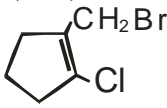


Alkyl Halides

1. Preparation of Alkyl Halides

Q 1. (a) Classify the following halides as alkyl, allyl, and vinyl halide.

(i) $\text{CH}_3\text{CH}=\text{CFCH}_2\text{CH}_3$ (ii) $(\text{CH}_3)_2\text{CClCH}_2\text{CH}_3$

(iii) $\text{H}_2\text{C}=\text{CHCH}_2\text{I}$, (iv) 

Q 2. $\text{C}_2\text{H}_5\text{Br}$ can be obtained in the laboratory by the action of ethyl alcohol with

(A) KBr (B) NH_4Br
(C) Br_2 (D) KBr & conc. H_2SO_4

Q 3. The reaction



is reversible. For the completion of the reaction, which reagent is most suitable?

(A) anhydrous ZnCl_2 (B) concentrated H_2SO_4
(C) excess of water (D) calcium chloride

Q 4. When (–)-2-methyl butan-1-ol is heated with

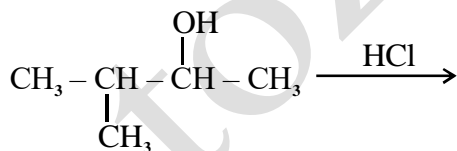
conc. HCl , (+)-1-chloro-2-methyl butane is

obtained. The reaction is an example of
(A) inversion (B) resolution
(C) racemisation (D) retention

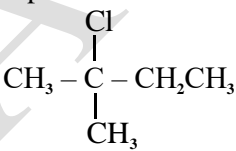
Q 5. The reagent used in the conversion of 1-butanol to 1-bromobutane is

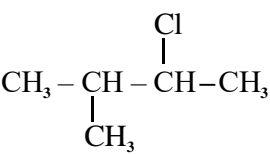
(A) CHBr_3 (B) Br_2
(C) CH_3Br (D) PBr_3

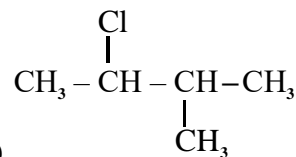
Q 6. In the reaction



Major product is

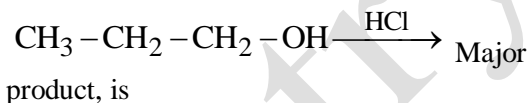
(A) 

(B) 



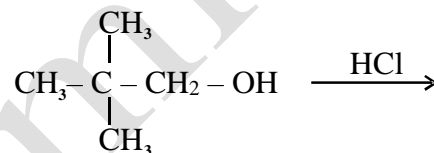
(C)
(D) None of these

Q 7. In the reaction

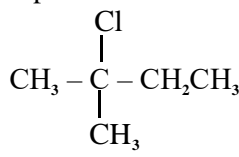


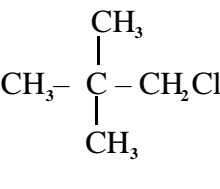
(A) $\text{CH}_3\text{CH}_2\text{CH}_2\text{Cl}$ (B) $\text{CH}_3\text{CHClCH}_3$
(C) $\text{CH}_3\text{CH}_2\text{CH}_3$ (D) None of these

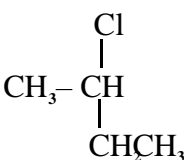
Q 8. In the reaction



Major product is

(A) 

(B) 

(C) 

(D) None of these

Q 9. Reactivity order of alcohol towards HCl is

(A) $3^\circ\text{ROH} > 2^\circ\text{ROH} > 1^\circ\text{ROH} > \text{CH}_3\text{OH}$
(B) $\text{CH}_3\text{OH} > 1^\circ\text{ROH} > 2^\circ\text{ROH} > 3^\circ\text{ROH}$
(C) $3^\circ\text{ROH} > 2^\circ\text{ROH} > \text{CH}_3\text{OH} > 1^\circ\text{ROH}$
(D) None of these

Q 10. In the reaction

ROH + HI → Product, is

- (A) R - I (B) R - OR
(C) R - H (D) R - R

Q 11. Which of the following halides are prepared by halogen exchange?

