



## CHEMISTRY

### BOOKS - CENGAGE CHEMISTRY

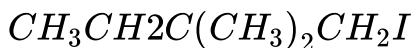
### ORGANOHALOGEN COMPOUNDS

#### Mandatory Exercise Exercise Set I

1. Name the following halides according to IUPAC system and classify them.

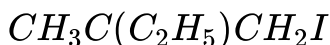
[View Text Solution](#)

2. Name the following halides according to IUPAC system and classify them.



[View Text Solution](#)

3. Name the following halides according to IUPAC system and classify them.



[View Text Solution](#)

4. Name the following halides according to IUPAC system and classify them.



 [View Text Solution](#)

5. What are alkyl halides?

 [View Text Solution](#)

6. What are haloarenes? How are they classified?

 [View Text Solution](#)

7. The boiling point of an alkyl halide is higher than that of the corresponding alkane because of .....

 [View Text Solution](#)

8. Alkyl halides are insoluble in water because they do not form \_\_\_\_\_ with water.



[View Text Solution](#)

9. Explain the following:

Although haloalkanes are polar in character they are insoluble in water.



[View Text Solution](#)

10. Explain the following:

The boiling point of bromoethane is higher than that of chloroethane.



[View Text Solution](#)

**11.** How are alkyl halides prepared from

Alcohols?



**View Text Solution**

**12.** How are alkyl halides prepared from

Alkenes?



**View Text Solution**

**13.** How are alkyl halides prepared from

Alkanes?



**View Text Solution**

14. Write the equations for the preparation of 1-iodobutane from

1-butanol



[View Text Solution](#)

15. Write the equations for the preparation of 1-iodobutane from

1-chlorobutane



[View Text Solution](#)

16. Write the equations for the preparation of 1-iodobutane from

but-1-ene



[View Text Solution](#)

17. Which of the following will have least hindered rotation about carbon-carbon bond?

A. ethane

B. ethylene

C. acetylene

D. chloroethene

**Answer: A**



[View Text Solution](#)

18. When hydrochloric acid is treated with prepene in presence of peroxide, it gives

A. 2-chloropropane

B. allyl chloride

C. no reaction

D. n-propyl chloride

**Answer: A**



[View Text Solution](#)

**19.** The main product of the reaction of propane with chlorine at  $25^{\circ}\text{C}$  in the presence of sunlight is:

A. 1-Chloropropane

B. 2-Chloropropane

C. Chloroethane



D. Chloromethane

**Answer: B**

 [View Text Solution](#)

20. Which of the following compounds is used as refrigerant?

A. Acetone

B.  $CCl_4$

C.  $CF_4$

D.  $CCl_2F_2$

**Answer: D**

 [View Text Solution](#)

21. Which of the following will give iodoform test?

A. 3-Pentanone

B. Formaldehyde

C. Butanone

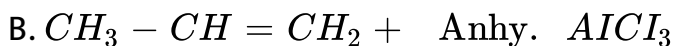
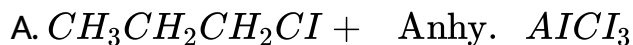
D. Benzyl alcohol

**Answer: C**



[View Text Solution](#)

22. Benzene can be converted to isopropyl benzene (Cumene) by the following reagent



C. Both of the above

D. None of the above

**Answer: C**



[View Text Solution](#)

**23.** Compounds A,B and C in the following reaction sequence are:



A.  $CH_2H_5CN$ ,  $C_2H_5COOH$ ,  $NH_3$

B.  $C_2H_5NC$ ,  $C_2H_5NH_2$ ,  $HCOOH$

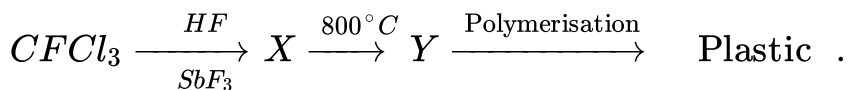
C.  $C_2H_5NC$ ,  $C_2H_5NHCH_3$ ,  $HCOOH$

D. None of these

**Answer: B**

 [View Text Solution](#)

