CHEMISTRY

BOOKS - U-LIKE CHEMISTRY (HINGLISH)

HALOALKANES AND HALOARENES

Ncert Intext Questions

1. Write structures of the following compounds :

(i) 2-Chloro -3- methylpentane (ii) 1-Chloro -4- ethylcyclohexane

(iii) 4- Tert.Butyl-3-iodoheptane (iv) 1, 4-Dibromobut -2- ene

(v) 1-Bromo -4-sec. butyl -2-methylbenzene

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2. Why is sulphuric acid not used during the reaction of alcohols with KI ?

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3. Write structures of different dihalogen derivaties of propane.

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4. Among the isomeric alkanes of molecular formula C_5H_{12}, identify the one that on photo chemical chlorination yields

(i) a single monochloride. (ii) three isomeric monochlorides.

(iii) four isomeric monochlorides.

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5. Draw the structures of major monohalo procucts in each of the following reactions :

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6. Arrange each set of compounds in order of increasing boiling points.

(i) Bromomethane, Bromoform, Chloromethane, Dibromomethane.

(ii) 1-Chloropropane, Isopropyl chloride, 1-Chlorobutane.

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7. Which alkyl halide from the following pairs would you expect to react more rapidly by S_N2 mechanism ? Explain your answer.

$CH_3CH_2CH_2CH_2$ or $CH_3CH_2-\underset{\displaystyle Br}{\underset{|}{CH}}-CH_3$

(ii) $CH_3CH_2\underset{\displaystyle Br}{\underset{|}{CH}}CH_3$ or $H_3C-\underset{\displaystyle CH_3}{\underset{|}{\overset{\displaystyle CH_3}{\overset{|}{C}}}}-Br$

(iii) $CH_3\underset{\displaystyle CH_3}{\underset{|}{C}}HCH_2CH_2Br$ or $CH_3CH_2\underset{\displaystyle CH_3}{\underset{|}{C}}HCH_2Br$

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8. In the following pairs of halogen compounds, which compound undergoes faster S_N1 reaction ?

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9. Identify A, B, C, D, E, R and R^1 in the following :

$$R-Br+Mg \xrightarrow{\text{dry ether}} C \xrightarrow{D_2O} CH_3-\underset{\underset{D}{|}}{CH}-CH_3$$

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Ncert Textbook Exercises

1. Name the following halides according to IUPAC system and classify them as alkyl , allyl , benzyl (primary , secondary , tertiary), vinyl or aryl halides :

$(CH_3)_2CHCH(Cl)CH_3$

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2. Name the following halides according to IUPAC system and classify them as alkyl , allyl , benzyl (primary , secondary , tertiary), vinyl or aryl halides :

$CH_3CH_2CH(CH_3)CH(C_2H_5)Cl$

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3. Name the following halides according to IUPAC system and classify them as alkyl , allyl , benzyl (primary , secondary , tertiary), vinyl or aryl halides :

$CH_3CH_2C(CH_3)_2CH_2I$

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4. Name the following halides according to IUPAC system and classify them as alkyl , allyl , benzyl (primary , secondary , tertiary), vinyl or aryl

halides :

$(CH_3)_3CCH_2CH(Br)C_6H_5$

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5. Name the following halides according to IUPAC system and classify them as alkyl , allyl , benzyl (primary , secondary , tertiary), vinyl or aryl halides :

$CH_3CH(CH_3)CH(Br)CH_3$

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6. Name the following halides according to IUPAC system and classify them as alkyl , allyl , benzyl (primary , secondary , tertiary), vinyl or aryl halides :

$CH_3C(C_2H_5)_2CH_2Br$

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7. Name the following halides according to IUPAC system and classify them as alkyl , allyl , benzyl (primary , secondary , tertiary), vinyl or aryl halides :

$CH_3C(Cl)(C_2H_5)CH_2CH_3$

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8. Name the following halides according to IUPAC system and classify them as alkyl , allyl , benzyl (primary , secondary , tertiary), vinyl or aryl halides :

$CH_3CH = C(Cl)CH_2CH(CH_3)_2$

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9. Name the following halides according to IUPAC system and classify them as alkyl , allyl , benzyl (primary , secondary , tertiary), vinyl or aryl halides :

$CH_3CH = CHC(Br)(CH_3)_2$

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10. Name the following halides according to IUPAC system and classify them as alkyl , allyl , benzyl (primary , secondary , tertiary), vinyl or aryl halides :

$p - ClC_6H_4CH_2CH(CH_3)_2$

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11. Name the following halides according to IUPAC system and classify them as alkyl , allyl , benzyl (primary , secondary , tertiary), vinyl or aryl halides :

$m - ClCH_2C_6H_4CH_2C(CH_3)_3$

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12. Name the following halides according to IUPAC system and classify them as alkyl , allyl , benzyl (primary , secondary , tertiary), vinyl or aryl

halides :

$o - Br - C_6H_4CH(CH_3)CH_2CH_3$

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13. Give the IUPAC names of the following compounds :

(i) $CH_3CH(Cl)CH(Br)CH_3$ $(ii)CHF_2CBrClF$

$(iii)ClCH_2C \equiv CCH_2Br$ $(iv)(CCl_3)_3CCl$

$(v)CH_3C(p - ClC_6H_4)_2CH(Br)CH_3$ $(vi)(CH_3)_3CCH = ClC_6H_4I$

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14. Give the IUPAC names of the following compounds :

2-Chloro -3- methylpentane

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15. Give the IUPAC names of the following compounds :

p-Bromochlorobenzene

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16. Give the IUPAC names of the following compounds :

1-Chloro -4- ethylclohexane

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17. Give the IUPAC names of the following compounds :

2-(2-Chlorophenyl)-1-iodooctane

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18. Give the IUPAC names of the following compounds :

Perfluorobenzene

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19. Give the IUPAC names of the following compounds :

4-tert -Butyl -3- iodoheptane

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20. Give the IUPAC names of the following compounds :

1-Bromo -4-sec - butyl -2-methylbenzene

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21. Give the IUPAC names of the following compounds :

1,4- Dibromobut -2-ene

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22. Which one of the following has the highest dipole moment ?

$(i)CH_2Cl_2 \quad (ii)CHCl_3 \quad (iii)CCl_4.$

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23. A hydrocarbon C_5H_{10} does not react with chlorine in dark but gives a single monochloro compound C_5H_9Cl in bright sunlight. Identify the hydrocarbon .

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24. Write the isomers of the compound having formula C_4H_9Br.

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

(i) 1- butanol (ii) 1-chlorobutane (iii) but -1-ene.

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26. What are ambident nucleophiles ? Explain with an example.

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27. Which compound in each of the following pairs will react faster in S_N2 reaction with $-OH$?

$(i) CH_3Br$ or CH_3I $(ii) (CH_3)_3CCl$ or CH_3Cl

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28. Predict all the alkenes that would be formed by dehydrohalogenation of the following halides with sodium ethoxide in ethanol and identify the major alkene :

1-Bromo -1- methylcyclohexane

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29. Predict all the alkenes that would be formed by dehydrohalogenation of the following halides with sodium ethoxide in ethanol and identify the major alkene :

2-chloro -2- methylbutane

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30. Predict all the alkenes that would be formed by dehydrohalogenation of the following halides with sodium ethoxide in ethanol and identify the major alkene :

2,2,3- trimethyl -3-Bromopentane

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31. How will you bring about the following conversions ?