- (A) R - Cl (B) R - Br
(C) R - F (D) R - I

Q 12. Lucas reagent is

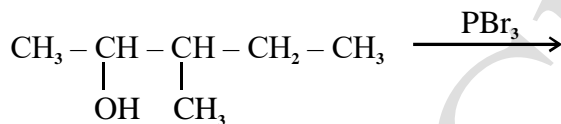
- (A) HCl + HgCl₂ (B) HCl + ZnCl₂
(C) HBr + ZnBr₂ (D) HI + HgI₂

Q 13. Which of the alcohol gives turbidity quickly with lucas reagent

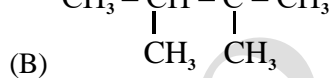
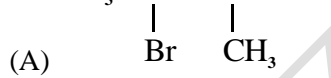
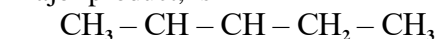
- (A) 3° R-OH (B) 2° R-OH
(C) 1° R-OH (D) None of these

2. Preparation of Alkyl Halides

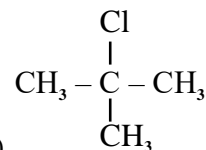
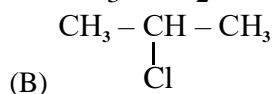
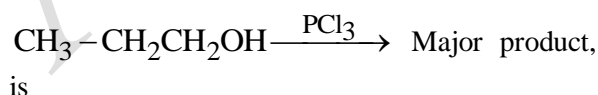
Q 1. In the reaction



Major product, is

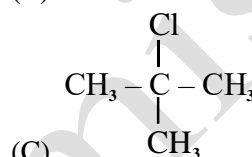
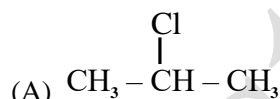
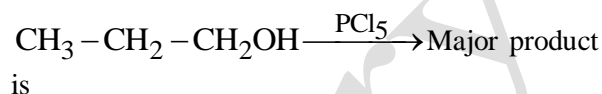


Q 2. In the reaction



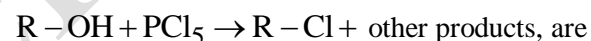
- (D) None of these

Q 3. In the reaction



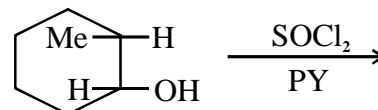
- (D) None of these

Q 4. In the reaction

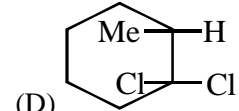
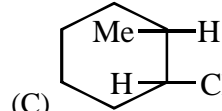
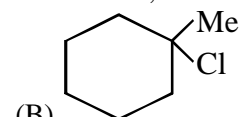
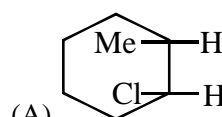


- (A) HCl & POCl₃ (B) H₂O + PCl₃
(C) HCl + PO₂Cl (D) H₃PO₄ + HCl

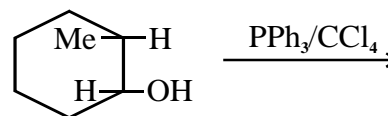
Q 5. In the reaction



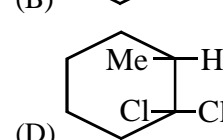
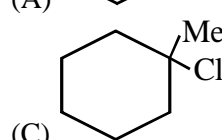
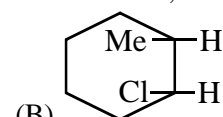
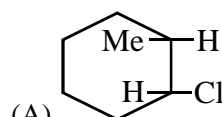
Product, is



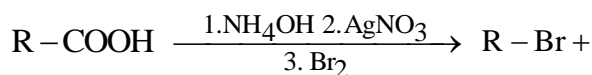
Q 6. In the reaction



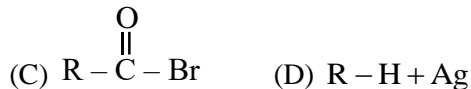
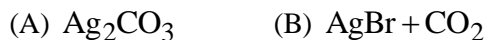
Product, is



Q 7. In the reaction



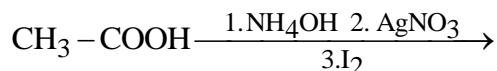
Products, are



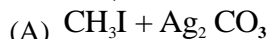
Q 8. Hunsdiecker reaction has ease of the order



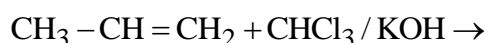
Q 9. In the reaction



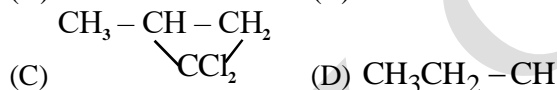
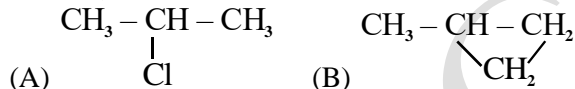
Products, formed are



