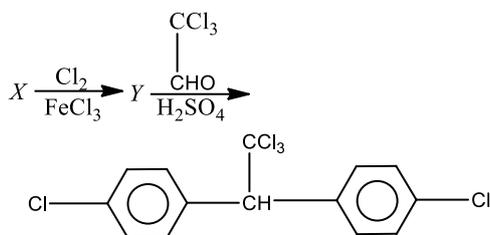


**CHEMISTRY ( QUESTION BANK )****10.HALOALKANES AND HALOARENES**

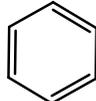
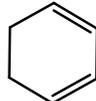
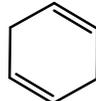
## Single Correct Answer Type

- Among the following the one that gives positive iodoform test upon reaction with  $I_2$  and NaOH is
  - $CH_3CH_2CH(OH)CH_2CH_3$
  - $C_6H_5CH_2CH_2OH$
  - $$\begin{array}{c} H_3C - CH - CH_2OH \\ | \\ CH_3 \end{array}$$
  - $PhCHOHCH_3$
- Vicinal and geminal dihalides can be distinguished by:
  - $KOH(aq.)$
  - $KOH(alc.)$
  - Zn dust
  - None of these
- An alkyl halide may be converted into an alcohol by:
  - Addition
  - Substitution
  - Dehydrohalogenation
  - Elimination
- Dehydrohalogenation in haloalkanes produces:
  - A single bond
  - A double bond
  - A triple bond
  - Fragmentation
- Chlorination of  $CS_2$  gives:
  - $CCl_4$
  - $CS_2Cl_2$
  - $CH_4$
  - $CHCl_3$
- Methylene chloride on hydrolysis yields:
  - HCHO
  - $CH_3CHO$
  - $CHCl_3$
  - $CH_3COCl$
- The greater the ionic character of the carbon metal bond:
  - The more reactive is the organometallic compound
  - The less reactive is the organometallic compound
  - Both are correct
  - None of the above is correct
- For the reaction,
 
$$C_2H_5OH + HX \xrightarrow{ZnX_2} C_2H_5X$$
, the order of reactivity is:
  - $HI > HCl > HBr$
  - $HI > HBr > HCl$
  - $HCl > HBr > HI$
  - $HBr > HI > HCl$
- The order of reactivities of methyl halides in the formation of Grignard reagent is
  - $CH_3I > CH_3Br > CH_3Cl$
  - $CH_3Cl > CH_3Br > CH_3I$
  - $CH_3Br > CH_3Cl > CH_3I$
  - $CH_3Br > CH_3I > CH_3Cl$
- The antiseptic character of iodoform is due to:
  - Its poisonous nature
  - Unpleasant smell
  - Liberation of free iodine
  - None of the above
- On treating a mixture of two alkyl halides with sodium metal in dry ether, 2-methyl propane was obtained. The alkyl halides are
  - 2-chloropropane and chloromethane
  - 2-chloropropane and chloroethane
  - Chloromethane and chloroethane
  - Chloromethane and 1-chloropropane
- The IUPAC name of the compound,  $(CH_3)_2CHCH_2CH_2Br$  is:

- a) 2-methyl-3-bromopropane  
 b) 1-bromopentane  
 c) 2-methyl-4-bromobutane  
 d) 1-bromo-3-methylbutane
13. The given reaction is an example of,  
 $C_2H_5Br + KCN(aq.) \rightarrow C_2H_5CN + KBr$ :  
 a) Elimination  
 b) Nucleophilic substitution  
 c) Electrophilic substitution  
 d) Redox change
14. Which one of the following compound reacts with chlorobenzene to produce DDT?  
 a) Acetaldehyde  
 b) Nitrobenzene  
 c) *m*-chloroacetaldehyde  
 d) Trichloroacetaldehyde
15. Preparation of alkyl halides in laboratory is least preferred by:  
 a) Halide exchange  
 b) Direct halogenation of alkanes  
 c) Treatment of alcohols  
 d) Addition of hydrogen halides to alkenes
16. Which one of the following pairs is the strongest pesticide?  
 a) Chloroform and benzene hexachloride  
 b) DDT and 666  
 c) 666 and ether  
 d) isocyanides and alcohol
17. Iodoform gives a precipitate with  $AgNO_3$  on heating but chloroform does not because:  
 a) Iodoform is ionic  
 b) Chloroform is covalent  
 c) C—I bond in iodoform is weak and C—Cl bond in chloroform is strong  
 d) None of the above
18. Which reagent is useful in increasing the carbon chain of an alkyl halide?  
 a) HCN  
 b) KCN  
 c)  $NH_4CN$   
 d) AgCN
19. Chloroform on reaction with conc.  $HNO_3$  gives an insecticide and war gas known as:  
 a) Chloropicrin  
 b) Nitromethane  
 c) Picric acid  
 d) Acetylene
20. Aryl halides are less reactive towards electrophiles than alkyl halides due to:  
 a) Resonance  
 b) Stability of carbonium ions  
 c) High boiling point  
 d) None of the above
21. Carbon tetrachloride reacts with steam at  $500^\circ C$  to give:  
 a)  $COCl_2$   
 b)  $CHCl_3$   
 c) Both (a) and (b)  
 d) None of these
22. Chloroform on reaction with acetone yields:  
 a) Insecticide  
 b) Hypnotic agent  
 c) Analgesic  
 d) Isocyanide
23. In Wurtz reaction alkyl halide reacts with  
 a) Sodium in ether  
 b) Sodium in dry ether  
 c) Sodium only  
 d) Alkyl halide in ether
24. When iodoform is heated with silver powder it forms:  
 a) Acetylene  
 b) Ethylene  
 c) Methane  
 d) Ethane
25. 1,3-dibromopropane reacts with metallic zinc to form:  
 a) Propene  
 b) Cyclopropane  
 c) Propane  
 d) Hexane
26. In the reaction sequence

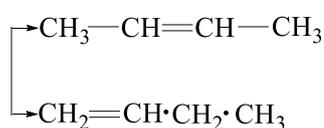
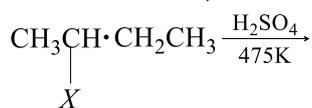


Compound 'X' is

- a) Chlorobenzene                      b) Benzene                      c) Toluene                      d) Biphenyl methane
27. Which is used as a general anaesthetic in place of diethyl ether?  
a)  $\text{CF}_3\text{—CHClBr}$                       b)  $\text{CF}_3\text{—CHCl}_2$                       c)  $\text{CF}_3\text{—CHBr}_2$                       d) None of these
28. Which of the following ketones will not respond to iodoform test?  
a) Methyl isopropyl ketone                      b) Ethyl isopropyl ketone  
c) Dimethyl ketone                      d) 2-hexanone
29. Propyl iodide and isopropyl iodide are:  
a) Functional isomers                      b) Chain isomers                      c) Metamers                      d) Position isomers
30.  $X + \text{KCN} \rightarrow \text{CH}_3\text{CN} \xrightarrow{2\text{H}_2/\text{Ni}} \text{CH}_3\text{CH}_2\text{NH}_2$ ,  
What is (X)?  
a)  $\text{CH}_3\text{CH}_2\text{Cl}$                       b)  $\text{CH}_3\text{Cl}$                       c)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{Cl}$                       d)  $(\text{CH}_3)_2\text{CHCl}$
31. 2-chlorobutane obtained by chlorination of butane, will be:  
a) *meso*-form                      b) Racemic form                      c) *d*-form                      d) *l*-form
32. Reaction of alkyl halides with aromatic compounds in presence of anhy.  $\text{AlCl}_3$  is known as  
a) Friedel-Craft's reaction                      b) Hofmann degradation  
c) Kolbe's synthesis                      d) Beckmann rearrangement
33. Which of the following statements is incorrect regarding benzyl chloride?  
a) It gives white precipitate with alcoholic  $\text{AgNO}_3$   
b) It is an aromatic compound with substitution in the side chain  
c) It undergoes nucleophilic substitution reaction  
d) It is less reactive than vinyl chloride
34. Which of the following compounds is not formed in iodoform reaction of acetone?  
a)  $\text{CH}_3\text{COCH}_2\text{I}$                       b)  $\text{ICH}_2\text{COCH}_2\text{I}$                       c)  $\text{CH}_3\text{COCHI}_2$                       d)  $\text{CH}_3\text{COCl}_3$
35. Of the isomeric hexanes, the isomers that give the minimum and maximum number of monochloro derivatives are respectively  
a) 3-methylpentane and 2, 3-dimethylbutane                      b) 2, 3-dimethylbutane and *n*-hexane  
c) 2, 2-dimethylbutane and 2-methylpentane                      d) 2, 3-dimethylbutane and 2-methylpentane
36. 1, 2-dibromo cyclohexane on dehydrogenation gives  
a)                       b)                       c)                       d) None of these
37. Ethyl ortho formate is formed by heating ..... with sodium ethoxide.  
a)  $\text{CHCl}_3$                       b)  $\text{C}_2\text{H}_5\text{OH}$                       c)  $\text{HCOOH}$                       d)  $\text{CH}_3\text{CHO}$
38. Chloroform is kept in dark coloured bottles because:  
a) It is inflammable  
b) It gives a peroxide  
c) It undergoes rapid chlorination  
d) It is oxidized to poisonous phosgene
39. Which of the following will not respond to iodoform test?  
a) Ethyl alcohol                      b) Propanol-2                      c) Propanol-1                      d) Ethanal
40. At higher temperature, iodoform reaction is given by:  
a)  $\text{CH}_3\text{COOCH}_3$                       b)  $\text{CH}_3\text{COOC}_2\text{H}_5$                       c)  $\text{C}_6\text{H}_5\text{COOCH}_3$                       d)  $\text{CH}_3\text{COOC}_6\text{H}_5$

41. Molecular formula of chloropicrin is  
 a)  $\text{CHCl}_3\text{NO}_2$                       b)  $\text{CCl}_3\text{NO}_3$                       c)  $\text{CCl}_2\text{NO}_2$                       d)  $\text{CCl}_3\text{NO}_2$
42. Which one of the following is not true for the hydrolysis of *t*-butyl bromide with aqueous NaOH?  
 a) Reaction occurs through the  $\text{S}_{\text{N}}1$  mechanism.  
 b) The intermediate formed is a carbocation.  
 c) Rate of the reaction doubles when the concentration of alkali is doubled.  
 d) Rate of the reaction doubles when the concentration of *t*-butyl bromide is doubled.
43.  $\text{CHCl}_3$  reacts with conc.  $\text{HNO}_3$  to give  
 a)  $\text{CCl}_3\text{NO}_2$                       b)  $\text{CH}_3\text{NO}_2$                       c)  $\text{CH}_3\text{CN}$                       d)  $\text{CH}_3\text{CH}_2\text{NO}_2$
44. The correct order of melting and boiling points of the primary ( $1^\circ$ ), secondary ( $2^\circ$ ) and tertiary ( $3^\circ$ ) alkyl halides is:  
 a)  $P > S > T$                       b)  $T > S > P$                       c)  $S > T > P$                       d)  $T > P > S$
45. Ethyl alcohol gives ethyl chloride on treatment with:  
 a) NaCl                      b)  $\text{SOCl}_2$                       c)  $\text{Cl}_2$                       d) KCl
46. 20% aqueous solution of sodium chloride containing ethyl alcohol on electrolysis gives:  
 a) Ethyl chloride                      b) Chloral                      c) Acetaldehyde                      d) Chloroform
47. Which of the following statements about benzyl chloride is incorrect?  
 a) It is less reactive than alkyl halides  
 b) It can be oxidised to benzaldehyde by boiling with copper nitrate solution  
 c) It is a lachrymatory liquid and answers Beilstein's test  
 d) It gives a white precipitate with alcoholic silver nitrate
48. The  $\text{S}_{\text{N}}1$  reactivity of ethyl chloride is:  
 a) More or less equal to that of benzyl chloride  
 b) Less than that of benzyl chloride  
 c) More or less equal to that of chlorobenzene  
 d) Less than that of chlorobenzene
49. Which of the following will not give iodoform test?  
 a) Isopropyl alcohol  
 b) Ethanol  
 c) Ethanal  
 d) Benzyl alcohol
50. Elimination of HBr from 2-bromobutane results in the formation of:  
 a) Equimolar mixture of 1- and 2- butene  
 b) Predominantly 2-butene  
 c) Predominantly 1- butene  
 d) Predominantly 2-butyne
51. 1,2-dibromoethane is added to prevent deposition of lead metal in :  
 a) Water pipes  
 b) Petrol engines  
 c) Electric heaters  
 d) Metal working lathe machines

52. For the reaction,



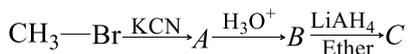
- a)  $\text{CH}_3-\text{CH}=\text{CH}-\text{CH}_3$  predominates

- b)  $\text{CH}_2=\text{CH}-\text{CH}_2-\text{CH}_3$  predominates  
 c) Both are formed in equal amounts  
 d) The product ratio is dependent on the halogen  $X$

53. Grignard reagent is prepared by the reaction between:

- a) Zinc and alkyl halide  
 b) Magnesium and alkyl halide  
 c) Magnesium and alkane  
 d) Magnesium and aromatic hydrocarbon

54. In the following sequence of reactions



the end product (C) is:

- a) Acetaldehyde                      b) Ethyl alcohol                      c) Acetone                      d) Methane

55. The IUPAC name of the compound,

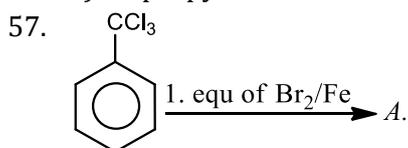
$\text{CH}_3\text{COCH}-\text{CHCOOH}$  is:



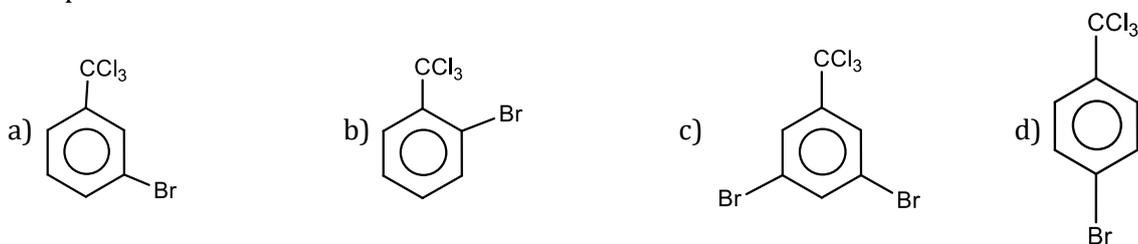
- a) 2-bromo-3-chloro-4-oxopentanoic acid  
 b) 3-chloro-2-bromo-4-oxopentanoic acid  
 c) 4-carboxybromo-3-chloro-2-butanone  
 d) None of the above

56. Which of the following is primary halide?

- a) Isopropyl halide                      b) Sec-butyl halide                      c) Tert-butyl halide                      d) Neo-hexyl chloride



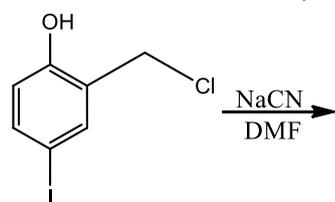
Compound A is

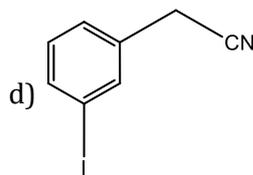
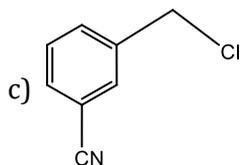


58. Which of the following do not form Grignard reagent?

- a)  $\text{CH}_3\text{F}$                       b)  $\text{CH}_3\text{Cl}$                       c)  $\text{CH}_3\text{Br}$                       d)  $\text{CH}_3\text{I}$

59. The structure of the major product formed in the following reaction is

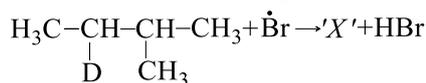




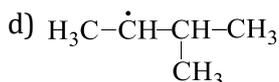
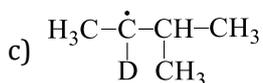
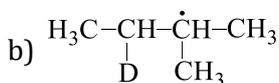
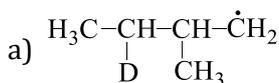
60. Butane nitrile may be prepared by heating:

- Propyl alcohol with KCN
- Butyl alcohol with KCN
- Butyl chloride with KCN
- Propyl chloride with KCN

61. Consider the following reaction,



Identify the structure of the major product 'X':



62. A mixture of 1-chloropropane and 2-chloropropane when treated with alcoholic KOH, it gives:

- 1-propene
- 2-propene
- Isopropylene
- A mixture of 1-propene and 2-propene

63. In Wurtz reaction of alkyl halides with sodium, the reactivity order of these halides is:

- $\text{RI} > \text{RBr} > \text{RCl}$
- $\text{RCl} > \text{RBr} > \text{RI}$
- $\text{RBr} > \text{RI} > \text{RCl}$
- None of these

64. A mixture of sodium acetate and sodalime is heated and the product treated with excess of chlorine in presence of bright sunlight. The product is:

- $\text{CH}_3\text{COOH}$
- $\text{CH}_2\text{BrCOOH}$
- $\text{CCl}_4$
- $\text{CH}_3\text{Cl}$

65. 1-chlorobutane on reaction with alcoholic KOH gives:

- 1-butene
- 1-butanol
- 2-butene
- 2-butanol

66. Which halide does not get hydrolysed by sodium hydroxide?

- Vinyl chloride
- Methyl Chloride
- Ethyl chloride
- Isopropyl chloride

67. Iodoform test is not given by

- 2-pentanone
- Ethanol
- Ethanal
- 3-pentanone

68. The alkyl halides that can be made by free radical halogenation of alkanes are

- $\text{RCl}$  and  $\text{RBr}$  but not  $\text{RF}$  or  $\text{RI}$
- $\text{RF}$ ,  $\text{RCl}$  and  $\text{RBr}$  but not  $\text{RI}$
- $\text{RF}$ ,  $\text{RCl}$ ,  $\text{RBr}$ ,  $\text{RI}$
- $\text{RF}$ ,  $\text{RCl}$  and  $\text{RI}$  but not  $\text{RBr}$

69. Non-sticking frying pans are coated with:

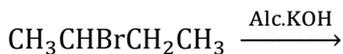
- Ethylene
- Styrene
- Tetrafluoroethylene (Teflon)
- Chlorofluoro methane

70. Ethyl chloride on heating with  $\text{AgCN}$  forms a compound X. The functional isomer of X is

- $\text{C}_2\text{H}_5\text{NC}$
- $\text{C}_2\text{H}_5\text{NH}_2$
- $\text{C}_2\text{H}_5\text{CN}$
- None of these

