Time : 1 Mins **HALOALKANES' AND HALOARENES' 1** **Marks : 811**

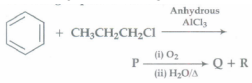
1. Identify the products (A) and (B) in the reactions.

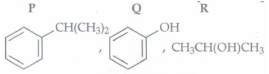
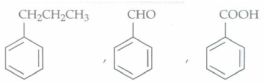
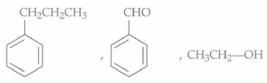
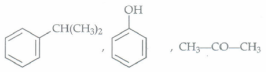
   $RX + AgCN \longrightarrow \underline{\quad(A)\quad} + AgX$

   $RX + KCN \longrightarrow \underline{\quad(B)\quad} + KX$

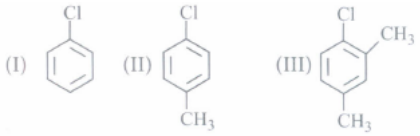
   a) (A)→ RCN, (B) → RCN b) (A) → RCN, (B) → RNC c) (A) → RNC, (B)→ RCN
   d) (A)→ RNC, (B) → RNC

2. Identify the major products P, Q and R in the following sequence of reactions :



   a) 
   b) 
   c) 
   d) 

3. Arrange the compounds in increasing order of rate of reaction towards nucleophilic substitution



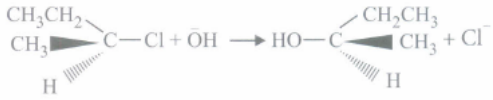
   a) (I) < (II) < (III) b) (II) < (I) < (III) c) (III) < (II) < (I) d) (I) < (III) < (II)

4. $CH_3CH_2Cl \xrightarrow{NaCN} X \xrightarrow{Ni/H_2} Y \xrightarrow[anhydride]{Acetic} Z$

   Z in the above reaction sequence is :

   a) $CH_3CH_2CH_2NHCOCH_3$ b) $CH_3CH_2CH_2NH_2$ c) $CH_3CH_2CH_2CONHCH_3$
   d) $CH_3CH_2CH_2CONHCOCH_3$

5. In the reaction given below:



   Which of the following statements is correct

   a) The reaction proceeds via S_N2 mechanism hence inversion of configuration takes place.
   b) The reaction proceeds via S_N1 mechanism hence inversion of configuration takes place.
   c) The reaction proceeds via S_N2 mechanism hence their is no change in the configuration.
   d) The reaction proceeds via S_N1 mechanism hence there is no change in the configuration.

6. Match the column I with column II and mark the appropriate choice.

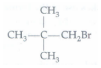
	Column I		**Column II**
(A)	$CH_3(CH_2)_3OH \xrightarrow[H_2SO_4,\Delta]{NaBr}$	(i)	$CH_3CH(Br)(CH_2)_2CH_3$
(B)	$(CH_3)_3COH \xrightarrow[room\ temp]{Conc.HCl}$	(ii)	$CH_3CH_2CH_2Cl$
(C)	$CH_3CH(OH)(CH_2)_2CH_3 \xrightarrow{PBr_3}$	(iii)	$(CH_3)CCl$
(D)	$CH_3CH_2CH_2OH \xrightarrow{SOCl_2}$	(iv)	$CH_3(CH_2)_3Br$

   a) (A)→ (iv), (B)→ (iii), (C)→ (i), (D) → (ii)
   b) (A) → (iv), (B) → (iii), (C)→ (ii), (D) → (i)
   c) (A) → (iii), (B) → (iv), (C) → (i), (D) → (ii)
   d) (A) → (iii), (B) → (iv), (C) → (ii), (D) → (i)

7. In a S_N2 substitution reaction of the type

   $R\text{-}Br + Cl^- \xrightarrow{DMF} R\text{-}Cl + Br^-$

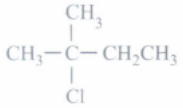
   Which one of the following has the highest relative rate?

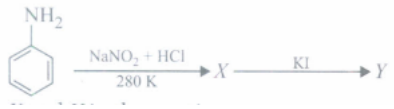
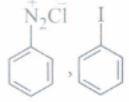
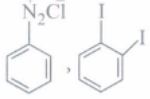
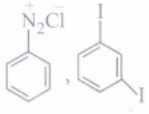
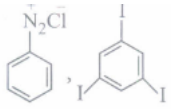
a)  b) CH_3CH_2Br c) $CH_3CH_2CH_2Br$ d) CH_3-  -CH_2Br

8. **Assertion:** Aryl halides are highly reactive towards nucleophilic substitution reactions.
   Reason : In case of haloarenes, halogen atom is attached to sp hybridised carbon atom.
   a) If both assertion and reason are true and reason is the correct explanation of assertion
   b) If both assertion and reason are true but reason is not the correct explanation of assertion
   c) If assertion is true but reason is false d) If both assertion and reason are false.

9. Halogen acids react with alcohols to form alkyl halides. The reaction follows a nucleophilic substitution mechanism. What will be the major product of the following reaction?

$$CH_3 - \underset{}{\overset{CH_3}{\overset{|}{C}}}H - \underset{OH}{\overset{|}{C}}H - CH_3 + HCl \longrightarrow$$

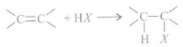
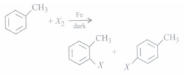
   a) $CH_3\underset{CH_3}{\overset{|}{C}}H - \underset{Cl}{\overset{|}{C}}H - CH_3$ b) $CH_3\underset{Cl}{\overset{|}{C}}H - \underset{CH_3}{\overset{|}{C}}H - CH_3$ c) 
   d) $CH_3CH_2CH_2CH_2CH_2Cl$

10. 
    X and Y in the reaction are
    a)  b)  c)  d) 

11. Alkyl halides are formed when thionyl chloride and _____are refluxed in presence of pyridine. The order of reactivity (3° > 2° > 1°) is due to +1 effect of the alkyl group which _____the polarity of C-Xbond.
    a) acids, decreases b) alcohols, increases c) aldehydes, changes
    d) ketones, decreases

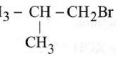
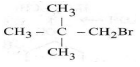
12. Benzene reacts with n-propyl chloride in the presence of anhydrous $AlCl_3$ to give:
    a) 3-propyl-I-chlorobenzene b) n-propyl benzene c) no reaction d) isopropyl benzene.

13. Reactivity order of halides for dehydrohalogenation is:
    a) R-F > R-Cl > R-Br > R-I b) R-I> R-Br > R-Cl > R-F c) R-I > R-Cl > R-Br > R-F
    d) R-F > R-I > R-Br > R-Cl

14. Which of the following is halogen exchange reaction?
    a) RX + NaI→RI + NaX b)  c) $R - OH + HX \xrightarrow{ZnCl_2} R - X + H_2O$
    d) 

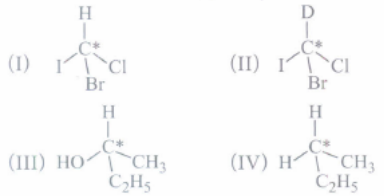
15. Which of the following reactions does not take place?
    a) $C_2H_5Br + KNO_2 \longrightarrow C_2H_5 - O - N = O + KBr$
    b) 
    c) $C_2H_5Br + AgCN \longrightarrow C_2H_5NC + AgBr$ d) $C_2H_5Br + KCN \longrightarrow C_2H_5NC + KBr$

16. HBr reacts fastest with _____ .
    a) 2 -methyl propan-1-ol b) 2 -methyl propan-2-ol c) propan-2-o1 d) propan-1-ol

17. In a S_N2 substitution reaction of the type $R - Br + Cl^- \xrightarrow{DMF} R - Cl + Br^-$ which one of the following has the highest relative rate?
    a) $CH_3 - CH_2 - CH_2Br$ b)  c)  d) CH_3CH_2Br

18. A 10 g mixture of iso-butane and iso-butene requires 20 g of Br_2 (in CCl_4) for complete addition. If 10 g of the mixture is catalytically hydrogenated and the entire alkane is monobrominated in the presence of light at 127°C, how much of it would be formed? (Atomic weight of bromine = 80).
    a) 24.21 g b) 24.21 g c) 30.0 g d) 12 g

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



a) (I), (II), (III), (IV) b) (I), (II), (III) c) (II), (III), (IV) d) (I), (III), (IV)

20. Consider the following reaction and identify X and Y.

$$CH_3CH_2CH_2I \xrightarrow{alc.KOH} X \xrightarrow{Br_2} Y$$

a)

X	Y
$CH_3CH{=}CH_2$	$CH_3-\underset{Br}{CH}-CH_2Br$

b)

X	Y
$CH_3CH_2CH_2OH$	$CH_3CH_2CH_2Br$

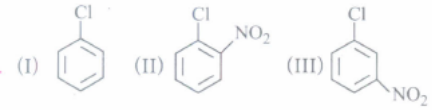
c)

X	Y
$CH_3-\underset{OH}{CH}-CH_3$	$CH_3-\underset{Br}{CH}-CH_3$

d)

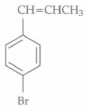
X	Y
$CH_3CH=CH_2$	$CH_3CH_2CH_2Br$

21. Arrange the compounds in increasing order of rate of reaction towards nucleophilic substitution.



a) (I) < (II) < (III) b) (III) < (II) < (I) c) (I) < (III) < (II) d) (III) < (I) < (II)

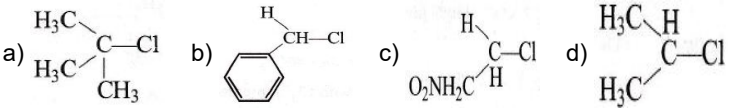
22. The reaction of $C_6H_5CHCH{=}CH_3$ with HBr produces:

a) $C_6H_5CH_2CH_2CH_2Br$ b)  c) $C_6H_5\underset{Br}{CH}\,CH_2CH_3$ d) $C_6H_5CH_2\underset{Br}{CH}\,CH_3$

23. Which is the correct increasing order of boiling points of the following compounds?
1-Iodobutane, 1-Bromobutane, 1-Chlorobutane, Butane
a) Butane < 1-Chlorobutane < 1-Bromobutane < 1-Iodobutane
b) 1-Iodobutane < 1-Bromobutane < 1-Chlorobutane < Butane
c) Butane < 1-Iodobutane <1-Bromobutane < 1-Chlorobutane
d) Butane < 1-Chlorobutane < 1-Iodobutane < 1-Bromobutane

24. The compound which reacts fastest with Lucas reagent is (at room temperature)
a) butan-1-ol b) butan-2-ol c) 2-methyl propan-1-ol d) 2-methyl propan-2-ol

25. In which of the following compounds, the C-Cl bond ionisation shall give most stable carbon ion?



26. The order of reactivity of various alkyl halides towards nucleophilic substitution follows the order
a) R- I > R - Br > R - Cl > R - F b) R - F > R - Cl > R - Br > R - I
c) R-Cl > R-Br > R-I > R-F d) R-Br > R-I > R-Cl > R-F

27. Grignard reagent, a very useful starting compound for a number of organic reactions can be prepared by
a) reaction of alkyl halides with a solution of magnesium hydroxide
b) reaction of alkyl halides with dry magnesium powder in presence of dry ether
c) reaction of $MgCl_2$ with ether and alcohol
d) reaction of alkyl halide with magnesium in presence of alcohol.