Ethanol to but -1- yne .

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32. How will you bring about the following conversions ?

Ethane to bromoethene .

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33. How will you bring about the following conversions ?

Propene to 1- nitropropane .

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34. How will you bring about the following conversions ?

Toluene to benzyl alcohol .

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35. How will you bring about the following conversions ?

Propene to propyne .

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36. How will you bring about the following conversions ?

Ethanol to ethyl fluoride .

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37. How will you bring about the following conversions ?

Bromomethane to propanone .

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38. How will you bring about the following conversions ?

But -1- ene to but -2- ene .

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39. How will you bring about the following conversions ?

1-Chlorobutane to n-octane .

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40. How will you bring about the following conversions ?

Benzene to biphenyl .

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41. the dipole moment of chlorobenzene is lower than that of cyclohexyl chloride ?

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42. alkyl halides, though polar, are immiscible with water?

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43. Grignard reagents should be prepared under anhydrous conditions ?

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44. Write the structure of the major organic product in each of the following reaction :

$$CH_3CH_2CH_2Cl + NaI \xrightarrow[\text{heat}]{\text{acetone}}$$

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45. Write the structure of the major organic product in each of the following reaction :

$$(CH_3)_3CBr + KOH \xrightarrow[\text{heat}]{\text{ethanol}}$$

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46. Write the structure of the major organic product in each of the following reaction :

$CH_3CH(Br)CH_2CH_3 + NaOH \xrightarrow{\text{water}}$

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47. Write the structure of the major organic product in each of the following reaction :

$CH_3CH_2Br + KCN \xrightarrow{\text{aq.ethanol}}$

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48. Write the structure of the major organic product in each of the following reaction :

$C_6H_5ONa + C_2H_5Cl \rightarrow$

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49. Write the structure of the major organic product in each of the following reaction :

$CH_3CH_2CH_2OH + SOCl_2 \rightarrow$

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50. Write the structure of the major organic product in each of the following reaction :

$CH_3CH_2CH = CH_2 + HBr \xrightarrow{\text{peroxide}}$

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51. Write the structure of the major organic product in each of the following reaction :

$CH_3CH = C(CH_3)_2 + HBr \rightarrow$

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52. Write the mechanism of the following reaction :

$$nBuBr + KCN \xrightarrow{EtOH - H_2O} nBuCN$$

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53. Arrange the compounds of each set in order of reactivity towards S_N2 displacement :

(i) 2- Bromo-2-methylbutane , 1- Bromopentane, 2- Bromopentane

(ii) 1-Bromo -3- methylbutane, 2- Bromo -2- methylbutane, 3- Bromo -2-methylbutane.

(iii) 1-Bromobutane, 1- Bromo -2, 2- dimethylpropane, 1- Bromo -2-methylbutane, 1- Bromo -3- methylbutane.

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54. Out of $C_6H_5CH_2Cl$ and $C_6H_5CHClC_6H_5$ which is more easily hydrolysed by equeous KOH ?

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55. p-Dichlorobenzene has higher m.p. and lower solubility than those of o - and m-isomers. Discuss.

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56. How the following conversions can be carried out ?

Propene to propan-1-ol

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57. How the following conversions can be carried out ?

Ethanol to but-1-yne

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58. How the following conversions can be carried out ?

1-Bromopropane to 2-bromopropane

View Text Solution

59. How the following conversions can be carried out ?

Toluene to benzyl alcohol

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60. How the following conversions can be carried out ?

Benzene to 4-bromonitrobenzene

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61. How the following conversions can be carried out ?

Benzyl alcohol to 2-phenylethanoic acid

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62. How the following conversions can be carried out ?

Ethanol to propanenitrile

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63. How the following conversions can be carried out ?

Aniline to chlorobenzene

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64. How the following conversions can be carried out ?

2-Chlorobutane to 3, 4-dimethylhexane

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65. How the following conversions can be carried out ?

2-methyl-1-propene to 2-chloro-2-methylpropane

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66. How the following conversions can be carried out ?

Ethyl chloride to propanoic acid

View Text Solution

67. How the following conversions can be carried out ?

But-l-ene to n-butyliodide

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68. How the following conversions can be carried out ?

2-chloropropane to 1-propanol

View Text Solution

69. How the following conversions can be carried out ?

Isopropyl alcohol to iodoform

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70. How the following conversions can be carried out ?

Chlorobenzene to p-nitrophenol

View Text Solution

71. How the following conversions can be carried out ?

2-Bromopropane to 1-bromopropane

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72. How the following conversions can be carried out ?

Chloroethane to butane

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73. How the following conversions can be carried out ?

Benzene to diphenyl

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74. How the following conversions can be carried out ?

tert-Butyl bromide to isobutyl bromide

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75. How the following conversions can be carried out ?

Aniline to phenylisocyanide

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76. The treatment of alkyl chlorides with aqueous KOH leads to the formation of alcohols but in the presence of alcoholic KOH, alkenes are major products. Explain.

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77. Primary alkyl halide C_4H_9Br (a) reacted with alcoholic KOH to give compound (b). Compound (b) is reacted with HBr to give (c) which is an isomer of (a). When (a) is reacted with sodium metal, it gives a compound (d), C_8H_{18} which is different from the compound formed when n-butyl bromide is reacted with sodium. Give the structural formula of (a) and write the equations for all the reactions.

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78. What happens when

n-butyl chloride is treated with alcoholic KOH.

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79. What happens when

bromobenzene is treated with Mg in the presence of dry ether.

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80. What happens when

chlorobenzene is subjected to hydrolysis.

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81. What happens when

ethyl chloride is treated with aqueous KOH.

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82. What happens when

methyl bromide is treated with sodium in the presence of dry ether.

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83. What happens when

methyl chloride is treated with KCN ?

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Case Based Source Based Integrated Questions

1. Read the given passage and answer questions follow :

The replacement of hydrogen atom(s) in an aliphatic or aromatic hydrocarbon by halogen atom(s) results in the formation of alkyl halide (haloalkane) and aryl halide (haloarene),respectively. Haloalkanes contain

halogen atom(s) attached to the sp^3 hybridised carbon atom of an alkyl group whereas haloarenes contain halogen atom(s) attached to sp^2 hybridised carbon atom(s) of an aryl group. Many halogen containing organic compounds occur in nature and some of these are clinically useful. These classes of compounds find wide applications in industry as well as in day-to-day life. They are used as solvents for relatively non-polar compounds and as starting materials for the synthesis of wide range of organic compounds. Chlorine containing antibiotic, chloramphenicol, produced by microorganisms is very effective for the treatment of typhoid fever. Our body produces iodine containing hormone, thyroxine, the deficiency of which causes a disease called goiter. Synthetic halogen compounds, viz. chloroquine is used for the treatment of malaria, halothane is used as an anaesthetic during surgery.