71. Chlorine is most reactive towards NaOH in:

- a)  $\text{CH}_3\text{Cl}$                       b)  $\text{CH}_2=\text{CHCl}$                       c)  $\text{C}_6\text{H}_5\text{Cl}$                       d)  $\text{C}_6\text{H}_5\text{CH}_2\text{Cl}$
72. The chemical formula of 'tear gas' is  
a)  $\text{COCl}_2$                       b)  $\text{CO}_2$                       c)  $\text{Cl}_2$                       d)  $\text{CCl}_3\text{NO}_2$
73. The order of polarity of  $\text{CH}_3\text{I}$ ,  $\text{CH}_3\text{Br}$  and  $\text{CH}_3\text{Cl}$  molecules follows the order:  
a)  $\text{CH}_3\text{Br} > \text{CH}_3\text{Cl} > \text{CH}_3\text{I}$   
b)  $\text{CH}_3\text{I} > \text{CH}_3\text{Br} > \text{CH}_3\text{Cl}$   
c)  $\text{CH}_3\text{Cl} > \text{CH}_3\text{Br} > \text{CH}_3\text{I}$   
d)  $\text{CH}_3\text{Cl} > \text{CH}_3\text{I} > \text{CH}_3\text{Br}$
74. Chloroform gives a trichloro derivative of an alcohol on reaction with  
a) conc. nitric acid                      b) aq. alkali  
c) acetone and alkali                      d) a primary amine and an alkali
75. In order to convert aniline into chlorobenzene the reagent used is  
a)  $\text{NaNO}_2/\text{HCl}$ ,  $\text{CuCl}$                       b)  $\text{Cl}_2/\text{CCl}_4$                       c)  $\text{Cl}_2/\text{AlCl}_3$                       d)  $\text{CuCl}_2$
76. Number of monochloro derivatives obtained when *neo* –pentane is chlorinated, is  
a) One                      b) Two                      c) Three                      d) Four
77. Which of the following will not form a yellow precipitate on heating with an alkaline solution of iodine?  
a)  $\text{CH}_3\text{CH}(\text{OH})\text{CH}_3$                       b)  $\text{CH}_3\text{CH}_2\text{CH}(\text{OH})\text{CH}_3$                       c)  $\text{CH}_3\text{OH}$                       d)  $\text{CH}_3\text{CH}_2\text{OH}$
78.  $\text{CaOCl}_2 + \text{H}_2\text{O} \rightarrow \text{Ca}(\text{OH})_2 + X$   
 $X + \text{CH}_3\text{CHO} \rightarrow Y$   
 $Y + \text{Ca}(\text{OH})_2 \rightarrow \text{CHCl}_3$ .  
What is 'Y'?  
a)  $\text{CH}_3\text{CH}(\text{OH})_2$                       b)  $\text{CH}_2\text{Cl}_2$                       c)  $\text{CCl}_3\text{CHO}$                       d)  $\text{CCl}_3\text{COCH}_3$
79. Reaction of *trans*-2-phenyl-1-bromocyclopentane on reaction with alcoholic KOH produces  
a) 4-phenylcyclopentene                      b) 2-phenylcyclopentene  
c) 1-phenylcyclopentene                      d) 3-phenylcyclopentene
80. In order to get ethanethiol from  $\text{C}_2\text{H}_5\text{Br}$ , the reagent used is:  
a)  $\text{Na}_2\text{S}$                       b)  $\text{NaHS}$                       c)  $\text{KCNS}$                       d)  $\text{K}_2\text{S}$
81. Solvent used in dry-cleaning of clothes is:  
a) Alcohol                      b) Acetone                      c) Carbon tetrachloride                      d) freon
82. Correct order of reactivity for halides is:  
a) Vinyl chloride > allyl chloride > propyl chloride  
b) Propyl chloride > vinyl chloride > allyl chloride  
c) Allyl chloride > propyl chloride > vinyl chloride  
d) None of the above
83. The substance employed as tear gas is:  
a) Westron                      b) Chloropicrin                      c) Chloretone                      d) None of these
84. One of the following that cannot undergo dehydrohalogenation is  
a) *iso*-propyl bromide                      b) ethanol                      c) Ethyl bromide                      d) None of the above
85. The starting material for the preparation of  $\text{CHI}_3$  is:  
a)  $\text{C}_2\text{H}_5\text{OH}$                       b)  $\text{CH}_3\text{OH}$                       c)  $\text{C}_2\text{H}_5\text{CHO}$                       d)  $\text{HCHO}$
86. Optically active compound is:  
a) 2-chloropropane                      b) 2-chlorobutane                      c) 3-chloropentane                      d) None of these
87.  $\text{CCl}_4$  is insoluble in water because:  
a) Water is non-polar  
b)  $\text{CCl}_4$  is non-polar  
c) Water and  $\text{CCl}_4$  are polar  
d) None of the above
88. Which one is most reactive towards  $\text{S}_\text{N}1$  reactions?  
a)  $\text{C}_6\text{H}_5\text{CH}(\text{C}_6\text{H}_5)\text{Br}$                       b)  $\text{C}_6\text{H}_5\text{CH}(\text{CH}_3)\text{Br}$                       c)  $\text{C}_6\text{H}_5\text{C}(\text{CH}_3)(\text{C}_6\text{H}_5)\text{Br}$                       d)  $\text{C}_6\text{H}_5\text{CH}_2\text{Br}$
89. Which of the following applies in the reaction,



(i)  $\text{CH}_3\text{CH} = \text{CHCH}_3$  (major product)

(ii)  $\text{CH}_2 = \text{CHCH}_2\text{CH}_3$  (minor product)

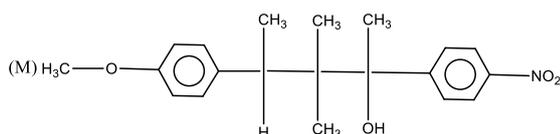
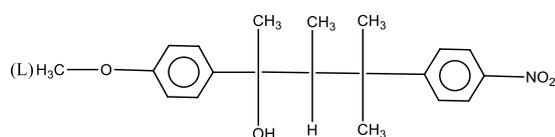
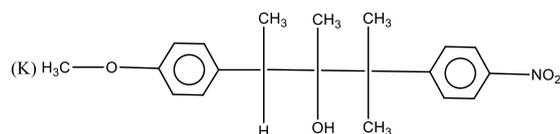
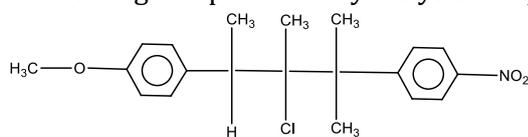
a) Markownikoff's rule

b) Saytzeff's rule

c) Kharasch effect

d) Hofmann's rule

90. The following compound on hydrolysis in aqueous acetone will give



a) Mixture of (K) and (L)

b) Mixture of (K) and (M)

c) Only (M)

d) Only (K)

91. The metal used for the de-bromination reaction of 1, 2-dibromoethane.

a) Na

b) Zn

c) Mg

d) Li

92. Reaction of *t*-butyl bromide with sodium methoxide produces

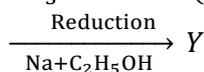
a) Isobutane

b) Isobutylene

c) Sodium *t*-butoxide

d) *t*-butylmethyl ether

93.  $\text{CH}_3\text{Br} + \text{KCN}(\text{alc.}) \rightarrow X$



What is Y in the series?

a)  $\text{CH}_3\text{CN}$

b)  $\text{C}_2\text{H}_5\text{CN}$

c)  $\text{C}_2\text{H}_5\text{NH}_2$

d)  $\text{CH}_3\text{NH}_2$

94. If methyl iodide and ethyl iodide are mixed in equal proportions, and the mixture is treated with metallic sodium in presence of dry ether, the number of possible products formed is:

a) 2

b) 3

c) 1

d) 4

95. An alkyl iodide on standing darkens, due to:

a) Hydrolysis

b) Conversion into ether

c) Liberation of iodine

d) Formation of alkanes

96. X compound reacts with Na to give  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$ , then compound X is

a)  $\text{CH}_3\text{CH}_2\text{OH}$

b)  $\text{CH}_3\text{CH}_2 - \text{Cl}$



114. Hexachloroethane is also called

- a) Artificial sweetner      b) Artificial camphor      c) Artificial polymer      d) None of these

115. Isobutyl magnesium bromide with dry ether and absolute alcohol gives:

- a)  $\text{CH}_3 \cdot \text{CH} \cdot \text{CH}_2\text{OH} \cdot$  and  $\text{CH}_3 \cdot \text{CH}_2\text{MgBr}$   
 $\quad \quad \quad |$   
 $\quad \quad \quad \text{CH}_3$
- b)  $\text{CH}_3 \cdot \text{CH} \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \text{CH}_3$  and  $\text{Mg(OH)Br}$   
 $\quad \quad \quad |$   
 $\quad \quad \quad \text{CH}_3$
- c)  $\text{CH}_3 - \text{CH} - \text{CH}_3 \cdot \text{CH}_2 = \text{CH}_2$  and  $\text{Mg(OH)Br}$   
 $\quad \quad \quad |$   
 $\quad \quad \quad \text{CH}_3$
- d)  $\text{CH}_3 - \text{CH} - \text{CH}_3$  and  $\text{CH}_3\text{CH}_2\text{OMgBr}$   
 $\quad \quad \quad |$   
 $\quad \quad \quad \text{CH}_3$

116. Strong reducing agent converts  $\text{CHCl}_3$  into:

- a)  $\text{C}_2\text{H}_2$                       b)  $\text{C}_2\text{H}_6$                       c)  $\text{C}_2\text{H}_4$                       d)  $\text{CH}_4$

117. Which of the following are arranged in decreasing order of dipole moment:

- a)  $\text{CH}_3\text{Cl}, \text{CH}_3\text{Br}, \text{CH}_3\text{F}$       b)  $\text{CH}_3\text{Cl}, \text{CH}_3\text{F}, \text{CH}_3\text{Br}$       c)  $\text{CH}_3\text{Br}, \text{CH}_3\text{Cl}, \text{CH}_3\text{F}$       d)  $\text{CH}_3\text{Br}, \text{CH}_3\text{F}, \text{CH}_3\text{Cl}$

118. Fluorobenzene ( $\text{C}_6\text{H}_5\text{F}$ ) can be synthesised in the laboratory

- a) By heating phenol with HF and KF  
 b) From aniline by diazotisation followed by heating the diazonium salt with  $\text{HBF}_4$   
 c) By direct fluorination of benzene with  $\text{F}_2$  gas  
 d) By reacting bromobenzene with NaF solution

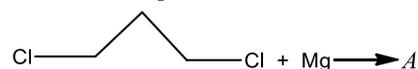
119. 1-chlorobutane on reaction with alcoholic potash gives

- a) but-1-ene                      b) butan-1-ol                      c) but-2-ene                      d) butan-2-ol

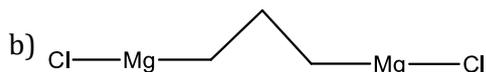
120. On warming with silver powder, chloroform is converted into

- a) Acetylene                      b) Hexachloroethane  
 c) 1, 1, 2, 2-tetrachloroethane      d) Ethylene

121. What is the product *A* in the following?

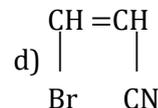
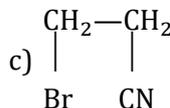
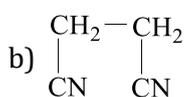
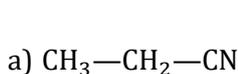
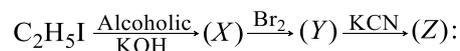


c) Both (a) and (b)

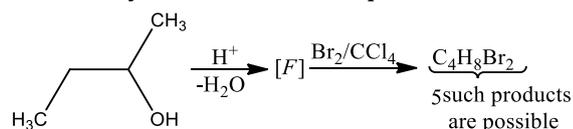


d) None of the above

122. Identify (Z) in the following reaction series,



123. How many structures of *F* is possible?



a) 2

b) 5

c) 6

d) 3

124. PVC plastics are produced by the polymerization of:

- a) Vinyl acetate                      b) Allyl chloride                      c) Vinyl chloride                      d) Ethene

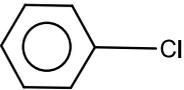
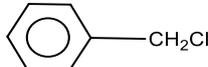
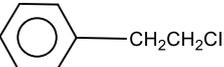
125. Ethylene dichloride can be prepared by the reaction of HCl and :

- a) Ethane                      b) Ethylene                      c) Acetylene                      d) Ethylene glycol

126. Polymer of chloroethylene is:

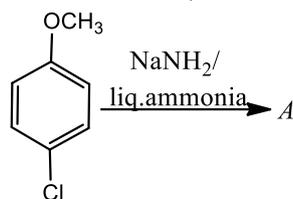
- a) PVC                                      b) Teflon                                      c) Nylon                                      d) Terylene
127. Most readily hydrolysed halides is:  
 a)  $C_6H_5Cl$                                       b)  $(C_6H_5)_2CHCl$                                       c)  $C_6H_5CH_2Cl$                                       d)  $(C_6H_5)_3CCl$
128. What is the product of the reaction of 1, 3-butadiene with  $Br_2$ ?  
 a) 1, 4-dibromo butene                                      b) 1, 2- dibromo butene  
 c) 3, 4- dibromo butene                                      d) 2, 3- dibromo-2-butene
129. Chlorobenzene gives aniline with  
 a)  $NH_3/Cu_2O$                                       b)  $NH_3/H_2SO_4$                                       c)  $NaNH_2$                                       d) None of the above
130. In the following compound, least number of monochlorination is possible
- a)  $CH_3CH_2CH_2CH_2CH_3$
- b) 
$$\begin{array}{c} H_3C-CH-CH_2-CH_3 \\ | \\ CH_3 \\ | \\ CH_3 \end{array}$$
- c) 
$$\begin{array}{c} CH_3 \\ | \\ H_3C-C-H \\ | \\ CH_3 \end{array}$$
- d) 
$$\begin{array}{c} H_3C-CH-CH_3 \\ | \\ CH_3 \end{array}$$
131. 2, 2-dichloro propane on hydrolysis yields  
 a) Acetone                                      b) 2, 2-propane diol  
 c) Isopropyl alcohol                                      d) Acetaldehyde
132. The product of vinyl chloride and HCl is a  
 a) *gem* chloride                                      b) Ethylidene chloride  
 c) 1, 1 dichloroethane                                      d) All of the above are correct
133. Among the following, the molecule with the highest dipole moment is:  
 a)  $CH_3Cl$                                       b)  $CH_2Cl_2$                                       c)  $CHCl_3$                                       d)  $CCl_4$
134.  $CO_2$  on reaction with  $C_2H_5MgBr$  and  $H_2O$  gives:  
 a) Ethane                                      b) Propionic acid                                      c) Acetic acid                                      d) None of these
135. Methyl chloride reacts with silver acetate to yield:  
 a) Acetic acid                                      b) Methyl acetate                                      c) Acetyl chloride                                      d) Acetaldehyde
136. A compound *A* of formula  $C_3H_6Cl_2$  on reaction with alkali can give *B* of formula  $C_3H_6O$  or *C* of formula  $C_3H_4$ . *B* on oxidation gave a compound of the formula  $C_3H_6O_2$ . *C* with dilute  $H_2SO_4$  containing  $Hg^{2+}$  ion gave *D* of formula  $C_3H_6O$ , which with bromine and NaOH gave the sodium salt of  $C_2H_4O_2$ . Then *A* is:  
 a)  $CH_3CH_2CHCl_2$   
 b)  $CH_3CCl_2CH_3$   
 c)  $CH_2ClCH_2CH_2Cl$   
 d)  $CH_3CHClCH_2Cl$
137. Compounds formed, when methyl amine is heated with chloroform in the presence of KOH is:  
 a)  $CH_3-C\equiv N$                                       b)  $CH_3N^+\equiv C^-$                                       c)  $CH_3-N^-\equiv C^+$                                       d)  $CH_3NHCH_3$
138. Tertiary butyl alcohol gives tertiary butyl chloride on treatment with  
 a) Conc. HCl/anhy.  $ZnCl_2$                                       b) KCN                                      c) NaOCl                                      d)  $Cl_2$
139. The reaction of toluene with  $Cl_2$  in presence of  $FeCl_3$  gives predominantly  
 a) Benzoyl chloride                                      b) Benzyl chloride  
 c) *o*- and *p*-chlorotoluene                                      d) *m*-chlorotoluene
140. Which one of the following compounds when heated with KOH and a primary amine gives carbylamine test?  
 a)  $CHCl_3$                                       b)  $CH_3Cl$                                       c)  $CH_3OH$                                       d)  $CH_3CN$
141. In the following reaction:  

$$C_6H_5CH_2Br \xrightarrow[2.H_3O^+]{1.Mg/ether} X$$
; the product 'X' is :

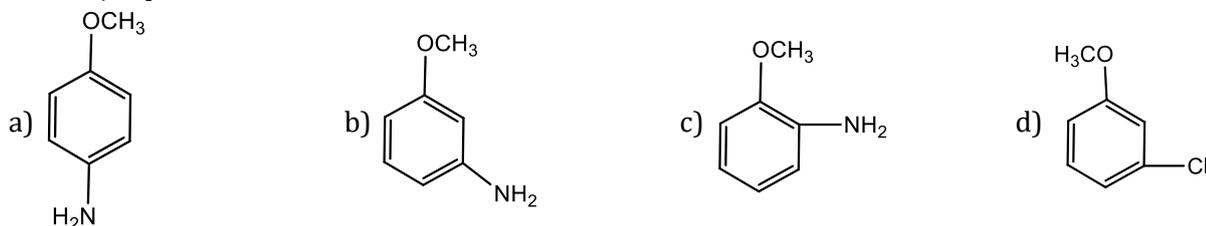
- a)  $C_6H_5CH_2OCH_2C_6H_5$     b)  $C_6H_5CH_2OH$     c)  $C_6H_5CH_3$     d)  $C_6H_5CH_2CH_2C_6H_5$
142. For a given alkyl group, the densities/b. p./m. p. are in the order:  
 a)  $RI < RBr < RCl$     b)  $RI < RCl < RBr$     c)  $RBr < RI < RCl$     d)  $RCl < RBr < RI$
143. Carbylamine test is performed by heating alc. KOH with:  
 a)  $CHCl_3$  and Ag  
 b) Trihalogenated methane and primary amine  
 c)  $CH_3Cl$  and  $C_2H_5NH_2$   
 d)  $RCN$  and  $RNH_2$
144. Which of these compounds is synthesised by chloral?  
 a) DDT    b) BHC    c) Chloroform    d) Michlers ketones
145. Iodoform can be prepared from all except:  
 a) Isopropyl alcohol    b) 3-methyl -2-butanone    c) Isobutyl alcohol    d) Ethyl methyl ketone
146. When vinyl chloride is passed through alcoholic KOH solution:  
 a) It dissolves    b) It forms vinyl alcohol    c) It forms acetylene    d) It has no action
147. Following compounds are given:  
 (i)  $CH_3CH_2OH$     (ii)  $CH_3COCH_3$   
 (iii)  $CH_3-\underset{\substack{| \\ CH_3}}{CH}OH$     (iv)  $CH_3OH$
- Which of the above compound(s), on being warmed with iodine solution and NaOH, will give iodoform?  
 a) (i),(iii) and (iv)    b) Only (ii)    c) (i), (ii) and (iii)    d) (i) and (ii)
148. DDT is obtained by the reaction of chlorobenzene with  
 a) Chloral    b) Chloroform    c) Dichloromethane    d) Acetaldehyde
149. The reaction products of the reaction between  $C_6H_5NH_2$ ,  $CHCl_3$  and KOH are:  
 a)  $C_6H_5NC + KCl$   
 b)  $C_6H_5OH + NH_4Cl + H_2O$   
 c)  $C_6H_5Cl + NH_4Cl + KCl$   
 d)  $C_6H_5CN + KCl$
150. In the reaction,  
 $CH_3C \equiv \bar{C} Na^+ + (CH_3)_2CHCl \rightarrow$   
 the product formed is:  
 a) 4-methyl-2-pentyne    b) Propyne    c) Propyne and propene    d) None of these
151. Which one of the following chlorohydrocarbons readily undergoes solvolysis?  
 a)  $CH_2 = CHCl$   
 b)   
 c)   
 d) 
152. Grignard reagent with hydrogen cyanide gives:  
 a) Aldehyde    b) Ketone    c) Both (a) and (b)    d) None of these
153. What happens if  $CCl_4$  is treated with  $AgNO_3$ ?  
 a) A white ppt. of  $AgCl$  will form    b)  $NO_2$  will be evolved  
 c)  $CCl_4$  will dissolve in  $AgNO_3$     d) Nothing will happen
154. Among the following which one has weakest carbon-halogen bond?  
 a) Benzyl bromide    b) Bromobenzene    c) Vinyl bromide    d) Benzyl chloride
155. Of the five isomeric hexanes, the isomer which can give two monochlorinated compounds is  
 a) 2-methylpentane    b) 2,2-dimethylbutane    c) 2, 3-dimethylbutane    d) *n*-hexane
156. Which of the following compounds gives trichloromethane on distilling with bleaching powder?  
 a) Methanal    b) Phenol    c) Ethanol    d) Methanol
157. Sodium ethoxide reacts with ethyl iodide to yield:

158.  $\text{CH}_3\text{Br} + \text{KCN (alc.)} \rightarrow X \xrightarrow[\text{Na/C}_2\text{H}_5\text{OH}]{\text{Reduction}} Y$ , what is  $Y$  in the series?
- a)  $\text{CH}_3\text{CH}_3$                       b)  $\text{C}_2\text{H}_5\text{OCH}_3$                       c)  $\text{C}_2\text{H}_5\text{OC}_2\text{H}_5$                       d) None of these
159. Identify  $A$  and  $B$  in the following reactions
- $$A \xrightarrow[\Delta]{\text{Aq. NaOH}} \text{C}_2\text{H}_5\text{OH} \xleftarrow{\text{AgOH}} B$$
- a)  $A = \text{C}_2\text{H}_2, B = \text{C}_2\text{H}_6$                       b)  $A = \text{C}_2\text{H}_5\text{Cl}, B = \text{C}_2\text{H}_4$   
c)  $A = \text{C}_2\text{H}_4, B = \text{C}_2\text{H}_5\text{Cl}$                       d)  $A = \text{C}_2\text{H}_5\text{Cl}, B = \text{C}_2\text{H}_5\text{Cl}$
160. The reagent used in the conversion of 1-butanol to 1-bromobutane is:
- a)  $\text{CHBr}_3$                       b)  $\text{Br}_2$                       c)  $\text{CH}_3\text{Br}$                       d)  $\text{P} + \text{Br}_2$
161.  $t$ -butyl chloride preferably undergo hydrolysis by
- a)  $\text{S}_{\text{N}}1$  mechanism  
b)  $\text{S}_{\text{N}}2$  mechanism  
c) Any of (a) and (b)  
d) None of the above
162. Which statement is wrong about chloroform?
- a) Chloroform is used as anaesthetic  
b) Chloroform has distorted tetrahedral shape  
c) Chloroform is used as a solvent  
d) Chloroform has  $sp^2$ -hybridised carbon atom
163. When  $\text{CCl}_4$  is boiled with  $\text{KOH}$ , the product formed is:
- a) Formic acid                      b) Methyl alcohol                      c) Formaldehyde                      d) Carbon dioxide
164. Which set of reagents will produce freon ( $\text{CCl}_2\text{F}_2$ ) ?
- a)  $\text{C} + \text{F}_2 + \text{Cl}_2 \rightarrow$                       b)  $\text{CH}_3\text{Cl} + \text{F}_2 \rightarrow$                       c)  $\text{CCl}_4 + \text{HF} \xrightarrow{\text{SbCl}_5}$                       d)  $\text{CCl}_4 + \text{F}_2 \rightarrow$
165. Which of the following will not give positive iodoform test?
- a)  $\text{CH}_3\text{CH}_2\text{CHOHCH}_3$                       b)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{COCH}_3$                       c)  $\text{CH}_3\text{CH}_2\text{COCH}_2\text{CH}_3$                       d)  $\text{CH}_3\text{COC}_6\text{H}_5$
166. Which of the following does not react with benzene in presence of anhydrous  $\text{AlCl}_3$ ?
- a)  $\text{C}_6\text{H}_5\text{Cl}$                       b)  $\text{C}_6\text{H}_5\text{CH}_2\text{Cl}$                       c)  $\text{CH}_3\text{Cl}$                       d)  $\text{C}_6\text{H}_5\text{CH}_2\text{CH}_2\text{CH}_2\text{Cl}$
167. Iodoform is obtained when ethanol is heated with
- a)  $\text{KI}$  and aq.  $\text{KOH}$                       b)  $\text{I}_2$  and aq.  $\text{KOH}$                       c)  $\text{I}_2/\text{aq. KI}$                       d)  $\text{HI}$  and  $\text{HIO}_3$
168.  $n$ -propyl bromide reacts with ethanolic  $\text{KOH}$  to form:
- a) Propane                      b) Propene                      c) Propyne                      d) Propyl alcohol
169. Which of the following statements regarding the  $\text{S}_{\text{N}}1$  reaction shown by alkyl halide is not correct?
- a) The added nucleophile plays no kinetic role in  $\text{S}_{\text{N}}1$  reaction.  
b) The  $\text{S}_{\text{N}}1$  reaction involves the inversion of configuration of the optically active substrate.  
c) The  $\text{S}_{\text{N}}1$  reaction on the chiral starting material ends up with racemization of the product.  
d) The more stable the carbocation intermediate the faster the  $\text{S}_{\text{N}}1$  reaction.
170. Pick up the correct statement about alkyl halides:
- a) They show H-bonding.  
b) They are soluble in water.  
c) They are soluble in organic solvents.  
d) They do not contain any polar bond.
171. The product of reaction between alcoholic silver nitrite with ethyl bromide is
- a) Ethene                      b) Ethane                      c) Ethyl nitrile                      d) Nitro ethane
172. 1-phenyl, 2-chloropropane on treating with alc.  $\text{KOH}$  gives mainly:
- a) 1-phenylpropene  
b) 2-phenylpropene  
c) 1-phenylpropan-2-ol  
d) 1-phenylpropan-1-ol

173. In the reaction,



The major product  $A$  is



174.  $(\text{CH}_3)_3\text{CMgCl}$  on reaction with  $\text{D}_2\text{O}$  gives:

- a)  $(\text{CH}_3)_3\text{CD}$       b)  $(\text{CH}_3)_3\text{OD}$       c)  $(\text{CD}_3)_3\text{CD}$       d)  $(\text{CD}_3)_3\text{OD}$

175. Grignard reagent shows addition on:

- a)  $>\text{C}=\text{O}$       b)  $-\text{C}\equiv\text{N}$       c)  $>\text{C}=\text{S}$       d) All of these

176. When tetrahydrofuran is treated with excess  $\text{HI}$ , the product formed is

- a) 1, 4-diiodobutane      b) 1, 4-butanediol  
c) 2-iodotetrahydrofuran      d) 4-iodo-1-butanol

177. Iodoform can be used in medicine as:

- a) Anaesthetic      b) Antiseptic      c) Analgesic      d) Antifebrin

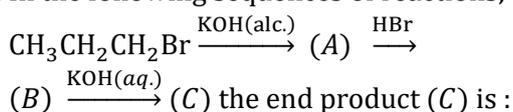
178. A mixture of two organic compounds was treated with sodium metal in ether solution. Isobutane was obtained as a product. The two chlorine compounds are:

- a) Methyl chloride and propyl chloride  
b) Methyl chloride and ethyl chloride  
c) Isopropyl chloride and methyl chloride  
d) Isopropyl chloride and ethyl chloride

179. Wurtz's reaction involves the reduction of alkyl halide with

- a)  $\text{Zn}/\text{HCl}$       b)  $\text{HI}$       c)  $\text{Zn}/\text{Cu}$  couple      d)  $\text{Na}$  in ether

180. In the following sequences of reactions;



- a) Propene  
b) Propyne  
c) Propan-1-ol  
d) Propan-2-ol

181. When  $\text{CHCl}_3$  is boiled with  $\text{NaOH}$ , it gives

- a) Formic acid      b) Trihydroxy methane  
c) Acetylene      d) Sodium formate

182. Which of the following compounds has the highest boiling point ?

- a)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{Cl}$       b)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{Cl}$   
c)  $\text{CH}_3\text{CH}(\text{CH}_3)\text{CH}_2\text{Cl}$       d)  $(\text{CH}_3)_3\text{CCl}$

183. Which one is liquid at room temperature?

- a)  $\text{CH}_3\text{Cl}$       b)  $\text{C}_2\text{H}_5\text{Cl}$       c)  $\text{CH}_3\text{Br}$       d)  $\text{C}_2\text{H}_5\text{Br}$

184. The organic chloro compound, which shows complete stereochemical inversion during an  $\text{S}_\text{N}2$  reaction is

- a)  $(\text{C}_2\text{H}_5)_2\text{CHCl}$       b)  $(\text{CH}_3)_3\text{CCl}$       c)  $(\text{CH}_3)_2\text{CHCl}$       d)  $\text{CH}_3\text{Cl}$

185. The best method for the conversion of an alcohol into an alkyl chloride is by treating the alcohol with

- a)  $\text{PCl}_3$       b)  $\text{PCl}_5$

- c)  $\text{SOCl}_2$  in presence of pyridine  
 d) dry HCl in the presence of anhydrous  $\text{ZnCl}_2$
186. Which compound is used in cooling?  
 a)  $\text{CHCl}_3$                       b)  $\text{CCl}_4$                       c)  $\text{CF}_4$                       d)  $\text{CCl}_2\text{F}_2$
187. Which is finally produced when acetylene reacts with HCl?  
 a)  $\text{CH}_2=\text{CHCl}$                       b)  $\text{CH}_3\text{CHCl}_2$                       c)  $\text{ClCH}=\text{CHCl}$                       d) None of these
188. The reaction,  

$$\text{CH}_3-\underset{\text{CH}_3}{\text{CH}}-\text{Cl} \xrightarrow{\text{KOH}(aq.)} \text{CH}_3-\underset{\text{CH}_3}{\text{CH}}-\text{OH} + \text{Cl}^-$$
 shows:  
 a) Reduction  
 b) Oxidation  
 c) Neutralisation  
 d) Nucleophilic substitution
189. Which of the following alkyl halide is used as methylating agent?  
 a)  $\text{C}_2\text{H}_5\text{Cl}$                       b)  $\text{C}_2\text{H}_5\text{Br}$                       c)  $\text{C}_2\text{H}_5\text{I}$                       d)  $\text{CH}_3\text{I}$
190. The products of reaction of alcoholic silver nitrite with ethyl bromide are:  
 a) Ethane                      b) Ethene                      c) Ethyl alcohol                      d) Nitroethane
191. Which is most reactive for  $\text{S}_{\text{N}}2$  reactions?  
 a)  $\text{CH}_3\text{I}$                       b)  $\text{C}_2\text{H}_5\text{I}$                       c)  $\text{C}_3\text{H}_7\text{I}$                       d)  $\text{C}_4\text{H}_9\text{I}$
192. The product obtained on treatment of ethyl chloride with potassium cyanide is reduced by sodium and alcohol to give:  
 a) Propyl amine                      b) Ethyl amine                      c) Diethyl amine                      d) Acetic acid
193. The molecular formula of the chlorinated acetone formed in the distillation of acetone with bleaching powder is:  
 a)  $\text{CH}_3\text{COCl}$                       b)  $\text{CCl}_2\text{OCl}_3$                       c)  $\text{CH}_2\text{ClCOOH}$                       d)  $\text{CCl}_3\text{COCH}_3$
194. Compound 'A' reacts with alcoholic KOH to yield compound 'B' which on ozonolysis followed by reaction with  $\text{Zn}/\text{H}_2\text{O}$  gives methanal and propanal. Compound 'A' is  
 a) 1-propanol                      b) 1-butanol                      c) 1-chlorobutane                      d) 1-chloropentane
195. Phenol is heated with  $\text{CHCl}_3$  and alcoholic KOH when salicylaldehyde is produced. The reaction is known as:  
 a) Rosenmund's reaction  
 b) Reimer-Tiemann reaction  
 c) Friedel-Craft's reaction  
 d) Sommelet reaction
196. Which of the following can be used as local anaesthetic?  
 a)  $\text{CHCl}_3$                       b)  $\text{C}_2\text{H}_4$  with  $\text{O}_2$                       c)  $\text{C}_2\text{H}_5\text{Cl}$                       d)  $\text{C}_2\text{H}_5\text{OH}$
197. Which of the following is not inflammable?  
 a)  $\text{CHCl}_3$                       b) Benzene  
 c) Toluene                      d) Carbon tetrachloride
198. Which of the following does not answer iodoform test?  
 a) *N*-butyl alcohol                      b) *Sec*-butyl alcohol                      c) Acetophenone                      d) Acetaldehyde
199. Grignard reagent is not prepared in aqueous medium but prepared in ether medium, because  
 a) the reagent is highly reactive in ether                      b) the reagent does not react with water  
 c) the reagent becomes inactive in water                      d) the reagent reacts with water
200. The reaction in which phenol differs from alcohol is  
 a) It undergoes esterification with carboxylic acid                      b) It reacts with ammonia  
 c) It forms yellow crystals of iodoform                      d) It liberates  $\text{H}_2$  with Na metal
201. Which compound is used as helminthicide for elimination of hook worms?  
 a)  $\text{CH}_4$                       b)  $\text{CHCl}_3$                       c)  $\text{C}_2\text{H}_2\text{Cl}_4$                       d)  $\text{CCl}_4$

202. In the preparation of chlorobenzene from aniline, the most suitable reagent is  
 a) Chlorine in the presence of ultraviolet light      b) Chlorine in the presence of  $\text{AlCl}_3$   
 c) Nitrous acid followed by heating with  $\text{Cu}_2\text{Cl}_2$       d)  $\text{HCl}$  and  $\text{Cu}_2\text{Cl}_2$
203. Methyl magnesium iodide on treatment with  $\text{D}_2\text{O}$  furnishes a hydrocarbon, alongwith  $\text{Mg}(\text{OD})\text{I}$ . The hydrocarbon is:  
 a)  $\text{CH}_3\text{D}$       b)  $\text{CH}_3\text{CH}_2\text{D}$       c)  $\text{CH}_4$       d) None of these
204. A Grignard reagent is prepared by reacting magnesium with:  
 a) Methyl amine      b) Diethyl ether      c) Ethyl iodide      d) Ethyl alcohol
205. Identify *A* and *B* in the following reaction  

$$\text{C}_2\text{H}_5\text{Cl} \xrightarrow{\text{A}} \text{C}_2\text{H}_5\text{OH} \xleftarrow{\text{B}} \text{C}_2\text{H}_5\text{Cl}$$
 a) *A* = aqueous  $\text{KOH}$ ; *B* =  $\text{AgOH}$       b) *A* = alcoholic  $\text{KOH}/\Delta$ ; *B* = aqueous  $\text{NaOH}$   
 c) *A* = aqueous  $\text{NaOH}$ ; *B* =  $\text{AgNO}_2$       d) *A* =  $\text{AgNO}_2$ ; *B* =  $\text{KNO}_2$
206. A yellow precipitate is obtained when aqueous  $\text{AgNO}_3$  is added to a solution of the compound:  
 a)  $\text{CCl}_3\text{CHO}$       b)  $\text{CHI}_3$       c)  $\text{CHCl}_3$       d)  $\text{C}_6\text{H}_5\text{CH}_2\text{Cl}$
207. Which statement is correct?  
 a)  $\text{C}_2\text{H}_5\text{Br}$  reacts with alcoholic  $\text{KOH}$  to form  $\text{C}_2\text{H}_5\text{OH}$   
 b)  $\text{C}_2\text{H}_5\text{Br}$  when treated with metallic sodium gives ethane  
 c)  $\text{C}_2\text{H}_5\text{Br}$  when treated with sodium ethoxide forms diethyl ether  
 d)  $\text{C}_2\text{H}_5\text{Br}$  with  $\text{AgCN}$  forms ethyl cyanide
208. Phosgene is a common name for:  
 a)  $\text{CO}_2$  and  $\text{PH}_3$       b) Phosphoryl chloride      c) Carbonyl chloride      d) Carbon tetrachloride
209. The alkyl halide which does not give white precipitate with alcoholic  $\text{AgNO}_3$  solution is:  
 a) Ethyl chloride      b) Allyl chloride      c) Isopropyl chloride      d) Vinyl chloride
210. An alkyl halide reacts with equivalent amount of  $\text{NH}_3$  to give:  
 a) Amide      b) Cyanide      c) Amine      d) None of these
211. The combination which produces *t*-butyl alcohol when treated with Grignard reagent:  
 a)  $\text{CH}_3\text{MgBr} + \text{CH}_3\text{COCH}_3$   
 b)  $\text{C}_2\text{H}_5\text{MgBr} + \text{CH}_3\text{COCH}_3$   
 c)  $\text{CH}_3\text{MgBr} + (\text{CH}_3)_2\text{CHOH}$   
 d)  $\text{CH}_3\text{MgBr} + (\text{CH}_3)_3\text{COH}$
212. Methyl chloride on treatment with potassium cyanide followed by hydrolysis yields:  
 a)  $\text{HCOOH}$       b)  $\text{CH}_3\text{COOH}$       c)  $\text{CH}_3\text{CN}$       d)  $\text{CH}_3\text{COOK}$
213. 9.65 C of electric current is passed through fused anhydrous magnesium chloride. The magnesium metal thus, obtained is completely converted into a Grignard reagent. The number of moles of the Grignard reagent obtained is  
 a)  $5 \times 10^{-4}$       b)  $1 \times 10^{-4}$       c)  $5 \times 10^{-5}$       d)  $1 \times 10^{-5}$
214. A bromoalkane 'X' reacts with magnesium in dry ether to form compound 'Y'. The reaction of 'Y' with methanal followed by hydrolysis yield an alcohol having molecular formula  $\text{C}_4\text{H}_{10}\text{O}$ . The compound 'X' is  
 a) Bromoethane      b) Bromomethane      c) 1-bromopropane      d) 2-bromopropane
215.  $\text{C}_2\text{H}_5\text{Br} \xrightarrow{\text{KCN}} (\text{A}) \xrightarrow{\text{Hydrolysis}} (\text{B})$   
 The compound (*B*) in above reaction is:  
 a) Ethylene chloride      b) Acetic acid      c) Propionic acid      d) Ethyl cyanide
216. A salt solution is treated with chloroform drops and is shaken with chlorine water. Chloroform layer becomes violet, solution contains:  
 a)  $\text{NO}_2^-$       b)  $\text{NO}_3^-$       c)  $\text{Br}^-$       d)  $\text{I}^-$
217. Which of the following is least reactive in a nucleophilic substitution reaction?  
 a)  $(\text{CH}_3)_3\text{CCl}$       b)  $\text{CH}_2=\text{CHCl}$       c)  $\text{CH}_3\text{CH}_2\text{Cl}$       d)  $\text{CH}_2=\text{CHCH}_2\text{Cl}$
218. Ethylidene dichloride ( $\text{CH}_3\text{CHCl}_2$ ) can be prepared by the addition of hydrogen chloride on:  
 a)  $\text{C}_2\text{H}_6$       b)  $\text{C}_2\text{H}_4$       c)  $\text{C}_2\text{H}_2$       d) All of these

219. Which of the following statements is true?

- a) Allyl chloride is more reactive than vinyl chloride
- b) Vinyl chloride is as reactive as allyl chloride
- c) Vinyl chloride is more reactive than allyl chloride
- d) Both of them are more reactive than chlorobenzene

220. An alkyl halide (RX) reacts with Na to form 4, 5-diethyloctane. Compound RX is

- a)  $\text{CH}_3(\text{CH}_2)_3\text{Br}$
- b)  $\text{CH}_3(\text{CH}_2)_2\text{CH}(\text{Br})\text{CH}_2\text{CH}_3$
- c)  $\text{CH}_3(\text{CH}_2)_3\text{CH}(\text{Br})\text{CH}_3$
- d)  $\text{CH}_3(\text{CH}_2)_5\text{Br}$

221.  $\text{PCl}_5$  reacts with propanone, to give:

- a) Gem dichloride
- b) Vic dichloride
- c) Propanal
- d) Propane chloride

222. Which is not present in Grignard reagent?

- a) Carboxylic radical represented by  $\text{COOH}$
- b) Magnesium represented by  $\text{Mg}$
- c) Alkyl radical represented by  $R$
- d) Halide radical represented by  $X$

223. Alkyl iodide reacts with  $\text{NaCN}$  to give alkyl cyanide and small amount of alkyl isocyanide. Formation of these two products is due to the

- a) ionic character of  $\text{NaCN}$
- b) nucleophilic character of  $\text{CN}^-$
- c) ambidentate character of  $\text{CN}^-$
- d) Electrophilic character of  $\text{CN}^-$

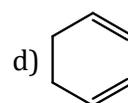
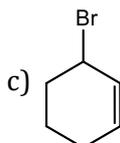
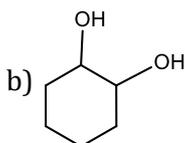
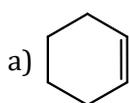
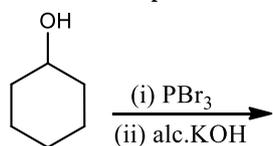
224. Which of the following gives iodoform test?

