



CHEMISTRY

BOOKS - CHEMISTRY

HALOALKANES AND HALOARENES

Haloalkanes And Haloarenes

1. The order of reactivity of following alcohols with halogen acids

is.....

(A)
$$CH_{3}CH_{2} - CH_{2} - OH$$
 (B) $CH_{3CH_{2}- CH_{-}OH}$
 $(C)CH_{3}CH_{2} - \overset{CH_{3}}{\overset{|}{C}}_{CH_{3}} - OH$

A.
$$(A)>(B)>(C)$$

$$B.(C) > (B) > (A)$$

 $C.(B) > (A) > (C)$
 $D.(A) > (C) > (B)$

Answer: B



2. Which of the following alcohols will yield the corresponding alkyl chloride on reaction with concentrated HCl at room temperature ?

Thinking process:

To solve this problem, students should keep in mind that tertiary alcohol being most reactive react at room temperature.

A. $CH_3CH_2 - CH_2 - OH$

$$\begin{array}{l} \mathsf{B.}\ CH_3CH_2-\underset{CH_3}{\operatorname{CH}}-OH\\ & \mid\\ CH_3\\ \mathsf{C.}\ CH_3CH_2-\underset{CH_3}{\operatorname{CH}}-OH\\ & \mid\\ CH_3\\ \mathsf{D.}\ CH_3CH_2-\underset{CH_3}{\overset{|}{\operatorname{CH}}}-OH\\ & \mid\\ CH_3\end{array}$$

Answer: D



3. Identify the compound Y in the following reaction.





Β.







4. Toluene react with a halogen in the presence of iron (III) chloride giving ortho and para halo compounds. The reactions is

A. electrophilic elimination reaction

B. electrophilic substitution reaction

C. free radical addition reaction

D. nucleophilic substitution reaction

Answer: B



5. Which of the following is halogen exchange reaction ?

A.
$$RX + NaI
ightarrow RI + NaX$$

$$>C = C < + H_X \longrightarrow >C = C < C < B.$$

$$\mathsf{C.}\ R - OH + HX \xrightarrow{ZnCl_2} R - X + H_2O$$

D. None

Answer: A

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6. Which reagent will you use for the following reaction ?

 $CH_3CH_2CH_2CH_3 \rightarrow CH_3CH_2CH_2CH_2Cl + CH_3CH_2CHClCH_3$

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

Answer: A



7. Arrange the following comounds in the increasing order densities.



$$\begin{array}{l} \mathsf{A}_{\cdot}\left(i\right) < (ii) < (iii) < (iv) \\ \\ \mathsf{B}_{\cdot}\left(i\right) < (iii) < (iv) < (ii) \\ \\ \mathsf{C}_{\cdot}\left(iv\right) < (iii) < (ii) < (i) \\ \\ \\ \mathsf{D}_{\cdot}\left(ii\right) < (iv) < (iv) < (iii) < (i) \end{array}$$

Answer: A

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



Answer: C

9. In which of the following molecules carbon atom marked with

asterik (*) is asymmetric ?



- A. (i),(ii),(iii) and (iv)
- B. (i), (ii) and (iii)
- C. (ii), (iii) and (iv)
- D. (i), (iii) and (iv)

Answer: B



10. Which of the following structures is enantiomeric with the molecule (A) given below ?





Answer: A



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

A. Dichloromethane

B. 1, 2-dichloroethane

C. Ethylidene chloride

D. Allyl chloride

Answer: B



12. The position of Br in the compound in $CH_2 = CHC(Br)(CH_3)_2$ can be classified as:

A. allyl

B. aryl

C. vinyl

D. secondary

Answer: A

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13. 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^+

 $\mathsf{C.} AlCl_3$

D. $\left[AlCl_4
ight]^-$

Answer: B

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14. Ethylidene chloride is a/an....

A. vic-dihalide

B. gem-dihalide

C. allylic halide

D. vinylic halide

Answer: B

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









Answer: C



16. A primary alkyl halide would prefer to undergo :-

A. $S_N 1$ reaction

B. $S_N 2$ reaction

C. α -elimination

D. racemisation

Answer: B

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17. Which of the following alkyl halides will undergo $S_N 1$ reaction

most redily?