**24.** Which of the following plastics is a last product



A. Bakelite

B. Teflon

C. Polyethene

D. None of the above

**Answer: B**

 [View Text Solution](#)

25. Which of the following samples of chloroform will give white precipitate with silver nitrate?

- A. Pure chloroform
- B. Chloroform exposed to air
- C. Both of the above
- D. None of the above

**Answer: B**



[View Text Solution](#)

26. Which of the following is boiled with ethyl chloride for the preparation of ethyl alcohol?

- A. Alcoholic KOH

B. Aqueous KOH

C.  $H_2O$

D.  $H_2O_2$

**Answer: B**



[View Text Solution](#)

27. The compound X in the reaction  $X + Zn \rightarrow$  3-Hexene is:

A. 3,4-Dichlorohexane

B. 1,1-Dichloropropane

C. Both of the above

D. None of the above

**Answer: C**



[View Text Solution](#)

28. The following is obtained by heating iodoform with an alkali powder:

A. Acetylene

B. Ethylene

C. Methane

D. Ethane

**Answer: A**



[View Text Solution](#)

29. The most inert compound is

- A. Iodoform
- B. Dichloromethane
- C. Dichlorodifluoromethane
- D. Chloroform

**Answer: C**



**View Text Solution**

**30.** The following is not obtained by the hydrolysis of a gem dihalide?

- A. A 1, 2-Diol
- B. An aldehyde
- C. A ketone



D. None of these

**Answer: A**



[View Text Solution](#)

**31.** 1% pure alcohol is added to the chloroform used in hospitals because:

- A. It stops the oxidation of chloroform
- B. The poisonous gas phosgene is not formed
- C. Phosgene is formed but ethyl alcohol converts it into diethyl carbonate
- D. It is helpful in producing unconsciousness

**Answer: C**



[View Text Solution](#)

32. What is false for alkyl halides?

- A. These are completely soluble in water
- B. These give nucleophilic substitution reactions
- C. These are insoluble in water
- D. These are soluble in organic solvents

**Answer: A**



[View Text Solution](#)

33. The reactivity of alkyl halides depends upon:

- A. the nature of halogen atom

B. the nature of alkyl group

C. both of the above

D. None of these

**Answer: C**



**View Text Solution**

**34.** Hunsdicker reaction is an example of :

A. Decarboxylation

B. Debromination

C. Decarboxylation and bromination

D. Bromination

**Answer: C**



[View Text Solution](#)

35.  $C_4H_9Br$  can represent:

- A.  $3^\circ$  bromoalkane
- B.  $2^\circ$  bromoalkane
- C.  $1^\circ$  bromoalkane
- D. All of the above

**Answer: D**



[View Text Solution](#)

36. The reason to keep chloroform in the dark brown coloured bottle is:

- A. To stop its oxidation
- B. To stop its decomposition
- C. To stop the formation of carbon tetrachloride from it
- D. To stop its hydrolysis

**Answer: A**



[View Text Solution](#)

**37. Which of the following metals is used in Wurtz synthesis?**

- A. Ba
- B. Al
- C. Na
- D. Fe

**Answer: C**



[View Text Solution](#)

**38.**  $CCl_4$  does not give a precipitate with  $AgNO_3$ . Its reason is:

- A. The formation of a complex
- B. The evolution of  $Cl_2$  gas
- C. Chloride ion is not formed
- D.  $AgNO_3$  does not give Ag ions

**Answer: C**



[View Text Solution](#)

**39.** In carbylamine test, alcoholic KOH is heated with:

- A. Chloroform and silver powder
- B. Trihalomethane and a primary amine
- C. Alkyl halide and a primary amine
- D. Alkyl cyanide and a primary amine

**Answer: B**



[View Text Solution](#)

**40.** At room temperature, iodoform is :

- A. A colourless liquid
- B. A violet coloured gas
- C. A yellow solid
- D. A grey liquid

**Answer: C**



[View Text Solution](#)

**41.** In the Darzen's process for the preparation of alkyl chlorides, alcohol react with:

- A. Thionyl chloride in pyridine
- B. Sulphuryl chloride in pyridine
- C.  $HCl + \text{ anhy. } ZnCl_2$
- D. None of the above