- a)  $\text{CH}_3 - \text{CH}_2(\text{OH})$
- b)  $\text{C}_2\text{H}_5\text{CHO}$
- c)  $(\text{CH}_2\text{OH})_2$
- d) None of the above

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

- a)  $\text{KBr}$
- b)  $\text{NH}_4\text{Br}$
- c)  $\text{Br}_2$
- d)  $\text{KBr}$  and conc.  $\text{H}_2\text{SO}_4$

226. Predict the product,



227. Trichloro acetone reacts with lime water to form:

- a)  $\text{CH}_3\text{CHO}$
- b)  $\text{CHCl}_3$
- c)  $\text{CH}_3\text{Cl}$
- d)  $\text{CH}_3\text{OH}$

228. When 32.25 g of ethyl chloride is subjected to dehydrohalogenation reaction the yield of the alkene formed is 50%. The mass of the product formed is (atomic mass of chlorine is 35.5)

- a) 14 g
- b) 28 g
- c) 64.5 g
- d) 7 g

229. Which one of the following possess highest m.pt. ?

- a) Chlorobenzene
- b) *o*-dichlorobenzene
- c) *m*-dichlorobenzene
- d) *p*-dichlorobenzene

230. Which of the compounds when brominated turns to *meso* 2, 3-dibromobutane?

- a) *Cis*-2-butene
- b) *Iso*-butane
- c) Butane
- d) *Trans*-2-butene

231. Iodoform can be obtained on warming  $\text{NaOH}$  and iodine with

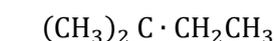
- a)  $\text{CH}_3 - \text{CH}_2 - \text{CH}(\text{OH})\text{CH}_3$
- b)  $\begin{array}{c} \text{O} \\ || \\ (\text{CH}_3)_2\text{CH} - \text{C} - \text{C}_2\text{H}_5 \end{array}$
- c)  $\begin{array}{c} \text{CH}_3 - \text{C} - \text{OCH}_3 \\ || \end{array}$
- d)  $(\text{CH}_3)_3\text{CCH}_2\text{OH}$

232. 1-chlorobutane on reaction with alcoholic potash gives  
 a) 1-butene                      b) 1-butanol                      c) 2-butene                      d) 2-butanol
233.  $S_N1$  reaction is favoured by:  
 a) Non-polar solvents  
 b) More no. of alkyl group on the carbon atom attached to the halogen atom  
 c) Small groups on the carbon attached to the halogen atom  
 d) None of the above
234. What mass of isobutylene is obtained from 37 g of tertiary butyl alcohol by heating with 20%  $H_2SO_4$  at 363 K, if the yield is 65%?  
 a) 16 g                      b) 18.2 g                      c) 20 g                      d) 22 g
235. Tertiary alkyl halides are practically inert to substitution by  $S_N2$  mechanism because of  
 a) Steric hindrance                      b) Inductive effect                      c) Instability                      d) Insolubility
236. Identify the set of reagents/reaction conditions 'X' and 'Y' in the following set of transformations:  
 $CH_3CH_2CH_2Br \xrightarrow{X} \text{Product} \xrightarrow{Y} (CH_3)_2CHBr$   
 a) X = dilute NaOH aq.; 20°C  
 Y = HBr/acetic acid; 20°C  
 b) X = conc., alc. NaOH; 80°C  
 Y = HBr/acetic acid; 20°C  
 c) X = dilute aqueous NaOH; 20°C  
 Y =  $Br_2/CHCl_3$ ; 0°C  
 d) X = conc., alc. NaOH; 80°C  
 Y =  $Br_2/CHCl_3$ ; 0°C
237. In the dichlorination reaction of propane, mixture of products are obtained. How many isomers the mixture contains?  
 a) 2                      b) 3                      c) 4                      d) 5
238. The number of stereoisomers of compound  $CH_3-CH=CH-CHBr-CH_3$  would be:  
 a) 3                      b) 6                      c) 2                      d) 4
239. The industrial preparation of chloroform employs acetone and:  
 a) Sodium chloride                      b) Chlorine gas                      c) Calcium hypochlorite                      d) Phosgene
240.  $RX + A \rightarrow RNC$   
 A is  
 a) AgCN                      b) KCN                      c) NaCN                      d) HCN
241. On mixing a certain alkane with chlorine and irradiating it with ultraviolet light, it forms only one monochloroalkane.  
 a) Propane                      b) Pentane                      c) *Iso*-pentane                      d) *Neo*-pentane
242. Formation of alkane by the action of Zn on alkyl halide is called:  
 a) Wurtz reaction                      b) Kolbe's reaction                      c) Cannizzaro's reaction                      d) Frankland's reaction
243. Chloroform used as a drug is prepared by the reaction of acetone with:  
 a) Chlorine                      b) Ethyl chloride                      c) Chloroform                      d) Ethylene dichloride
244. Which is gem dihalide?  
 a)  $CH_3 \cdot CHBr_2$                       b)  $CH_2Br \cdot CH_2Br$                       c)  $CH_3 \cdot CHBr \cdot CH_2Br$                       d) None of these
245. Which of the following is a Grignard reagent?  
 a) Ammoniacal solution of  $AgNO_3$   
 b) Ethereal solution of  $C_2H_5MgCl$   
 c) Alcoholic solution of KOH  
 d) Aqueous solution of caustic soda
246. The product formed on reaction of ethyl alcohol with bleaching powder is  
 a)  $CHCl_3$                       b)  $CCl_3CHO$                       c)  $CH_3COCH_3$                       d)  $CH_3CHO$

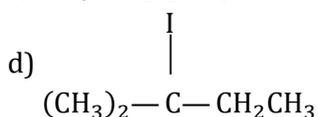
247. Chloral is:

- a)  $\text{CCl}_3\text{CHO}$                       b)  $\text{CCl}_3 \cdot \text{CO} \cdot \text{CH}_3$                       c)  $\text{CCl}_3 \cdot \text{CO} \cdot \text{CCl}_3$                       d)  $\text{CCl}_3 \cdot \text{CH}_2\text{OH}$

248. Which of the following compounds undergo  $E_2$  reactions more easily?



- a)  $\begin{array}{c} | \\ \text{Br} \end{array}$   
b)  $\text{CH}_3(\text{CH}_2)_2\text{CH}_2\text{Cl}$   
c)  $\text{CH}_3(\text{CH}_2)_2\text{CH}_2\text{I}$



249. Decomposition of benzene diazonium chloride by using  $\text{Cu}_2\text{Cl}_2/\text{HCl}$  to form chlorobenzene is

- a) Raschig's reaction                      b) Sandmeyer's reaction  
c) Kolbe's reaction                      d) Cannizaro's reaction

250. Isobutyl chloride and butyl chloride are:

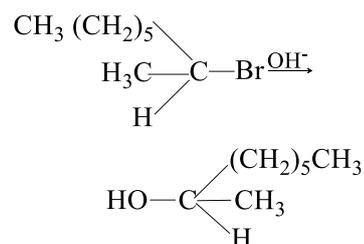
- a) Position isomers                      b) Chain isomers                      c) Functional isomers                      d) Metamers

251.  $\text{CH}_3\text{Br} + \text{Nu}^- \rightarrow \text{CH}_3 - \text{Nu} + \text{Br}^-$

The decreasing order of the rate of the above reaction with nucleophiles ( $\text{Nu}^-$ ) A to D is [ $\text{Nu}^- = (\text{A})\text{PhO}^-, (\text{B})\text{AcO}^-, (\text{C})\text{HO}^-, (\text{D})\text{CH}_3\text{O}^-$ ]

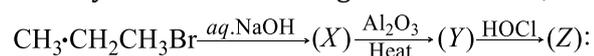
- a)  $D > C > A < B$                       b)  $D > C > B > A$                       c)  $A > B > C > D$                       d)  $B > D > C > A$

252. The reaction described below is:



- a)  $\text{S}_{\text{E}}1$                       b)  $\text{S}_{\text{N}}2$                       c)  $\text{S}_{\text{N}}1$                       d)  $\text{S}_{\text{E}}2$

253. Identify 'Z' in the following reaction series,



Mixture of

- a)  $\begin{array}{c} \text{CH}_3 - \text{CH} - \text{CH}_2 \\ | \quad | \\ \text{Cl} \quad \text{Cl} \end{array}$  and  $\begin{array}{c} \text{CH}_3 - \text{CH} - \text{CH}_2 \\ | \quad | \\ \text{OH} \quad \text{Cl} \end{array}$   
b)  $\begin{array}{c} \text{CH}_3 - \text{CH} - \text{CH}_2 \\ | \quad | \\ \text{OH} \quad \text{Cl} \end{array}$   
c)  $\begin{array}{c} \text{CH}_3 - \text{CH} - \text{CH}_2 \\ | \quad | \\ \text{Cl} \quad \text{OH} \end{array}$   
d)  $\begin{array}{c} \text{CH}_3 - \text{CH} - \text{CH}_2 \\ | \quad | \\ \text{Cl} \quad \text{Cl} \end{array}$

254. Which of the following when heated with KOH and primary amine gives carbylamine test?

- a)  $\text{CHCl}_3$                       b)  $\text{CH}_2\text{Cl}_2$                       c)  $\text{CH}_3\text{OH}$                       d)  $\text{CCl}_4$

255. The reagent used for dehalogenation of 1,2-dichloropropane is:

- a) Zn dust                      b) Zn—Hg                      c) Na                      d) Zn—Cu couple

256.  $\text{CH}_3\text{NH}_2$  reacts with  $\text{CH}_3\text{MgX}$  to give:

- a) Acetone                      b) Alcohol                      c) Methane                      d) Ethane

257. Which of the following haloalkanes is most reactive?

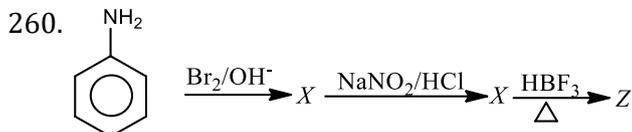
- a) 1-chloropropane                      b) 1-bromopropane                      c) 2-chloropropane                      d) 2-bromopropane

258. Iodoform is formed when ethanol is heated with:

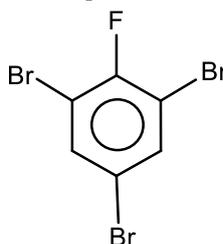
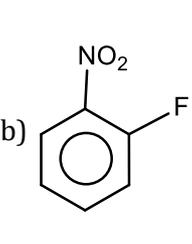
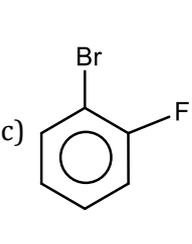
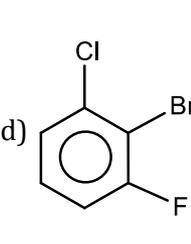
- a) Potassium iodide and sodium hydroxide
- b) Iodine and aqueous potassium hydroxide
- c) Chloroform and iodine
- d) Iodine and potassium iodide

259. Tertiary alkyl halides are practically inert to  $S_N2$  mechanism because of:

- a) Insolubility
- b) Instability
- c) Inductive effect
- d) Steric hinderance



The final product, is

- a) 
- b) 
- c) 
- d) 

261. Carbon tetrachloride on treatment with  $Fe/H_2O$  gives:

- a) Chloromethane
- b) Methane
- c) Chloroform
- d) Methylene chloride

262. Which group is displaced by a halogen group?

- a) Hydroxyl (OH) group
- b) Aldehyde ( $-CHO$ ) group
- c) Nitro ( $-NO_2$ ) group
- d) Keto ( $C=O$ ) group

263. A small amount of alcohol is usually added to  $CHCl_3$  bottles because:

- a) It retards the anaesthetic property of  $CHCl_3$
- b) It retards the oxidation of  $CHCl_3$  to phosgene
- c) It converts any phosgene formed to harmless ethyl carbonate
- d) Both (b) and (c)

264. Which one is correct?

- a) Freon-14 is  $CF_4$ ; Freon-13 is  $CF_3Cl$ ; Freon-12 is  $CF_2Cl_2$  and Freon-11 is  $CFCl_3$
- b) Freons are chlorofluorocarbons
- c) Freons are used as refrigerants
- d) All of the above

265. The reactivity order of alkyl halides depends upon:

- a) Nature of alkyl group only
- b) Nature of halogen atom only
- c) Nature of both alkyl group and halogen atom
- d) None of the above

266. *p*-nitrobromobenzene can be converted to *p*-nitroaniline by using  $NaNH_2$ . The reaction proceeds through the intermediate named

- a) Carbocation
- b) Carbanion
- c) Benzyne
- d) Dianion

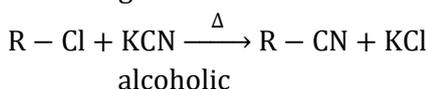
267. Reagent not used to prepare an alkyl halide from an alcohol is:

- a)  $HCl + ZnCl_2$
- b)  $NaCl$
- c)  $PCl_5$
- d)  $SOCl_2$

268. The catalyst used in the preparation of an alkyl chloride by the action of dry  $HCl$  on an alcohol is

- a) anhy.  $AlCl_3$
- b)  $FeCl_3$
- c) anhy.  $ZnCl_2$
- d)  $Cu$

269. Following is the substitution reaction in which  $-CN$  replaces  $-Cl$ .



To obtain propanenitrile, R – Cl should be

- a) Chloroethane      b) 1-chloropropane      c) Chloromethane      d) 2-chloropropane

270.  $\text{CH}_3\text{Br} + \text{OH}^- \rightarrow \text{CH}_3\text{OH} + \text{Br}^-$  reaction proceeds by  $\text{S}_\text{N}2$  mechanism. Its rate is dependent on the concentration of

- a)  $\text{CH}_3\text{Br}, \text{OH}^-$       b)  $\text{CH}_3\text{Br}$  only      c)  $\text{OH}^-$  only      d)  $\text{CH}_3\text{Br}, \text{CH}_3\text{OH}$

271. If chloroform is left open in air in presence of sun-rays:

- a) Explosion takes place  
b) Poisonous phosgene gas is formed  
c) Polymerization takes place  
d) No reaction takes place

272. Westrosol is:

- a) Acetylene tetrachloride  
b) Acetylene dichloride  
c) Trichloroethyne  
d) 1,1,2-trichloroethene

273. The compound formed on heating chlorobenzene with chloral in the presence of concentrated sulphuric acid is

- a) Gammexane      b) DDT      c) Freon      d) Hexachloroethane

274. The C—Mg bond in  $\text{CH}_3\text{CH}_2\text{MgBr}$  is:

- a) Ionic      b) Non-polar covalent      c) Polar covalent      d) Hydrogen

275. In  $\text{S}_\text{N}1$  reaction, the first step involves the formation of:

- a) Free radical      b) Carbanion      c) Carbocation      d) Final product

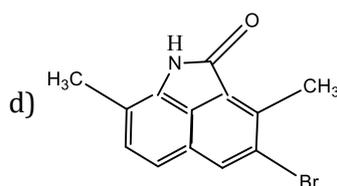
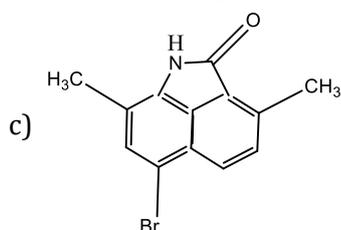
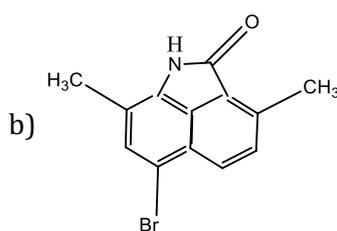
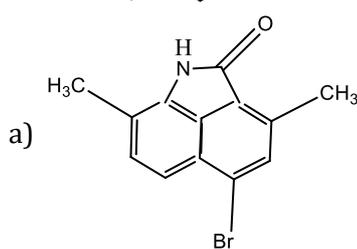
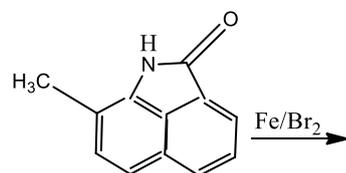
276. The alkyl group of Grignard reagent acts as:

- a) Free radical      b) Carbonium ion      c) Carbanion      d) None of these

277. Methyl ketone is identified by

- a) Iodoform test      b) Fehling solution      c) Tollen's reagent      d) Schiff's reagent

278. Product on monobromination of this compound is



279. Which of the following is added to chloroform to slow down its aerial oxidation in presence of light?

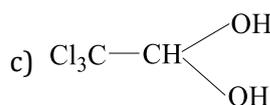
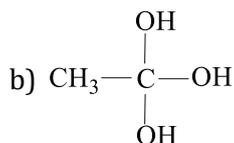
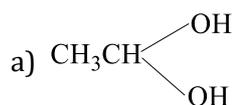
- a) Carbonyl chloride      b) Ethyl alcohol      c) Sodium hydroxide      d) Nitric acid

280. When a solution of  $\text{AgNO}_3$  is added to pure  $\text{CCl}_4$ :

- a) A pale yellow precipitate is formed  
b) Curdy white precipitate is formed  
c) No precipitate is formed

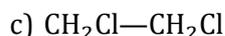
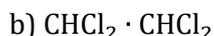
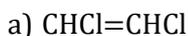
d) None of the above

281. A compound containing two —OH groups attached with one carbon atom is unstable but which one of the following is stable?



d) None of these

282. Westron is:



d) None of these

283. Monohalogen derivative of alkanes with alcoholic KOH gives:

a) Alkane

b) Alkene

c) Alkyne

d) Alicyclic hydrocarbon

284. The reaction  $\text{RCl} + \text{NaI} \xrightarrow{\text{Acetone}} \text{R-I} + \text{NaCl}$  is known as:

a) Wurtz reaction

b) Fittig reaction

c) Frankland's reaction

d) Finkelstein's reaction

285. The hydrogen atom in chloroform is:

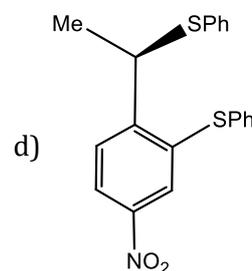
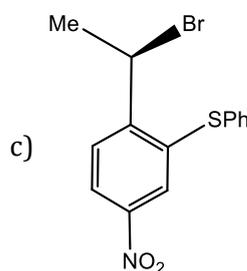
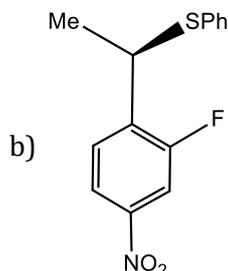
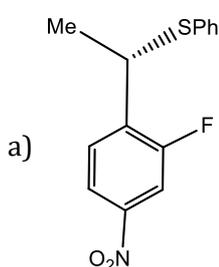
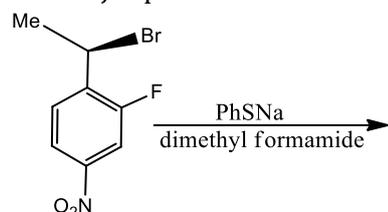
a) Acidic

b) Basic

c) Neutral

d) None of these

286. The major product of the following reaction is



287. Ethyl bromide and isopropyl chloride can be distinguished by:

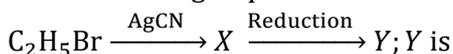
a) Alcoholic  $\text{AgNO}_3$

b) Comparing their colours

c) Burning the compound on spatula

d) Aqueous KOH solution

288. In the following sequence of reactions



a) *n*-propyl amine

b) Isopropylamine

c) Ethylamine

d) ethylmethyl amine

289. Which alkyl halide is preferentially hydrolysed by  $\text{S}_{\text{N}}1$  mechanism?

a)  $\text{CH}_3\text{Cl}$

b)  $\text{CH}_3\text{CH}_2\text{Cl}$

c)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{Cl}$

d)  $(\text{CH}_3)_2\text{C} \cdot \text{Cl}$

290. Treatment of ammonia with excess of ethyl chloride will yield:

a) Diethyl amine

b) Ethane

c) Tetraethyl ammonium chloride

d) Methyl amine

291. In a group of isomeric alkyl halides, the order of boiling points is

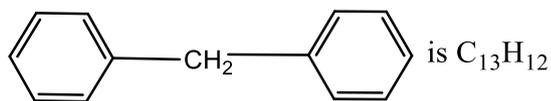
a) primary < secondary < tertiary

b) primary > secondary < tertiary

c) primary < secondary > tertiary

d) primary > secondary > tertiary

292. Ethylene dichloride and ethylidene chloride are isomeric compounds. Identify the statement which is not applicable to both of them?
- React with alcoholic potash
  - React with aqueous potash and give the same products
  - Are dihalides
  - Answer Beilstein's test
293. The Mg—Br bond in  $\text{CH}_3\text{CH}_2\text{MgBr}$  is:
- Ionic
  - Non-polar
  - Covalent
  - None of these
294. Chloroform is slowly oxidised by air in the presence of light and air to form
- Formyl chloride
  - Trichloro methanol
  - Phosgene
  - Formaldehyde
295. Among the following the one that gives positive iodoform test upon reaction with  $\text{I}_2$  and  $\text{NaOH}$  is:
- $\text{CH}_3\text{CH}_2\text{CH}(\text{OH})\text{CH}_2\text{CH}_3$
  - $\text{C}_6\text{H}_5\text{CH}_2\text{CH}_2\text{OH}$
  - $$\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3-\text{CHCH}_2\text{OH} \end{array}$$
  - $\text{PhCHOHCH}_3$
296. 2-bromopentane is heated with potassium ethoxide in ethanol. The major product is:
- trans*-pent-2-ene
  - 2-ethoxy pentane
  - pent-1-ene
  - cis*-pent-2-ene
297. Bottles containing  $\text{C}_6\text{H}_5\text{I}$  and  $\text{C}_6\text{H}_5\text{CH}_2\text{I}$  lost their original labels. They were labelled *A* and *B* for testing. *A* and *B* were separately taken in a test tube and boiled with  $\text{NaOH}$  solution. The end solution in each tube was made acidic with dilute  $\text{HNO}_3$  and then some  $\text{AgNO}_3$  solution was added. Substance *B* gave a yellow precipitate. Which one of the following statements is true for this experiment?
- A* was  $\text{C}_6\text{H}_5\text{I}$
  - A* was  $\text{C}_6\text{H}_5\text{CH}_2\text{I}$
  - B* was  $\text{C}_6\text{H}_5\text{I}$
  - Addition of  $\text{HNO}_3$  was unnecessary
298.  $2\text{CHCl}_3 + \text{O}_2 \xrightarrow{X} 2\text{COCl}_2 + 2\text{HCl}$   
In the above reaction *X* stands for:
- An oxidant
  - A reductant
  - Light and air
  - None of these
299. Identify the product (*A*) in following reaction series,
- $$\text{CH}_3\text{CN} \xrightarrow{\text{Na/C}_2\text{H}_5\text{OH}} (\text{X}) \xrightarrow{\text{HNO}_2} (\text{Y}) \xrightarrow{[\text{O}]} (\text{Z}) \xrightarrow{\text{Tollen's reagent}} (\text{A})$$
- $\text{CH}_3\text{CHO}$
  - $\text{CH}_3\text{CONH}_2$
  - $\text{CH}_3\text{COOH}$
  - $\text{CH}_3-\text{CH}_2-\text{NHOH}$
300. Isocyanide test is used to detect:
- Primary alcohols
  - Primary amines
  - Secondary amines
  - Secondary alcohols
301. Which would be obtained by boiling  $\text{CHCl}_3$  with caustic soda?
- $\text{CH}_3\text{COONa}$
  - $\text{HCOONa}$
  - $\text{Na}_2\text{C}_2\text{O}_4$
  - $\text{CH}_3\text{OH}$
302. In the following sequences of reactions:
- $$\text{CH}_3\text{CH}_2\text{CH}_2\text{I} \xrightarrow{\text{KOH(alc.)}} (\text{A}) \xrightarrow{\text{Br}_2} (\text{B}) \xrightarrow{\text{NaNH}_2/\text{NH}_3} (\text{C})$$
- the end product (*C*) is:
- Alkene
  - Alkanol
  - Alkyne
  - Alkyl amine
303. Which of the following compound give yellow precipitate with  $\text{I}_2$  and  $\text{NaOH}$ ?
- $\text{CH}_3\text{OH}$
  - $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$
  - $\text{C}_2\text{H}_5\text{OC}_2\text{H}_5$
  - $\text{CH}_3\text{CH}_2\text{OH}$
304. In the reaction of phenol with  $\text{CHCl}_3$  and aqueous  $\text{NaOH}$  at  $70^\circ\text{C}$ , the electrophile attacking the ring is:
- $\text{CHCl}_3$
  - $\text{CHCl}_2$
  - $\text{CCl}_2$
  - $\text{COCl}_2$
305. The product formed in the reaction of  $\text{HX}$  with  $(\text{CH}_3)_2\text{C}=\text{CH}_2$  is:
- $(\text{CH}_3)_2\text{CXCH}_3$
  - $(\text{CH}_3)_2\text{CH} \cdot \text{CH}_2\text{X}$
  - $(\text{CH}_3)_2\text{CHCH}_3$
  - $(\text{CH}_3)_2\text{CXCH}_2\text{X}$
306. The molecular formula of diphenyl methane is