Out of C_2H_5Cl and C_6H_5Cl halogen compounds, which has the halogen attached to sp^2 hybridised carbon atom ?

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2. Read the given passage and answer questions follow :

The replacement of hydrogen atom(s) in an aliphatic or aromatic hydrocarbon by halogen atom(s) results in the formation of alkyl halide (haloalkane) and aryl halide (haloarene),respectively. Haloalkanes contain halogen atom(s) attached to the sp^3 hybridised carbon atom of an alkyl group whereas haloarenes contain halogen atom(s) attached to sp^2 hybridised carbon atom(s) of an aryl group. Many halogen containing organic compounds occur in nature and some of these are clinically useful. These classes of compounds find wide applications in industry as well as in day-to-day life. They are used as solvents for relatively non-polar compounds and as starting materials for the synthesis of wide range of organic compounds. Chlorine containing antibiotic, chloramphenicol, produced by microorganisms is very effective for the treatment of typhoid fever. Our body produces iodine containing hormone, thyroxine, the deficiency of which causes a disease called goiter. Synthetic halogen compounds, viz. chloroquine is used for the treatment of malaria, halothane is used as an anaesthetic during surgery.

Can we use halogen containing organic solvents to dissolve potassium chloride ?

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3. Read the given passage and answer questions follow :

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the deficiency of which causes a disease called goiter. Synthetic halogen compounds, viz. chloroquine is used for the treatment of malaria, halothane is used as an anaesthetic during surgery.

Name a chlorine containing compound produced by microorganisms for the treatment of typhoid fever.

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4. Read the given passage and answer questions follow :

The replacement of hydrogen atom(s) in an aliphatic or aromatic hydrocarbon by halogen atom(s) results in the formation of alkyl halide (haloalkane) and aryl halide (haloarene),respectively. Haloalkanes contain halogen atom(s) attached to the sp^3 hybridised carbon atom of an alkyl group whereas haloarenes contain halogen atom(s) attached to sp^2 hybridised carbon atom(s) of an aryl group. Many halogen containing organic compounds occur in nature and some of these are clinically useful. These classes of compounds find wide applications in industry as well as in day-to-day life. They are used as solvents for relatively non-polar compounds and as starting materials for the synthesis of wide range of

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What is thyroxine ?

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5. Read the given passage and answer questions follow :

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What is the use of halothane ?

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6. Read the given passage and answer questions follow:

The hydroxyl group of an alcohol is replaced by halogen on reaction with concentrated halogen acids, phosphorus halides or thionyl chloride. Thionyl chloride is preferred because in this reaction alkyl halide is formed along with gases SO_2 and HCl. The two gaseous products are escapable, hence, the reaction gives pure alkyl halides. The reactions of primary and secondary alcohols with HCl require the presence of a

catalyst, $ZnCl_2$. With tertiary alcohols, the reaction is conducted by simply shaking the alcohol with concentrated HCl at room temperature. Constant boiling with HBr $(48\,\%)$ is used for preparing alkyl bromide. Good yields of R- I may be obtained by heating alcohols with sodium or potassium iodide in $95\,\%$ orthophosphoric acid. The order of reactivity of alcohols with a given haloacid is $3^\circ > 2^\circ > 1^\circ$. Phosphorus tribromide and triiodide are usually generated in situ (produced in the reaction mixture) by the reaction of red phosphorus with bromine and iodine respectively.

Name the reagents that can be used for halogenation of alcohols.

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7. Read the given passage and answer questions follow:

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Why do we prefer thionyl chloride for the preparation of alkyl halides?

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Which catalyst is required when we prepare halogen compounds using concentrated HCl?

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9. Read the given passage and answer questions follow:

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Thionyl chloride is preferred because in this reaction alkyl halide is formed along with gases SO_2 and HCl. The two gaseous products are escapable, hence, the reaction gives pure alkyl halides. The reactions of primary and secondary alcohols with HCl require the presence of a catalyst, $ZnCl_2$. With tertiary alcohols, the reaction is conducted by simply shaking the alcohol with concentrated HCl at room temperature. Constant boiling with HBr $(48\,\%)$ is used for preparing alkyl bromide. Good yields of R- I may be obtained by heating alcohols with sodium or potassium iodide in $95\,\%$ orthophosphoric acid. The order of reactivity of alcohols with a given haloacid is $3^\circ > 2^\circ > 1^\circ$. Phosphorus tribromide and triiodide are usually generated in situ (produced in the reaction mixture) by the reaction of red phosphorus with bromine and iodine respectively.

How are PBr_3 and PI_3 prepared for halogenating the hydroxyl group of alcohols ?

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10. Read the given passage and answer questions follow:

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Give the reactivity order of alcohols in halogenation using a haloacid.

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11. Read the given passage and answer questions follow :

Tetrachloromethane is produced in large quantities for use in the manufacture of refrigerants and propellants for aerosol cans. It is also used as feedstock in the synthesis of chlorofluorocarbons and other chemicals, pharmaceutical manufacturing, and general solvent use. Until the mid 1960s, it was also widely used as a cleaning fluid, both in industry, as a degreasing agent, and in the home, as a spot remover and as fire extinguisher. There is some evidence that exposure to carbon tetrachloride causes liver cancer in humans. The most common effects are dizziness, light headedness, nausea and vomiting, which can cause permanent damage to nerve cells. In severe cases, these effects can lead rapidly to stupor, coma, unconsciousness or death. Exposure to CCl_4 can make the heart beat irregularly or stop. The chemical may irritate the eyes on contact. When carbon tetrachloride is released into the air, it rises to the atmosphere and depletes the ozone layer. Depletion of the ozone layer is believed to increase human exposure to ultraviolet rays, leading to increased skin cancer, eye diseases and disorders, and possible

disruption of the immune system.

Give two uses of tetrachloromethane.

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12. Read the given passage and answer questions follow :

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rises to the atmosphere and depletes the ozone layer. Depletion of the ozone layer is believed to increase human exposure to ultraviolet rays, leading to increased skin cancer, eye diseases and disorders, and possible disruption of the immune system.

Why was the use of tetrachloromethane as cleaning and degreasing agent stopped after mid 1960s ?

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What are the adverse health effects of exposure to carbon tetrachloride ?

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What is the role of CCl4 to ozone layer ?

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15. Read the given passage and answer questions follow :

Tetrachloromethane is produced in large quantities for use in the manufacture of refrigerants and propellants for aerosol cans. It is also used as feedstock in the synthesis of chlorofluorocarbons and other

chemicals, pharmaceutical manufacturing, and general solvent use. Until the mid 1960s, it was also widely used as a cleaning fluid, both in industry, as a degreasing agent, and in the home, as a spot remover and as fire extinguisher. There is some evidence that exposure to carbon tetrachloride causes liver cancer in humans. The most common effects are dizziness, light headedness, nausea and vomiting, which can cause permanent damage to nerve cells. In severe cases, these effects can lead rapidly to stupor, coma, unconsciousness or death. Exposure to CCl_4 can make the heart beat irregularly or stop. The chemical may irritate the eyes on contact. When carbon tetrachloride is released into the air, it rises to the atmosphere and depletes the ozone layer. Depletion of the ozone layer is believed to increase human exposure to ultraviolet rays, leading to increased skin cancer, eye diseases and disorders, and possible disruption of the immune system.