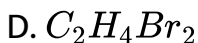
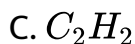
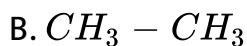
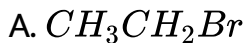
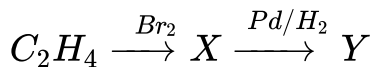
**Answer: A**



[View Text Solution](#)



42. The final product (Y) of the following reaction is:



**Answer: B**



[View Text Solution](#)

43. The reaction of bleaching powder with ethanol is :

A. Hydrolysis

B. Oxidation

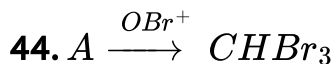
C. Halogenation

D. All of the above

**Answer: D**



[View Text Solution](#)



The compound is :

A. Isopropyl alcohol

B. Isobutyl alcohol

C. Neopentyl alcohol

D. n-Butanol

**Answer: A**

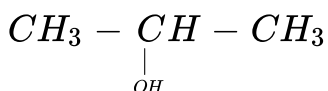
 [View Text Solution](#)

## Mandatory Exercise Exercise Set Ii

1. How will you convert n-propyl bromide into isopropyl bromide?

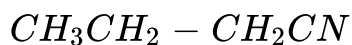
 [View Text Solution](#)

2. Outline the preparation of following compounds using a nucleophilic of following compounds using a nucleophilic substitution reaction.



 [View Text Solution](#)

3. Outline the preparation of following compounds using a nucleophilic of following compounds using a nucleophilic substitution reaction.



 [View Text Solution](#)

4. How do the products differ when ethyl bromide reacts separately with:

Aqueous KOH and alcoholic KOH

 [View Text Solution](#)

5. How do the products differ when ethyl bromide reacts separately with:

KCN and AgCN?



[View Text Solution](#)

6. How is ethyl iodide converted into diethyl ether



[View Text Solution](#)

7. How is ethyl iodide converted into ethylene?



[View Text Solution](#)

8. How will you bring about the following conversions?

Ethanol to butane.



[View Text Solution](#)

9. How will you bring about the following conversions?

Ethene to bromoethene.

 [View Text Solution](#)

10. How will you bring about the following conversions?

Propene to 1-nitropropane.

 [View Text Solution](#)

11. How will you bring about the following conversions?

1-chlorobutane to n-octane.

 [View Text Solution](#)

**12.** How will you convert

1-propanol to 2-bromopropane



**View Text Solution**

**13.** How will you convert

1-bromopropane to 2-bromopropane.



**View Text Solution**

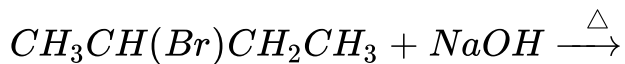
**14.** How will you convert

n-propyl chloride to isopropyl chloride?



**View Text Solution**

15. Write the structure of the major organic product formed in each of following reactions:



 [View Text Solution](#)

16. Write the structure of the major organic product formed in each of following reactions:



 [View Text Solution](#)

17. Write steps to bring about the following transformations:

tert-butyl bromide to 1-bromo-2methyl-propane

 [View Text Solution](#)



18. Write steps to bring about the following transformations:

Butan-1-ol to but -1-ene



[View Text Solution](#)

19. The alkyl halide is converted into an alcohol by

- A. addition reaction
- B. substitution reaction
- C. dehydrohalogenation reaction
- D. elimination reaction

**Answer: B**



[View Text Solution](#)

20. The conversion of 2,3-dibromobutane to 2-butene with Zn is

- A. redox reaction
- B. elimination
- C. addition
- D. both elimination and redox reaction

**Answer: C**



[View Text Solution](#)

21. Anti-Markownikov addition of HBr is not observed in

- A. propene
- B. 1-butene
- C. but-2-ene

D. pent-2ene

**Answer: C**

 [View Text Solution](#)

22. n-propyl bromide on treatment with alcoholic potassium hydroxide produces

A. propane

B. propene

C. propyne

D. propanol

**Answer: B**

 [View Text Solution](#)