28. Which of the following compounds is not chiral?
a) CH_3CHDCH_2Cl b) CH_3CH_2CHDCl c) $DCH_2CH_2CH_2Cl$ d) $CH_3CHClCH_2D$

29. Which of the following alkyl halides will undergo S_N1 reaction most readily?
a) $(CH_3)_3C$-F b) $(CH_3)_3C$-Cl c) $(CH_3)_3C$-Br d) $(CH_3)_3C$-I

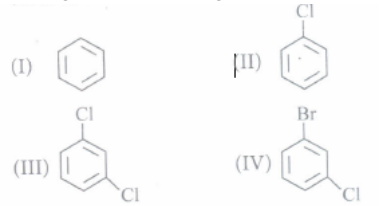
30. The most important chemical method to resolve a racemic mixture makes use of the formation of :
    a) a meso compound b) enantiomers c) diastereomers d) racemetes

31. Which of the following compounds can yield only one mono chlorinated product upon free radical chlorination?
    a) 2,2-Dimethylpropane b) 2-Methylpropane c) 2-Methylbutane d) n-Butane

32. Which of the following is not correctly matched with its IUPAC name?
    a) $CHF_2CBrClF$: l-Brorno-Lchloro-1, 2, 2 -trifluoroethane
    b) $(CCl_2)_3CCl$: 2-(Trichloromethyl)-1, 1, 1, 2, 3, 3, 3 -heptachloropropane
    c) $CH_3C(p\text{-}ClC_6H_4)_2CH(Br)CH_3$: 2- Bromo-3,3-bis(4-chlorophenyl) butane
    d) $o\text{-}BrC_6H_4CH(CH_3)CH_2CH_3$: 2- Bromo-1-methylpropylbenzene

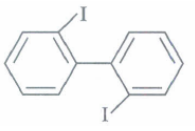
33. **Assertion :** Aryl halides cannot be prepared by replacement of hydroxyl group of phenol by halogen atom.
    Reason: Phenols react with halogen acids violently.
    a) If both assertion and reason are true and reason is the correct explanation of assertion.
    b)
    If both assertion and reason are true but reason is not the correct explanation of assertion.
    c) If assertion is true but reason is false d) If both assertion and reason are false.

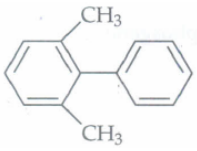
34. Arrange the following compounds in the increasing order of their densities.

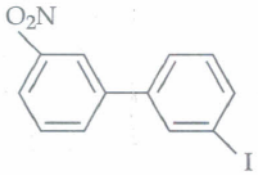


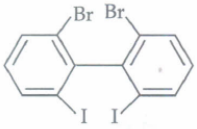
    a) (I) < (II) < (III) < (IV) b) (I) < (III) < (IV) < (II) c) (IV) < (III) < (II) < (I)
    d) (II) < (IV) < (III) < (I)

35. Which of the following biphenyl is optically active?

a) 

b) 

c) 

d) 

36. Methanol is industrially prepared by _____ .
    a) Oxidation of CH_4 by steam at $900^\circ C$ b) Reduction of HCHO using $LiAlH_4$
    c) Reaction of HCHO with a solution of NaOH
    d) Reduction of CO using and $ZnO - Cr_2O_3$

37. Which alkyl halide exhibits complete racemisation in S_N1 reaction?
    a) $(CH_3)_3CHCl$ b) $CH_3CH_2CH_2Cl$ c) CH_3CH_2Cl d) $C_6H_5CH_2Cl$

38. Which of the following is the most reactive towards nucleophilic substitution reaction?
    a) $ClCH_2 - CH = CH_2$ b) $CH_2 = CH - Cl$ c) $CH_3CH=CH-Cl$ d) C_6H_5Cl

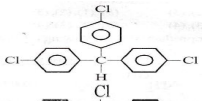
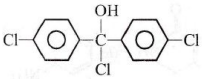
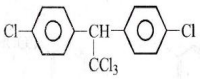
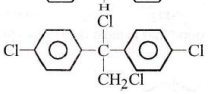
39. Which of the following will give enantiomeric pair on reaction with water due to presence of asymmetric carbon atom?
    a) $C_2H_5 - \overset{\overset{C_2H_5}{|}}{\underset{\underset{C_2H_5}{|}}{C}} - Br$ b) $C_2H_5 - \overset{\overset{C_2H_5}{|}}{\underset{\underset{CH_3}{|}}{C}} - CI$ c) $C_2H_5 - \overset{\overset{H}{|}}{\underset{\underset{CH_3}{|}}{C}} - I$ d) $C_2H_5 - \overset{\overset{CH_3}{|}}{\underset{\underset{C_2H_5}{|}}{C}} - Br$

40. The negative part of the addendum (the molecule to be added) adds on to the carbon atom of the double bond containing the least number of hydrogen atoms. This rule is known as
    a) Saytzeff's rule b) Peroxide rule c) Markovnikov's rule d) Hoffmann rule.

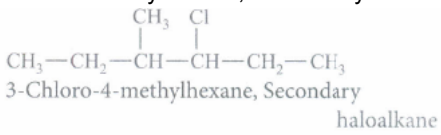
41. Reaction of t-butyl bromide with sodium methoxide produces:
    a) sodium t-butaoxide b) t-butyl methyl ether c) isobutane d) isobutylene

42. The reaction of toluene with Cl_2 in presence of $FeCl_3$ gives 'X' and reaction in presence of light gives 'Y'. Thus, 'X' and 'Y' are:
    a) X = Benzal chloride,Y = o- Chlorotoluene b) X = m - Chlorotoluene, Y = p-Chiorotoluene
    c) X = o -and p-Chiorotoluene, Y = Trichloromethyl - benzene
    d) X = Benzyl chloride, Y = m -Chlorotoluene

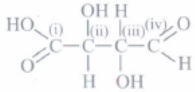
43. Elimination of bromine from 2-bromobutane results in the formation of
    a) equimolar mixture of 1 and 2-butene b) predominantly 2-butene
    c) predominantly I-butene d) predominantly 2-butyne.

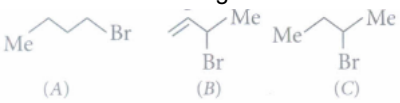
44. Trichloroacetaldehyde, CCl_3CHO reacts with chlorobenzene in presence of sulphuric acid and Produces:
    a) 
    b) 
    c) 
    d) 

45. Which of the following acid does not exhibit optical isomerism?
    a) Maleic acid b) α-amino acid c) Lactic acid d) Tartaric acid

46. Which of the following halides is not correct according to the name and classification?
    $CH_3CH_2C(CH_3)_2CH_2I$
    a) 1-Iodo- 2, 2-dimethylbutane, Primary haloalkane
    $(CH_3)_2CHCH(Cl)CH_3$
    b) 2-Chloro-3-methylbutane, Secondary haloalkane
    $CH_3C(Cl)(C_2H_5)CH_2CH_3$
    c) 2-Chloro-2-ethylbutane, Secondary haloalkane
    d) 

47. Which of the following is a primary halide?
    a) iso-Propyl iodide b) see-Butyl iodide c) tert-Butyl bromide d) neo-Hexyl chloride

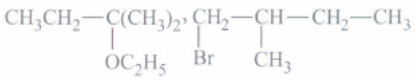
48. Which of the carbon atoms present in the molecule given below are asymmetric?
    
    a) (i), (ii), (iii), (iv) b) (ii), (iii) c) (i), (iv) d) (i), (ii), (iii)

49. Consider the following bromides:
    

    The correct order of S_N1 reactivity is
    a) A>B>C b) B>C>A c) B > A > C d) C> B > A

50. Which of the following is most reactive towards aqueous NaOH?
    a) C_6H_5Cl b) $C_6H_5CH_2Cl$ c) C_6H_5Br d) BrC_6H_4Br

51. Phosgene is a common name for _____ .
    a) Phosphonyl chloride b) Thionyl chloride c) Carbon dioxide and phosphine
    d) None of these

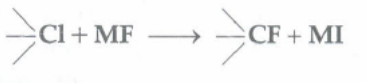
52. The products (A) and (B) are respectively
    (i) $CH_3 - \underset{Br}{CH} - \underset{CH_3}{CH} - CH_3 \xrightarrow{C_2H_5ONa} A$
    (ii) $CH_2 = \underset{CH_3}{C} - CH_2CH_3 \xrightarrow[Peroxide]{HBr} (B)$
    a) $CH_3CH_2 - \overset{CH_3}{CH} - CH_3, CH_3(CH_2)_2CH_3$ b) 
    c) $CH_3CH_2 - \underset{ONa}{CH} - CH_2CH_3, BrCH_2 - \overset{CH_3}{\underset{Br}{C}} - CH_2CH_3$

d) $CH_3CH_2-CH_2CH_2CH_3, CH_3-\underset{Br}{\underset{|}{CH}}-CH_2CH_3$

53. Chlorobenzene is formed by reaction of chlorine with benzene in the presence of $AlCl_3$. Which of the following species attacks the benzene ring in this reaction:
a) Cl^- b) Cl^+ c) $AlCl_3$ d) $[AlCl_4]^-$