How many structural isomers are possible when one of the hydrogen is replaced by a chlorine atom?

- a) 6                                      b) 4                                      c) 8                                      d) 7
307. For the preparation of *p*-nitroiodobenzene from *p*-nitroaniline, the best method is  
 a)  $NaNO_2/HCl$  followed by  $KI$                                       b)  $NaNO_2/HCl$  followed by  $CuCN$   
 c)  $LiAlH_4$  followed by  $I_2$                                       d)  $NaBH_4$  followed by  $I_2$
308. Iodoform test is not given by  
 a)  $HCHO$                                       b)  $CH_3CHO$                                       c)  $CH_3COCH_3$                                       d)  $C_2H_5OH$
309. Fires result from the combustion of alkali metals can be extinguished by:  
 a)  $CCl_4$                                       b) Sand                                      c) Water                                      d) Kerosene
310. The reactivities of methyl chloride (*A*) propyl chloride (*B*) and chlorobenzene (*C*) are in the order :  
 a)  $A > B > C$                                       b)  $C > B > A$                                       c)  $A > C > B$                                       d)  $B > A > C$
311. A sample of chloroform before being used as an anaesthetic is tested by:  
 a)  $AgNO_3$  solution  
 b)  $AgNO_3$  solution after boiling with alc.  $KOH$   
 c) Fehling's solution  
 d) Ammoniacal  $Cu_2Cl_2$
312. Ethylene dichloride can be prepared by adding  $HCl$  to:  
 a) Ethane                                      b) Ethylene                                      c) Acetylene                                      d) Ethylene glycol
313. Which of the following can be obtained by halide exchange method?  
 a)  $CH_3Cl$                                       b)  $C_2H_5Cl$                                       c)  $CH_3I$                                       d)  $CH_3Br$
314. Grignard reagent undergoes:  
 a) Nucleophilic substitution  
 b) Nucleophilic addition  
 c) Both (a) and (b)  
 d) None of the above
315. Ethylene on treatment with chlorine gives:  
 a) Ethylene dichloride  
 b) Ethylene chlorohydrin  
 c)  $CH_4$   
 d)  $C_2H_6$
316. Ethylidene dichloride on treatment with aq.  $KOH$  gives:  
 a)  $CH_3CHO$                                       b)  $\begin{array}{c} CH_2OH \\ | \\ CH_2OH \end{array}$                                       c)  $HCHO$                                       d)  $\begin{array}{c} CHO \\ | \\ CHO \end{array}$
317. The bad smelling substance formed by the action of alcoholic caustic potash on chloroform and aniline is:  
 a) Phenyl isocyanide                                      b) Nitrobenzene                                      c) Acetylene                                      d) Chlorobenzene
318. In the reaction,  
 $2A + \text{dry oxide} \xrightarrow{\Delta} \text{ether} + 2AgX$   
*A* is a/an  
 a) Primary alcohol                                      b) Acid                                      c) Alkyl halide                                      d) Alcohol
319. Ethyl alcohol is used as a preservative for chloroform because it  
 a) Prevents aerial oxidation of chloroform                                      b) Prevents decomposition of chloroform  
 c) Decomposes phosgene to  $CO$  and  $Cl_2$                                       d) Removes phosgene by converting it to ethyl carbonate
320. Anhydrous  $HCl$  gas, on passing through ethyl alcohol, in presence of anhy.  $ZnCl_2$  gives:  
 a) Ethane                                      b) Ethyl chloride                                      c) Ethene                                      d)  $CCl_4$
321. Which one of the isomers of cyclohexane hexachloride is strong pesticide?



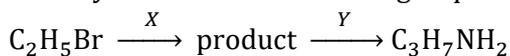
337. Which of the following solvent may be used instead of ether in the preparation of Grignard reagent?

- a) THF                                      b)  $C_6H_5OCH_3$                                       c)  $C_6H_5N(CH_3)_2$                                       d) All are correct

338. Chloroform on reduction with Zn and HCl (alc.) gives:

- a) Formic acid                                      b) Chloroform                                      c) Chloropicrin                                      d) Methylene dichloride

339. Identify *X* and *Y* in the following sequence

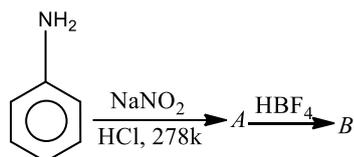


- a)  $X = KCN, Y = LiAlH_4$                                       b)  $X = KCN, Y = H_3O^+$   
c)  $X = CH_3Cl, Y = AlCl_3/HCl$                                       d)  $X = CH_3NH_2, Y = HNO_2$

340. In alkyl nitrites the oxygen of  $-O-N=O$  group is linked with carbon. An alkyl nitrite is:

- a) An ester                                      b) A nitro compound                                      c) An amide                                      d) A nitrile

341. In the chemical reactions,



The compounds '*A*' and '*B*' respectively are

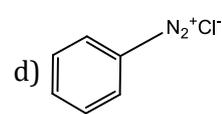
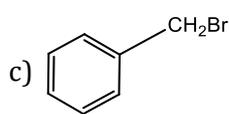
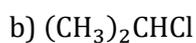
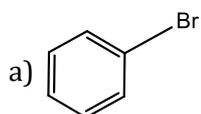
- a) Nitrobenzene and fluorobenzene  
b) Phenol and benzene  
c) Benzene diazonium chloride and fluorobenzene  
d) Nitrobenzene and chlorobenzene

342. Chloroform, when kept open, is oxidised to

- a)  $CO_2$                                       b)  $COCl_2$                                       c)  $CO_2, Cl_2$                                       d) None of these

343.  $X \xrightarrow[HNO_3]{AgNO_3} Y$  Yellow or white ppt.

Which of the following cannot be *X*?



**CHEMISTRY ( QUESTION BANK )****10.HALOALKANES AND HALOARENES****: ANSWER KEY :**

1)	d	2)	a	3)	b	4)	b	145)	c	146)	c	147)	c	148)	a
5)	a	6)	a	7)	a	8)	b	149)	a	150)	a	151)	d	152)	a
9)	a	10)	c	11)	a	12)	d	153)	d	154)	a	155)	c	156)	c
13)	b	14)	d	15)	b	16)	b	157)	c	158)	c	159)	d	160)	d
17)	c	18)	b	19)	a	20)	a	161)	a	162)	d	163)	d	164)	c
21)	a	22)	b	23)	b	24)	a	165)	c	166)	a	167)	b	168)	b
25)	b	26)	b	27)	a	28)	b	169)	b	170)	c	171)	d	172)	a
29)	d	30)	b	31)	b	32)	a	173)	a	174)	a	175)	d	176)	a
33)	d	34)	b	35)	d	36)	b	177)	b	178)	c	179)	d	180)	d
37)	a	38)	d	39)	c	40)	b	181)	d	182)	b	183)	d	184)	d
41)	d	42)	c	43)	a	44)	a	185)	c	186)	d	187)	b	188)	d
45)	b	46)	d	47)	a	48)	b	189)	d	190)	d	191)	a	192)	a
49)	d	50)	b	51)	b	52)	a	193)	d	194)	c	195)	b	196)	c
53)	b	54)	b	55)	a	56)	d	197)	d	198)	a	199)	d	200)	c
57)	a	58)	a	59)	d	60)	d	201)	d	202)	c	203)	a	204)	c
61)	b	62)	a	63)	a	64)	c	205)	a	206)	b	207)	c	208)	c
65)	a	66)	a	67)	d	68)	a	209)	d	210)	c	211)	a	212)	b
69)	c	70)	c	71)	d	72)	d	213)	c	214)	c	215)	c	216)	d
73)	c	74)	c	75)	a	76)	a	217)	b	218)	c	219)	a	220)	b
77)	c	78)	c	79)	d	80)	b	221)	a	222)	a	223)	c	224)	a
81)	c	82)	c	83)	b	84)	b	225)	d	226)	a	227)	b	228)	d
85)	a	86)	b	87)	b	88)	c	229)	d	230)	d	231)	a	232)	a
89)	b	90)	a	91)	b	92)	b	233)	b	234)	b	235)	a	236)	b
93)	c	94)	b	95)	c	96)	b	237)	c	238)	d	239)	c	240)	a
97)	a	98)	a	99)	c	100)	c	241)	d	242)	d	243)	c	244)	a
101)	a	102)	a	103)	a	104)	d	245)	b	246)	a	247)	a	248)	d
105)	a	106)	d	107)	d	108)	a	249)	b	250)	b	251)	a	252)	b
109)	c	110)	a	111)	c	112)	a	253)	b	254)	a	255)	a	256)	c
113)	b	114)	b	115)	d	116)	d	257)	d	258)	b	259)	d	260)	a
117)	b	118)	b	119)	a	120)	a	261)	c	262)	a	263)	d	264)	d
121)	a	122)	b	123)	d	124)	c	265)	c	266)	c	267)	b	268)	c
125)	d	126)	a	127)	d	128)	a	269)	a	270)	a	271)	b	272)	d
129)	a	130)	d	131)	a	132)	d	273)	b	274)	c	275)	c	276)	c
133)	a	134)	b	135)	b	136)	a	277)	a	278)	b	279)	b	280)	c
137)	b	138)	a	139)	c	140)	a	281)	c	282)	b	283)	b	284)	d
141)	c	142)	d	143)	b	144)	a	285)	a	286)	a	287)	a	288)	d

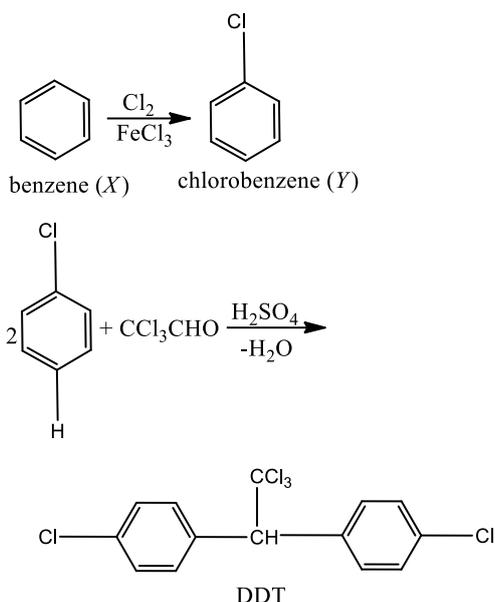
289) d	290) c	291) d	292) b	321) c	322) b	323) a	324) d
293) a	294) c	295) d	296) a	325) b	326) c	327) a	328) a
297) a	298) c	299) c	300) b	329) c	330) b	331) a	332) b
301) b	302) c	303) d	304) c	333) a	334) a	335) d	336) d
305) a	306) b	307) a	308) a	337) d	338) d	339) a	340) a
309) a	310) a	311) b	312) d	341) c	342) b	343) a	
313) c	314) c	315) a	316) a				
317) a	318) c	319) d	320) b				

Total Questions : 341

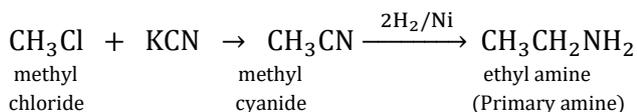
**CHEMISTRY ( QUESTION BANK )****10. HALOALKANES AND HALOARENES****: HINTS AND SOLUTIONS :**

- 1 (d)  
For positive iodoform test, alcohol molecule must have  
CH<sub>3</sub> - CH - group.  
|  
OH  
Ph - CH - CH<sub>3</sub>  $\xrightarrow{I_2 + NaOH}$  CHI<sub>3</sub> + Ph - COO<sup>-</sup>  
|  
OH
- 2 (a)  
CH<sub>2</sub>ClCH<sub>2</sub>Cl  $\xrightarrow{KOH(aq.)}$  CH<sub>2</sub>OHCH<sub>2</sub>OH  
Ethane-1,2-diol  
CH<sub>3</sub>CHCl<sub>2</sub>  $\xrightarrow{KOH(aq.)}$  CH<sub>3</sub>CHO  
Ethanal
- 3 (b)  
R - X  $\xrightarrow{KOH(aq.)}$  R - OH
- 4 (b)  
CH<sub>3</sub>CH<sub>2</sub>Cl  $\xrightarrow{KOH(alc.)}$  CH<sub>2</sub> = CH<sub>2</sub> + HCl
- 5 (a)  
CS<sub>2</sub> + 2Cl<sub>2</sub> → CCl<sub>4</sub> + 2S
- 6 (a)  
CH<sub>2</sub>Cl<sub>2</sub>  $\xrightarrow{HOH}$  CH<sub>2</sub>(OH)<sub>2</sub>  $\xrightarrow{-H_2O}$  HCHO
- 8 (b)  
HI reacts with C<sub>2</sub>H<sub>5</sub>OH even in absence of ZnX<sub>2</sub>.  
Larger is bond length, more is reactivity.
- 9 (a)  
Among alkyl halides, iodides are least stable, hence these form Grignard reagent easily. Hence, the correct order of reactivity in formation of Grignard reagent is  
CH<sub>3</sub>I > CH<sub>3</sub>Br > CH<sub>3</sub>Cl
- 10 (c)  
The I<sub>2</sub> has antiseptic nature.
- 11 (a)  
This is Wurtz reaction. 2-chloropropane and chloromethane reacts in presence of dry ether to form 2-methyl propane.  
CH<sub>3</sub>Cl + 2Na + Cl - CH - CH<sub>3</sub>  $\xrightarrow{Ether}$   
|  
CH<sub>3</sub>  
CH<sub>3</sub> - CH - CH<sub>3</sub> + 2NaCl  
|  
CH<sub>3</sub>
- 13 (b)  
Br is replaced by a nucleophile CN<sup>-</sup>.
- 15 (b)  
A mixture of halides is formed.
- 16 (b)  
DDT and 666 (C<sub>6</sub>H<sub>6</sub>Cl<sub>6</sub> or benzene hexachloride) is the pair of strongest pesticides.
- 17 (c)  
Thus, decomposition of CHI<sub>3</sub> occurs.
- 18 (b)  
CH<sub>3</sub>X + KCN → CH<sub>3</sub>CN
- 19 (a)  
CHCl<sub>3</sub> + HNO<sub>3</sub>  
→ CCl<sub>3</sub> · NO<sub>2</sub> + H<sub>2</sub>O · CCl<sub>3</sub>  
· NO<sub>2</sub> is called chloropicrin.
- 20 (a)  
Aryl halides show resonance in their structure.
- 21 (a)  
CCl<sub>4</sub> + H<sub>2</sub>O(v) → COCl<sub>2</sub> + 2HCl
- 23 (b)  
In Wurtz reaction alkyl halide react with sodium in dry ether to produce alkane having double number of carbon atoms as in alkyl halide.  
2R - X + 2Na  $\xrightarrow{Dry\ ether}$  R - R + 2NaX  
alkyl halide                      alkane
- 24 (a)  
CH<sub>3</sub>I + 6Ag + I<sub>3</sub>HC → C<sub>2</sub>H<sub>2</sub> + 6AgX

- 26 (b) This is the preparation method of DDT (dichloro diphenyl trichloroethane).

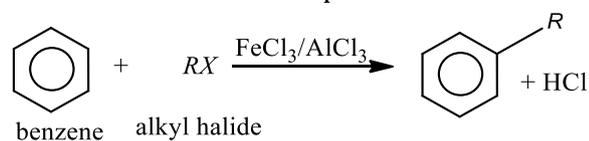


- 30 (b)
- $$RCl + KCN \rightarrow RCN + KCl$$
- alkyl chloride      alkyl cyanide



- 31 (b) An optically inactive compound forming optically active compound during a reaction always gives racemic mixture.

- 32 (a) **Friedel-Craft reaction** : In this reaction alkyl halides react with aromatic compounds in presence of  $AlCl_3$  or  $FeCl_3$  to form alkyl substituted aromatic compounds.

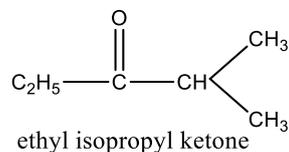


- 33 (d) Benzyl chloride is very reactive. It readily gives white precipitate with alcoholic  $AgNO_3$  at room

- 34 (b)
- $$CH_3 - \overset{O}{\parallel} C - CH_3 \xrightarrow{OH^-} CH_3 - \overset{O}{\parallel} C - CH_2I + OH^-$$

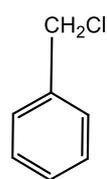
- 27 (a)  $CF_3CHClBr$ , *i. e.*, haloethane is less hazardous and

- 28 (b) All the except ethyl isopropyl ketone gives iodoform test in this question.



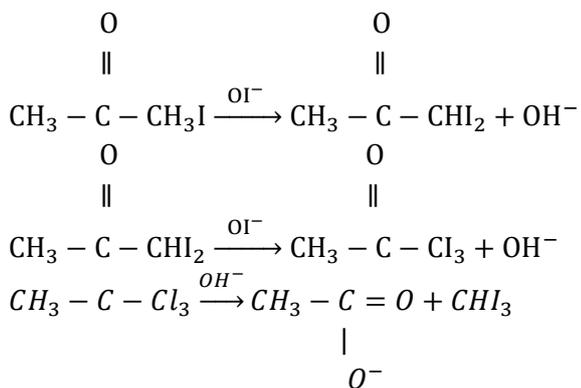
- 29 (d)  $CH_3CH_2CH_2I$  and  $CH_3CHICH_3$ ; note the position of iodine.

temperature. It also readily undergoes nucleophilic substitution. Its structure is as follows



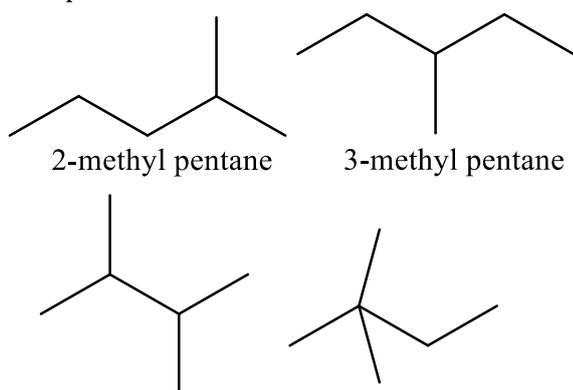
Vinyl chloride ( $CH_2 = CH \cdot Cl$ ), on the other hand, is less reactive than benzyl chloride due to resonance.