A.
$$\left(CH_{3}
ight) _{3}C-F$$

B. $(CH_3)_3$ C-Cl

$$\mathsf{C.}\left(CH_3\right)_3C-Br$$

D. $(CH_3)_3C - I$

Answer: D

18. Which is the correct IUPAC name for $CH_3 - \operatorname{CH}_3 - CH_2 - Br$

?

A. 1-bromo-2-ethylpropane

B. 1-bromo-2-ethyl-2-methylethane

C. 1-bromo-2-methylbutane

D. 2-methyl-1-bromobutane

Answer: C



19. What should be the correct IUPAC name for diethylbromomethane?

- A. 1-bromo-1, 1-dimethylethane
- B. 3-bromopentane
- C. 1-bromo-1-ethylpropane
- D. 1-bromopentane

Answer: B



20. The reaction of toluene with chlorine in the presence of iron

and in the absence of light yields





D. Mixture of (b) and (c)

Answer: D



21. Chloromethane on treatment with excess of ammonia yields

mainly

A. N, N-dimethylmethanamine
$$\begin{pmatrix} CH_3 & CH_3 \\ CH_3 & CH_3 \end{pmatrix}$$

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

C. methanamine (CH_3NH_2)

D. mixture containing all these in equal proportion

Answer: C

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

A. 2-bromobutane

B. 1-bromobutane

C. 2-bromopropane

D. 2-bromopropan-2-ol

Answer: A

23. Reactions of $C_6H_5CH_2Br$ with aqueous sodium hydroxide follows:

A. $S_N 1$ mechanism

B. $S_N 2$ mechanism

C. Any of the above two depending upon the temperature of

reaction

D. saytzeff rule

Answer: A



24. Which of the carbon atoms present in the molecule given below are asymmetric ?



A. 1,2,3,4

B. 2,3

C. 1,4

D. 1,2,3

Answer: B



25. Which of the following compounds will give racemic mixture on nucleophillic substitution by OH^{-} ion?

(i)
$$CH_3 - CH - Br$$

 C_2H_5
(ii) $CH_3 - CH_2Br$
 C_2H_5
(iii) $CH_3 - CH_2Br$
 C_2H_5

A. (i)

- B. (i), (ii) and (iii)
- C. (ii) and (iii)

D. (i) and (iii)

Answer: A





 $\mathsf{B}.\,(iii)<(ii)<(i)$

$$\mathsf{C}.\,(i)<(iii)<(ii)$$

$$\mathsf{D}.\left(iii
ight)<\left(ii
ight)<\left(i
ight)$$

Answer: C





A. (i) < (ii) < (iii)B. (i) < (iii) < (ii)

$$\mathsf{C.}\,(iii)<(ii)<(i)$$

$$\mathsf{D}.\,(ii)<(iii)<(i)$$

Answer: D





- A. (iii) < (ii) < (i)
- $\texttt{B.}\,(ii) < (iii) < (i)$
- $\mathsf{C}_{\cdot}\left(i\right)<\left(iii\right)<\left(ii\right)$

$$\mathsf{D}_{\cdot}\left(i\right)<\left(ii\right)<\left(iii\right)$$

Answer: D





B. (ii) < (i) < (iii)C. (iii) < (ii) < (i)

$$\mathsf{D}.\left(i
ight)<\left(iii
ight)<\left(ii
ight)$$

Answer: C



30. Which is the correct increasing order of boiling points

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

Answer: A



31. Which is the correct increasing order of boiling points of the

following compounds ?

1-bromomethane, 1-bromobutane, 1-chlorobutane, Butane

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-bromoethane < 1-bromopropane < 1-bromobutane <

Bromobenzene

Answer: D





Which of the following statements are correct about the above reaction ?