How does carbon tetrachloride affect the heart?

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Multiple Choice Questions

1. Chloroform on exposure to air in the presence of light produces

A. phosphoryl chloride.

B. phosphine .

C. phosphorus oxytrichloride.

D. phosgene.

Answer: d

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2. Chlorobenzene reacts with alkyl chloride in the presence of sodium metal gives

A. toluene.

B. xylene.

C. phenol .

D. benzyl chloride.

Answer: a

View Text Solution

3. Which of the following statements about DDT is incorrect?

A. Many species of insects developed resistance to DDT.

B. DDT is safe to use as insecticide.

C. It has a high toxicity towards fish.

D. DDT is not metabolised rapidly by animals.

Answer: b

View Text Solution

4. Which of the following is not used for the preparation of alkyl halides from alcohols ?

A. Cl_2

B. $HCl / ZnCl_2$

C. PCl_5

D. $SOCl_2$

Answer: a

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5. Which of the following is least reactive towards S_N2 reaction ?

A. CH_3X

B. Primary halide

C. Secondary halide

D. Tertiary halide

Answer: d

View Text Solution

6. Alkyl iodides are often prepared by the reaction of alkyl chlorides/bromides with Nal in dry acetone. This reaction is known as

A. Wurtz reaction .

B. Finkelstein reaction .

C. Gngnard reaction .

D. Sandmeyer's reaction .

Answer: b

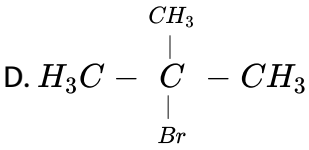
View Text Solution

7. Which of the following has the least boiling point ?

A. CH_3CH_2Br

B. $CH_3CH_2\underset{\underset{CH_3}{|}}{C}HCH_3$

C. $CH_3CH_2CH_2CH_2Br$

D. 

Answer: a

View Text Solution

8. Vinylic halides are compounds in which the halogen atom is bonded to sp hybridised carbon atom of

A. an alkane.

B. an alkene.

C. an alkyne.

D. an aromatic ring.

Answer: b

View Text Solution

9. Propene on treatment with HI gives

A. Only $CH_3CH_2CH_2I$

B. Only CH_3CHICH_3

C. $CH_3CH_2CH_2(\text{minor}\ ) + CH_3CHICH_3$(major)

D. $CH_3CH_2CH_2I(\text{major}) + CH_3CHICH_3$ (minor)

Answer: c

View Text Solution

10. Treatment of toluene with a halogen in dark in the presence of Fe gives

A. o-Halotoluene.

B. p-Halotoluene.

C. m-Halotoluene.

D. Mixture of o- and p- Halotoluene.

Answer: d

View Text Solution

11. Molecules whose mirror image is non superimposable over them are known as chiral. Which of the following molecules is chiral in nature ?

A. 2-Bromobutane

B. 1-Bromobutane

C. 2-Bromopropane

D. 2-Bromopropan -1-ol

Answer: a

View Text Solution

12. Which of the following compounds will give racemic mixture on nucleophilic substitution by OH^- ion ?

$(a) CH_3 - \underset{C_2H_5}{\overset{|}{C}} H - Br$ $(b) CH_3 - \overset{Br}{\overset{|}{\underset{C_2H_5}{\overset{|}{C}}}} - CH_3$ $(c) CH_3 - \underset{C_2H_5}{\overset{|}{C}} H - C$

A. (a)

B. $(a), (b), (c)$

C. $(b), (c)$

D. $(a), (c)$

Answer: a

View Text Solution

13. Which of the following are secondary bromides?

A. $(CH_3)_2CHBr$

B. $(CH_3)_3CCH_2Br$

C. $CH_3CH(Br)CH_2CH_3$

D. $(CH_3)_2CBrCH_2CH_3$

Answer: a, b

View Text Solution

14. Reaction of $C_6H_5CH_2Br$ with aqueous sodium hydroxide follows _____ .

A. S_N1 mechanism

B. S_N2 mechanism

C. any of the above two depending upon the temperature of reaction

D. Saytzeff rule

Answer: a

View Text Solution

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

A. electrophilic elimination reaction.

B. electrophilic substitution reaction.

C. free radical addition reaction.

D. nucleophilic substitution reaction.

Answer: b

View Text Solution

16. Chloromethane on treatment with excess of ammonia yields mainly

A. N, N - Dimethylmethanamine

B. N- methylmethanamine $(CH_3 - NH - CH_3)$

C. Methanamine (CH_3NH_2)

D. Mixture containing all these in equal proportion

Answer: c

View Text Solution

17. Which of the following compounds are gem-dihalides?

A. Ethylidene chlride

B. Ethylene dichloride

C. Methylene chloride

D. Benzyl chloride

Answer: a, c

View Text Solution

18. Which of the following is an example of vic-dihalide ?

A. Dichloromethane

B. 1,2- dichloroethane

C. Ethylidine chloride

D. Allylchloride

Answer: b

View Text Solution

19. Which reagent would you use for the following reaction ?

$CH_3CH_2CH_2CH_3 \rightarrow CH_3CH_2CH_2Cl + CH_3CH_2CHClCH_3$

A. Cl_2/UV light

B. $NaCl + H_2SO_4$

C. Cl_2 gas in dark

D. Cl_2 gas in the presence of iron in dark

Answer: a

View Text Solution

Assertion Reason Questions

1. Assertion (A): In the case of optically active alkyl halide, the product formed as a result of S_N2 mechanism has the inverted configuration as compared to the reactant.

Reason (R) In S_N2 mechanism, the nucleophile attaches itself on the side opposite to the one where the halogen is present resulting in inversion in configuration of the product.

A. Both Assertion (A) and Resort (R) are correct statements, quid Reason (R) is the correct explanation of the Assertion (A).

B. Both Assertion (A) and Reason (R) are correct statements, brit Reason (R) is not the correct explanation of the Assertion (A).

C. Assertion (A) is correct, but Reason (R) is incorrect statement.

D. Assertion (A) is incorrect, but Renson (R) is correct statement.

Answer: a

View Text Solution

2. Assertion (A): A racemic mixture is represented by fixing dl or ($\pm$) before the name.

Reason (R) : Aryl halides are extremely reactive towards nucleophilic substitutions.

A. Both Assertion (A) and Resort (R) are correct statements, quid Reason (R) is the correct explanation of the Assertion (A).

B. Both Assertion (A) and Reason (R) are correct statements, brit Reason (R) is not the correct explanation of the Assertion (A).

C. Assertion (A) is correct, but Reason (R) is incorrect statement.

D. Assertion (A) is incorrect, but Renson (R) is correct statement.

Answer: c

View Text Solution

3. Assertion (A): The stereoisomer's related to each other as non-super imposable mirror images are called enantiomers.

Reason (R) : Butan-2-ol has four different groups attached to the tetrahedral carbon and is chiral.

