl alcohol.

Reason : The reaction follows SN₂ mechanism.

(iv) Assertion : Rate of hydrolysis of methyl chloride to methanol is higher in DMF than in water.

Reason : Hydrolysis of methyl chloride follows second order kinetics.

OR

Assertion : SN1 reaction is carried out in the presence of a polar protic solvent.

Reason : A polar protic solvent increases the stability of carbocation due to solvation.

39.

Read the passage given below and answer the following questions :

A chlorocompound (A) on reduction with Zn-Cu and ethanol gives the hydrocarbon (B) with five carbon atoms. When (A) is dissolved in dry ether and treated with sodium metal it gave 2,2,5,5-tetramethylhexane. The treatment of (A) with alcoholic KCN gives compound (C).

The following questions are multiple choice questions. Choose the most appropriate answer :

- (i) The compound (A) is
- | | |
|-----------------------------------|-----------------------------------|
| (a) 1-chloro-2, 2-dimethylpropane | (b) 1-chloro-2, 2-dimethyl butane |
| (c) 1-chloro-2-methyl butane | (d) 2-chloro-2-methyl butane. |
- (ii) The reaction of (C) with Na, C₂H₅OH gives
- | | |
|--|---|
| (a) (CH ₃) ₃ CCH ₂ CONH ₂ | (b) (CH ₃) ₃ CNH ₂ |
| (c) (CH ₃) ₃ CCH ₂ CH ₂ NH ₂ | (d) (CH ₃) ₂ CHCH ₂ NH ₂ |
- (iii) The reaction of (C) with Na, C₂H₅OH is called
- | | |
|---------------------|-----------------------|
| (a) Gilman reaction | (b) Mendius reaction |
| (c) Grooves process | (d) Swart's reaction. |

OR

The reaction of (A) with aq. KOH will preferably favour

- (a) S_N1 mechanism (b) S_N2 mechanism (c) E₁ mechanism (d) E₂ mechanism.

(iv) Compound (B) is

- | | |
|-----------------------|--------------------------|
| (a) <i>n</i> -pentane | (b) 2, 2-dimethylpropane |
| (c) 2-methylbutane | (d) none of these. |

40.

Read the passage given below and answer the following questions :

A primary alkyl halide (A) C₄H₉Br reacted with alcoholic KOH to give compound (B).

Compound (B) is reacted with HBr to give compound (C) which is an isomer of (A).

When (A) reacted with sodium metal, it gave a compound (D) C₈H₁₈ that is different than the

compound obtained when *n*-butyl bromide reacted with sodium metal.

The following questions are multiple choice questions. Choose the most appropriate answer :

- (i) Compound (A) is
- (a) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{Br}$ (b) $\text{CH}_3\text{CH}(\text{CH}_3)\text{CH}_2\text{Br}$
- (c) $\text{CH}_3\text{C}(\text{CH}_3)_2\text{Br}$ (d) $\text{CH}_3\text{CH}_2\text{CH}_2\text{Br}$
- (ii) Which type of isomerism is present in compound (A) and (C)?
- (a) Positional (b) Functional (c) Chain (d) Both (a) and (c)

OR

Identify compound (B).

- (a) $\text{CH}_3\text{C}(\text{CH}_3)=\text{CH}_2$ (b) $\text{CH}_3\text{CH}=\text{CHCH}_3$
- (c) $\text{CH}_3\text{CH}_2\text{CH}=\text{CH}_2$ (d) None of these
- (iii) IUPAC name of compound (D) is
- (a) *n*-octane (b) 2,5-dimethylhexane
- (c) 2-methylheptane (d) 3,4-dimethyl hexane.
- (iv) When compound (C) is treated with alc. KOH and then treated with HBr in presence of peroxide, the compound obtained is
- (a) $\text{CH}_3\text{C}(\text{CH}_3)_2\text{Br}$ (b) $\text{CH}_3\text{CH}(\text{CH}_3)\text{CH}_2\text{Br}$
- (c) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{Br}$ (d) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}(\text{CH}_3)\text{Br}$