CHEMISTRY

BOOKS - MTG CHEMISTRY (ENGLISH)

HALOALKANES AND HALOARENES

Classification

1. Which of the following is a primary halide ?

A. iso-Propyl iodide

B. sec-Buty iodie

C. tert-Butyl bromide

D. neo-Hexyl chloride

Answer: D

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2. 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)-primary,(ii)-secondary,(iii)-tertiary

Answer: D

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3. Which of the following is not an allylic halide?

A. 4-Bromopent-2-ene

B. 3-Bromo-2-methylbut-1-ene

C. 1-Bromobut-2-ene

D. 4-Bromobut-1-ene

Answer: D

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

A. Only (ii)

B. (ii) and (iv) only

C. (i) and (iv) only

D. (i),(ii) and (iii) only

Answer: C

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5. 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)	$CHCl = CH_2$	(iii)	Alkylene dihalide
(D)	$ClCH_2—CH=CH_2$	(iv)	Allyl halide

A. $(A) \to (i), (B) \to (ii), (C) \to (iv), (D) \to (iii)$

B. $(A) \to (ii), (B) \to (iii), (C) \to (i), (D) \to (iv)$

C. $(A) \to (iii), (B) \to (iv), (C) \to (ii), (D) \to (i)$

D. $(A) \to (iv), (B) \to (i), (C) \to (iii), (D) \to (ii)$

Answer: B

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Nomenclature

1. 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

Answer: A

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2. The IUPAC name of of $(CH_3)_2CH - CH_2 - CH_2 - CH_2$Br is

A. 1-bromopentane

B. 1-bromo-4-methypentane

C. 2-methy-4-bromobutane

D. 2-methyl-3-bromopantane.

Answer: B

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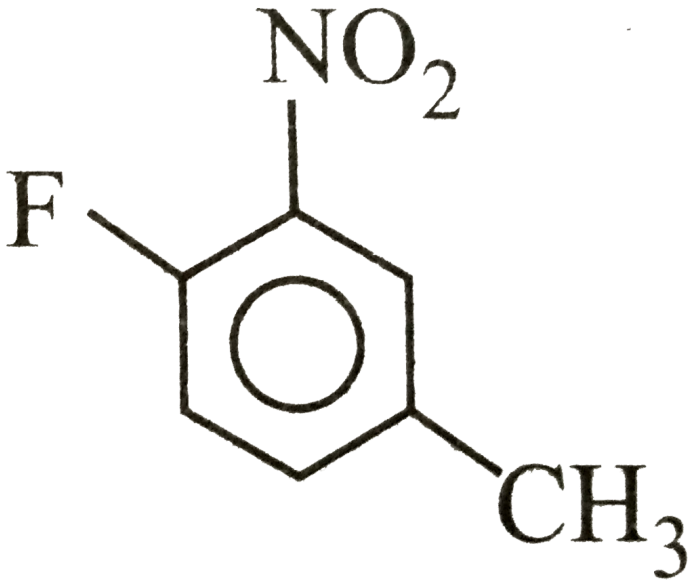
3. The IUPAC name of the compound



A. 1-fluoro-4-methyl-2-nitrobenzene

B. 4-fluoro-1-methyl-3- nitrobenzene

C. 4-methyl-1-fluoro-2-nitrobenzene

D. 2-fluoro-5-methyl-1 nitrobenzene

Answer: A

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4. Which of the following halides is not correct according to the name and classification?