A. Both Assertion (A) and Resort (R) are correct statements, quid Reason (R) is the correct explanation of the Assertion (A).

B. Both Assertion (A) and Reason (R) are correct statements, brit Reason (R) is not the correct explanation of the Assertion (A).

C. Assertion (A) is correct, but Reason (R) is incorrect statement.

D. Assertion (A) is incorrect, but Renson (R) is correct statement.

Answer: b

View Text Solution

4. Assertion (A): Alkyl halides are prepared by electrophilic halogenation of alkanes.

Reason (R) : DDT is a safe insecticide.

A. Both Assertion (A) and Resort (R) are correct statements, quid Reason (R) is the correct explanation of the Assertion (A).

B. Both Assertion (A) and Reason (R) are correct statements, brit Reason (R) is not the correct explanation of the Assertion (A).

C. Assertion (A) is correct, but Reason (R) is incorrect statement.

D. Assertion (A) is incorrect, but Renson (R) is correct statement.

Answer: d

View Text Solution

5. Assertion (A) : Halothane is used as an anaesthetic during surgery.

Reason (R) : The deficiency of iodine in our body causes goitre.

A. Both Assertion (A) and Resort (R) are correct statements, quid Reason (R) is the correct explanation of the Assertion (A).

B. Both Assertion (A) and Reason (R) are correct statements, brit Reason (R) is not the correct explanation of the Assertion (A).

C. Assertion (A) is correct, but Reason (R) is incorrect statement.

D. Assertion (A) is incorrect, but Renson (R) is correct statement.

Answer: b

View Text Solution

6. Assertion (A): The compounds in which the halogen atom is bounded to an sp^3 hybridised carbon atom adjacent to the carbon-carbon double bond are called vinylic halides.

Reason (R) : Common names of alkyl halides are derived by naming the alkyl group folllowed by the name of the halide.

A. Both Assertion (A) and Resort (R) are correct statements, quid Reason (R) is the correct explanation of the Assertion (A).

B. Both Assertion (A) and Reason (R) are correct statements, brit Reason (R) is not the correct explanation of the Assertion (A).

C. Assertion (A) is correct, but Reason (R) is incorrect statement.

D. Assertion (A) is incorrect, but Renson (R) is correct statement.

Answer: d

View Text Solution

7. Assertion (A) : Common name of $CH_3 - CHCl_2$ is ethylidene chloride. Reason (R) As we go down the group in the Periodic Table, the size of halogen atom decreases.

A. Both Assertion (A) and Resort (R) are correct statements, quid Reason (R) is the correct explanation of the Assertion (A).

B. Both Assertion (A) and Reason (R) are correct statements, brit Reason (R) is not the correct explanation of the Assertion (A).

C. Assertion (A) is correct, but Reason (R) is incorrect statement.

D. Assertion (A) is incorrect, but Renson (R) is correct statement.

Answer: c

View Text Solution

8. Assertion (A): The minor product obtained in the reaction between $CH_3CH = CH_2$ and HI is $CH_3CH_2CH_2I$.

. Reason (R) : Alkyl bromides and iodides develop colour when exposed to light.

A. Both Assertion (A) and Resort (R) are correct statements, quid Reason (R) is the correct explanation of the Assertion (A).

B. Both Assertion (A) and Reason (R) are correct statements, brit Reason (R) is not the correct explanation of the Assertion (A).

C. Assertion (A) is correct, but Reason (R) is incorrect statement.

D. Assertion (A) is incorrect, but Renson (R) is correct statement.

Answer: b

View Text Solution

9. Assertion (A): Boiling points of alkyl halides decreases in the order : $RI > RBr > BCl > RF$

Reason (R) : Attractions get stronger as the molecules get bigger in size.

A. Both Assertion (A) and Resort (R) are correct statements, quid Reason (R) is the correct explanation of the Assertion (A).

B. Both Assertion (A) and Reason (R) are correct statements, brit Reason (R) is not the correct explanation of the Assertion (A).

C. Assertion (A) is correct, but Reason (R) is incorrect statement.

D. Assertion (A) is incorrect, but Renson (R) is correct statement.

Answer: a

View Text Solution

10. Assertion (A): A mixture containing two enantiomers in equal proportions is called a racemic mixture.

Reason (R) : Compounds of the type RMgX were discovered by Sandmeyer.

A. Both Assertion (A) and Resort (R) are correct statements, quid Reason (R) is the correct explanation of the Assertion (A).

B. Both Assertion (A) and Reason (R) are correct statements, brit Reason (R) is not the correct explanation of the Assertion (A).

C. Assertion (A) is correct, but Reason (R) is incorrect statement.

D. Assertion (A) is incorrect, but Renson (R) is correct statement.

Answer: c

View Text Solution

Fill In The Blanks

1. Presence of _____ group at o- and p-positions withdraws the electron density from the benzene ring.

View Text Solution

2. Fluorides and iodides of hydrocarbons are best prepared by _____ method.

View Text Solution

3. Grignard reagents are highly reactive and react with any source of _____ to give hydrocarbons.

View Text Solution

4. There is some evidence that exposure to carbon tetrachloride causes _____ cancer in humans.

View Text Solution

5. Alkyl halides may be prepared by _____ halogenation of alkanes.

View Text Solution

6. Alkyl halides react with sodium in dry ether to give hydrocarbons containing _____ the number of carbon atoms present in the halide.

View Text Solution

7. The major use of chloroform today is in the production of the _____ refrigerant R-22.

View Text Solution

8. The boiling points of organohalogen compounds are comparatively _____ than corresponding hydrocarbons.

View Text Solution

9. Iodoform was earlier used as an antiseptic but the antiseptic properties are due to the liberation of free _____ and not due to iodoform itself.

View Text Solution

10. Many species of insects developed resistance to DDT and it was discovered to have a high toxicity towards _____ .

View Text Solution

True Or False

1. A mixture containing two enantiomers in equal proportion is known as racemic mixture.

View Text Solution

2. Tertiary halides are the least reactive in S_N2 substitution reactions because bulky groups hinder the approaching nucleophiles.

View Text Solution

3. Alkyl halides react with sodium in dry ether to give hydrocarbons.

View Text Solution

4. Substitution can take place with alkyl halides by two different mechanisms, S_N1 and S_N2.

View Text Solution

5. The observation by Louis Pasteur that crystals of certain compounds exist in the form of mirror images laid the foundation of modern stereochemistry.

View Text Solution

Very Short Answer Questions 1 Mark Each

1. Out of chlorobenzene and benzyl chloride, which one gets easily hydrolysed by aqueous NaOH and why?

View Text Solution

2. Write the structure of 1-Bromo-4-chlorobut-2-ene.

View Text Solution

3. Out of

wich is an example of allylic halide ?

View Text Solution

4. Among the isomers of pentane (C_5H_{12}), write the one which on photochemical chlorination yields a single monochloride .