54. Haloalkanes contain halogen atom(s) attached to the Sp^3 hybridised carbon atom of an alkyl group. Identify haloalkane from the following compounds.
(i) 2- Bromopentane
(ii) Vinyl chloride
(iii) 2-Chloroacetophenon
(iv) Trichloromethane
a) Only (ii) b) (ii) and (iv) only c) (i) and (iv) only d) (i), (ii) and (iii) only

55. In the replacement reaction



The reaction will be most favorable if M happens to be :
a) Na b) K c) Rb d) Li

56. Which of the following statements is not correct about S_N2 reactions of alkyl halides?
a)
Nucleophile attacks the carbon from the side opposite to where the leaving group is attached.
b) The bond formation and bond breaking take place in one step
c) The rate of reaction depends upon the concentration of nucleophile
d) S_N2 mechanism is predominant in tertiary alkyl halides

57. What should be the correct IUPAC name for diethylbromomethane?
a) 1-Bromo-1, 1-diethylmethane b) 3-Bromopentane c) 1-Bromo-1-ethylpropane
d) 1-Brornopentane

58. Which of the following reactions will give the major and minor products?

$$CH_3-CH_2-\underset{Br}{\underset{|}{CH}}-CH_3 \xrightarrow[heat]{alc.KOH} \underset{(A)}{CH_3-CH=CH-CH_3} + \underset{(B)}{CH_3-CH_2-CH=CH_2}$$

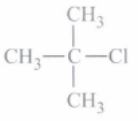
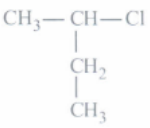
a) (A) is major product and (B) is minor product.
b) (A) is minor product and (B) is major product. c) Both (A) and (B) are major products.
d) Only (B) is formed and (A) is not formed.

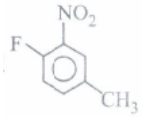
59. Which of the following alcohols will yield the corresponding alkyl chloride on reaction with concentrated HCl at room temperature?
a) CH_3CH_2-CH_2-OH b) $CH_3CH_2-\underset{CH_3}{\underset{|}{CH}}-OH$ c) $CH_3CH_2-\underset{CH_3}{\underset{|}{CH}}-CH_2OH$
d) $CH_3CH_2-\underset{CH_3}{\overset{CH_3}{\overset{|}{\underset{|}{C}}}}-OH$

60. Which one is most reactive towards S_N1 reaction?
a) $C_6H_5C(CH_3)(C_6H_5)Br$ b) $C_6H_5CH_2Br$ c) $C_6H_5CH(C_6H_5)Br$ d) $C_6H_5CH(CH_3)Br$

61. An alkyl chloride produces a single alkene on reaction with sodium ethoxide and ethanol. The alkene further undergoes hydrogenation to yield 2-methylbutane. Identify the alkyl chloride from amongst the following
a) $ClCH_2CH(CH_3)CH_2CH_3$ b) $ClCH_2CH_2CH_2CH_3$ c) $ClCH_2CH(CH_3)CH_2CH_3$
d) $CH_3C(Cl)(CH_3)CH_2CH$

62. When chlorine is passed through propene at 400°C, which of the following is formed?
a) PVC b) Allyl chloride c) Nickel chloride d) 1,2-dichloro ethane

63. S_N1 reaction is fastest in
a) CH_3CH_2Br b) $CH_3-\underset{Cl}{\underset{|}{CH}}-CH_3$ c)  d) 

64. The IUPAC name of the compound  is

a) 1-fluoro-4-methyl-2-nitrobenzene b) 4-fluoro-1-methyl-3-nitrobenzene
c) 4-methyl-1-fluoro-2-nitrobenzene d) 2-fluoro-S-methyl-1-nitrobenzene

65. Replacement Cl of chlorobenzene to give phenol requires drastic conditions but chlorine of 2, 4-dinitro chlorobenzene is readily replaced. This is because _____ .
a) NO_2 makes the ring electron rich at ortho and para-positions
b) NO_2 withdraw electrons from meta-position
c) NO_2 donates electrons at meta-position
d) NO_2 withdraw electrons from ortho/para-positions

66. **Assertion:** The boiling point of the compounds increases in the order: Isopropylchloride < 1-Chloropropane < 1-Chlorobutane.
Reason: Boiling point depends upon the molecular mass and surface area.
a) If both assertion and reason are true and reason is the correct explanation of assertion
b) If both assertion and reason are true but reason is not the correct explanation of assertion
c) If assertion is true but reason is false d) If both assertion and reason are false.

67. Arrange the following alkyl halides in order of dehydrohalogenation; C_2H_5I, C_2H_5Cl, C_2H_5Br, C_2H_5F
a) C_2H_5:F > C_2H_5Cl > C_2H_5Br > C_2H_5I b) C_2H_5I > C_2H_5Br > C_2H_5Cl > C_2H_5F
c) C_2H_5I> C_2H_5Cl > C_2H_5Br > C_2H_SF d) C_2H_5F> C_2H_5I > C_2H_5Br > C_2H_5Cl

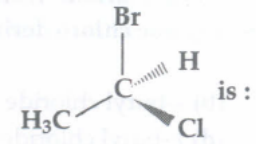
68. Match the column I with column II and mark the appropriate choice.

Column I		**Column II**	
(A)	CH_3CHCl_2	(i)	Vinyl halide
(B)	CH_2ClCH_2Cl	(ii)	Alkylidene halide
(C)	$CHCl = CH_z$	(iii)	Alkylene dihalide
(D)	$ClCH_2$-CH=CH_2	(iv)	Allyl halide

a) (A) → (i), (B) → (ii), (C) → (iv), (D) → (iii)
b) (A) → (ii), (B) → (iii), (C) → (i), (D) → (iv)
c) (A) → (iii), (B) → (iv), (C)→ (ii), (D) → (i)
d) (A)→ (iv), (B) → (i), (C) → (iii), (D) → (ii)

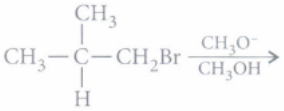
69. Methyl bromide reacts with AgF to give methyl fluoride and silver bromide. This reaction is called
a) Fittig reaction b) Swarts reaction c) Wurtz reaction d) Finkelstein reaction

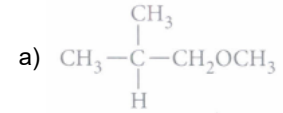
70. Ethyl chloride is converted into diethyl ether by :
a) Perkins reaction b) Grignard reaction c) Wurtz synthesis d) Williamson's synthesis

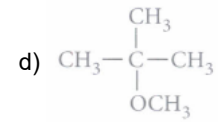
71. The chirality of the compound:


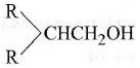
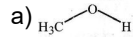
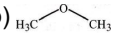
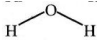
is
a) R b) S c) Z d) E

72. 0.0852 g of an organic halide (A) when dissolved in 2.0 g of camphor, the melting point of the mixture was found to be 167°C. Compound (A) when heated with sodium gives a gas (B). 280 mL of gas (B) at STP weighs 0.375 g. What would be 'A' in the whole process? Kj for camphor = 40, m.pt. of camphor = 179°C.
a) C_2H_5Br b) CH_3I c) $(CH_3)_2CHI$ d) C_3H_5Br

73. The major product formed in the following reaction is


a)  b) $CH_3-\underset{OCH_3}{\underset{|}{CH}}-CH_2CH_3$ c) $CH_3-\overset{CH_3}{\overset{|}{C}}=CH_2$

d) 

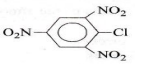
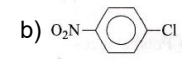
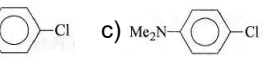
74. Elimination reaction of 2-Bromo-pentane to form pent-2-ene is:
    (I) p-Elimination reaction
    (2) Follow Zaitsev rule
    (3) Dehydrohalogenation reaction
    (4) Dehydration reaction
    a) (I),(2),(3) b) (1),(2),(3) c) (I),(3),(4) d) (2),(3),(4)
75. A mixture of 1-chloropropane and 2-chloropropane when treated with alcoholic KOH gives
    a) prop-1-ene b) prop-2-ene c) a mixture of prop-1-ene and prop-2-ene d) propanol.
76. Propene, $CH_3-CH=CH_2$ can be converted into 1-propanol by oxidation. Indicate which set of reagents amongst the following is ideal to affect the above conversion?
    a) $KMnO_4(alkaline)$ b) Osmium tetroxide (OsO_4/CH_2Cl_2)
    c) B_2H_6 and alk H_2O_2 d) O_3/Zn
77. Consider the reaction, $CH_3CH_2CH_2Br$+ NaCN ⟶ $CH_3CH_2CH_2CN$ + NaBr
    This reaction will be the fastest in :
    a) ethanol b) methanol c) N, N'-dimethylformamide (DMF) d) water
78. Which of the following is not chiral?
    a) 2-Hydroxypropanoic acid b) 2-Butanol c) 2,3-Dibromopentane d) 3-Bromopentane
79. Toluene reacts with a halogen in the presence of iron (III) chloride giving ortho and para halo compounds. The reaction is
    a) electrophilic elimination reaction b) electrophilic substitution reaction
    c) free radical addition reaction d) nucleophilic substitution reaction.
80. Reaction of  with RMgX leads to formation of _____ .
    a) $RCHOHR$ b) $RCHOHCH_3$ c) RCH_2CH_2OH d) 
81. An alkyl halide with molecular formula $C_6H_{13}Br$ on dehydrohalogenation gives two isomeric alkenes X and Y with molecular formula C_6H_{12}. On reductive ozonolysis X and Y gave four compounds CH_3COCH_3, CH_3CHO, CH_3CH_2CHO and $(CH_3)_2CHCHO$. The alkyl halide is
    a) 4-bromo-2-methylpentane b) 3-bromo- 2- methylpentane
    c) 2-bromo-2,3-dimethylbutane d) 2, 2-dimethyl-I-bromobutane
82. **Assertion:** Electrophilic substitution reactions in haloarenes occur slowly and require more drastic conditions as compared to those in benzene.
    Reason: Halogens are ortho and para-directors.
    a) If both assertion and reason are true and reason is the correct explanation of assertion.
    b) If both assertion and reason are true but reason is not the correct explanation of assertion
    c) If assertion is true but reason is false d) If both assertion and reason are false.
83. Cyanide ion acts as an ambident nucleophile. From which end it acts as a stronger nucleophile in aqueous medium?
    a) It acts as a stronger nucleophile from carbon end.
    b) It acts as a stronger nucleophile from nitrogen end.
    c) It depends on the nature of the alkyl halide d) It has same strength from both the ends
84. **Assertion:** Chloroform is stored in dark coloured bottles.
    Reason : Chronic chloroform exposure may cause damage to the liver and kidneys.
    a) If assertion is true but reason is false b) If both assertion and reason are false.
    c) If both assertion and reason are true and reason is the correct explanation of assertion
    d)
    If both assertion and reason are true but reason is not the correct explanation of assertion.
85. The compound that is most difficult to protonate is:
    a)  b)  c)  d) 
86. In an S_N1 reaction on chiral centres, there is:

a) inversion more than retention leading to partial racemisation b) 100% retention
c) 100% inversion d) 100% racemisation

87. The order of reactivity of following alcohols with halogen acids is_____
(I) CH_3CH_2-CH_2-OH
(II) $CH_3CH_2-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}}H-OH$
(III) $CH_3CH_2-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}}-OH$
a) (I) > (II) > (III) b) (III) > (II) > (I) c) (II) > (I) > (III) d) (I) > (III) > (II)

88. The main difference in C - X bond of a haloalkane and a haloarene is
a) C - X bond in haloalkanes is shorter than haloarenes.
b)
in haloalkanes the C attached to halogen in C - X bond is Sp^3 hybridised while in haloarenes it is Sp^2 hybridised.
c)
C - X bond in haloarenes acquires a double bond character due to higher electronegativity of X than haloalkanes.
d)
haloalkanes are less reactive than haloarenes due to difficulty in C - X cleavage in halo alkanes.

89. Consider the reactions:
$(i)(\mathrm{Ca_3})_2\mathrm{CH}-\mathrm{CH_2Br}\xrightarrow{C_2H_5OH}(\mathrm{CH_3})_2\mathrm{CH}-\mathrm{CH_2OC_2H_5}+\mathrm{HBr}$
$(ii)(\mathrm{CH_3})_2\mathrm{CH}-\mathrm{CH_2Br}\xrightarrow{C_2H_5O^-}(\mathrm{CH_3})_2\mathrm{CH}-\mathrm{CH_2OC_2H_5}+\mathrm{Br^-}$
The mechanism of reactions (i) and (ii) are respectively:
a) $\mathrm{S_N1}$ and $\mathrm{S_N2}$ b) $\mathrm{S_N1}$ and $\mathrm{S_N1}$ c) $\mathrm{S_N2}$ and $\mathrm{S_N2}$ d) $\mathrm{S_N2}$ and $\mathrm{S_N1}$

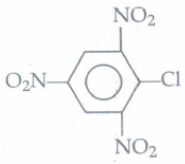
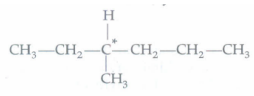
90. Which chloro derivative of benzene among the following would undergo hydrolysis most readily with aq. NaOH to furnish the corresponding hydroxy derivative?
a)  b)  c)  d) $\mathrm{C_6H_5-Cl}$

91. Which of the following reactions follows Markovnikov's rule?
a) C_2H_4 + HBr b) C_3H_6 + Cl_2 c) C_3H_6 + HBr d) C_3H_6 + Br_2

92. The $\mathrm{Cl-C-Cl}$ angle in 1, 1, 2, 2-tetra-chloroethene and tetrachloromethane will be about _____ .
a) 120° and $109^\circ 28'$ b) 90° and 109.5° c) 109.5° and $90'$
d) 109.5° and 120°

93. Which of the following statements regarding the S_N1 reaction shown by alkyl halide is not correct?
a) The added nucleophile plays no kinetic role in S_N1 reaction
b) The S_N1 reaction involves the inversion of configuration of the optically active substrate.
c) The $S_N1$reaction on the chiral starting material ends up with racemisation of the product
d) The more stable the carbo cation intermediate the faster the S_N1 reaction.

94. 36.4 g of 1, 1, 2, 2-tetrachloropropane was heated with zinc dust and the product was bubbled through ammoniacal $AgNO_3$.What is the weight of precipitate obtained?
a) 30.0 g b) 29.4 g c) 28.0 g d) 25.7 g

95. Which chloro derivative of benzene among the following would undergo hydrolysis most readily with aqueous sodium hydroxide to furnish the corresponding hydroxyl derivative?
a)  b)  c)  d) C_6H_5Cl

96. The compound C_7H_8 undergoes the following reactions:
$C_7H_8\xrightarrow{3CL_2/\triangle}A\xrightarrow{Br_2/Fe}B\xrightarrow{Zn/HCl}C$ The product 'C' is

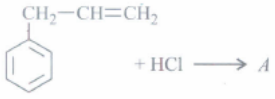
a) m-bromotoluene b) o-bromotoluene c) 3-bromo-2,4,6-trichlorotoluene
d) p-bromotoluene

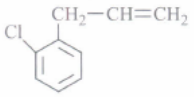
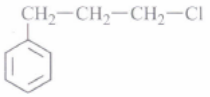
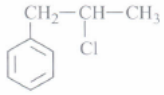
97. Molecules whose mirror image is nonsuperimposable over them are known as chiral. Which of the following molecules is chiral in nature?
a) 2-Bromobutane b) 1-Bromobutane c) 1-Bromobutane d) 2-Bromopropan-2-ol

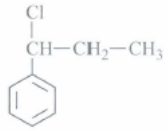
98. Which one of the following is not correct order of boiling points of the alkyl/aryl halides?
a) $CHCl_3 > CH_2Cl_2$ b) $CH_3(CH_2)_3CI > CH_3(CH_2)_2CI$ c) $(CH_3)_3CCI > (CH_3)_2CHCH_2CI$
d) $CH_3(CH_2)_3CI > CH_3CH_2CHCICH_3$

99. Ethyl alcohol is obtained when ethyl chloride is boiled with
a) alcoholic KOH b) aqueous KOH c) water d) aqueous $KMnO_4$.

100. What is 'A' in the following reaction?



a)  b)  c) 

d) 

101. The (R) and (S) enantiomers of an optically active compound differ in :
a) their solubility in a chiral solvent b) their reactivity with a chiral reagent
c) their optical rotation of plane polarized light d) their melting points.

102. Identify the products X and Y formed in the following reaction.
$$CH_3 - CH_2 - CH = CH - CH_3 + HCl \longrightarrow X + Y$$
a) $X = CH_3CH_2CH_2CH_2CH_2Cl, Y = CH_3CH_2 - \underset{Cl}{CH} - CH_2CH_3$
b) $X = CH_3CH_2 - \underset{Cl}{CH} - CH_2CH_3, Y = CH_3CH_2\underset{Cl}{CH_2} - \underset{Cl}{CH} - CH_3$
c) $X = CH_3CH_2 - \underset{Cl}{CH} - CH_2CH_3, Y = CH_3 - \underset{Cl}{CH} - \underset{Cl}{CH} - CH_2CH_3$
d) $X = ClCH_2 - CH_2 - CH = CH - CH_3, Y = \underset{Cl}{CH_3}\underset{Cl}{CH_2} - CH = CH - CH_2Cl$

103. **Assertion:** S_N1 reactions are generally carried out in polar protic solvents (like water, alcohol, acetic acid, etc.)
Reason : $C_6H_5CH(C_6H_5)Br$ is less reactive than $C_6H_5CH(CH_3)Br$ in S_N1 reactions.
a) If both assertion and reason are true and reason is the correct explanation of assertion.
b) If both assertion and reason are true but reason is not the correct explanation of assertion
c) If assertion is true but reason is false d) If both assertion and reason are false

104. Which one is correct?
a) Freon-14 is CF_4, Freon-13 is CF_3CI, Freon-12 is CF_2Cl_2 and Freon-II is $CFCI_3$
b) Freons are chlorofluorocarbons. c) Freons are used as refrigerants d) All the above.

105. Identify the product of the following reaction. $ClCH_2CH_2CH_2Br + KCN \rightarrow$ Product
a) $ClCH_2CH_2CH_2CN$ b) $CNCH_2CH_2Br$ c) $CNCH_2CH_2CH_2CN$
d) $CI\,\underset{CN}{C}\,HCH_2CH_2CH_2Br$

106. Grignard reagent is prepared by the reaction between:
a) magnesium and alkane b) magnesium and aromatic hydrocarbon
c) zinc and alkyl halide d) magnesium and alkyl halide

107. Among the choices of alkyl bromide, the least reactive bromide in S_N2 reaction is
a) l-bromopentane b) 2-bromo-2-methylbutane c) l-bromo-3-methylbutan
d) l-bromo-z-rnethylbutane.