A. (i) and (v) both are nucleophiles

B. In (iii) carbon atom is sp^3 hybridised

C. In (iii) carbon atom is ${\it sp}^2$ hybridised

D. (i) and (v) both are electrophiles

Answer: C

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33. Which of the following statements are correct about this reaction?

A. The given reaction follows $S_N 2$ mechanism

B. (ii) and (iv) have opposite configuration

C. (ii) and (iv) have same configuration

D. The given reaction follows $S_N 1$ mechanism

Answer: A::B

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34. Which of the following statements are correct about the reaction intermediate ?

A. intermediate (iii) is unstable because in this carbon is

attached to 5 atoms

B. intermediate (iii) is unstable because carbon atom is sp^2

hybridised

C. intermediate (iii) is stable because carbon atom is sp^2

hybridised

D. intermediate (iii) is less stable than the reactant (ii)

Answer: A::D

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35. Which of the following statements are correct about the mechanism of this reaction ?

A. A carbocation will be formed as an intermediate in the

reaction

B. OH^- will attach the substrate (ii) from one side and Cl^-

will leave it simultaneously from other side

C. An unstable intermediate will be formed in which OH^{-} and

 Cl^- will be attached by weak bonds

D. Reactions proceeds through $S_N 1$ mechanism

Answer: A::D

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36. Which of the following statements are correct about the kinetics of this reaction ?

A. The rate of reaction depends on the concentration of only

(ii)

B. The rate of reaction depends on concentration of both (i)

and (ii)

- C. Moleculirity of reaction is one
- D. Molecularity of reaction is two

Answer: A::C

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37. Haloalkanes contain halogen atom(s) attached to the sp^3 hybridised carbon atom of an alkyl group. Identify haloalkane from the following compounds.

A. 2-bromopentane

- B. Vinyl chloride (chloroethane)
- C. 2-chloroacetophenon
- D. Trichloromethane

Answer: A::D



38. Ethylene cghloride and ethylidene chloride are isomers. Identify the correct statements.

A. Both the compounds form same product on treatment wih

alcoholic KOH

B. Both the compounds form same product on treatment with

C. Both the compounds form same product on reduction

aq. NaOH

D. Both the compounds are optically active

Answer: A::C



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

A. Ethylidene chloride

B. Ethylene dichloride

C. Methylene chloride

D. Benzyl chloride

Answer: A::C

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40. Which of the following are secondary bromides ?

A. $(CH_3)_2 CHBr$

 $\mathsf{B.} (CH_3)_3 \mathbb{C} H_2 Br$

 $\mathsf{C.}\,CH_3CH(Br)CH_2CH_3$

D. $(CH_3)_2 CBrCH_2 CH_3$

Answer: A::C



41. Which of the following compounds can beclassified as aryl halides ?

A. $p - ClC_6H_4CH_2CH(CH_3)_2$

B. $p - CH_3CHCl(C_6H_4)CH_2CH_3$

 $\mathsf{C.}\,o-BrH_2C-C_6H_4CH(CH_3)CH_2CH_3$

D. C_6H_5 -Cl

Answer: A::D

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42. Alkyl halides are prepared from alcohols by treating with

A. $HCl + ZnCl_2$

B. Red P+ Br_2

 $\mathsf{C.}\,H_2SO_4\text{+}\mathsf{KI}$

D. All of these

Answer: A::B

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A. CaF_2

B. CoF_2

 $\mathsf{C.}\,Hg_2F_2$

D. NaF

Answer: C::D

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44. Aryl chlorides and bromides can be easily prepared by electrophilic substitution of arenes with chlorine and bromine respectively in the presence of Lewis acid catalyst. But why does

preparation of aryl iodides requires presence of an oxidising agent?

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45. Out of o- and p-dibromobenzene which one has higher melting

point and why?

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46. Which of the compounds will react faster in $S_N 1$ reaction with

 ^{-}OH ion?

 $CH_3 - CH_2 - Cl$ or $C_6H_5 - CH_2 - Cl$

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47. Why iodoform has appreciable antiseptic property?

48. Haloarenes are less reactive than haloalkanes and haloalkenes. Explain.

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49. Discuss the role of Lewis acids in the preparation of aryl

bromides and chlorides in the dark.