View Text Solution

5. Out of $CH_3 - \underset{\underset{CH_3}{|}}{C}H - CH_2 - Cl$ and $CH_3 - CH_2 - \underset{\underset{CH_3}{|}}{C}H - Cl$, which is more reactive towards S_N1 reaction and why ?

View Text Solution

6. Write the structure of an isomer of compound C_4H_9Br which is most reactive towards S_N1 reaction.

View Text Solution

7. Which of the following reactions is S_N1 type ?

View Text Solution

8. Which would undergo S_N1 reaction faster in the following pair ?

$CH_3 - CH_2 - CH_2 - Br$ and $CH_3 - \underset{\underset{Br}{|}}{CH} - CH_3$

View Text Solution

9. Which would undergo S_N2 reaction faster in the following pair and why ?

$CH_3 - CH_2 - Br$ and $CH_3 - \underset{\underset{Br}{|}}{\overset{\overset{CH_3}{|}}{C}} - CH_3$

View Text Solution

10. Which would undergo S_N2 reaction faster in the following pair and why ?

$CH_3 - CH_2 - Br$ and $CH_3 - CH_2 - I$

View Text Solution

11. Identify the chiral molecule in the following pair :

View Text Solution

12. Write the IUPAC name of $CH_3 - \underset{\underset{Cl}{|}}{CH} - CH_2 - CH = CH_2$.

View Text Solution

13. Give the IUPAC name of the following compound :

$$CH_2 = \underset{\underset{CH_3}{|}}{C} - CH_2Br$$

View Text Solution

14. Write the IUPAC name of the following compound :

$$CH_2 = CHCH_2Br$$

View Text Solution

15. Write the IUPAC name of the following compound :

$$(CH_3)_3CCH_2Br$$

View Text Solution

16. Write the structure of the following compound :

2-(2-Chlorophenyl) -1- iodooctane .

View Text Solution

17. A solution of KOH hydrolyses $CH_3CHClCH_2CH_3$ and $CH_3CH_2CH_2CH_2Cl$. Which one of these is more easily hydrolysed ?

View Text Solution

18. In each of the following pairs of organic compounds , identify the compound which will undergo , S_N1 reaction faster :

View Text Solution

19. Give IUPAC name of the following organic compound :

$$CH_3CH = \underset{\underset{CH_3}{|}}{C} - \underset{\underset{Br}{|}}{CH} - CH_3$$

View Text Solution

20. Which of the following compounds (a) and (b) will not react with a mixture of NaBr and H_2SO_4 ?

(a) $CH_3CH_2CH_2OH$

(b) 

View Text Solution

21. Identify the products A and B formed in the following reaction :

$$CH_3CH_2CH = CH - CH_3 + HCl \rightarrow A + B$$

View Text Solution

22. Why is the solubility of haloalkanes in water very low ?

View Text Solution

23. Which of the following has chirality centre ?

(a) sec . Butyl chloride (b) Ethanethiol

(c) 2- methylbutane (d) 3-bromohexane

(e) 3- aminobut -2- ene.

View Text Solution

24. What is meant by chirality of molecules ?

View Text Solution

25. Draw the structure of 4- tertbutyl -3- iodoheptane .

View Text Solution

26. Which of the following compounds will have the highest melting point and why ?

o - dichlorobenzene , m - dichlorobenzene and p - dichlorobenzene .

View Text Solution

27. What is the type of hybridisation of carbon in haloarenes ?

View Text Solution

28. Name a chlorine containing antibiotic .

View Text Solution

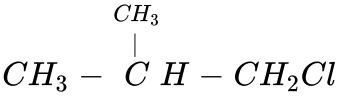
29. Name an iodine containing hormone.

View Text Solution

30. Give the general formula of alkyl halides .

View Text Solution

31. Name the compound (IUPAC) having the following structure :



View Text Solution

32. Name the catalyst used in the preparation of alkyl halide from primary and secondary alcohol and HCI.

View Text Solution

33. What is the major product when propene is treated with HI ?

View Text Solution

34. Name the product when ethene is treated with Br_2 in CCl_4.

View Text Solution

35. Alkyl chlorides on treatment with Nal in dry acetone gives alkyl iodides. What is this reaction known as ?

View Text Solution

36. Alkyl bromide on treatment with silver fluoride gives alky fluoride. What is this reaction known as ?

View Text Solution

37. Name the reagent used in the conversion of benzene diazonium halide to aryl halide.

View Text Solution

38. Out of 1-bromobutane, 2-bromobutane and 2-bromo-2 methylpropane, which has the lowest boiling point ?

View Text Solution

39. Certain groups like cyanides and nitrites possess two nucleophilic centres. What are they called ?

View Text Solution

40. Which out of CH_3Cl and $(CH_3)_3C-Cl$ on reaction with NaOH gives Snl reaction ?

View Text Solution

41. What do we call a mixture containing two enantiomers in equal proportions ?

View Text Solution

42. Who invented compounds like RMgX ?

View Text Solution

43. Which reaction do we use generally to prepare diphenyl from aryl halide ?

View Text Solution

44. Which compound is formed when chloroform is exposed to air in presence of light?

View Text Solution

Short Answer Questions 2 Marks Each

1. Allyl cholride can be distinguished from vinyl chloride by NaOH and silver nitrate test.

View Text Solution

2. Alkyl halide reacts with lithium aluminium hydride to give alkane. Name the attacking reagent which will bring out this change.

View Text Solution

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

$(a)(CH_3)_3CBr + H_2O \xrightarrow{\text{heat}}$ $(b)CH_3CH_2Cl + SbF_3 \xrightarrow{\text{heat}}$

View Text Solution

4. What mass of propene is obtained from 34.0 g of 1- iodopropane on treating with ethanolic KOH , if yield is $36\ \%$?

View Text Solution

5. State one use each of DDT and iodoform.

View Text Solution

6. Which compound in the following couples will react faster in S_N2 displacement and why?

(a) 1-Bromopentane or 2-bromopentane

(b) 1-Bromo-2-methylbutane or 2-bromo-2-methylbutane.

View Text Solution

7. How are the following conversions carried out ?

(i) Benzyl chloride to benzyl alcohol,

(ii) Methyl magnesium bromide to 2-methylpropan-2-ol.

View Text Solution

8. How would you differentiate between S_N1 and S_N2 mechanisms of substitution reactions ? Give one example of each.

View Text Solution

9. Write all possible isomers of C_7H_7Cl.

View Text Solution

10. Which one in the following pairs undergoes S_N1 substitution reaction faster and why ?

View Text Solution

11. Which ones in the following pairs of substances undergoes S_N2 substitution reaction faster and why?

View Text Solution

12. Complete the following reaction equations :

(i) 

(ii) $CH_3CH_2CH=CH_2+HBr\rightarrow$

View Text Solution

13. Propose mechanism of the reaction taking place when

(a) $(-)-2-$ Bromooctane reacts with sodium hydroxide to form

$(+)-$ octane -2-ol.

(b) 2-Bromopentane is heated with (alc.) KOH to form alkenes.

View Text Solution

14. Draw the structures of the optically active unsaturated compound having molecular formula C_5H_9Br, that after addition of H_2 becomes either optically inactive or shows optical activity.