23. 1-chlorobutane on reaction with alcoholic potash gives

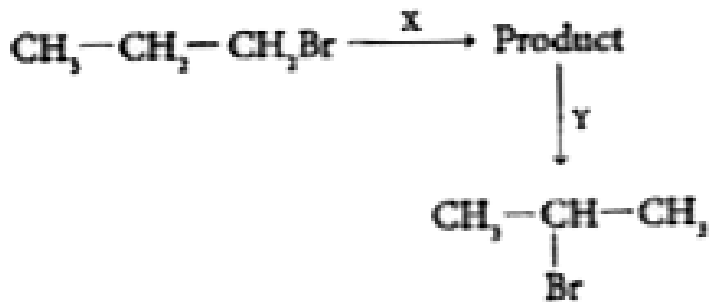
- A. 1-butene
- B. 1-butanol
- C. 2-butene
- D. 2-butanol

**Answer: A**



[View Text Solution](#)

24. Identify the set of reagent 'X' and 'y' in the following transformation:



- A. X = dil. Aqueous NaOH, Y = HBr
- B. X = conc. Alcoholic NaOH, Y = HBr
- C. X = dil. Aueous  $\text{NaOH}$ ,  $Y = \text{Br}_2$
- D. X = conc. Alcoholic  $\text{NaOH}$ ,  $Y = \text{Br}_2$

**Answer: B**

 [View Text Solution](#)

25. The following reagent is required for the conversion of a primary amine into a primary alkyl halide:

A.  $SOCl_2$ / Pyridine

B. Luca's reagent

C. Tilden's reagent

D.  $PCl_5$

**Answer: C**



[View Text Solution](#)

**26.** The product of the reaction of ethyne with hydrochloric acid can also be prepared by the following reaction

A. Ethanal with  $PCl_5$

B. Ethene with  $Cl_2$

C. Ethyl chloride with  $Cl_2$

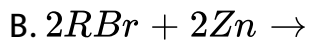
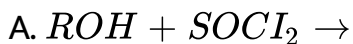
D. None of these

**Answer: A**



[View Text Solution](#)

27. Strecker's reaction is:



**Answer: C**



[View Text Solution](#)

28. Which will react with aqueous KOH with difficulty?

A. Allyl chloride

B. Vinyl chloride

C. Chlorobenzene

D. (B) and ( C ) Both

**Answer: D**



[View Text Solution](#)

29. The following reagent is used in the preparation of an unsaturated compound from chloroform:

A.  $Zn + H_2O$

B.  $Fe + H_2O$



C. Zn

D. Ag powder

**Answer: D**



[View Text Solution](#)

**30.** The halogen derivative used as an antiseptic is:

A.  $CHCl_3$

B.  $CHBr_3$

C.  $CCl_4$

D.  $CHI_3$

**Answer: D**



[View Text Solution](#)

31. Which of the following reagents is used to step up to C-chain in alkyl halides:

A. HCN

B. KCN

C.  $NH_4CN$

D. AgCN

**Answer: B**



[View Text Solution](#)

32. Which of the following group is replaced by a halogen atom?

A. Hydroxyl group (-OH)

B. Aldehyde (-CHO)

C. Nitro ( $NO_2$ )

D. Ketone ( $>C=O$ )

**Answer: A**



**View Text Solution**

**33.**  $CCl_4$  is insoluble in water because:

A. water is polar

B.  $CCl_4$  is nonpolar

C. water and  $CCl_4$  are polar

D. None of the above

**Answer: B**



[View Text Solution](#)

**34.** The compound formed by the reaction of ethyl chloride with sodium-lead alloy is:

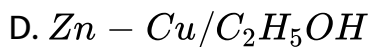
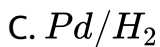
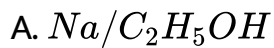
- A. Tetraethyl lead
- B. Sodium ethoxide
- C. Ethyl sodium
- D. No reaction

**Answer: A**



[View Text Solution](#)

**35.** Which of the following reagents reduces alkyl halide by hydride ion?

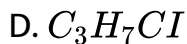
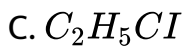
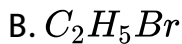
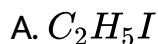


**Answer: B**



[View Text Solution](#)

**36.** The compound with highest boiling point is:



**Answer: A**



[View Text Solution](#)

**37.** The following alkane is not obtained by the reaction of ethyl iodide with propyl iodide and sodium metal in the presence of dry ether

A. Propane

B. Butane

C. Pentane

D. Hexane

**Answer: A**



[View Text Solution](#)

38. The reaction of methane with iodine is carried out in the presence of  $HNO_3$  because  $HNO_3$

- A. Gives iodine in the iodination of methane
- B. Oxidises HI formed in the reaction
- C. Reduces HI formed in the reaction
- D. Changes the  $I_2$  molecule into I atoms.