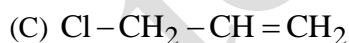
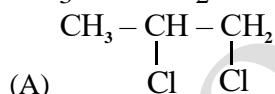
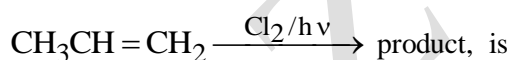
Q 10. In the reaction



Product, is

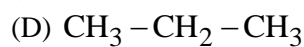
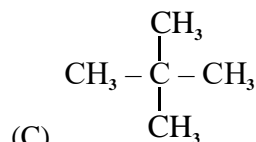
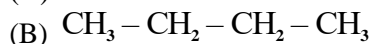
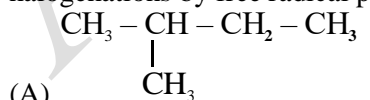


Q 11. In the reaction

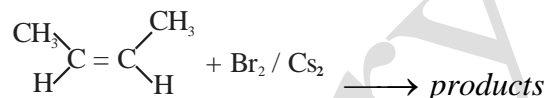


(D) None of these

Q 12. Which of the following alkane is preferred in halogenations by free radical pathway?



Q 13. In the reaction

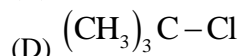
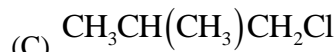
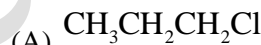


Products are



3. Properties of Alkyl Halides

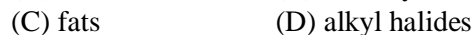
Q 1. Which of the following compounds has the highest boiling point?



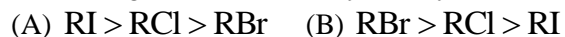
Q 2. Which of the following halides turn violet on standing in sunlight?



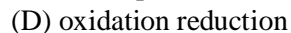
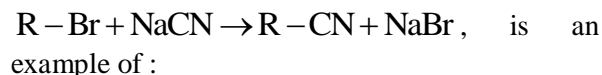
Q 3. The derivatives not found in nature are



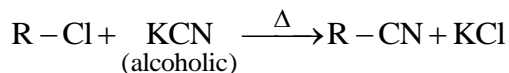
Q 4. Decreasing order of reactivity of alkyl halide is



Q 5. The reaction,

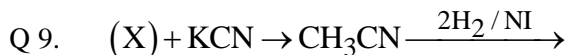


- Q 6. Following is the substitution reaction in which $-\text{CN}$ replaces $-\text{Cl}$



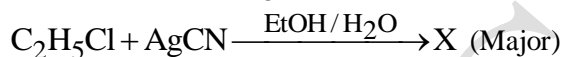
To obtain propane nitrile, $\text{R}-\text{Cl}$ should be

- (A) chloroethane (B) 1-chloropropane
(C) chloromethane (D) 2-chloropropane
- Q 7. When ethyl chloride is heated with AgCN , the main product is
(A) ethyl cyanide (B) ethyl isocyanide
(C) ethyl amine (D) ethyl nitrate
- Q 8. Alkyl halide reacts with alcoholic potassium hydrogen sulphide to form
(A) alkanethiol (B) thioether
(C) thioacid (D) alkane



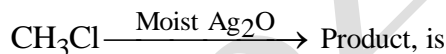
$\text{CH}_3\text{CH}_2\text{NH}_2$ what is (X) ?

- (A) $\text{CH}_3\text{CH}_2\text{Cl}$ (B) CH_3Cl
(C) $\text{CH}_3\text{CH}_2\text{CH}_2\text{Cl}$ (D) $(\text{CH}_3)_2\text{CHCl}$
- Q 10. Consider the following reaction :



Which one of the following statements is true for X ?

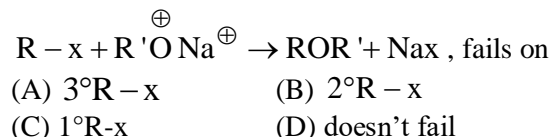
- (A) It gives propionic acid on hydrolysis
(B) It has an ester function
(C) It has a nitrogen linked to ethyl carbon
(D) It has a cyanide group
- Q 11. In the reaction