View Text Solution

15. Which will have a higher boiling point ? 1-chloroethane or 2-methyl-2-chlorobutane Give reasons:

View Text Solution

16. p-nitro chlorobenzene undergoes nucleophilic substitution faster than chlorobenzene.

View Text Solution

17. Explain giving the resonating structures as well.

View Text Solution

18. How may methyl bromide be preferentially converted to methyl cyanide and methylisocyanide ?

View Text Solution

19. Write the structure of following compound:

1-Bromo-4-sec-butyl-2-methylbenzene

View Text Solution

20. How will you bring about the conversion :

Methyl bromide to methyl iodide

View Text Solution

21. Explain :

Grignard reagents should be prepared under anhydrous conditions.

View Text Solution

22. Explain :

$C_6H_5CHClCH_3$ is hydrolysed more easily with KOH than $C_6H_5CH_2Cl$.

View Text Solution

23. Which compound in each of the following pairs will react faster in S_N2 reaction with $-OH$ and why?

$(i) CH_3Br$ or CH_3I $(ii) (CH_3)_3CCl$ or CH_3Cl

View Text Solution

24. Arrange the following compounds in the decreasing order of reactivity towards S_N2 displacement reaction and give reasons in support of your answer:

(a) $C_2H_5Br, C_2H_5I, C_2H_5Cl$

(b) $(CH_3)_3CBr, CH_3CH_2CHBrCH_3, CH_3CH_2CH_2CH_2Br.$

View Text Solution

25. An optically active compound having molecular formula $C_7H_{15}Br$ reacts with aqueous KOH to give a racemic mixture of products. Write the mechanism involved for this reaction.

View Text Solution

26. Write the formula of main product formed in the following chemical reactions :

$(i)(CH_3)_2CH - Cl \xrightarrow[\text{dry ether}]{Na}$ $(ii)CH_3Br + AgF \xrightarrow{\Delta}$

(iii) $CH_3CH_2Br + NaI \xrightarrow[\text{acetone}]{\text{dry}}$

(iv) 

View Text Solution

27. Aryl chlorides and bromides can be easily prepared by electrophilic substitution of arenes with chlorine and bromine respectively in the presence of Lewis acid catalysts. But why does preparation of aryl iodides requires presence of an oxidising agent ?

View Text Solution

28. Draw other resonance structures related to the following structure and find out whether the functional group present in the molecule is

ortho, para directing or meta directing.

View Text Solution

29. Aryl halides are extremely less reactive towards nucleophilic substitution. Predict and explain the order of reactivity of the following compounds towards nucleophilic substitution :

View Text Solution

30. Out of o- and p- dibromobenzenes which one has higher melting point and why?

View Text Solution

31. Compound 'A' with molecular formula C_4H_9Br is treated with aq. KOH solution. The rate of this reaction depends upon the concentration of the compound 'A' only. When another optically active isomer 'B' of this compound was treated with aq. KOH solution, the rate of reaction was found to be dependent on concentration of compound and KOH both.

(i) Write down the structural formula of both compounds 'A' and 'B'.

(ii) Out of these two compounds, which one will be converted to the product with inverted configuration.

View Text Solution

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

$(a)(CH_3)_3CBr + H_2O \xrightarrow{\text{heat}}$

$(b)(CH_3)_2CH - CH(Br)CH_2CH_3 \xrightarrow[\text{ethanol /heat}]{C_2H_5ONa}$

$(c)CH_3CH_2Cl + SbF_3 \xrightarrow{\text{heat}}$

$(d)CH_2 = CHCH_2Br + CH_3C \equiv CNa \xrightarrow{\text{liq.}NH_3}$

View Text Solution

33. Explain as to why haloarenes are much less reactive than haloalkenes towards nucleophilic substitution reactions.

View Text Solution

34. Cyanide ion acts as an ambident nucleophile. From which end it acts as a stronger nucleophile in aqueous medium ? Give reason for your answer.

View Text Solution

35. Why are haloalkanes more reactive towards nucleophilic substitution reaction than haloarenes?

View Text Solution

36. Which of the following two substances undergo Syl reaction faster and why?

View Text Solution

37. Why are haloarenes more stable than haloalkanes and undergo electrophilic substitution reaction at ortho and para-positions ?

View Text Solution

38. Complete the following reaction equations :

(i) $C_6H_5N_2Cl + KI \rightarrow$

(ii) 

View Text Solution

39. Identify and indicate the presence of centre of chirality, if any, in the following molecules. How many stereoisomers are possible for those containing chiral centre ?

(i) 1, 2 dichloropropane (ii) 3-bromo -pent -1-ene

View Text Solution

Long Answer Questions I 3 Marks Each

1. Identify the chiral molecule in the following pair :

View Text Solution

2. Write the structure of the product when chlorobenzene is treated with methyl chloride in the presence of sodium metal and dry ether.

View Text Solution

3. Write the structure of the alkene formed by dehydrohalogenation of 1-bromo-1methylcyclohexane with alcoholic KOH.

View Text Solution

4. Following compounds are given to you:

2-Bromopentane, 2-Bromo-2-methylbutane, 1-Bromopentane

(i) Write the compound which is most reactive towards S_N2 reaction.

(ii) Write the compound which is optically active.

(iii) Write the compound which is most reactive towards β-elimination reaction.

View Text Solution

5. Draw the structures of the major monohalo product for each of the following reactions :

View Text Solution

6. Give reasons :

C-Cl bond length in chlorobenzene is shorter than C -- Cl bond length in $CH_3 - Cl$.

View Text Solution

7. Give reasons :

The dipole moment of chlorobenzene is lower than that of cyclohexyl chloride.

View Text Solution

8. Give reasons :

S_N1 reactions are accompanied by recemisation in optically active alkyl halides.

View Text Solution

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9. How do you convert :

(i) Chlorobenzene to biphenyl

(ii) Propene to 1-iodopropane

(iii) 2-bromobutane to but-2-ene.

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10. Write the major product(s) in the following:

(i) 

(ii) $2CH_3 - \underset{\underset{Cl}{|}}{CH} - CH_3 \xrightarrow[\text{dry ether}]{Na}$

(iii) $CH_3 - CH_2 - Br \xrightarrow{\text{AgCN}}$

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11. Write the major product(s) in the following reactions :

(iii) $CH_3CH_2Cl \xrightarrow{KNO_2}$?

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12. Give reason :

n-Butyl bromide has higher boiling point than t-butyl bromide.

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13. Give reason :

Racemic mixture is optically inactive.

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14. Give reason :

The presence of nitro group $(-NO_2)$ at o/p positions increases the reactivity of haloarenes towards nucleophilic substitution reactions.

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15. How can the following conversions be carried out:

(i) Aniline to bromobenzene

(ii) Chlorobenzene to 2-chloroacetophenone

(iii) Chloroethane to butane

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16. Why are alkyl halides insoluble in water?

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17. Why is Butan-1-ol optically inactive but Butan-2-ol is optically active ?