108. Arrange the following compounds in order of their reactivity towards SN2 reaction.
(i) $CH_3(CH_2)_3CH_2Br$
(ii) $(CH_3)_2CHCH_2CH_2Br$

(iii) $CH_3CH_2-\overset{\overset{CH_3}{|}}{CH}-CH_2Br$

(iv) $CH_3-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}}-CH_2Br$

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

109. Which of the following compounds will give racemicmixture on nucleophilic substitution by OH^- ion?

(i)

$CH_3-\underset{\underset{C_2H_5}{|}}{C}H-Br$

(ii)

$CH_3-\underset{\underset{C_2H_5}{|}}{\overset{\overset{Br}{|}}{C}}-CH_3$

(iii)

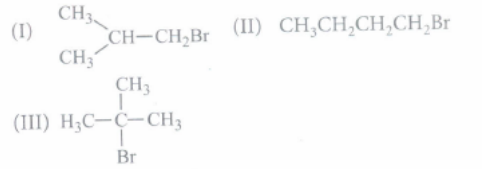
$CH_3-\underset{\underset{C_2H_5}{|}}{C}H-CH_2Br$

a) (I) b) (I), (II), (III) c) (II), (III) d) (I), (III)

110. In two separate experiments equal quantities of an alkyl halide, C_4H_9Cl, were treated at the same temperature with equal volume of 0.1 molar and 0.2 molar solutions of NaOH respectively. In the two experiments, $t_{1/2}$ of the two reactions were the same. The most likely structure of halide is:

a) $CH_3CH_2CH_2CH_2C$ b) $CH_3CH(Cl)CH_2CH_3$ c) $(CH_3)_2CHCH_2Cl$ d) $(CH_3)_2CCl$

111. Arrange the following compounds in increasing order of their boiling points.



a) (II)< (1)< (III) b) (1) < (II) < (III) c) (III) < (1) < (II) d) (III) < (II)< (1)

112. **Assertion:** Replacement of -Cl group by -OH in chlorobenzene is easier if nitro group is present in the ring.

Reason: Nitro group leads to strengthening of the C-Cl bond in chlorobenzene.

a) If both assertion and reason are true and reason is the correct explanation of assertion

b) If both assertion and reason are true but reason is not the correct explanation of assertion

c) If assertion is true but reason is false. d) If both assertion and reason are false

113. Bromination of methane in presence of sunlight is

a) nucleophilic substitution b) free radical substitution c) electrophilic substitution

d) nucleophilic addition

114. The reaction

$CH_2=CH-CH_3+HBr\longrightarrow CH_3-\overset{\overset{Br}{|}}{CH}-CH_3$ is an example of

a) nucleophilic addition b) free radical addition c) electrophilic addition

d) electrophilic substitution

115. Industrial preparation of chloroform employs acetone and _____ .

a) Phosgene b) Calcium hypochlorite c) Chlorine gas d) Sodium chloride

116. Classify the following compounds as primary, secondary and tertiary halides.

(i) 1-Bromobut-2-ene

(ii) 4-Bromopent-2-ene

(iii) 2- Bromo-2-methylpropane

a) (i)-secondary, (ii)-tertiary, (iii)-primary b) (i)-secondary, (ii)-primary, (iii)-tertiary

c) (i)-primary, (ii)-tertiary, (iii)-secondary d) (i)-prirnary, (ii)-secondary, (iii)-tertiary

117. Triiodomethane has antiseptic property because of

a) liberation of iodoform b) liberation of free iodine c) formation of phosgene gas

d) none of these

118. Chlorobenzene reacts with Mg in dry ether to give a compound (A) which further reacts with ethanol to yield:

a) phenol b) benzene c) ethyl benzene d) phenyl ether.

119. $CH_3 - \underset{Br}{CH} - CH_3 \xrightarrow{alc.KOH} X \xrightarrow[Peroxide]{HBr} Y \xrightarrow[Acetone]{NaI} Z$

In the given reaction what will be the final product?

a) $CH_3CH_2CH_2I$ b) CH_3CHICH_2I c) $CH_3CH_2CH_2CH_2CH_3$ d) $CH_3CH_2CHI_2$

120. Which of the following alkyl halides is hydrolysed by S_N1 mechanism?

a) CH_3Cl b) CH_3CH_2Cl c) $CH_3CH_2CH_2Cl$ d) $(CH_3)_3CCl$

121. **Assertion:** Haloalkanes react with KCN to form alkyl cyanides as main product while with AgCN form isocyanide as the main product.

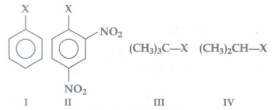
Reason : KCN and AgCN, both are ionic compounds.

a) If both assertion and reason are true and reason is the correct explanation of assertion.

b) If both assertion and reason are true but reason is not the correct explanation of assertion

c) If assertion is true but reason is false. d) If both assertion and reason are false.

122. The correct order of increasing reactivity of

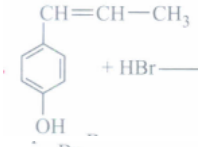


C-X bond towards nucleophile in the following compounds is :

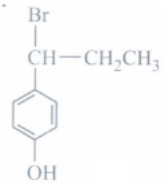
a) I < II < IV < III b) II < III < I < IV c) IV < III < I < II d) III < II < I < IV

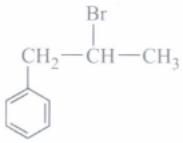
123. Which of the following undergoes nucleophilic substitution exclusively by $^SN^1$ mechanism?

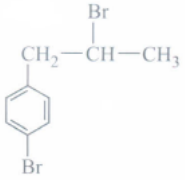
a) Benzyl chloride b) Ethyl chloride c) Chlorobenzene d) Isopropyl chloride

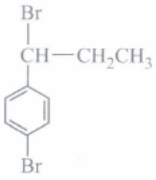
124. 

X in the reaction is

a) 

b) 

c) 

d) 

125. Chloromethane on treatment with excess of ammonia yields mainly

a) 

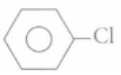
b) N-methylmethanamine (CH_3-NH-CH_3)

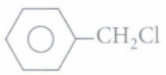
c) methanamine (CH_3NH_2) d) mixture containing all these in equal proportion.

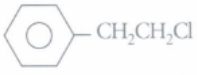
126. A primary alkyl halide would prefer to undergo_____

a) S_N1 reaction b) S_N2 reaction c) a-elimination d) racemisation

127. Which one of the following chlorohydrocarbons readily undergoes solvolysis?

a) CH_2 = CHCl b) 

c) 

d) 

128. Which of the following halo alkanes reacts with aqueous KOH most easily?

a) I-Bromobutane b) 2-Bromobutane c) 2-Bromo-2-methylpropane d) 2-Chlorobutane

129. Identify the products X and Y in the given reaction,

$$CH_3 - \underset{Br}{CH} - CH_3 + Mg \xrightarrow{Dry\ ether} X \xrightarrow{D_2o} Y$$

$X = CH_3 - \underset{Br}{CH} - CH_2Mg,$ $X = CH_3 - \underset{MgBr}{C}\ H - CH_3$

a) $Y = CH_3 - CH_2CH_2CH_2OH$ b) $Y = CH_3 - \underset{D}{CH} - CH_3$

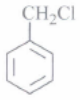
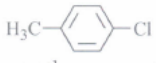
$X = CH_3 - \underset{MgBr}{C}\ H - CH_3$ $X = CH_3 - \underset{Br}{CH} - CH_2Mg$

c) $Y = CH_3 - \underset{OD}{CH} - CH_3$ d) $Y = CH_3 - \underset{OH}{CH} - CH_3$

130. In compound ' X ' all the bond angles are exactly $109^\circ 28$, 'X 'is _____ .
a) Chloromethane b) Carbon tetrachloride c) Iodoform d) Chloroform

131. The alkyl halide is converted into an alcohol by
a) elimination b) dehydrohalogenation c) addition d) substitution

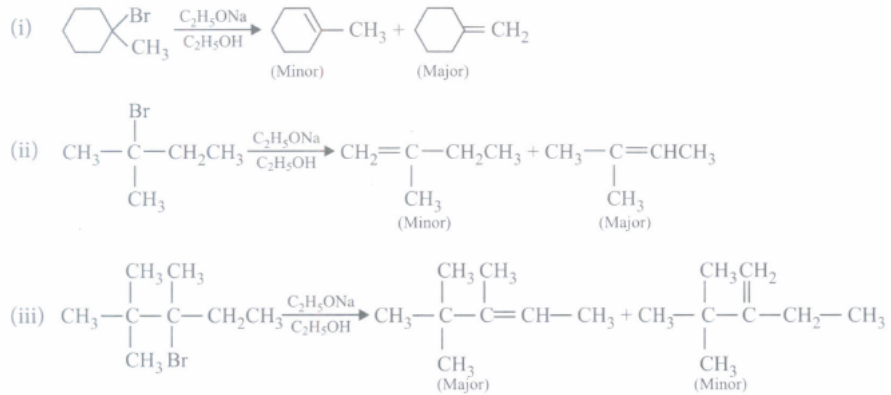
132. 2-Bromo-3, 3-dimethylbutane on reaction with aqueous KOH yields X as the major product. X is
a) 2, 3, 3-trimethylpropan-l-ol b) 2, 2-dimethylbutan-3-ol c) 2, 3-dimethylbutan-2-ol
d) 2, 2-dimethylpropan-2-ol

133. The reaction of toluene with chlorine in the presence of iron and in the absence of light yields _____
a)  b)  c)  d) mixture og (b) and (c)

134. Consider the reactions,
(i) $(CH_3)_2CH\text{-}CH_2Br \xrightarrow{C_2H_5OH} (CH_3)_2CH\text{-}CH_2OC_2H_5 + HBr$
(ii) $(CH_3)_2CH\text{-}CH_2Br \xrightarrow{C_2H_5O-} (CH_3)_2CH\text{-}CH_2OC_2H_5 + Br^-$
The mechanisms of reactions (i) and (ii) are respectively:
a) S_N1 and S_N2 b) S_N1 and S_N1 c) S_N2 and S_N2 d) S_N2 and S_N1

135. The ease of dehydrohalogenation of alkyl halide with alcoholic KOH is
a) 3°<2°<1° b) 3°>2°>1° c) 3°<2°>1° d) 3°>2°<1°

136. Which of the following products as shown by the dehydrohalogenation of alkyl halides with sodium ethoxide in ethanol is correctly marked as major product?