50. Which of the following compounds (i) and (ii) will not react with a mixture of NaBr and H_2SO_4 . Explain why ?



51. Which of the products will be major product in the reaction

given below? Explain

$$CH_3CH=CH_2+Hi
ightarrow CH_3CH_2I+CH_3CHICH_3 \ {}_{(A)} \ {}_{(B)}$$

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

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53. Draw other resonance structures related to the following structure and find out whether the functional fgroup present in the molecule is ortho, para directing or meta directing.





55. Compound 'A' with molecular formula C_4H_9 Br is treated with aq. KOH solution. The rate of this reaction depends upon the the concentration of the compounds 'A' only. When another optically active isomer 'B' of this compound was treated with aq. KOH solution, the rate of reaction was found to be dependent on concentration of compound and KOH both.

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

(ii) Out of these two compounds, which one will be converted to

the product with inverted configuration.



56. Write the structures and names of the compounds formed when compound 'A' with molecular formula C_7H_8 is treated with Cl_2 in the presence of $FeCl_3$

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57. Identify the product A and B formed in the following reaction

 $CH_3 - CH_2 - CH = CH - CH_3 + HCl \rightarrow A + B$

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58. Which of the following compounds will have the highest

melting point and why?





59. Write down the structure and IUPAC name for neopentylbromide.



60. A hydrocarbon of molecular mass 72 g mol^{-1} gives a single monochloro derivative and two dichloro derivatives on photo

chlorination. Give the structure of the hydrocarbon.

61. Name of the alkene which will yield 1-chloro-1methylcyclohexane by its reaction with HCl. Write the reaction involved.

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62. Which of the following haloalkanes reacts with aqueous KOH

most easily? Explain giving reason.





65. Allyl chloride is hydrolysed more readily than n-propyl chloride.

Why?



molecule.





73. Aryl halides are extermely less reactive towards nucleophilic substitution. Predictand explain the order of reactivity of the compounds towards nucleophilic substitution.



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77. How can you obtain iodoethane from ethanol when no other

iodine containing reagent except NaI is available in the

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78. Cyanide ion acts as an ambident nucleophille. From which end

it acts as a strong nucleophile in aqueous medium? Give reason

for your answer.

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79. Match the compounds given in column I with the effects given

in Column II

	Column I		Column II
A.	Chloramphenicol	1.	Malaria
В.	Thyroxine	2.	Anaesthetic
C.	Chloroquine	3.	Typhoid fever
D.	Chloroform	4.	Goiter
		5.	Blood substituent

80. Match the items of Column I and Column II

	Column I		Column II
A.	S _N 1reaction	1.	vic-dibromides
Β.	Chemicals in fire extinguisher	2.	gem-dihalides
C.	Bromination of alkenes	3.	Racemisation
D.	Alkylidene halides	4.	Saytzeff rule
E.	Elimination of HX from alkylhalide	5.	Chlorobromocarbons



81. Match the structures of compounds given in Column I with the

classes of compounds given Column II



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82. Match the reactions given in Column I with the types of reactions given in Column II.



83. Match the structures given in Column I with the names in Column II



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84. Match the reactions given in Column I with the names givn in

Column II.



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85. Assertion (A) Phosphorus chlorides (tri and penta) are preferred over thionyl chloride for the preparation of alkyl chlorides from alcohols.

Reason (R) Phosphorus chlorides give pure alkyl halides.

A. Assertion and reason both are correct and reason is correct

explanation of assertion

B. Assertion and reason both are wrong statements

C. Assertion is correct but reason is wrong statement

D. Assertion is wrong but reason is correct statement.

Answer: B

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86. Assertion(A) The boiling points of alkyl halides decrease in the order RI > RBr > RCl > RF

Reason (R) The boiling points of alkyl chlorides, bromides and iodides are considerably higher than that of the hydrocarbon of comparable molecular mass.