**Answer: B**



[View Text Solution](#)

39. The following compound is obtained when a mixture of carbon tetra chloride vapours and water vapours is heated at  $500^\circ C$ .

- A. Carbon dioxide
- B. Phosgene gas
- C. Phosphine gas
- D. Phosphoryl chloride

**Answer: B**



[View Text Solution](#)

**40.** The product of the reaction of ethyl iodide with Zn-Cu couple/alcohol can also be prepared by the following reaction

- A. By the hydrolysis of the product obtained from the reaction of ethyl iodide with Mg in dry ether.
- B. Reaction of iodomethane with Na in dry ether



C. By the reduction of ethyl alcohol with red P + HI

D. All of the above

**Answer: D**



[View Text Solution](#)

41. The following compound is obtained on heating 2, 2-dichloropropane with aqueous KOH

A. 2,2-Propandiol

B. 1,2-Propandiol

C. Propanone

D. Propanal

**Answer: C**

 [View Text Solution](#)

42. The product of which of the following reactions is not a vicinal dihalide

- A. Reaction of ethylene glycol with  $P + Br_2$
- B. Reaction of HCl with ethyne
- C. Reaction of HBr with ethyne in the presence of peroxide
- D. Reaction of  $CI_2$  with propene

**Answer: B**

 [View Text Solution](#)

43. Ethylene chloride and ethylidene chloride are positional isomers. Which of the following statement is not applicable on

both?

- A. both are dihalogen derivatives
- B. Both form the same product with aqueous potash
- C. Both form the same product with alcoholic potash
- D. Both give Beilstein test

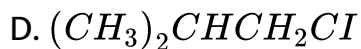
**Answer: B**



[View Text Solution](#)

44. Which of the following chlorides hydrolyses most easily

- A.  $CH_3CH_2CH_2Cl$
- B.  $CH_2 = CH - Cl$
- C.  $CH_2 = CH - CH_2Cl$



**Answer: C**



[View Text Solution](#)

45. A dihalogen derivative (A) with three C-atoms gives a hydrocarbon (B) on reacting with alcoh. KOH. (B) gives a white precipitate with Tollen's reagent. (A) on heating with aqueous KOH gives a ketone. Compound (A) is

A. 1, 1-Dihalopropane

B. 1, 2-Dihalopropane

C. 2, 2-Dihalopropane

D. 1,3-Dihalopropane

**Answer: C**



[View Text Solution](#)

**46.** A five C-atom hydrocarbon is formed by the reduction of a chloroderivative (A) of an alkane with Zn/Cu couple. (A) is dissolved in dry ether and then treated with metallic sodium to give 2, 2, 5, 5-tetramethyl hexane. The IUPAC name of compound (A) is

- A. Neopentyl chloride
- B. 1-chloro-2, 2-dimethyle propane
- C. 1-chloro-3-methyl butane
- D. 2-chloro-3-methylbutane

**Answer: B**



[View Text Solution](#)

47. The unsaturated hydrocarbon obtained by the reaction of a dihalogen derivative with alcoholic potash gives a red precipitate with ammonical cuprous chloride. The dihalogen derivative gives propanal on heating with aqueous potash. The dihalogen derivative is

- A. 1, 1-Dichloropropane
- B. 1, 2-Dichloropropane
- C. 2, 2-Dichloropropane
- D. 1, 4-Dchloropropane

**Answer: A**



[View Text Solution](#)

48. The following reaction is used in the Darzen's process for the preparation of alkyl chloride

- A. Alcohol with nitrosyl chloride
- B. Alcohol with thionyl chloride in the presence of pyridine
- C. Alcohol with HCl in the presence of anhy.  $ZnCl_2$
- D. None of these