- (A) CH_3OCH_3 (B) CH_3OH
(C) CH_3-CH_3 (D) CH_2 :
- Q 12. In the reaction

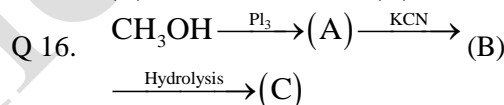
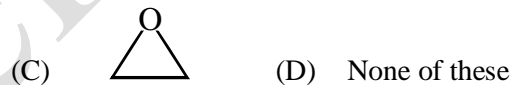
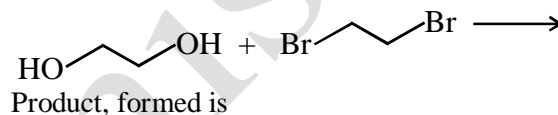


- (A) $\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$
(B) $\text{CH}_3\text{CH}_2\text{OH}$
(C) $\text{CH}_3-\text{CH}_2-\text{CH}_2-\text{CH}_3$
(D) None of these
- Q 13. The reaction



- Q 14. In the formation of PhOCH_3 , which is the best starting material?
(A) $\text{PhBr} + \text{CH}_3\text{O}^-\text{Na}^+$
(B) $\text{CH}_3\text{Br} + \text{PhO}^-\text{Na}^+$
(C) Both a & b are equally effective
(D) $\text{CH}_3\text{OH} + \text{PhOH}$

- Q 15. In the reaction

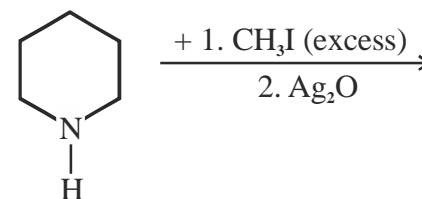


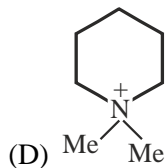
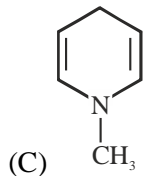
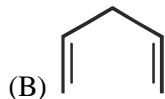
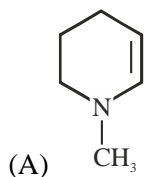
The compound (C) is

- (A) CH_3OH (B) HCOOH
(C) CH_3CHO (D) CH_3COOH

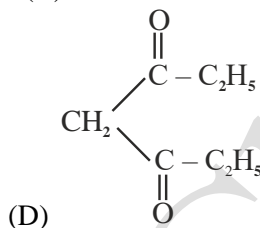
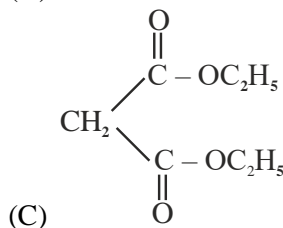
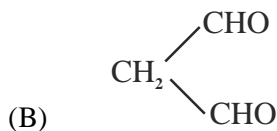
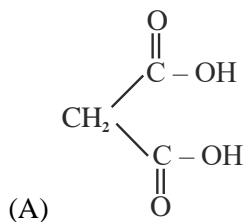
4. Chemical Properties of Alkyl Halides, Haloform reaction

- Q 1. In the reaction

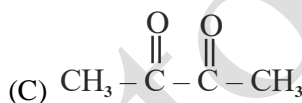
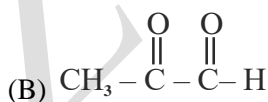
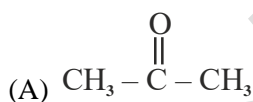
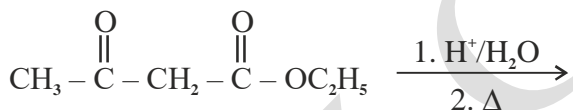




Q 2. DEM is

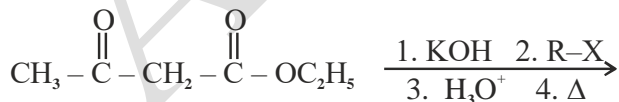


Q 3. Product, is

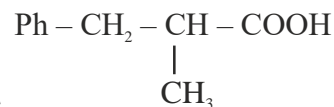
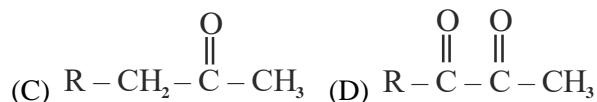
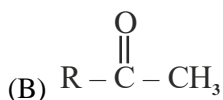
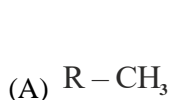


(D) None of these

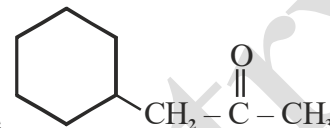
Q 4.