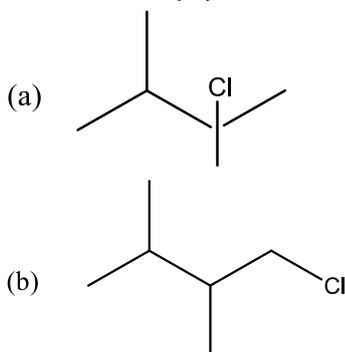
35 (d)

The possible isomers of hexane are



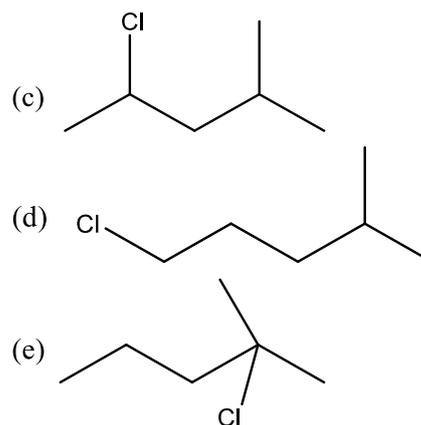
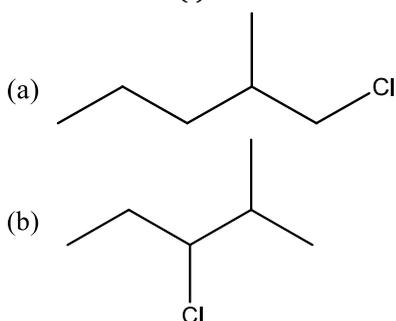
Out of these structure (iii) and (i) have respectively minimum and maximum number of monochloro derivatives

For structure(iii)



[Only 2 monochloro derivatives (minimum) are possible]

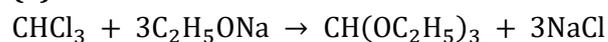
For structure (i).



[5 monochloro derivatives (maximum) are possible]

37

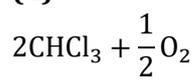
(a)



Ethyl ortho formate

38

(d)



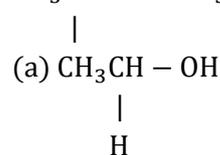
+ H<sub>2</sub>O; COCl<sub>2</sub> *i. e.*, phosgene is poisonous gas.

39

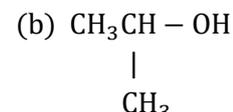
(c)

Iodoform test is given by only those compounds which contain either

CH<sub>3</sub>C = O or CH<sub>3</sub>CH - OH group



ethyl alcohol  
(c) CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>OH  
Propanol-1



propanol-2  
(c) CH<sub>3</sub> - C = O  
|  
H  
ethanal

Hence, propanal-1 due to absence of above given groups, does not give positive iodoform test.

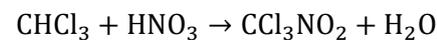
40

(b)

At higher temperature, esters undergo hydrolysis to give alcohol and acid. In (b) ethyl alcohol is formed which responds for positive iodoform test.



41 (d)

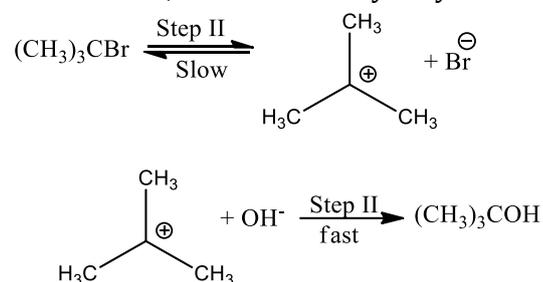


Chloroform nitric acid chloropicrin

Thus, the molecular formula of chloropicrin is  $CCl_3NO_2$ .

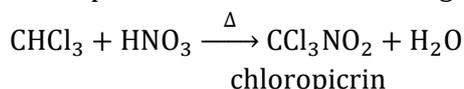
42 (c)

The reaction between *tert*-butyl bromide and hydroxide ion yields *tert*-butyl alcohol and follows the first order kinetics. The rate of reaction depends upon the concentration of only one reactant, which is tertiary butyl bromide.



43 (a)

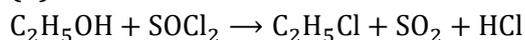
Chloroform reacts with conc.  $HNO_3$  to give chloropicrin which is used as tear gas.



44 (a)

More is the branching in molecule, lesser is surface area, lower is attraction, lower is b.p.

45 (b)



46 (d)

$Cl_2$  formed at anode reacts with  $C_2H_5OH$  in presence of  $NaOH$  (formed in reaction) to give haloform reaction.

47 (a)

Benzyl chloride is more reactive than alkyl halides. Benzyl carbocation is stabilised by resonance hence, benzyl chloride easily gives nucleophilic substitution reaction.

48 (b)

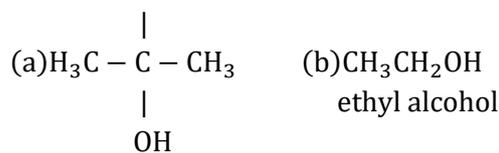
$S_N1$  order.

Benzyl > Allyl >  $3^\circ$  >  $2^\circ$  >  $1^\circ$  > Phenyl halide.

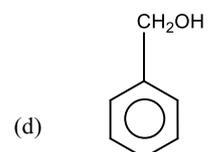
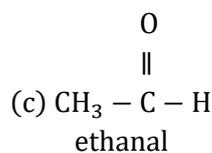
49 (d)

Iodoform test is given by compounds which have  $CH_3CO$  or  $CH_3CHOH$  group.

H



Iso-propyl alcohol



benzyl alcohol

(i) *iso*-propyl alcohol, ethanol and ethanal all have  $CH_3CO$  or  $CHOH$  group, therefore they give iodoform test.

(ii) Benzyl alcohol does not have  $CH_3CO$  or  $CHOH$  group,



Therefore, it does not give iodoform test.

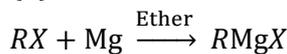
50 (b)

Follow Saytzeff's rule.

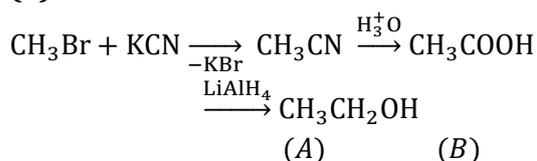
51 (b)

The lead deposited is exhausted out in the form of  $PbBr_2$ .

53 (b)



54 (b)

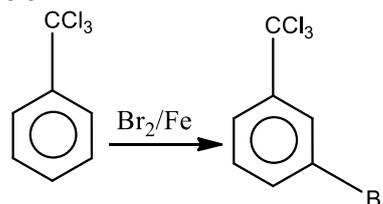


(C)

56 (d)

$(CH_3)_3CCH_2CH_2Cl$ ; halogen is attached on  $1^\circ$  carbon.

57 (a)

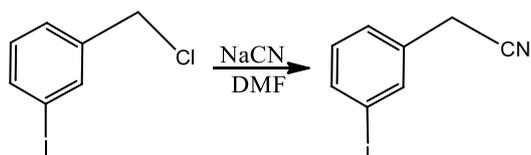


As- $CCl_3$  group is *meta*-directing.

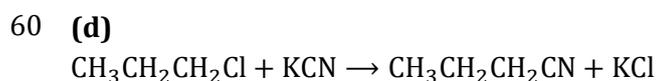
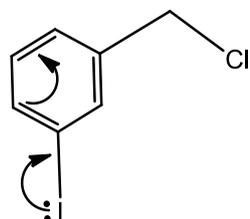
58 (a)

$RMgF$  are unstable compounds.

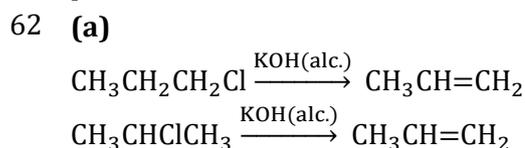
59 (d)



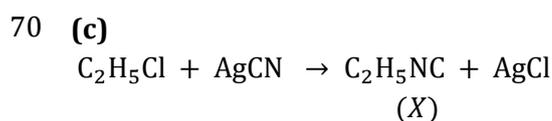
Chloride is an  $1^\circ$  aliphatic carbon which is substituted easier in comparison to iodide which is aryl and more stable due to delocalisation hence, difficult to substitute.



61 (b) Br is less reactive and more selective and thus, formation of  $3^\circ$  free radical will be the major product.

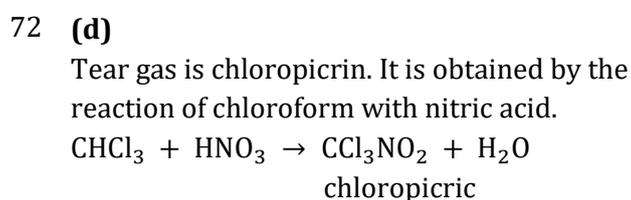


68 (a)  $\text{RCl}$  and  $\text{RBr}$  can be prepared by free radical halogenation of alkanes while  $\text{RF}$  and  $\text{RI}$  cannot be prepared. With  $\text{F}_2$ , the reaction is not only explosive but also brings cleavage of C-C bonds while with  $\text{I}_2$  the reaction is too slow to be of any practical value.



Functional isomer of X is  $\text{C}_2\text{H}_5\text{CN}$ .

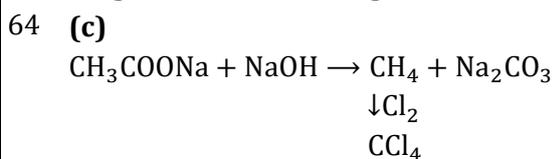
71 (d) Benzyl carbonium ion is most stable and thus, its chloride is most reactive.



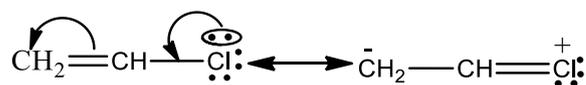
73 (c) C—Cl bond is more polar due to more electronegativity difference.

76 (a) The number of monochloro derivatives of a compound depends upon the type of hydrogen present in the compound. The structure of *neo*-pentane is

63 (a) Larger is C—X bond length; more is reactivity.



66 (a) In vinyl chloride, the C-Cl bond acquires some double bond character due to resonance.



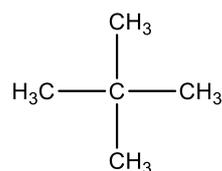
Vinyl chloride

Thus, it is very difficult to break C-Cl bond. Hence, vinyl chloride not get hydrolysed by NaOH.

67 (d) Iodoform test is given by compounds which have  $(\text{CH}_3 - \text{CO} -)$  group or  $\text{CH}_3 - \text{CH} -$  group.

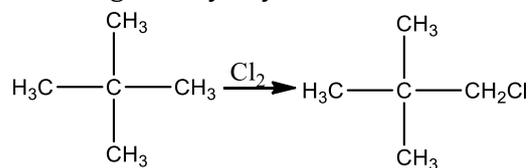


Hence, 2-pentanone,  $\text{CH}_3\text{CHO}$  and  $\text{C}_2\text{H}_5\text{OH}$  give the test. But 3-pentanone does not give iodoform test. Actually, iodoform test can be used to distinguish methyl ketones from ketones.

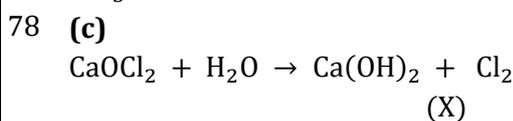
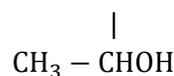


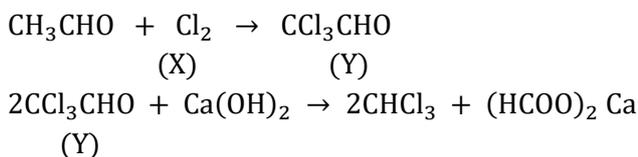
∴ It contains only one type of hydrogens.

∴ It will give only one monochloro derivative

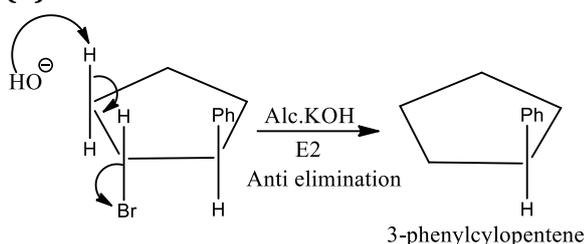


77 (c) An organic compound forms yellow precipitate of iodoform with  $\text{I}_2$  in presence of alkali, if it has  $\text{CH}_3\text{CO} -$  group directly or it has



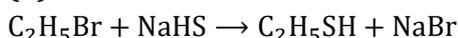


79 (d)



Anti-elimination, means -H and the -Br both departing group must be present at dihedral angle of  $180^\circ$  (anti).

80 (b)



82 (c)

Allyl carbonium shows resonance and thus, allyl chloride is more reactive. Vinyl chloride shows resonance and thus, less reactive.

83 (b)

$\text{CCl}_3\text{NO}_2$  is chloropicrin used as tear gas.

84 (b)

Ethanol cannot undergo dehydrohalogenation as it does not contain any halogen.

85 (a)

By haloform reaction.

86 (b)

$\text{CH}_3-\text{CHCH}_2\text{CH}_3$  has one asymmetric carbon atom.

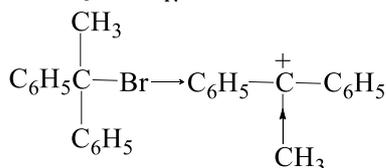


87 (b)

$\text{CCl}_4$  is non-polar;  $\text{H}_2\text{O}$  is polar.

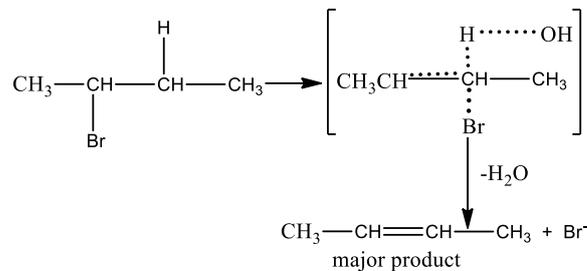
88 (c)

Most stable carbocation formation by halide shows more reactivity for  $\text{S}_{\text{N}}1$  reactions.



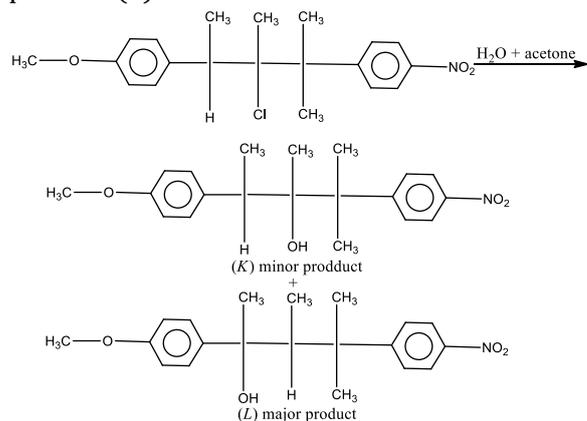
89 (b)

Alkyl halides on heating with alcoholic KOH give dehydrogenation reaction to yield alkene. If in reaction, more than one alkenes are formed, then according to Saytzeff, the most highly substituted alkene is the major product.



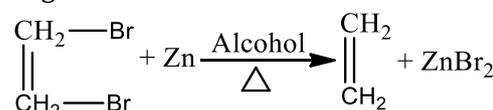
90 (a)

The product (K) is formed through simple substitution while major product (L) is formed through  $\text{H}^-$  shift via  $\text{S}_{\text{N}}1$  reaction and methoxy group stabilizes the carbocation intermediate of product (L).

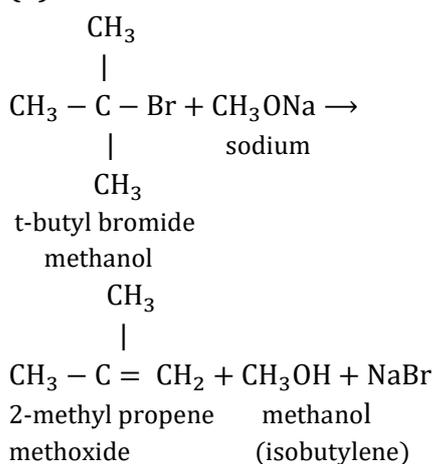


91 (b)

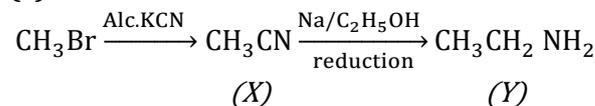
Zinc is used for debromination of dibromoalkane to give alkene.



92 (b)



93 (c)

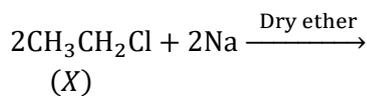


95 (c)

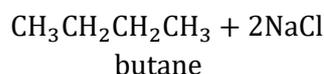
Liberated iodine is absorbed by iodides to darken their colour.

96 (b)

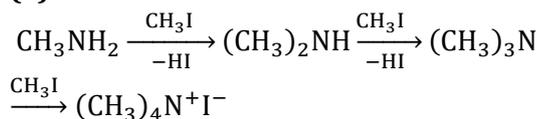
This is Wurtz reaction. In this reaction two molecules of alkyl halide react with each other to form alkane having double the number of carbon atoms.



(X)  
ethyl chloride



97 (a)



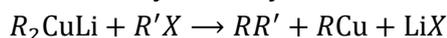
Hence, three molecules of  $\text{CH}_3\text{I}$  is used.

98 (a)

$\text{CHCl}_3$  will give positive carbylamine reaction.

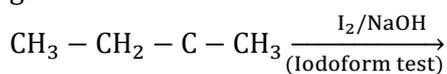
99 (c)

This is corey house synthesis:

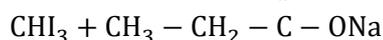


100 (c)

When a carbonyl compound having the structure  $\text{CH}_3 - \text{CO} - R$  is reacted with a halogen in the presence of  $\text{NaOH}$ ,  $\text{KOH}$ ,  $\text{Na}_2\text{CO}_3$  or  $\text{K}_2\text{CO}_3$  solution, haloform is obtained. Thus, butanone-2 gives +ve iodoform test.

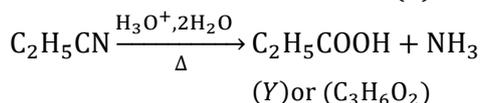
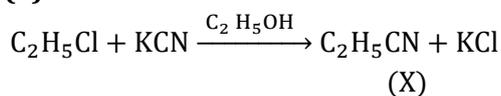


2-butanone



iodoform

101 (a)



So, the molecular formula of the Y is  $\text{C}_3\text{H}_6\text{O}_2$ .

102 (a)

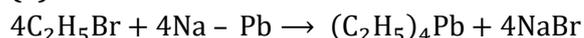
When ethyl bromide reacts with alcoholic KCN, propane nitrile is obtained as main product.



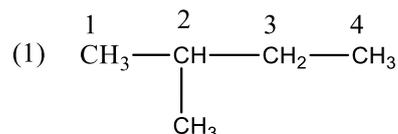
104 (d)

Carbylamine reaction is characteristic reaction for primary amine and chloroform.