**Answer: B**



[View Text Solution](#)

49. 3.94g of iodoform is heated with Ag powder. What will be the volume of the gas obtained at NTP

- A. 224 ml

B. 112 ml

C. 22400 ml

D. 2240 ml

**Answer: B**



**View Text Solution**

**50.** In the laboratory, chloroform is prepared by the following method

A. By oxidation of alcohol with bleaching powder

B. By reduction of carbon tetrachloride with  $Fe + H_2O$

C. By oxidation of carbon tetrachloride with bleaching powder



D. None of the above

Answer: A



View Text Solution

## Consolidated Exercise Matching

1. Match the following:

Column A	Column B
(a) $C_2H_5Cl + Na - OC_2H_5 \xrightarrow{\Delta} C_2H_5O - C_2H_5 + NaCl$	(p) Wurtz reaction
(b) $CH_3CH_2MgCl$	(q) Elimination reaction
(c) $2C_2H_5Cl + 2Na \xrightarrow[\text{ether}]{\text{dry}} C_4H_{10} + 2NaCl$	(r) Dehydrohalogenation reaction
Column A	Column B
(d) $CH_3CH_2Cl \xrightarrow{H_2/Pt} CH_3 - CH_3 + HCl$	(s) Substitution reaction
(e) $CH_3CH_2Br + KOH \xrightarrow[\text{(alc)}]{\Delta} C_2H_4 + KBr + H_2O$	(t) Reduction reaction
	(u) Grignard reagent
	(v) Aqua regia
	(w) Williamson's synthesis



View Text Solution

1. Haloalkanes can be obtained from

- A. alcohols
- B. alkenes
- C. silver
- D. alkanes

**Answer: A::B::D**



[View Text Solution](#)

2. Alkyl halides are insoluble in water because

- A. they are polar

B. they cannot form hydrogen bonds with water

C. they cannot break hydrogen bonds already existing in water

D. they are non polar

**Answer: A::B::C::D**



**View Text Solution**

**3. The products of alcoholic silver nitrite with ethyl bromide are**

A. ethyne

B. ethane

C. nitroethane

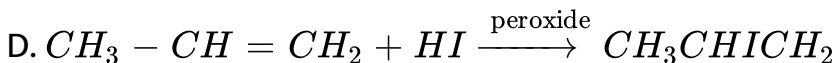
D. silver bromide

Answer: A::C::D



View Text Solution

4. Pick the correct equations:



Answer: A::C::D



View Text Solution

5. Alkyl halides are reduced to the corresponding alkanes by the following reducing agent (s)

- A. potassium nitrite
- B. potassium alkoxide
- C. zinc-hydrochloric acid couple
- D. zinc-copper couple in alcohol

**Answer: A::C::D**



[View Text Solution](#)

**Challenging Exercise**

1. Explain why alkyl halides undergo hydrolysis more easily as compared to aryl halides?



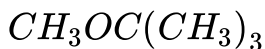
[View Text Solution](#)

2. Outline the preparation of following compounds using a nucleophilic substitution reaction:



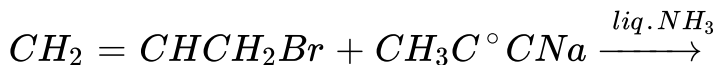
[View Text Solution](#)

3. Outline the preparation of following compounds using a nucleophilic substitution reaction:



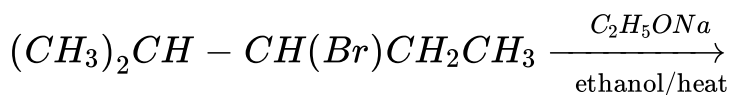
[View Text Solution](#)

4. Write the structures of the major organic product formed in each of the following reaction:



 [View Text Solution](#)

5. Write the structures of the major organic product formed in each of the following reaction:



 [View Text Solution](#)

6. How are the following conversions carried out?

Bromomethane to ethanoic acid

 [View Text Solution](#)

 [View Text Solution](#)

7. How are the following conversions carried out?

Propanol from ethanol



[View Text Solution](#)