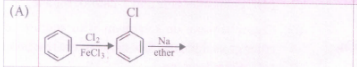
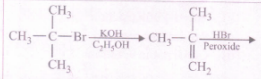
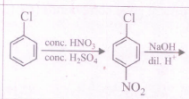
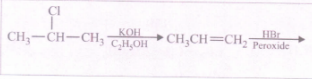


a) (i) and (ii) only b) (i) and (iii) only c) (ii) and (iii) only d) (ii) only

137. **Assertion:** On free radical monochlorination of $(CH_3)_2CHCH_2CH_3$ four monochloro structural isomers are possible.
Reason: In $(CH_3)CHCH_2CH_3$ there are four different types of hydrogen atoms
a) If both assertion and reason are true and reason is the correct explanation of assertion
b) If both assertion and reason are true but reason is not the correct explanation of assertion
c) If assertion is true but reason is false d) If both assertion and reason are false

138. The position of - Br in the compound in $CH_3CH=CHC(Br)(CH_3)_2$ can be classified as_____
a) allyl b) aryl c) vinyl d) secondary

139. Match the column I with column II and mark the appropriate choice.

Column I		Column II	
(A)		(i)	$CH_3CH_2CH_2Br$
(B)		(ii)	
(C)		(iii)	
(D)		(iv)	

a) (A) → (iv), (B)→ (ii), (C) → (i), (D) → (iii)
b) (A)→ (iii), (B) → (iv), (C) → (ii), (D) → (i)
c) (A)→ (ii), (B) → (i), (C) → (iii), (D)→ (iv)
d) (A) → (i), (B) → (iii), (C) → (iv), (D)→ (ii)

140. Benzene reacts with CH_3Cl in the presence of anhydrous $AlCl_3$ to form:
a) Chlorobenzene b) Benzychloride c) Xylene d) Toluene

141. **Assertion:** Melting points of isomeric dihalobenzenes are nearly the same.
Reason : Isomeric dihalobenzenes have different molecular masses
a) If both assertion and reason are true and reason is the correct explanation of assertion.
b) If both assertion and reason are true but reason is not the correct explanation of assertion
c) If assertion is true but reason is false. d) If both assertion and reason are false

142. Match the column I with column II and mark the appropriate choice

Column I		Column II	
(A)	Carbon tetrachloride	(i)	Paint remover
(B)	Methylene chloride	(ii)	Refrigerators and air conditioners
(C)	DDT	(iii)	Fire-extinguisher
(D)	Freons	(iv)	Non-biodegradable insecticide

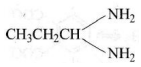
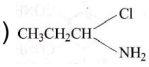
a) (A) → (ii), (B)→ iii), (C) → (i), (D)→ (iv)
b) (A)→ (iv), (B) → (iii), (C) → (ii), (D) → (i)
c) (A)→ (i), (B)→ (ii), (C) → (iii), (D) → (iv) d) (A)→ (iii), (B)→ (i), (C) → (iv), (D) → (ii)

143. Chloroform is kept in dark coloured bottles because
a) it reacts with clear glass b) it undergoes chlorination in transparent glass bottles
c) it is oxidised to poisonous gas, phosgene in sunlight
d) it starts burning when exposed to sunlight

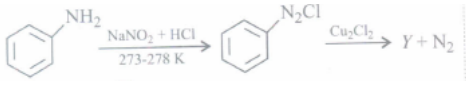
144. Which one of the reactive S_N1 reaction?
a) $C_6H_5CH_2Br$ b) $C_6H_5CH(C_6H_5)Br$ c) $C_6H_5CH(CH_3)Br$
d) $C_6H_5C(CH_3)(C_6H_5)Br$

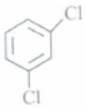
145. Which of the following is an optically active compound?
a) I-Butanol b) I-Propanol c) 2-Chlorobutane d) 4-Hydroxyheptane

146. Alkyl halides are immiscible in water though they are polar because
a) they react with water to give alcohols b) they cannot form hydrogen bonds with water
c) C - X bond cannot be broken easily d) they are stable compounds and are not reactive

147. When $CH_3CH_2CHCl_2$ is treated with $NaNH_2$, the product formed is _____ .
a) $CH_3-CH=CH_2$ b) $CH_3-C\equiv CH$ c)  d) 

148. Tertiary alkyl halides are practically inert to substitution by S_N2 mechanism because
a) the carbocation formed is unstable b) there is steric hindrance
c) there is inductive effect d) the rate of reaction is faster in S_N2 mechanism.

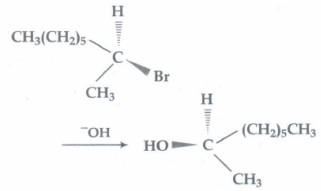
149. Identify the compound' Y' in the following reaction.


a)  b)  c)  d) 

150. An alkyl halide, RXreacts with KCN to give propane nitrile. RX is
a) C_3H_7Br b) C_4H_9Br c) C_2H_5Br d) $C_5H_{11}Br$

151. A compound of molecular formula C_7H_{16} shows optical isomerism, compound will be :
a) 2,3-dimethylpentane b) 2,2-dimethylbutane c) 2-methylhexane d) None of these

152. The reaction is described as



a) $^{S}E^2$ b) $^{S}N^1$ c) $^{S}N^2$ d) $^{S}N^0$

153. **Assertion:** Common name of 1, I-dichloroethane is ethylidene chloride.
Reason: Ethylidene chloride is a gem-dihalide.
a) If both assertion and reason are true and reason is the correct explanation of assertion
b) If both assertion and reason are true but reason is not the correct explanation of assertion
c) If assertion is true but reason is false d) If both assertion and reason are false

154. Arrange the following compounds in decreasing order of their boiling points.
(i) CH_3Br
(ii) CH_3CH_2Br
(iii) $CH_3CH_2CH_2Br$
(iv) $CH_3CH_2CH_2CH_2Br$
a) (i) > (ii) > (iii) > (iv) b) (iv) > (Iii) > (ii) > (i) c) (i) > (iii) > (ii) > (iv) d) (iii) > (iv) > (i) > (ii)

155. Match the isomers given in column I with their names given in column II and mark the appropriate choice.

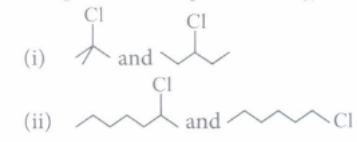
Column I	**Column II**	
(A)	(i)	2- Bromo- 3- methylbutane
(B)	(ii)	2- Bromopentane
(C)	(iii)	1-Bromo- 3- methylbutane
(D)	(iv)	1-Bromo- 2- methylbutane

a) (A)$\rightarrow$ (iii), (B)$\rightarrow$ (i), (C)$\rightarrow$ (iv), (D) $\rightarrow$ (ii)
b) (A) $\rightarrow$ (iv), (B)$\rightarrow$ (iii), (C) $\rightarrow$ (ii), (D) $\rightarrow$ (i)
c) (A) $\rightarrow$ (i), (B)$\rightarrow$ (ii), (C) $\rightarrow$ (iii), (D) $\rightarrow$ (iv)
d) (A) $\rightarrow$ (ii), (B) $\rightarrow$ (iii), (C) $\rightarrow$ (iv), (D) $\rightarrow$ (i)

156. Consider the following SN2 reactions
I. $RX+Y^- \rightarrow R\text{-}Y+X^-$
II. $RX + Y \rightarrow R\text{-}Y^+ + X$
III. $RX^+ + Y^- \rightarrow R - Y + X$
IV. $RX^+ + Y \rightarrow R\text{-}Y^+ + X$
In which reactions there is large increase and large decrease in rate of reaction respectively with increase in polarity of the solvent.
a) II and III b) II and IV c) I and IV d) IV and I

157. Bottles containing C_6H_5I and $C_6H_5CH_2I$ lost their original labels. They were labelled A and B for testing. A and B were separately taken in test tubes and boiled with NaOH solution. The end solution in each tube was made acidic with dilute HNO_3 and some $AgNO_3$ solution added. Solution B gave a yellow precipitate. Which one of the following statements is true for the experiment?
a) Addition of HNO_3 was unnecessary b) A was C_6H_5I c) A was $C_6H_5CH_2I$
d) B was C_6H_sI

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



a) 

b) 

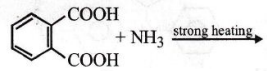
c) 

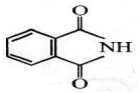
d) 

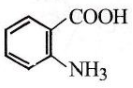
159. Which one of the following pairs represents stereoisomerism
   a) Chain isomerism and rotational isomerism
   b) Structural isomerism and geometrical isomerism
   c) Linkage isomerism and geometrical isomerism
   d) Optical isomerism and geometrical isomerism

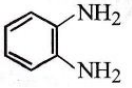
160. Which of the following alkyl halides undergoes hydrolysis with aqueous KOH at the fastest rate?
   a) $CH_3CH_2CH_2Cl$ b) CH_3CH_2Cl c) $CH_3CH_2CH_2CH_2Cl$ d) $CH_3CH_2CH(Br)CH_3$

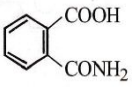
161. The major product of the following reaction is:



a) 

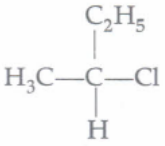
b) 

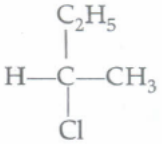
c) 

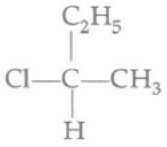
d) 

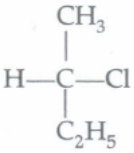
162. The fire extinguisher 'pyrene' contains
   a) Carbon dioxide b) Carbon disulphide c) Carbon tetrachloride d) Chloroform

163. CH_3-CHCl-CH_2-CH_3 has a chiral centre which one of the following represents its R-configuration?

a) 

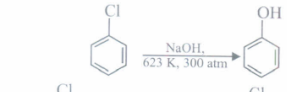
b) 

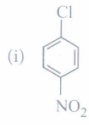
c) 

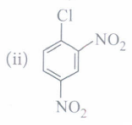
d) 

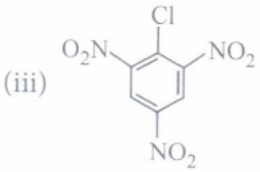
164. Which of the following is an example of vic-dihalide?
   a) Dichloromethane b) 1,2-Dichloroethane c) Ethylidene chloride d) Allyl chloride

165. Chlorobenzene can be converted into phenol by heating in aqueous sodium hydroxide solution at a temperature of 623 K and a pressure of 300 atm.However the rate of reaction can be increased by presence of certain groups in benzene ring. What will be the order of reactivity of following compounds towards the above substitution reaction?