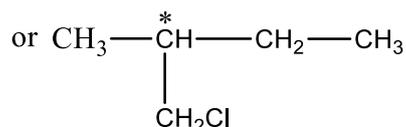
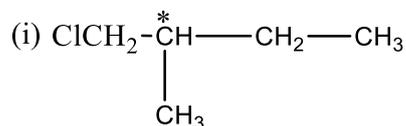
105 (a)



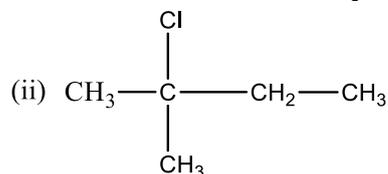
106 (d)



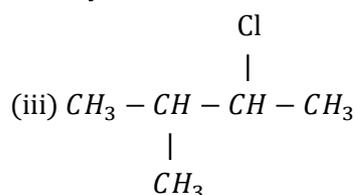
Its monochloro derivatives are follows



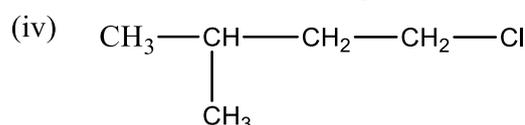
It will exist as enantiomers pair *d* and *l*-forms



no asymmetric C atom



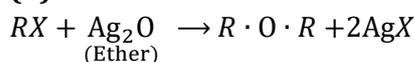
It will exist as enantiomeric pair (*d*- and *l*- forms)



No asymmetric carbon atom

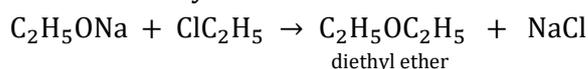
Hence, only two enantiomeric pairs will be obtained by the monochlorination of 2-methylbutane.

107 (d)

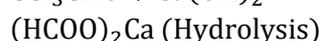
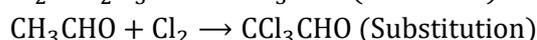


108 (a)

Williamson's synthesis



109 (c)



110 (a)

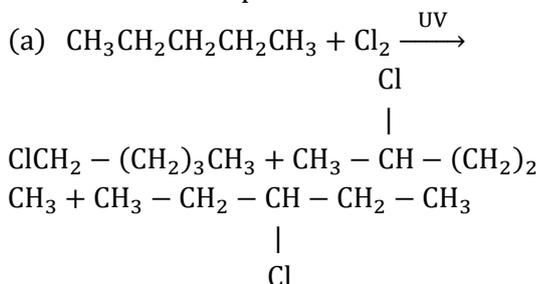




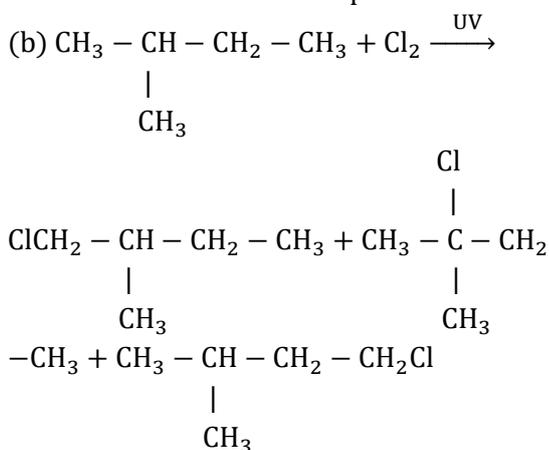
1,4-adduct is more stable than the 1,2-adduct.

130 (d)

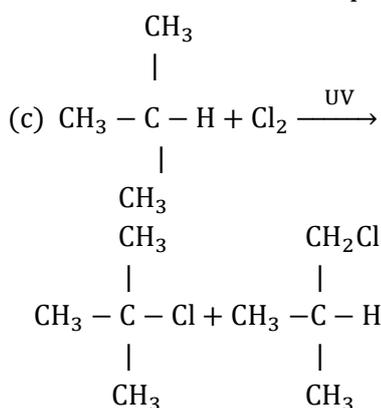
Write chlorination reaction for all of them to find which gives of the maximum number of monochlorination product.



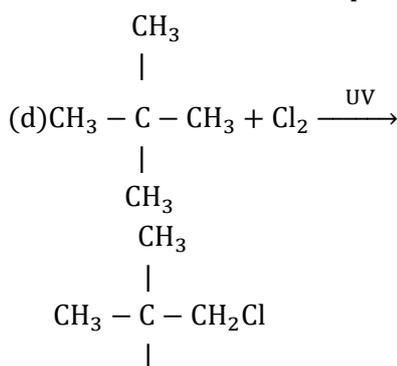
∴ Total 3 monochlorinated products are formed.



∴ Total 3 monochlorinated products are formed.

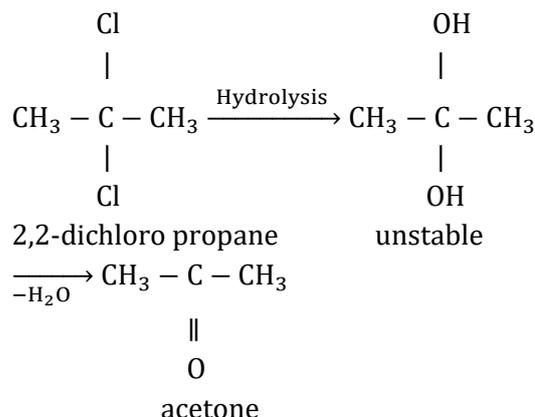


∴ Total 3 monochlorinated products are formed.

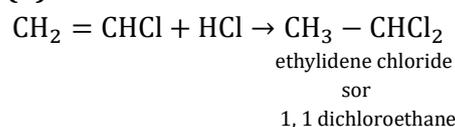


∴ Only one monochlorinated products formed.

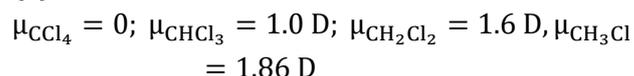
131 (a)



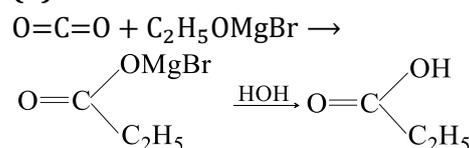
132 (d)



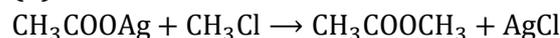
133 (a)



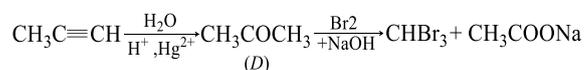
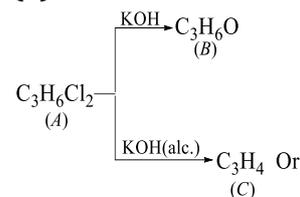
134 (b)



135 (b)



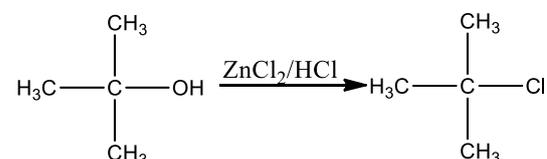
136 (a)



Since, B and D are different thus, B is  $\text{CH}_3\text{CH}_2\text{CHO}$  and so A is  $\text{CH}_3\text{CH}_2\text{CHCl}_2$ .

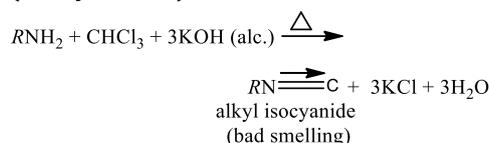
138 (a)

Tertiary alcohols readily react with Lucas reagent ( $\text{ZnCl}_2/\text{conc. HCl}$ ) to give white turbidity due to the formation of halide.



140 (a)

Carbylamine test is a characteristic test of aliphatic and aromatic primary amines. In this test, amine is heated with chloroform and alcoholic potash when a bad smelling isocyanide (carbylamine) is formed.



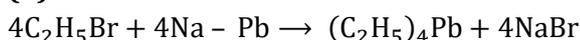
142 (d)

The density order is:

Iodine > Bromide > Chloride > Fluoride.

Higher is the molecular weight, more is b.p, m.p.

143 (b)



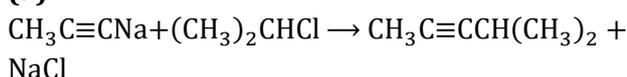
147 (c)

Follow iodoform test.

148 (a)



150 (a)



151 (d)

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

153 (d)

$\text{CCl}_4$  is a covalent compound, therefore, it does not ionise to give  $\text{Cl}^-$  ions hence, it does not give white ppt. of  $\text{AgCl}$  when treated with  $\text{AgNO}_3$  solution. There is no reaction to evolve  $\text{NO}_2$ .  $\text{CCl}_4$  will form a separate layer as it is immiscible with water.

154 (a)

$\text{C}-\text{X}$  bond in benzyl bromide is much weaker than in vinyl bromide and bromobenzene since the benzyl cation left after the removal of the bromide ion is stabilized by resonance. Further,  $\text{C}-\text{Br}$  is weaker than  $\text{C}-\text{Cl}$  bond. Therefore,  $\text{C}_6\text{H}_5\text{CH}_2\text{Br}$  has the weakest  $\text{C}-\text{X}$  bond.

155 (c)

5. 2-methylpentane  $\xrightarrow{\text{Cl}_2}$  five types of monochlorinated compounds

6. 3-methylpentane  $\xrightarrow{\text{Cl}_2}$  four types of monochlorinated compounds

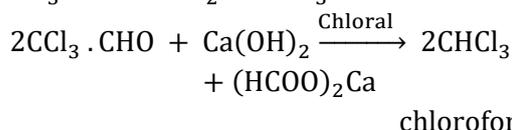
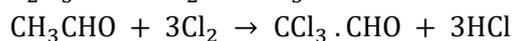
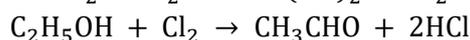
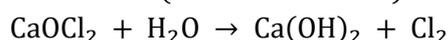
7. 2, 2-dimethylbutane  $\xrightarrow{\text{Cl}_2}$  three types .....

8. 2, 3-dimethylbutane  $\xrightarrow{\text{Cl}_2}$  two types ....

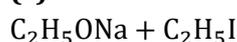
9. *n*-hexane  $\xrightarrow{\text{Cl}_2}$  three types ....

156 (c)

Ethanol on reaction with bleaching powder, gives chloroform (trichloromethane).

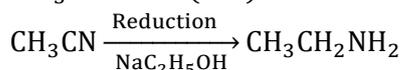


157 (c)



+ NaI; Williamson's synthesis.

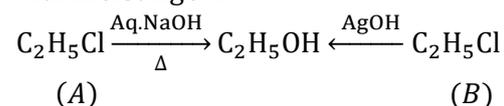
158 (c)



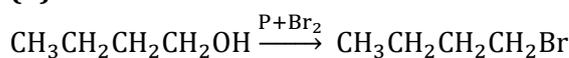
ethylamine

159 (d)

Ethyl chloride can be converted into ethanol either by its alkaline hydrolysis or by its reaction with moist  $\text{AgOH}$ .

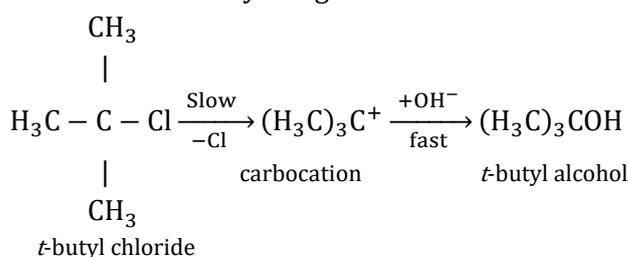


160 (d)



161 (a)

Tertiary halide preferentially undergo  $\text{S}_{\text{N}}1$  substitution as they can give stable carbocation.



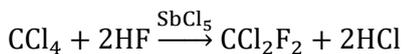
162 (d)

In  $\text{CHCl}_3$ , carbon is  $sp^3$ -hybridised.

163 (d)



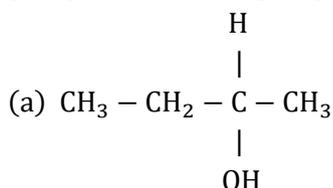
164 (c)



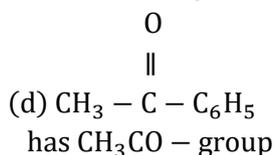
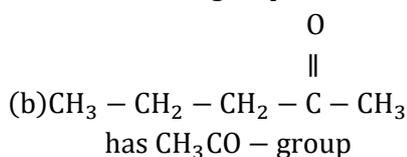
165 (c)

Iodoform test is positive for compounds which have O

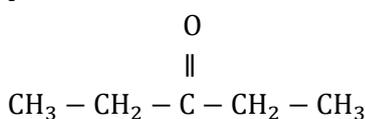
$\text{CH}_3 - \text{C}$   
group or 2° alcohol group.



has 2° alcoholic group



∴ Compounds in choice (a), (b) and (d) give positive iodoform test.



∴ This compound doesn't have  $\text{CH}_3\text{CO} -$  or 2° alcoholic group.

∴ It does not give positive iodoform test.

166 (a)

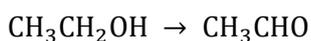
In  $\text{C}_6\text{H}_5\text{Cl}$ , Cl is firmly attached to  $\text{C}_6\text{H}_6$  nucleus.

167 (b)

For iodoform reaction, we need an oxidising agent

which is provided by only  $\frac{\text{I}_2}{\text{KOH}}$ , i.e.,  $\text{IO}^-$  ion.

Hypoiodide ion first oxidises



and then brings about iodination of

$\text{CH}_3\text{CHO}$  to  $\text{I}_3\text{C} \cdot \text{CHO}$ . Alkaline hydrolysis of

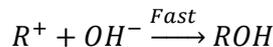
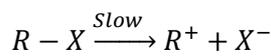
$\text{Cl}_3\text{CHO}$  then gives  $\text{CHI}_3$ . The other three reagents

do not contain any oxidising species and hence,

fail to give iodoform test.

169 (b)

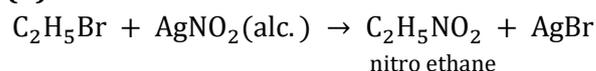
Statement (b) is not correct regarding the  $\text{S}_{\text{N}}1$  reaction for alkyl halide because in  $\text{S}_{\text{N}}1$  reaction no inversion takes place. The removal of  $\text{X}$  and the attachment of  $\text{OH}^-$  will take place from the same side.



170 (c)

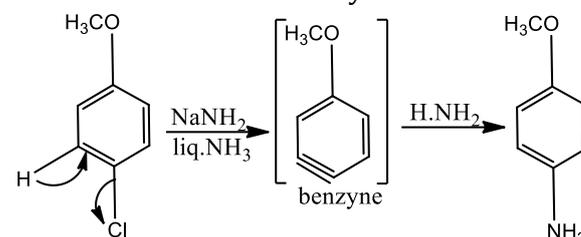
Alkyl halides are soluble in organic solvents.

171 (d)



173 (a)

This reaction follows benzyne mechanism.

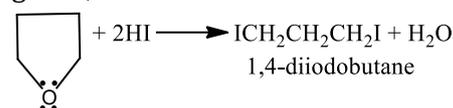


175 (d)

Grignard reagent give nucleophilic addition (of  $\text{R}^-$ ) at +ve centre.

176 (a)

Tetrahydrofuran when treated with excess HI, give 1, 4-diiodobutane.



177 (b)

$\text{I}_2$  possesses antiseptic nature.

179 (d)

Wurtz's reaction involves the reduction of alkyl halide with Na in ether.

181 (d)



182 (b)

Straight chain alkyl halides have greater boiling point than their isomers. Therefore,  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{Cl}$  has highest boiling point.

183 (d)

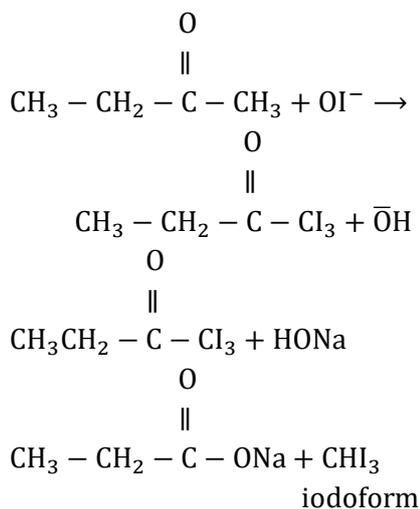
$\text{CH}_3\text{Cl}$ ,  $\text{C}_2\text{H}_5\text{Cl}$  and  $\text{CH}_3\text{Br}$  are gases at room temperature.

184 (d)

Nucleophilic substitution bimolecular ( $\text{S}_{\text{N}}2$ ) prefers less sterically hindered site to attack. Lesser the steric hindrance better the

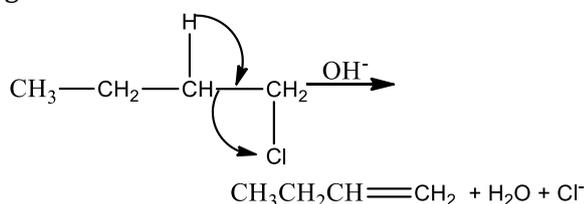




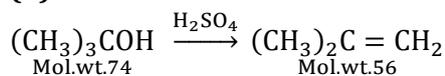


232 (a)

Alkyl halides in presence of strong alcoholic alkali give elimination reaction.



234 (b)

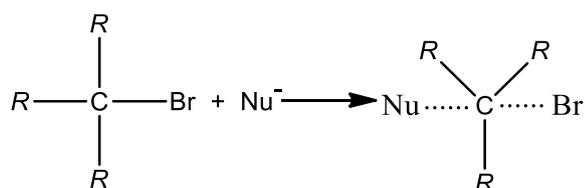


$$\therefore \% \text{ yield} = 65$$

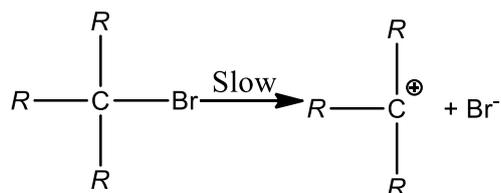
$$\therefore \text{Real yield} = \frac{56}{74} \times 37 \times \frac{65}{100} = 18.2 \text{ g}$$

235 (a)

In  $\text{S}_\text{N}2$  reaction, nucleophile and alkyl halide react in one step.

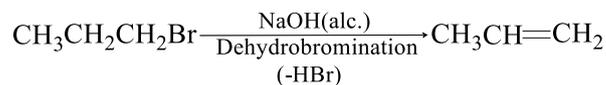


Thus, tertiary carbon is under steric hindrance thus reaction does not take place until (C-Br) bond breaks



Which is the  $\text{S}_\text{N}1$  reaction.

236 (b)



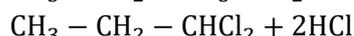
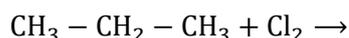
Acc. To Markownikoff's rule.

$\text{NaOH(aq.)}$  will lead to the formation of  $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$ ; in

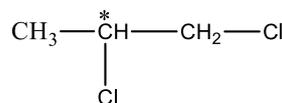
(d)  $\text{CH}_3\text{CHBrCH}_2\text{Br}$  will be formed.

237 (c)

There are four isomers obtained.



(1,1,dichloro propane)



1,2-dichloro propane

(optical active)

*d*- and *l*-form



1,3-dichloro propane

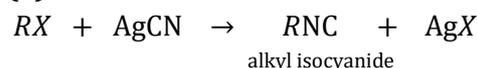
238 (d)

Two optical and two geometrical.

239 (c)

Industrial preparation of  $\text{CHCl}_3$  is carried out by the action of bleaching powder over acetone.

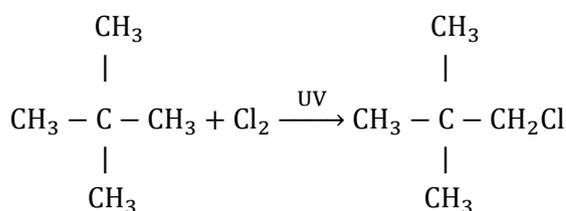
240 (a)



When alkyl halide reacts with silver cyanide, isocyanides are obtained. It is due to nucleophilic substitution in presence of  $\text{Ag}^+$ .

241 (d)

Neo-pentane gives only one monochloro derivative.



242 (d)

$\text{R-X} + \text{Zn} \rightarrow \text{R-Zn} + \text{ZnX}_2$ ; if Zn is used in place of Na, the reaction is called Frankland's reaction.

244 (a)

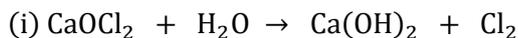
A gem dihalide possesses two halogens on same carbon atom.

245 (b)

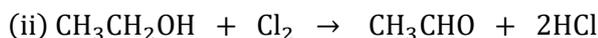
$\text{R-MgX}$  are obtained as ethereal solution.