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18. Although chlorine is an electron withdrawing group, yet it is ortho, para directing in electrophilic aromatic substitution reactions. Why?

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19. What happens when

(i) chlorobenzene is treated with $Cl_2 / FeCl_3$,

(ii) ethyl chloride is treated with $AgNO_2$.

(iii) 2-bromopentane is treated with alcoholic KOH ?

Write the chemical equations in support of your answer.

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20. Draw the structure of major monohalogen product in each of the following reactions :

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21. Draw the structures of major monohalogen products in each of the following reactions :

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22. Which halogen compound in each of the following pairs will react faster in S_N2 reaction :

$(i) CH_3Br$ or CH_3I $(ii) (CH_3)_3C-Cl$ or CH_3-Cl

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23. Give reasons for the following:

(i) Ethyl iodide undergoes S_N2 reaction faster than ethyl bromide.

(ii) ($\pm$) 2-Butanol is optically active.

(iii) C - X bond length in halobenzene is smaller than C - X bond length in CH_3-X.

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24. Answer the following questions :

(i) What is meant by chirality of a compound ? Give an example.

(ii) Which one of the following compounds is more easily hydrolysed by KOH and why?

$CH_3CHClCH_2CH_3$ or $CH_3CH_2CH_2Cl$

(iii) Which one undergoes S_N2 substitution reaction faster and why?

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25. Rearrange the compounds of each of the following sets in order of reactivity towards S_N2 displacement :

(i) 2-Bromo-2-methylbutane, 1-Bromopentane, 2 Bromopentane

(ii) 1-Bromo-3-methylbutane, 2-Bromo-2 methylbutane, 3-Bromo-2-methylbutane

(iii) 1-Bromobutane, 1-Bromo-2, 2-dimethylpropane, 1-Bromo-2-methylbutane

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26. Answer the following :

(i) Haloalkanes easily dissolve in organic solvents, why?

(ii) What is known as a racemic mixture ? Give an example.

(iii) Of the two bromoderivatives, $C_6H_5CH(CH_3)Br$ and $C_6H_5CH(C_6H_5)Br$, which one is more reactive in S_N1 substitution reaction and why?

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27. Which one of the two compounds, CH_3Br and CH_3I, will react faster in an S_N2 reaction with — OH ?

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28. Write the structures of the major products in the following reactions :

$(i)CH_3CH=C(CH_3)_2+HBr\rightarrow (ii)C_6H_5ONa+C_2H_5Cl\rightarrow$

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29. Account for following :

Chloromethane reacts with KCN to form ethane nitrile as main product and with $AgCN$ to form methyl isocyanide as chief product.

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30. Account for following :

Use of DDT was banned in United States in 1973.

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31. Account for following :

Benzylic halides show high reactivity towards S_N1 reaction.

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32. Some alkyl halides undergo substitution reaction whereas some undergo elimination reaction on treatment with bases. Discuss the structural features of alkyl halides with the help of examples which are responsible for this difference.

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33. Draw the structures of all the eight structural isomers that have the molecular formula $C_5H_{11}Br$.

Name each isomer according to IUPAC system and classify them as primary, secondary and tertiary bromide.

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34. Arrange the following compounds in increasing order of S_N1 reactivity.

$(i) ClCH_2CH = CHCH_2CH_3,$

$CH_3C(Cl) = CHCH_2CH_3,$

$CH_3CH = CHCH_2CH_2Cl$,

$CH_3CH = CHCH(Cl)CH_3$

(ii) CH_3CH_2Br, $CH_2 = CHCH(Br)CH_3$,

$CH_2 = CHBr$, $CH_3CH(Br)CH_3$

(iii) $(CH_3)_3CCl$, $C_6H_5C(CH_3)_2Cl$,

$(CH_3)_2CHCl$, $CH_3CH_2CH_2Cl$

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35. Write IUPAC names of the following :

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36. Explain why

(i) vinyl chloride is unreactive to nucleophilic substitution reactions.

(ii) neo-Pentyl bromide undergoes nucleophilic substitution reaction very slowly.

(iii) 3 - Bromocyclohexene is more reactive than 4-bromo cyclohexene in hydrolysis with aqueous NaOH.

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37. p-methoxylbenzyl bromide reacts faster than p-nitrobenzyl bromide with ethanol to form an ether product. Explain, why ?

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38. Give the IUPAC name of the product formed when : (1) 2 -Methyl-1-bromopropane is treated with sodium in the presence of dry ether.

(ii) 1-Methyl cyclohexene is treated with HI.

(iii) Chloroethane is treated with silver nitrite.

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Self Assessment Test Section A

1. In benzylic and vinylic halides the halogen bearing carbons are

A. both sp^3 hybridised.

B. both sp^2 hybridised .

C. sp^3 and sp^2 hybridised respectively.

D. sp^2 and sp^3 hybridised respectively.

Answer: c

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2. Boiling points of the alkyl halides decrease in the order :

A. $RI > RBr > RVl > RF$

B. $RF > RCl > RBr > RI$

C. $RI > RBr > RF > RCl$

D. $RI > RVl > RBr > RF$

Answer: a

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3. Which of the following reagent can be used to prepare alkyl halides from alcohols ?

A. $SOCl_2$

B. Red P/X_2

C. $ZnCl_2$

D. All the above

Answer: d

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4. Aniline was treated with $NaNO_2/HX$ at $273-278K$ and the product obtained was treated with Cu_2X_2. The final product obtained is

A. phenol

B. nitrobenzene

C. phenyl halide

D. sodium phenoixde

Answer: c

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5. Chlorobenzene on treatment with sodium in ether gives diphenyl. This reaction is known as

A. Wurtz-Fitting reaction .

B. Fittig's reaction .

C. Wurtz reaction .

D. Friedel-Crafts reaction .

Answer: b

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6. Assertion (A) : Dichloromethane is used as a solvent and as a paint-remover.

Reason (R) : Carbon tetrachloride was earlier used as an antiseptic.

A. Both Assertion (A) and Rersou (R) are correct statements, and Reason (R) is the correct explanation of the Assertion (A).

B. Both Assertion (A) and Renson (R) are correct statements, but Renson (R) is not the correct explanation of the Assertion (A).

C. Assertion (A) is correct, but Renson (R) is incorrect statement.

D. Assertion (A) is incorrect, but Reason (R) is correct statement.

Answer: c

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7. Assertion (A) : DDT as an insecticide is still being used worldwide on a large scale as a safe treatment.

Reason (R) : Carbon tetrachloride has been found to be responsible for depletion of ozone layer.

A. Both Assertion (A) and Rersou (R) are correct statements, and Reason (R) is the correct explanation of the Assertion (A).

B. Both Assertion (A) and Renson (R) are correct statements, but Renson (R) is not the correct explanation of the Assertion (A).

C. Assertion (A) is correct, but Renson (R) is incorrect statement.

D. Assertion (A) is incorrect, but Reason (R) is correct statement.

Answer: d

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Self Assessment Test Section B

1. What mass of propene is obtained from 34.0 g of 1- iodopropane on treating with ethanolic KOH, if the yield is $36\ \%$?

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