(i) 

(ii) 

(iii) 

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

166. When hydrochloric acid gas is treated with propene in presence of benzoyl peroxide, it gives _____ .
   a) 2 -chloropropane b) Alkyl chioride c) No reaction d) N-propyl chloride

167. Which of the following reactions is not correctly matched?
   a) $2C_2H_5Br + 2Na \xrightarrow{dry\ ether} C_4H_{10} + 2NaBr$: Wurtz reaction
   b) $CH_3Br + AgF \rightarrow CH_3F + AgBr$: Etard reaction

c) $C_6H_5Br + 2Na + BrC_2H_5 \xrightarrow{dry\ ether} C_6H_5C_2H_5 + 2NaBr$:Wurtz-Fittig reaction

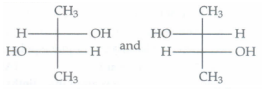
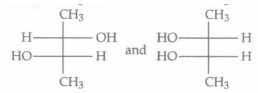
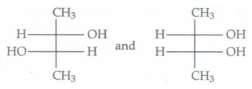
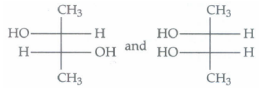
d) $2C_6H_5Br + 2Na \xrightarrow{dry\ ether} C_6H_5 - C_6H_5 + 2NaBr$: Fittig reaction

168. If there is no rotation of plane polarized light by a compound in a specific solvent, though to be chiral, it may mean that:
a) the compound is certainly meso b) there is no compound in the solvent
c) the compound may be a racemic mixture d) the compound is certainly a chiral.

169. The IUPAC name of tertiary butyl chloride is
a) 2-chloro-2-methypropane b) 3-chlorobutane c) 4-chlorobutane
d) 1,2-chloro-3-methylpropane.

170. Which of the following reactions is an example of nucleophilic substitution reaction?
a) 2RX + 2Na ⟶ R-R + 2NaX b) RX+ H_2⟶RH + HX c) RX+ Mg⟶RMgX
d) RX+ KOH⟶ROH + KX

171. Cyclic hydrocarbon 'A' has all the carbon and hydrogen atoms in a single plane. All the carbon-carbon bonds have the same length, less than 1.54 Aº , but more than 1.34 Aº. The $C - C - C$ bond angle will be _____ .
a) 109º28' b) 100º c) 180º d) 120º

172. Which of the following pairs of compounds are enantiomers ?
a)  b)  c) 
d) 

173. **Assertion:** CH_2=CH-CH_2-X is an example of allyl halides.
Reason : These are the compounds in which the halogen atom is bonded to an sl hybridised carbon atom
a) If both assertion and reason are true and reason is the correct explanation of assertion
b) If both assertion and reason are true but reason is not the correct explanation of assertion
c) If assertion is true but reason is false. d) If both assertion and reason are false

174. $C_8H_8Cl_2(A) \xrightarrow{Aq.NaOH} (B) \xrightarrow{Mild} \xrightarrow{Reduction} (C) \xrightarrow{I_2/NaOH} iodoform + acid \quad salt(D)$
In the given sequence of reaction, what would be the structure of (A)?
a) $PhCOCH_3$ b) $PhCH(OH)CH_3$ c) PhCOONa d) $PhC(Cl)_2CH_3$

175. 2-Chloro-2-methylpropane on reaction with alc. KOH gives X as the product. X is
a) but-2-ene b) 2- methylbut -l-ene c) 2- methylprop-l-ene d) 2-methylbutan-2-ol.

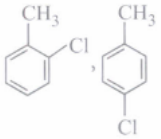
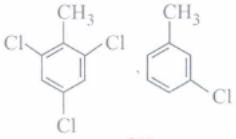
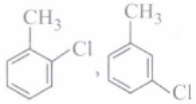
176. Which of the following is responsible for depletion of the ozone layer in the upper strata of the atmosphere?
a) Polyhalogens b) Ferrocene c) Fullerenes d) Freons

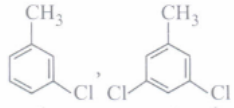
177. The IUPAC name of $(CH_3)_2CH - CH_z - CH_zBr$ is
a) l-bromopentane b) 1-bromo-3-methylbutane c) 2-methyl-4-bromobutane
d) 2-methyl-3-bromopropane.

178. **Assertion:** $CH_3 - \overset{Br}{\overset{|}{C}}H - CH_2 - CH_3$ on reaction with alcoholic KOH gives CH_3CH=$CHCH_3$ as a result of dehydrohalogenation.
Reason : Elimination reaction takes place in accordance with Markovnikov's rule
a) If both assertion and reason are true and reason is the correct explanation of assertion.
b) If both assertion and reason are true but reason is not the correct explanation of assertion
c) If assertion is true but reason is false d) If both assertion and reason are false

179. The process of separation of a racemic modification into d and l-enantiomers is called.
a) resolution b) dehydration c) revolution d) dehydrogenation

180. A compound X with molecular formula C_7H_5 is treated with Cl_2 in presence of $FeCl_3$. Which of the following compounds are formed during the reaction?

a)  b)  c) 

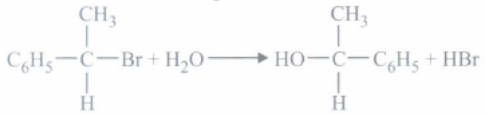
d) 

181. Ethylene dichloride and ethylidene chloride are isomeric compounds. The false statement about these isomers is that they
a) are both hydrolysed to the same product b) contain the same percentage of chlorine
c) are position isomers d) react with alcoholic potash and give the same product.

182. **Assertion:** The order of reactivity of alkyl halides towards S_N1 reaction is tertiary halide> secondary halide> primary halide.
Reason: The reaction follows carbocation mechanism
a) If both assertion and reason are true and reason is the correct explanation of assertion.
b) If both assertion and reason are true but reason is not the correct explanation of assertion
c) If assertion is true but reason is false. d) If both assertion and reason are false.

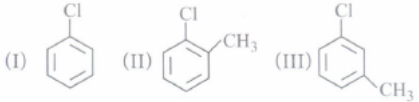
183. Which one is formed when sodium phenoxide is heated with ethyl iodide?
a) Phenetole b) Ethyl phenyl alcohol c) Phenol d) None of these

184. Consider the following reaction:



The reaction proceeds with 98% racemisation. The reaction may follow
a) S_N1 mechanism b) S_N2 mechanism c) EI mechanism d) E2 mechanism.

185. Arrange the compounds in increasing order of rate of reaction towards nucleophilic substitution

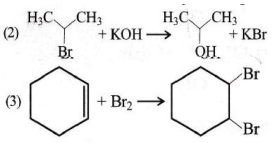


a) (I) < (II) < (III) b) (I) < (III) < (II) c) (III) < (II) < (I) d) (II) < (III) < (I)

186. In S_N2 reactions the sequence of bond breaking and bond formation is as follows
a) bond breaking and formation occur simultaneously
b) bond breaking and formation take place randomly
c) bond breaking is followed by formation d) bond formation is followed by breaking

187. For the following reactions:

$$(1)\ CH_3CH_2CH_2Br + KOH \rightarrow CH_3CH = CH_2 + KBr + H_2O$$



Which of the following statements is correct?
a) (1) and (2) are elimination reaction and (3) is addition reaction
b) (1) is elimination, (2) is substitution and (3) is addition reaction
c) (1) is elimination, (2) and (3) are substitution reactions
d) (1) is substitution, (2) and (3) are addition reaction

188. Two possible stereo-structures of $CH_3CHOHCOOH$, which are optically active, are called:
a) atropisomers b) enantiomers c) mesomers d) diastereomers

189. An organic compound A(C_4H_9Cl) on reaction with Na/diethyl ether gives a hydrocarbon which on monochlorination gives only one chloro derivative, then A is _____ .
a) tert-butyl chloride b) sec-butyl chloride c) iso-butyl chloride d) n-butyl chloride

190. Which of the following compounds has the highest boiling point?
a) $CH_3CH_2CH_2Cl$ b) $CH_3CH_2CH_2CH_2Cl$ c) $CH_3CH(CH_3)CH_2C$ d) $(CH_3)_3CCl$

191. Aryl halides are less reactive towards nucleophilic substitution reactions as compared to alkyl halides due to

a) formation of a less stable carbonium ion in aryl halides

b) resonance stabilisation in aryl halides c) presence of double bonds in alkyl halides

d) inductive effect in aryl halides

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

$$C_2H_5I \xrightarrow[KOH]{Alcoholic} (X) \xrightarrow{Br_2} (Y) \xrightarrow{KCN} (Z)$$

a) CH_3-CH_2-CN b) $\underset{CN}{CH_2}=\underset{CN}{CH_2}$ c) $\underset{Br}{CH_2}-\underset{CN}{CH_2}$ d) $\underset{Br}{CH}=\underset{CN}{CH}$

193. In the following reaction

C6H5CH2Br $\xrightarrow[2.H_3O^+]{1.Mg,\ Ether}$ X, the product 'X' is

a) $C_6H_5CH_2OCH_2C_2C_6H_5$ b) $C_6H_5CH_2OH$ c) $C_6H_5CH_3$ d) $C_6H_5CH_2CH_2C_6H_5$

194. Ethylidene chloride is a/an_____

a) vic-dihalide b) gem-dihalide c) allylic halide d) vinylic halide

195. Among the isomers of $C_5H_{11}Cl$, the one which is chiral is

(i) 2, 2-Dimethy-l-chloropropane

(ii) 2-Chloropentane

(iii) 2-Methyl- 2-chlorobutane

(iv) 3-Chloropentane

a) (i) and (ii) only b) (i), (ii) and (iii) only c) (i) and (iii) only d) only (ii)

196. **Assertion:** S_N2 reaction proceeds with racemisation while S_N1 reaction proceeds with complete stereochemical inversion.