8. How are the following conversions carried out?

Ethyne to pent-2-yne



[View Text Solution](#)

## Olympiad And Ntse Level Exercises

1. What is the main product of the reaction between 2-methyl propene with HBr



- A. 1-bromo butane
- B. 1-bromo-2 methyle propane
- C. 2-bromo butane
- D. 2-bromo-2-methyl propane

**Answer: D**



[View Text Solution](#)

2. Halogenation of alkanes is

- A. A reductive process
- B. An oxidative Process
- C. An isothermal process
- D. An endothermal process

**Answer: B**



[View Text Solution](#)

3.  $R - OH + HX \rightarrow R - X + H_2O$ . In the above reaction, the reactivity of different alcohols is

A. Tertiary  $>$  Secondary  $>$  Primary

B. Tertiary  $<$  Secondary  $<$  Primary

C. Tertiary  $<$  Secondary  $>$  Primary

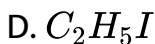
D. Secondary  $<$  Primary  $<$  Tertiary

**Answer: A**



[View Text Solution](#)

4. When ethyl alcohol and KI reacted in presence of  $Na_2CO_3$ , yellow crystals of ....., are formed

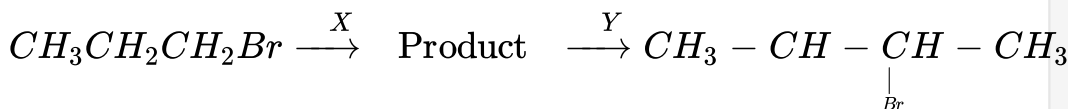


**Answer: A**



[View Text Solution](#)

5. Identify the set of reagent and reaction conditions 'X' and 'Y' in the following set of transformation,



A. X = dilute aqueous  $NaOH$ ,  $20^{\circ}C$

$Y = HBr$  / acetic acid,  $20^{\circ}C$

B. X = Concentrated alcoholic  $NaOH$ ,  $80^{\circ}C$

$Y = HBr$  / acetic acid,  $20^{\circ}C$

C. X = dilute aqueous  $NaOH$ ,  $20^{\circ}C$

$Y = Br_2/CHCl_3$ ,  $0^{\circ}C$

D. X = Concentrated alcoholic

$NaOH$ ,  $80^{\circ}C$ ,  $Y = Br_2/CHCl_3$ ,  $0^{\circ}$ .

**Answer: B**



[View Text Solution](#)

6. An isomer of  $C_3H_6Cl_2$  on boiling with aqueous KOH gives acetone. Hence, the isomer is

A. 2, 2-dichloropropane

B. 1, 2-dichloropropane

C. 1,1-dichloropropane

D. 1, 3-dichloropropane

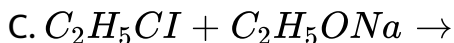
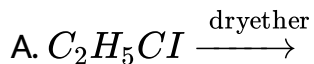
**Answer: A**

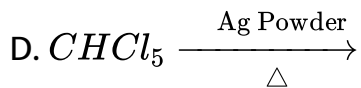


[View Text Solution](#)

7. Wurtz reaction of methyl iodide yields an organic compound

X. Which one of the following Reactions also yields X

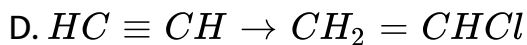
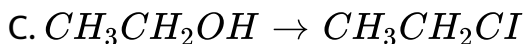
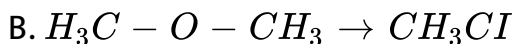
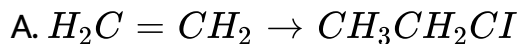




**Answer: B**

 [View Text Solution](#)

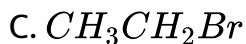
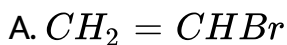
8. In which one of the following conversions phosphorus pentachloride is used as a reagent



**Answer: B::C**

 [View Text Solution](#)

9. Among the following the most reactive towards alcoholic Koh is



**Answer: D**



[View Text Solution](#)

10. Which one of the following possess highest m.pt.



B. o-dichlorobenzene

C. m-dichlorobenzene

D. p-dichlorobenzene

**Answer: D**



**View Text Solution**