A. Assertion and reason both are correct and reason is correct

explanation of assertion

B. Assertion and reason both are wrong statements

C. Assertion is correct but reason is wrong statement

D. Assertion and reason both are correct statements but

reason is not correct explanation of assertion

Answer: D

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87. Assertion(A) KCN reacts with methyl chloride to give methyl isocyanide.

Reason (R) CN^{-} is an ambident nucleophile.

A. Assertion and reason both are correct and reason is correct

explanation of assertion

B. Assertion and reason both are wrong statements

C. Assertion is correct but reason is wrong statement

D. Assertion is wrong but reason is correct statement.

Answer: D

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88. Assertion (A) tert-butyl bromide undergoes Wurtz reaction to give 2,2,3,3-tetramethylbutane.

Reason (R) In wurtz reaction, alkyl halides react with sodium in dry ether to give hydrocarbon containing double the number of carbon atoms present in the halide

A. Assertion and reason both are correct and reason is correct

explanation of assertion

B. Assertion and reason both are wrong statements

C. Assertion is correct but reason is wrong statement

D. Assertion is wrong but reason is correct statement.

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89. Assertion (A) Presence of a nitro group at ortho or para position increases the reactivity of haloarenas towards nucleophilic substitution.

Reason (R) Nitro group, being an electron withdrawing group decreases the electron density over the benzene ring.

A. Assertion and reason both are correct and reason is correct

explanation of assertion

B. Assertion and reason both are wrong statements

C. Assertion is correct but reason is wrong statement

D. Assertion is wrong but reason is correct statement.

Answer: A



90. Assertion: In monohaloarenes, further electrophilic substitution occurs at ortho and para position Reason: Halogen atom is a ring deactivator

A. Assertion and reason both are correct and reason is correct

explanation of assertion

B. Assertion and reason both are wrong statements

C. Assertion is correct but reason is wrong statement

D. Assertion and reason both are correct statements but

reason is not correct explanation of assertion

Answer: D



91. Assertion: Aryl iodides can be prepared by reaction of arenes with iodine in the presence of an oxidising agent.

Reason: Oxidising agent oxidises I_2 into HI.

A. Assertion and reason both are correct and reason is correct

explanation of assertion

B. Assertion and reason both are wrong statements

C. Assertion is correct but reason is wrong statement

D. Assertion is wrong but reason is correct statement.

Answer: C

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92. Assertion: It is difficult to replace chlorine by -OH in chlorobenzene in comparison to that in chloroethane Reason: Chlorine-carbon (C-Cl) bond in chlorobenzene has a partial double bond character due to resonance.

A. Assertion and reason both are correct and reason is correct explanation of assertion

B. Assertion and reason both are wrong statements

C. Assertion is correct but reason is wrong statement

D. Assertion is wrong but reason is correct statement.

Answer: A



93. Assertion (A) Hydrolysis of (-)-2-bromooctane proceeds with inversion of configuration Reason (R) This reaction proceeds through the formation of a

carbocation.

A. Assertion and reason both are correct and reason is correct

explanation of assertion

B. Assertion and reason both are wrong statements

C. Assertion is correct but reason is wrong statement

D. Assertion is wrong but reason is correct statement.

Answer: C



94. Assertion (A) Nitration of chlorobenzene leads to the formation of m-nitrochlorobenzene.

Reason (R) $-NO_2$ group is a m-directing group.

A. Assertion and reason both are correct and reason is correct

explanation of assertion

B. Assertion and reason both are wrong statements

C. Assertion is correct but reason is wrong statement

D. Assertion is wrong but reason is correct statement.

Answer: D

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95. Some alkyl halides undergo substitutionn whereas some undergo elimination reaction on treatment with bases. Discuss

the structural features of alkyl halides with the help of examples which are responsible for this difference.

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96. Some halogen containing compounds are useful in daily life. Some compounds of this class are responsible for exposure of flora and fauna to more and more of UV light which causes destruction to a great extent. Name the class of these halocompounds. In your opinion, what should be done to minimise harmful effects of these compounds.

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97. Aryl halides are less reactive towards nucleophilic substitution

reaction as compared to alkyl halides due to

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