Reason: S_N2 is two steps reaction while S_N is one step reaction.

a) If both assertion and reason are true and reason is the correct explanation of assertion

b) If both assertion and reason are true but reason is not the correct explanation of assertion

c) If assertion is true but reason is false d) If both assertion and reason are false

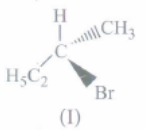
197. Choose the correct option from the following:

a) In the electrophilic substitution of toluene with Br_2, iron (III) bromide acts as a Lewis acid.

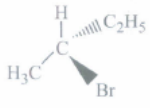
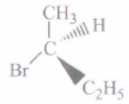
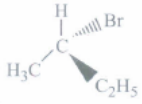
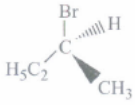
b) In the reaction of toluene with $Cl_2/FeCl_3$, ortho and para isomers are easily separated.

c) Similar reaction with iodine is reversible in nature. d) All of these.

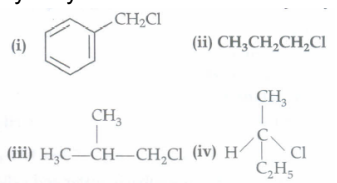
198. Which of the following structures is enantiomeric with the molecule (I) given below:



(I)

a)  b)  c)  d) 

199. Which of the following compounds will undergo racemisation when solution of KOH hydrolyses?



(i) (ii) $CH_3CH_2CH_2Cl$ (iii) (iv)

a) (i) and (ii) b) (ii) and (iv) c) (iii) and (iv) d) (i) and (iv)

200. Lucas reagent is _____ .

a) conc. HCl and anhy $ZnCl_2$ b) conc. HNO_3 and anhy. $ZnCl_2$

c) conc.HCl and hydrous $ZnCl_2$ d) conc. HNO_3 and hydrous $ZnCl_2$

201. Butane nitrile can be prepared by heating

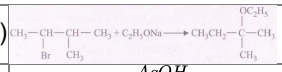
a) propyl alcohol with KCN b) butyl chloride with KCN c) butyl alcohol with KCN

d) propyl chloride with KCN.

202. When chlorine is passed through propene at 400°C, which of the following is formed?

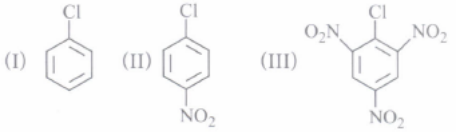
a) PVC b) Allyl chloride c) Propyl chloride d) 1, 2-Dichloroethane

203. Match the reactions given in column I with the type of reaction mentioned in column II and mark the appropriate choice.

Column I		Column II	
(A)		(i)	β-elimination
(B)	$CH_3CH_2Br \xrightarrow{AgOH} CH_3CH_2OH$	(ii)	S_N1 nucleophilic substitution
(C)	$CH_3CH = CH_2 + HBr \xrightarrow{peroxide} CH_3CH_2CH_2Br$	(iii)	S_N2 nucleophilic substitution
(D)	CH_3 - CH_2Br + ale. KOH ⟶ $CH_2 = CH_2$	(iv)	Kharasch effect

a) (A) ⟶ (iv), (B) ⟶ (i), (C) ⟶ (ii), (D) ⟶ (iii) b) (A) ⟶ (ii), (B) ⟶ (iii), (C) ⟶ (iv), (D) ⟶ (i)
c) (A) ⟶ (i), (B) ⟶ (ii), (C) ⟶ (iv), (D) ⟶ (iii) d) (A) ⟶ (iii), (B) ⟶ (i), (C) ⟶ (ii), (D) ⟶ (iv)

204. Arrange the compounds in increasing order of rate of reaction towards nucleophilic substitution

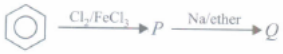


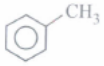
a) (III) < (II) < (I) b) (II) < (III) < (I) c) (I) < (III) < (II) d) (I) < (II) < (III)

205. An organic halogen compound which is used as refrigerant in refrigerators and air conditioners is
a) BHC b) CCl_4 c) freon d) $CHCl_3$

206. Which is the correct IUPAC name for $CH_3 - \underset{\underset{C_2H_5}{|}}{C}H - CH_2 - Br?$
a) 1-Bromo-2-ethylpropane b) 1-Bromo- 2-ethyl- 2-methylethane
c) 1-Bromo-2-methylbutane d) 2-Methyl-1-bromobutane

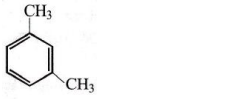
207. The end product (Q) in the following sequence of reactions is

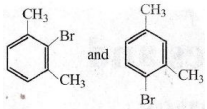
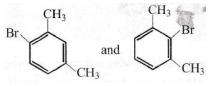
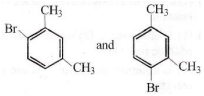


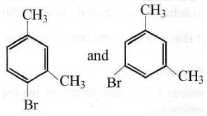
a)  b)  c)  d) 

208. Choose the correct increasing order of density of the following compound
a) $C_3H_7Cl < C_3H_7I < CH_2Cl_2 < CCl_4$ b) $C_3H_7I < C_3H_7Cl < CH_2Cl_2 < CCl_4$
c) $C_3H_7I < C_3H_7Cl < CCl_4 < CH_2Cl_2$ d) $CCl_4 < CH_2Cl_2 < C_3H_7I < C_3H_7Cl$

209. What products are formed when the following compounds is treated with Br_2 in the presence of $FeBr_3$?



a)  b)  c) 

d) 

210. CH_3-CH_2-$\underset{\underset{Cl}{|}}{CH}$-$CH_3$ obtained by chlorination of n-butane will be:
a) meso form b) racemic mixture c) d-form d) L-form

211. Which of the following molecules has highest dipole moment?
a) CH_3Cl b) CH_2Cl_2 c) $CHCl_3$ d) CCl_4

212. Which of the following is not an allylic halide?
a) 4-Bromopent-2-ene b) 3-Bromo- 2-methylbut -1-ene c) 1-Bromebut-2-ene
d) 4- Bromobut -1-ene

213. Which of the following will exhibit chirality.
a) 2-methyl hexane b) Neopentane c) 3-methyl hexane d) Isopentane

214. How many stereoisomers does this molecule have $CH_3CH=CHCH_2CHBrCH_3$?
a) 8 b) 2 c) 4 d) 6

215. Reaction of $C_6H_5CH_2Br$ with aqueous sodium hydroxide follows _____
a) S_N1 mechanism b) S_N2 mechanism
c) Any of the above two depending upon the temperature of reaction d) Saytzeff rule

216. The order of reactivities of methyl halides in the formation of Grignard reagent is
a) $CH_3I > CH_3Br > CH_3Cl$ b) $CH_3Cl > CH_3Br > CH_3I$ c) $CH_3Br > CH_3Cl > CH_3I$
d) $CH_3Br > CH_3I > CH_3Cl$

217. Which of the following haloalkanes is most reactive?
a) l-Chloropropane b) l-Bromopropane c) 2-Chloropropane d) 2-Bromopropane

218. Which reagent will you use for the following reaction?
$CH_3CH_2CH_2CH_3 \longrightarrow CH_3CH_2CH_2CH_2Cl + CH_3CH_2CHClCH_3$
a) Cl_2/UV light b) $NaCl + H_2SO_4$ c) Cl_2 gas in dark
d) Cl_2 gas in the presence of iron in dark.

219. Cyclobutyl bromide on treatment with magnesium in dry ether forms an organometallic compound (A). The organometallic compound reacts with ethanal to give an alcohol (B) after mild acidification. Prolonged treatment of alcohol (B) with an equivalent amount of HBr gives (C). What will be the product 'C?
a) l-Chloro-1-ethylcyclopentane b) 1-Bromo-1-methylcyclopentane
c) 3-Bromo- 2-methylcyclopentane d) None of these.

220. Primary alkyl halide C_4H_9Br (X) reacts with ale. KOH to give compound (Y). (Y) reacts with HBr to give compound (Z) which is an isomer of (X). When (X) reacts with a metal it gives compounds (P). (X), (Y), (Z) and (P) are
a)

X	Y	Z	P
$CH_3-\underset{CH_3}{CH}-CH_2Br$	$CH_3-\underset{CH_3}{C}=CH_2$	$CH_3-\overset{Br}{\underset{CH_3}{C}}-CH_3$	C_8H_{18}

b)

X	Y	Z	P
$CH_3CH_2CH_2CH_2Br$	$CH_3CH=CHCH_3$	$CH_3-\underset{Br}{CH}-CH_2CH_3$	C_5H_{10}

c)

X	Y	Z	P
$CH_3-\underset{Br}{CH}-CH_2CH_3$	$CH_3CH=CHCH_3$	$CH_3CH_2CH_2CH_2Br$	C_7H_{14}

d)

X	Y	Z	P
$CH_3-\underset{CH_3}{CH}-CH_2Br$	$CH_3CH=CHCH_3$	$CH_3-\underset{Br}{CH}-CH_2CH_3$	C_6H_{12}

221. Which of the following compounds will have highest melting point?
a) Chlorobenzene b) a-Dichlorobenzene c) m- Dichlorobenzene d) p- Dichlorobenzene

222. Chlorobenzene on treatment with sodium in dry ether gives diphenyl. The name of the reaction is
a) Fittig reaction b) Wurtz- Fittig reaction c) Sandmeyer reaction
d) Gattermann reaction

223. Which is the correct increasing order of boiling points of the following compounds?
1-Bromoethane, 1-Brornopropane, 1-Brornobutane, Bromobenzene
a) Bromobenzene < 1-Bromobutane < 1-Bromopropane < 1-Bromoethane
b) Bromobenzene < 1-Bromoethane < 1-Bromopropane < 1-Bromobutane
c) 1-Bromopropane < 1-Bromobutane < 1-Bromoethane < Bromobenzene
d) 1-Brornoethane < 1-Bromopropane < 1-Bromobutane < Bromobenzene