Product, is



Q 5. Prepare from DEM



Q 6. Prepare from EAA

Q 7. Which of the following reagent can be used in haloform reaction ?

- (A) $\text{Br}_2 + \text{NaOH}$ (B) $\text{Cl}_2 + \text{Light}$
(C) $\text{Ca}(\text{OCl})\text{Cl}$ (D) Both A & C

Q 8. In halogenation reaction involving 3 steps chlorination & 3 step halogenation; The slowest step is

- (A) 1st step (B) 2nd step
(C) 3rd step (D) None of these

Q 9. Which of the following reactant does not undergo haloform reaction?

- (A) $\text{CH}_3 - \overset{\text{O}}{\parallel}{\text{C}} - \text{CH}_2\text{Cl}$
(B) $\text{CH}_3 - \overset{\text{O}}{\parallel}{\text{C}} - \text{CH}_2 - \overset{\text{O}}{\parallel}{\text{C}} - \text{CH}_3$
(C) $\text{CH}_3 - \overset{\text{O}}{\parallel}{\text{C}} - \text{CH}_2 - \text{COOH}$
(D) All can undergo

Q 10. Which of the following alcohol undergo Chloroform reaction ?

- (A) $\text{CH}_3\text{CH}_2\text{OH}$ (B) $\text{CH}_3 - \overset{\text{OH}}{\text{CH}} - \text{CH}_3$
(C) $\text{CH}_3 - \overset{\text{OH}}{\text{CH}} - \text{CH}_2\text{CH}_3$ (D) All of these

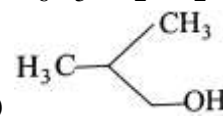
Q 11. Chloroform reacts with oxygen in the presence of light to give

- (A) methyl chloride (B) carbonyl chloride

- (C) acetaldehyde (D) methylenedichloride
- Q 12. The bad smelling substance formed by the action of alcoholic caustic potash on chloroform and aniline is
 (A) phenyl isocyanide (B) nitrobenzene
 (C) chloropicrin (D) acetylene
- Q 13. Chloroform can be obtained from
 (A) methanol (B) methanol
 (C) propan-1-ol (D) propan-2-ol
- Q 14. AgNO_3 does not give precipitate with CHCl_3 because :
 (A) AgNO_3 is chemically inert
 (B) CHCl_3 is chemically inert
 (C) CHCl_3 does not ionize in water
 (D) none of the above
- Q 15. Chloroform on reaction with acetone yields
 (A) insecticide (B) analgesic
 (C) isocyanide (D) hypnotic

5. Halofrom Reaction & its Properties

- Q 1. In the preparation of CHCl_3 from ethanol and bleaching powder, the latter provides :
 (A) Cl_2 (B) $\text{Ca}(\text{OH})_2$
 (C) both A & B (D) none of these
- Q 2. Iodoform can be prepared from all except
 (A) isopropyl alcohol (B) 3-methyl-2-butanone
 (C) isobutyl alcohol (D) ethylmethylketone
- Q 3. Which of the following compounds is not formed in iodoform reaction of acetone ?
 (A) $\text{CH}_3\text{COCH}_2\text{I}$ (B) $\text{CH}_3\text{COCHI}_2$
 (C) CH_3COCl_3 (D) $\text{ICH}_2\text{COCH}_2\text{I}$
- Q 4. Pure chloroform may be prepared by
 (A) chlorination of methane
 (B) partial reduction of CCl_4
 (C) the action of bleaching powder and alkali on ethanol
 (D) distilling chloral hydrate with conc. Aqueous alkali solution
- Q 5. When iodoform is heated with silver nitrate solution, we get
 (A) yellow ppt. of AgI (B) white ppt. of AgCl
 (C) silver mirror (D) no precipitate
- Q 6. Which is detected by carbylamine test ?
 (A) H_2NCONH_2 (B) CH_3CONH_2
 (C) $\text{C}_2\text{H}_5\text{NH}_2$ (D) All of these
- Q 7. In the chemical reaction,
 $\text{CH}_3\text{CH}_2\text{NH}_2 + \text{CHCl}_3 + 3\text{KOH} \rightarrow (\text{A}) + (\text{B}) + 3\text{H}_2\text{O}$
 The compounds (A) and (B) are respectively
 (A) $\text{C}_2\text{H}_5\text{NC}$ and 3KCl
 (B) $\text{C}_2\text{H}_5\text{CN}$ and 3KCl
 (C) $\text{CH}_3\text{CH}_2\text{CONH}_2$ and 3KCl
 (D) $\text{C}_2\text{H}_5\text{NC}$ and K_2CO_3
- Q 8. With conc. Nitric acid, the chloroform forms a compound which is used as an
 (A) anaesthetic (B) antiseptic
 (C) insecticide (D) antiknock compound
- Q 9. Chloropicrin is obtained by the reaction of
 (A) steam on carbon tetrachloride
 (B) nitric acid on chlorobenzene
 (C) chlorine on picric acid
 (D) nitric acid on chloroform
- Q 10. Which of the following gives iodoform test ?
 (A) $\text{CH}_3\text{CH}_2\text{OH}$ (B) $\text{C}_2\text{H}_5\text{CHO}$
 (C) $(\text{CH}_2\text{OH})_2$ (D) None of these
- Q 11. Among the following the one that gives positive iodoform test upon reaction with I_2 and NaOH is
 (A) $\text{CH}_3\text{CH}_2\text{CH}(\text{OH})\text{CH}_2\text{CH}_3$
 (B) $\text{C}_6\text{H}_5\text{CH}_2\text{CH}_2\text{OH}$