246 (a)

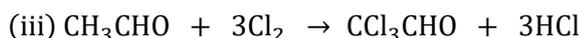
Chloroform (CHCl<sub>3</sub>) is formed on reaction of ethyl alcohol with bleaching powder. The reaction is complex and takes place in the following steps



bleaching  
powder

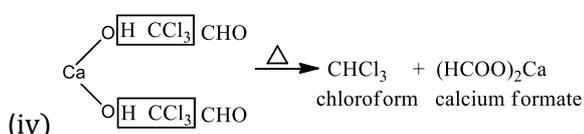


oxidation step



chloral

chlorination step



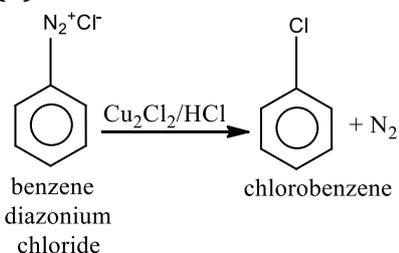
247 (a)

Chloral is commercial name of CCl<sub>3</sub>CHO.

248 (d)

C—I bond is broken easily as well as ease of reaction is *t*-alkyl halide > *s*-alkyl halide > *p*-alkyl halide.

249 (b)



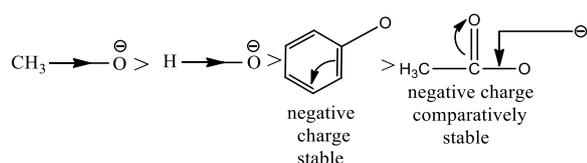
This reaction is known as Sandmeyer's reaction.

250 (b)

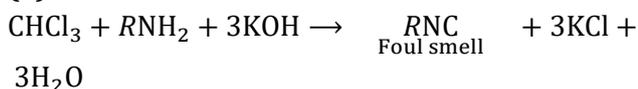
(CH<sub>3</sub>)<sub>2</sub>CHCH<sub>2</sub>Cl and CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>Cl; only chain is different.

251 (a)

Nucleophilicity order is ;



254 (a)



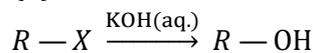
255 (a)

Zn dust removes X<sub>2</sub> from molecule.

257 (d)

Order of reactivity of alkyl halide iodide > bromide > chloride > fluoride and tertiary > secondary > primary

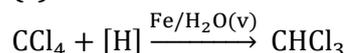
258 (b)



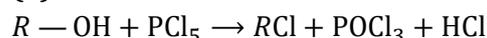
259 (d)

Reactivity of *t*-alkyl halides to show S<sub>N</sub>2 mechanism is least due to steric hinderance.

261 (c)



262 (a)



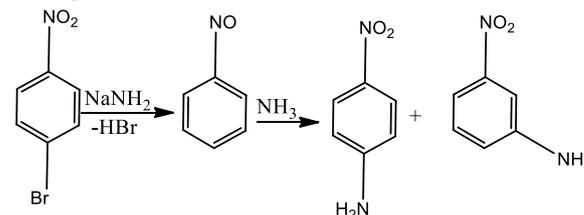
265 (c)

R—I > R—Br > R—Cl > R—F; reactivity order due to halogen atom.

3° > 2° > 1°; reactivity order due to alkyl group.

266 (c)

Aryl halides in presence of strong base like NaNH<sub>2</sub>, gives nucleophilic substitution reaction through benzyne intermediate.



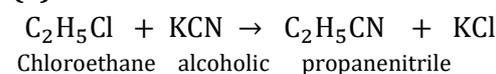
267 (b)

Rest all replace —OH by —Cl.

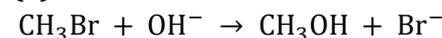
268 (c)

—OH group is converted into —Cl group by SOCl<sub>2</sub> or anhydrous ZnCl<sub>2</sub>/conc. HCl or HCl etc.

269 (a)



270 (a)

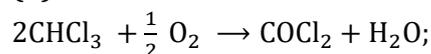


This reaction proceeds by S<sub>N</sub>2 mechanism.

Rate ∝ [substrate][nucleophile]

Rate ∝ [CH<sub>3</sub>Br][OH<sup>-</sup>]

271 (b)



COCl<sub>2</sub>, *i. e.*, phosgene is poisonous gas.

272 (d)

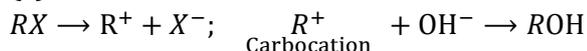
Westrosol is formed during addition of Cl<sub>2</sub> on CH≡CH followed with action of lime. It is a very good solvent.



274 (c)

C—Mg bond is covalent but polar.

275 (c)



277 (a)

10. Iodoform test is done to detect presence of  $\text{CH}_3\text{CO}$  group in organic compounds.

11. Fehling solution identifies aldehydes.

12. Tollen's reagent identifies aldehydes.

13. Schiff's reagent identifies aldehydes.

O

||

Methyl ketone is  $\text{CH}_3 - \text{C} - \text{R}$ .

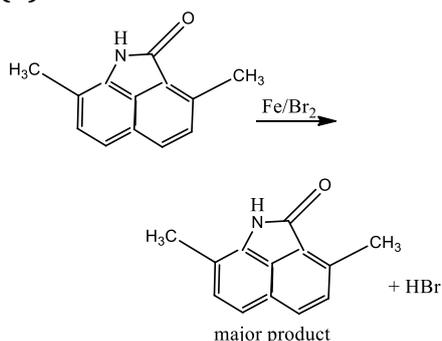
O

||

∴ It has  $\text{CH}_3 - \text{C}$  group. It is tested by using iodoform test.

The compound having  $\text{CH}_3\text{CO}$  group give yellow ppt. on reaction with  $\text{I}_2$  and aqueous alkali.

278 (b)



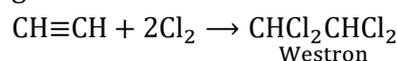
It is electrophilic substitution, so electrophile must be attacked on *o/p*-position due to higher electron density on this position. In this ring, the attached -NH- group will have high electron density due to resonance and *ortho* position is blocked, so electrophile is attached on *para* position.

280 (c)

$\text{CCl}_4$  is covalent compound.

282 (b)

Westrosol is formed during addition of  $\text{Cl}_2$  on  $\text{CH}\equiv\text{CH}$  followed with action of lime. It is a very good solvent.

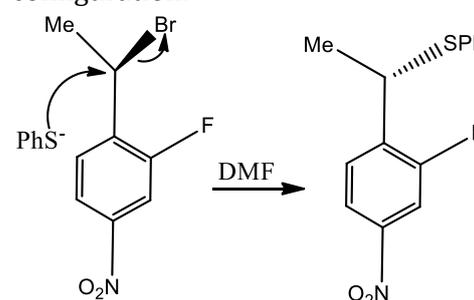


283 (b)

Elimination reaction.

286 (a)

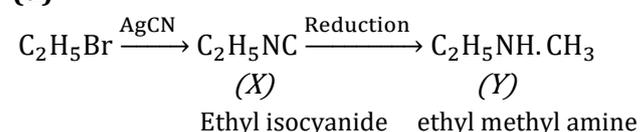
$\text{PhS}^-$  is a strong nucleophile and dimethyl formamide (DMF) is a highly polar aprotic solvent. Condition indicates that nucleophilic substitution ( $\text{S}_{\text{N}}2$ ) takes place at  $2^\circ$  benzylic place, stereochemically, it involves inversion of configuration.



287 (a)

$\text{C}_2\text{H}_5\text{Br}$  gives yellow ppt. of  $\text{AgBr}$  whereas,  $(\text{CH}_3)_2\text{CHCl}$  gives white ppt. if  $\text{AgCl}$ .

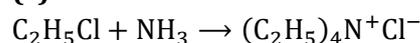
288 (d)



289 (d)

$\text{S}_{\text{N}}1$  order is  $\text{TH} > \text{SH} > \text{PH}$ .

290 (c)

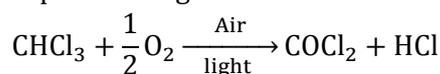


292 (b)

$\text{CH}_3\text{CHCl}_2$  gives aldehyde;  $\text{CH}_2\text{ClCH}_2\text{Cl}_2$  gives glycol.

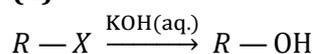
294 (c)

Chloroform is oxidised by air in the presence of light to form phosgene or carbonyl chloride which is poisonous gas.



Chloroform                      phosgene

295 (d)



296 (a)

$\text{CH}_3\text{CHBrCH}_2\text{CH}_2\text{CH}_3 \xrightarrow{\text{C}_2\text{H}_5\text{OK}} \text{CH}_3\text{CH}=\text{CHCH}_2\text{CH}_3$   
 $\alpha, \beta$ - elimination gives *trans*-isomers as main product.

298 (c)

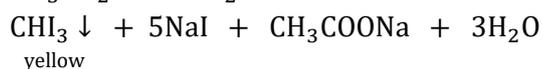
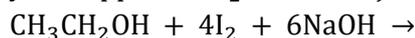
Oxidation of  $\text{CHCl}_3$  occurs in air and light.

301 (b)



303 (d)

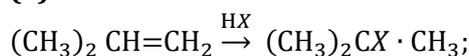
Ethyl alcohol gives positive iodoform test (*i. e.*, yellow ppt. with  $\text{I}_2$  and  $\text{NaOH}$ ).



304 (c)

Reimer-Tiemann reaction.

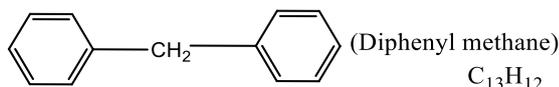
305 (a)



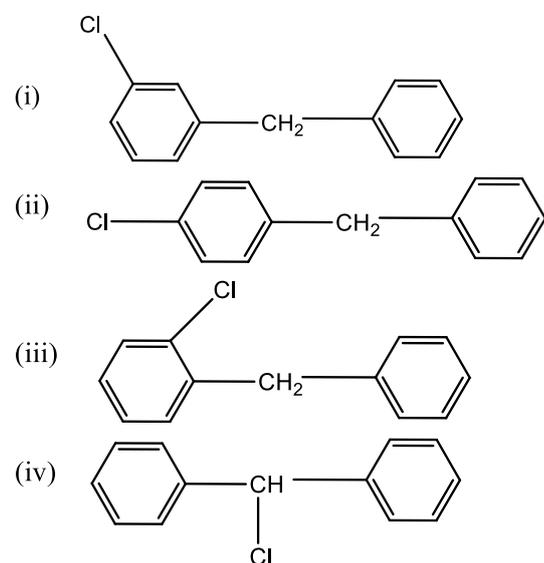
Follow Markownikoff's rule.

306 (b)

The molecular formula of diphenyl methane shows four isomers in form of monochloro derivatives.

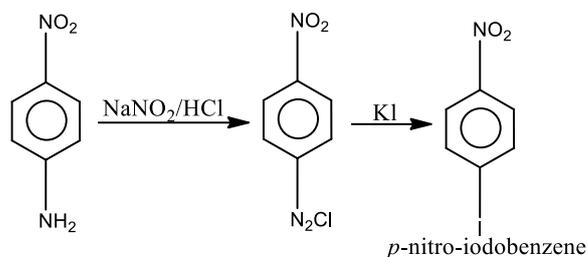


#### Monochloro derivatives



307 (a)

*p*-nitroiodobenzene can be prepared from *p*-nitroaniline as follows



308 (a)

Iodoform test is given by those compounds which have  $-\text{CH}_3\text{CO}$  group or on oxidation yields this group.  $\text{HCHO}$  does not give this test.

309 (a)

$\text{CCl}_4$  is fire extinguisher used under the name pyre

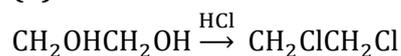
310 (a)

Among the primary halides reactivity order is  $\text{CH}_3\text{X} > \text{C}_2\text{H}_5\text{X} > \text{C}_3\text{H}_7\text{X}$ , also chlorobenzene is less reactive due to resonance.

311 (b)

A white ppt. of  $\text{AgCl}$  is obtained if  $\text{CHCl}_3$  is impure.

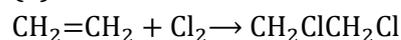
312 (d)



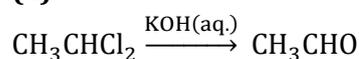
313 (c)

Only iodides and fluorides are obtained.

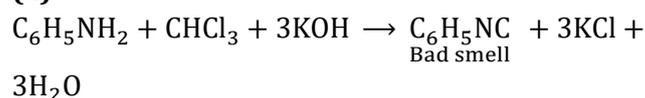
315 (a)



316 (a)

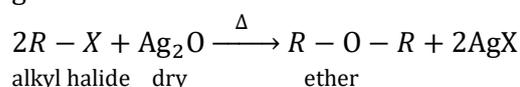


317 (a)



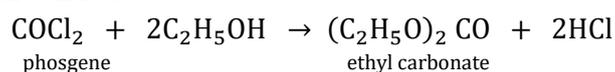
318 (c)

An alkyl halide on heating with dry silver oxide gives ether.



319 (d)

Ethyl alcohol converts phosgene to ethyl carbonate.

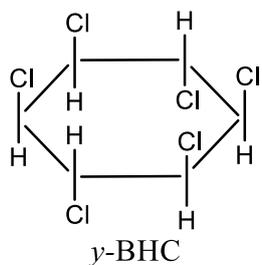


320 (b)



321 (c)

$\gamma$ -isomer of cyclohexane hexachloride is strong pesticide. It is also known as lindane.



322 (b)

Methyl alcohol ( $\text{CH}_3\text{OH}$ ) does not give iodoform test.

324 (d)

Elimination of  $\text{HCl}$  by alc.  $\text{KOH}$ .

325 (b)

Vapours of chloroform on inhaling causes unconsciousness.

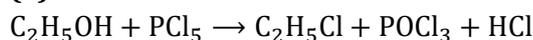
327 (a)

Alkyl halides give elimination reaction with alcoholic  $\text{KOH}$  and yield an alkene or alkyne (from dihalides) *e.g.*,

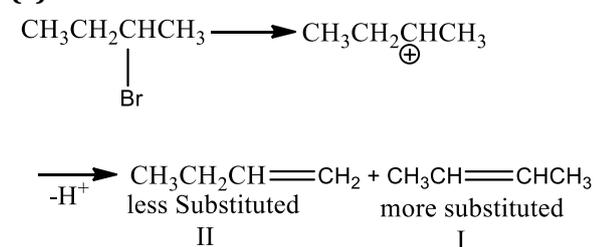


1,2-dibromo ethane                      acetylene  
Hence, product has both  $sp$ -hybridised carbon.

328 (a)

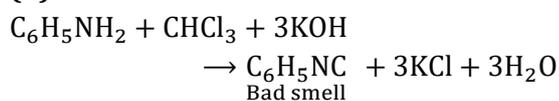


329 (c)



Stability of  $\text{I} > \text{II}$  hence,  $\text{I}$  is predominant.

330 (b)



331 (a)

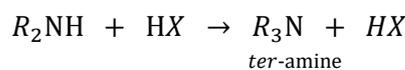
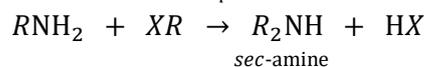
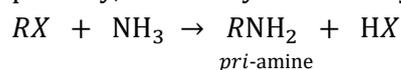
$\text{ROH} + \text{SOCl}_2 \rightarrow \text{RCl} + \text{SO}_2 \uparrow + \text{HCl} \uparrow$   
 $\therefore \text{SO}_2$  and  $\text{HCl}$  are gaseous by-products and can be removed easily to get pure alkyl halide.  
 $\therefore$  It is best method for preparation of alkyl halide.

332 (b)



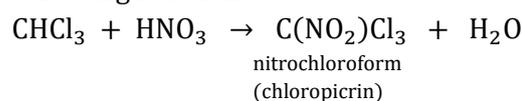
335 (d)

When an alkyl halide reacts with alcoholic ammonia in a sealed tube then a mixture of primary, secondary and tertiary amine is formed.



336 (d)

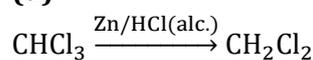
Chloroform on reaction with nitric acid gives chloropicrin (nitro chloroform) according to following reaction



337 (d)

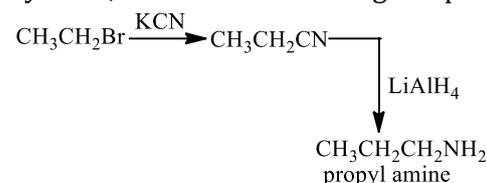
$\text{RMgX}$  is soluble in each.

338 (d)



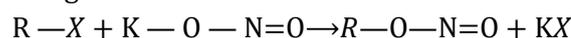
339 (a)

Ethyl bromide on treating with  $\text{KCN}$ , gives ethyl cyanide, which on reduction gives propyl amine.



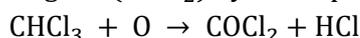
340 (a)

The compounds of oxyacids in which  $\text{H}$ -atom of  $-\text{OH}$  group is replaced by an alkyl group are called inorganic esters.

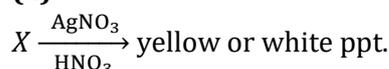


342 (b)

Chloroform is oxidised to a poisonous gas, phosgene ( $\text{COCl}_2$ ) by atmospheric oxidation.



343 (a)



The above reaction is not given by bromobenzene because the halogen is directly attached to the benzene ring.

Session : 2025-26

AS PER NEW NTA SYLLABUS

Total Questions : 341

## CHEMISTRY ( QUESTION BANK )

### 10. HALOALKANES AND HALOARENES

#### Matrix-Match Type

This section contain(s) 0 question(s). Each question contains Statements given in 2 columns which have to be matched. Statements (A, B, C, D) in **columns I** have to be matched with Statements (p, q, r, s) in **columns II**.

1. Match the following. The correct match is

Column-I		Column- II	
(A) $C_2H_5Cl$ , moist $Ag_2O$		(1) $CH_3CH_2ONO$	
(B) $C_2H_5Cl$ , aqueous ethanolic $AgCN$		(2) $C_2H_4$	
(C) $C_2H_5Cl$ , aqueous ethanolic $AgNO_2$		(3) $CH_3CH_2OH$	
(D) $C_2H_5Cl$ , ethanolic $KOH$		(4) $CH_3CH_2NC$	
		(5) $C_2H_6$	

CODES :

	A	B	C	D
a)	5	3	4	1
b)	1	2	3	4
c)	3	4	1	2

d) 4 1 2 5

## CHEMISTRY ( QUESTION BANK )

### 10.HALOALKANES AND HALOARENES

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#### : ANSWER KEY :

1) c

**CHEMISTRY ( QUESTION BANK )****10.HALOALKANES AND HALOARENES****: HINTS AND SOLUTIONS :**

1 (c)

Reactants	Products
A. $C_2H_5Cl$ , moist $Ag_2O$	(iii) $CH_3CH_2OH$
B. $C_2H_5Cl$ , aqueous ethanolic $AgCN$	(iv) $CH_3CH_2NC$

C. $C_2H_5Cl$ , aqueous ethanolic $AgNO_2$	(i) $CH_3CH_2ONO$
D. $C_2H_5Cl$ , ethanolic $KOH$	(ii) $C_2H_4$

## 10.HALOALKANES AND HALOARENES

**Matrix-Match Type**

This section contain(s) 0 question(s). Each question contains Statements given in 2 columns which have to be matched. Statements (A, B, C, D) in **columns I** have to be matched with Statements (p, q, r, s) in **columns II**.

1. Match the following. The correct match is

Column-I	Column- II
(A) $C_2H_5Cl$ , moist $Ag_2O$	(1) $CH_3CH_2ONO$
(B) $C_2H_5Cl$ , aqueous ethanolic $AgCN$	(2) $C_2H_4$
(C) $C_2H_5Cl$ , aqueous ethanolic $AgNO_2$	(3) $CH_3CH_2OH$
(D) $C_2H_5Cl$ , ethanolic $KOH$	(4) $CH_3CH_2NC$
	(5) $C_2H_6$

CODES :

	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
<b>a)</b>	5	3	4	1
<b>b)</b>	1	2	3	4
<b>c)</b>	3	4	1	2
<b>d)</b>	4	1	2	5

**Session : 2025-26**

**AS PER NEW NTA SYLLABUS**

**Total Questions : 341**

## **CHEMISTRY ( QUESTION BANK )**

### **10.HALOALKANES AND HALOARENES**

**: ANSWER KEY :**

1) c

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**CHEMISTRY ( QUESTION BANK )****10.HALOALKANES AND HALOARENES****: HINTS AND SOLUTIONS :**

1 (c)

Reactants	Products
A. $C_2H_5Cl$ , moist $Ag_2O$	(iii) $CH_3CH_2OH$
B. $C_2H_5Cl$ , aqueous ethanolic $AgCN$	(iv) $CH_3CH_2NC$

C. $C_2H_5Cl$ , aqueous ethanolic $AgNO_2$	(i) $CH_3CH_2ONO$
D. $C_2H_5Cl$ , ethanolic $KOH$	(ii) $C_2H_4$