(D) PhCHOHCH_3

- Q 12. Which can undergo haloform reaction ?
 (A) $(\text{CH}_3)_3\text{C}-\text{OH}$ (B) $(\text{C}_2\text{H}_5)_2\text{C}=\text{O}$
 (C) Acetophenone (D) Benzophenone

- Q 13. Which of the following is formed when the product of oxidation of chloroform is treated with ethyl alcohol?
 (A) Ethyl chloride (B) Ethyl carbonate
 (C) Chloral hydrate (D) Chloral
- Q 14. Which of the following is added to chloroform to slow down its oxidation in presence of light?
 (A) Carbonyl chloride (B) Ethyl alcohol
 (C) Sodium hydroxide (D) Nitric acid
- Q 15. $\text{CaOCl}_2 + \text{H}_2\text{O} \rightarrow \text{Ca}(\text{OH})_2 + \text{X}$
 $\text{X} + \text{CH}_3\text{CHO} \rightarrow \text{Y}$
 $\text{Y} + \text{Ca}(\text{OH})_2 \rightarrow \text{CHCl}_3$
 What is 'Y' ?
 (A) $\text{CH}_3\text{CH}(\text{OH})_2$ (B) CH_2Cl_2
 (C) CCl_3CHO (D) $\text{CCl}_3\text{COCH}_3$
- Q 16. Chloroform gives a trichloro derivative of an alcohol on reaction with
 (A) conc. HNO_3 (B) aq. alkali
 (C) acetone & alkali (D) sodium ethoxide

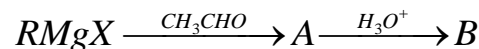
6. Grignard Reagent

- Q 1. In preparation of R-mgx
 $\text{R} - \text{x} + \text{Mg} / \text{dryethen} \rightarrow \text{R} - \text{mgx}$
 'R' - is not taken as
 (A) Benzyl (B) Allyl
 (C) Phenyl (D) Vinyl
- Q 2. Aryl halides are less reactive towards nucleophilic substitution reaction as compared to alkyl halides due to [IIT 1990]
 (A) formation of less stable carbonium ion
 (B) resonance stabilisation
 (C) longer carbon-halogen bond
 (D) double bond between C and halogen
- Q 3. Consider the following statements about Grignard synthesis :
 1. The carbon-magnesium bond of the Grignard reagent is covalent, but highly polar, carbon being positive relative to electronegative Mg.
 2. The Grignard reaction is an example of the

typical reactions of aldehydes and ketones, viz , nucleophilic addition.

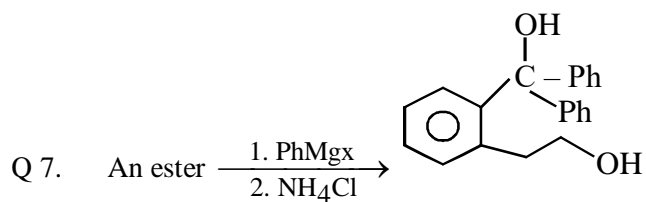
3. The reaction of carboxylic esters with Grignard reagents is an excellent method of preparing tertiary alcohols.
4. Grignard synthesis is important as it permits formation of new carbon-oxygen bond.
 Which of the above statements are correct?
 (A) 1, 2 and 3 (B) 1, 2 and 4
 (C) 1 and 4 (D) 2 and 3
- Q 4. An unknown alkyl halide reacts with alcoholic potassium hydroxide to produce a hydrocarbon C_4H_8 . Oxidation of hydrocarbon give propionic acid ($\text{CH}_2\text{CH}_2\text{COOH}$) and CO_2 . The structure of the alkyl halide is
 (A) $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{CH}_2 - \text{Br}$
 (B) $\text{CH}_3 - \underset{\text{Br}}{\text{CH}_2} - \underset{\text{Br}}{\text{CH}_2} - \text{CH}_2 - \text{Br}$
 (C) $\text{CH}_2 - \text{CH}_2 - \underset{\text{Br}}{\text{CH}} - \text{CH}_3$
 (D) $\text{CH}_2 - \underset{\text{Br}}{\text{CH}} - \text{CH}_2 - \text{CH}_2 - \text{Br}$

- Q 5. Consider the following sequence of reactions

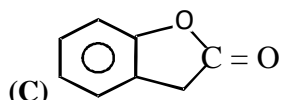
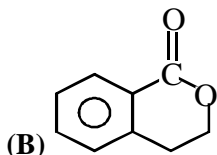
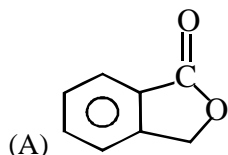


The compound B is a

- (A) Carboxylic acid (B) Primary alcohol
 (C) Secondary alcohol (D) Tertiary alcohol
- Q 6. **Assertion (A) :** In the addition of Grignard reagent to carbonyl compound. The R group of RMgX attacks carbonyl carbon.
Reason (R) : The carbon-magnesium bond of the Grignard reagent is highly polar, carbon being negative relative to electropositive Mg.
 (A) Both A and R are individually true and R is the correct explanation of A
 (B) Both A and R are individually true but R is not the correct explanation of A
 (C) A is true but R is false
 (D) A is false but R is true



Ester is

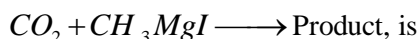


(D) None of these

Q 8. On Nucleophilic attack on RMgX is not possible because

- (A) It has acidic hydrogen
 (B) It has very low +ve charge on carbonyl carbon
 (C) It is acid
 (D) It has nucleophilic character

Q 9. In the reaction



- (A) CH_3COOH (B) CH_3COCH_3
 (C) CH_3CHO (D) HCOOH

Q 10. RMgX can not be prepared by

- (A) Vicinal dihalides
 (B) 1,3 - dihalides
 (C) Halides with reactive Group
 (D) All of these

Q 11. Isobutyl magnesium bromide with dry ether and absolute alcohol gives

- (A) $(\text{CH}_3)_2\text{CHCH}_2\text{OH}$ & $\text{CH}_3\text{CH}_2\text{MgBr}$
 (B) $(\text{CH}_3)_2\text{CHCH}_2\text{CH}_2\text{CH}_3$ & $\text{Mg}(\text{OH})\text{Br}$
 (C) $(\text{CH}_3)_2\text{CHCH}_3$, $\text{CH}_2=\text{CH}_2$ & $\text{Mg}(\text{OH})\text{Br}$
 (D) $(\text{CH}_3)_2\text{CHCH}_3$ & $\text{CH}_3\text{CH}_2\text{OMgBr}$

Q 12. The number of structural and configurational isomers of a bromo compound, $\text{C}_5\text{H}_9\text{Br}$ formed by the addition of HBr to 2-pentyne respectively are

- (A) 1 and 2 (B) 2 and 4
 (C) 4 and 2 (D) 2 and 1

Q 13. A solution of (+)-2-chloro-2-phenylethane in toluene racemises slowly on the presence of small amount of SbCl_5 , due to the formation of

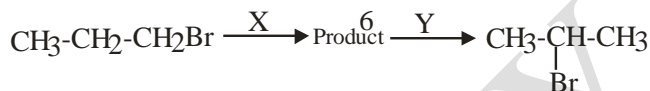
[IIT JEE 1999]

- (A) carbanion (B) carbene

(C) free-radical (D) carbocation

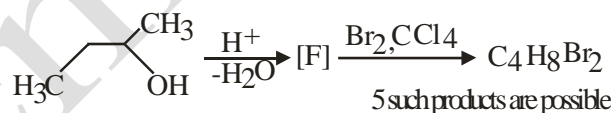
Q 14. Identify the set of reagent/reaction conditions X and Y in the following set of transformation.

[IIT JEE 2000]



- (A) X=dilute aqueous NaOH , 20°C ;
 Y= HBr /acetic acid, 20°C
 (B) X=concentrated alcoholic NaOH , 80°C ;
 Y= HBr /acetic acid, 20°C
 (C) X=dilute aqueous NaOH , 20°C ;
 Y= $\text{Br}_2/\text{CHCl}_3$, 0°C
 (D) X=concentrated alcoholic NaOH , 80°C ;
 Y= $\text{Br}_2/\text{CHCl}_3$, 0°C

Q 15. In the reaction [IIT JEE 2003]

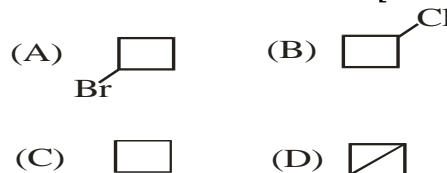


How many structure of F are possible?

- (A) 2 (B) 5 (C) 6 (D) 3

Q 16. What would be the product formed when 1-bromo-3-chlorocyclobutane reacts with 2 equivalent of metallic sodium in ether?

[IIT JEE 2005]



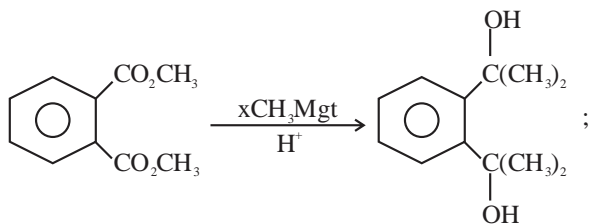
Q 17. Bromine is allowed to react with 1, 2, 3-trimethylcyclopropane the absence of light. Which one of the following is the most likely product ?

- (A) 3-Methylpentane
 (B) 2, 4 - Dibromo 3- methylpentane
 (C) 3, 3-Dibromo 3-methylpentane
 (D) 2, 2-Dibromo 3- methylpentane

Q 18. Addition of KI accelerates the hydrolysis of primary alkyl halides because

- (A) KI is soluble in organic solvents
 (B) iodide ion is weak base & poor leaving group
 (C) iodide ion is a strong base
 (D) iodide ion is a powerful nucleophile as well

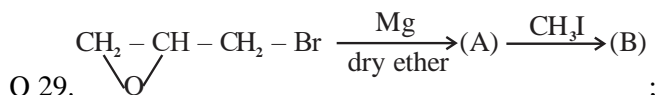
as good leaving group



Q 19.

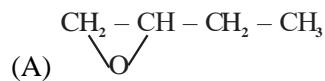
Dimethyl phthalate

- (A) 2 (B) 3 (C) 4 (D) 5



Q 29.

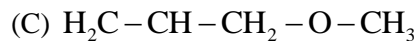
Product (B) is



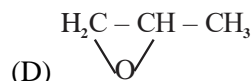
(A)



(B)



(C)



(D)

Answer Key

1. Preparation of Alkyl Halides

- (1).
 (i) Vinyl Halides (ii) Alkyl Halides
 (iii) Allyl Halides (iv) Vinyl Halides
 (2). D (3). A (4). D
 (5). A (6). A (7). A
 (8). A (9). C (10). C
 (11). C, D (12). A (13). A

2. Preparation of Alkyl Halides

- (1). A (2). A (3). B
 (4). A (5). A (6). B
 (7). B (8). A (9). B
 (10). C (11). C (12). C
 (13). A

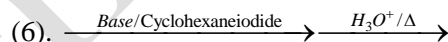
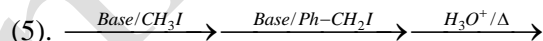
3. Properties of Alkyl Halides

- (1). B (2). D (3). D
 (4). C (5). B (6). A
 (7). B (8). A (9). B
 (10). C (11). B (12). A
 (13). A (14). B (15). A
 (16). D

4. Chemical Properties of Alkyl Halides,

Haloform reaction

- (1). B (2). C (3). A
 (4). C



- (7). D (8). A (9). B
 (10). D (11). B (12). A
 (13). D (14). C (15). D

5. Haloform Reaction & its Properties

- (1). C (2). C (3). D
 (4). D (5). A (6). C
 (7). A (8). C (9). D
 (10). A (11). D (12). C
 (13). B (14). B (15). C
 (16). C

6. Grignard Reagent

- (1). A, B (2). C (3). D
 (4). A (5). C (6). B
 (7). B (8). B (9). A
 (10). D (11). B (12). B
 (13). D (14). B (15). D
 (16). D (17). B (18). D
 (19). C (20). C