A. $CH_3CH_2C(CH)_2CH_2I$

1-Iodo-2, 2- dimethylbutane, Primary haloalkane

B. $(CH_3)_2CHCH(Cl)CH_3$

2-Chloro-3-methylbutane, Secondary haloalkane

C. $CH_3C(Cl)(C_2H_5)CH_2CH_3$

2- Chloro-2-ethylbutane, Secondary haloalkane

D. $CH_3 - CH_2 - \overset{CH_3}{\overset{|}{C}}H - \overset{Cl}{\overset{|}{C}}H - CH_2 - CH_3$

3- Chloro -4-methylhexane, Secondary haloalkane

Answer: C

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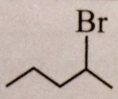
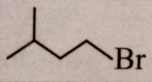
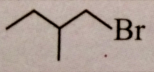
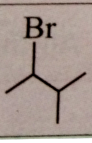
5. Match the isomers given in column I with their names given in column II and mark the appropriate choice.

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. $(A) \rightarrow (ii), (B) \rightarrow (iii), (C) \rightarrow (iv), (D) \rightarrow (i)$

Answer: D

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6. Which of the following is not correctly matched with its IUPAC names?

A. CHF_2CBrCIF: 1-Bromo-1-chloro-1,2,2

-trifluoroethane

B. $(\mathbb{C}Cl_3)_3$CCl:2-(Trichloromethyl)-1,1,1,2,3,3,3

-heptachloropropane

C. $CH_3C(p-ClC_6H_4)_2CH(Br)CH_3$:

2-Bromo-3,3-bis (4-chlorophenyl)butane

D. $o - BrC_6H_4CH(CH_3)CH_2CH_3$:

2-Bromo-1-methylpropylbenzene

Answer: D

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Methods Of Preparation

1. 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?

$$CH_3 - \overset{\overset{CH_3}{|}}{C}H - \underset{OH}{u\ ndeset(|)(CH)} - CH_3 + HCl \rightarrow$$

A. $CH_3\underset{CH_3}{\overset{|}{C}}H - \underset{Cl}{\overset{|}{C}}H_3$

B. $CH_3\underset{Cl}{\overset{|}{C}}H - \underset{CH_3}{\overset{|}{C}}H - CH_3$

C. $CH_3 - \underset{Cl}{\overset{CH_3}{\overset{|}{\underset{|}{C}}}} - CH_2CH_3$

D. $CH_3CH_2CH_2CH_2CH_2Cl$

Answer: C

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2. 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)	$(CH_3)_3COH \xrightarrow[\text{room temp.}]{\text{Conc. HCl}}$	(ii)	$CH_3CH_2CH_2Cl$
(C)	$CH_3CH(OH)(CH_2)_2CH_3 \xrightarrow{PBr_3}$	(iii)	$(CH_3)_3CCl$
(D)	$CH_3CH_2CH_2OH \xrightarrow{SOCl_2}$	(iv)	$CH_3(CH_2)_3Br$

A. $(A) \to (iv), (B) \to (iii), (C) \to (i), (D) \to (ii)$

B. $(A) \to (iv), (B) \to (iii), (C) \to (ii), (D) \to (i)$

C. $(A) \to (iii), (B) \to (iv), (C) \to (i), (D) \to (ii)$

D. $(A) \to (iii), (B) \to (iv), (C) \to (ii), (D) \to (i)$

Answer: A

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3. Which of the following compounds can yield only one monochlorinated product upon free radical chlorination?

A. 2,2-Dimethylopropane

B. 2-Methylpropane

C. 2-Methybutane

D. n-Butane

Answer: A

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4. Bromination of methane in presence of sunlight is a

A. nucleophilic substitution

B. free radical substitution

C. electrophilic substitution

D. nucleophilic addition

Answer: B

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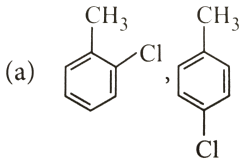
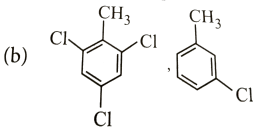
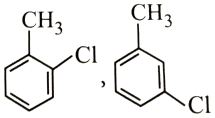
5. A compound X with molecular formula C_7H_8 is treated with Cl_2 in presence of $FeCl_3$. Which of the following compounds are formed during the reaction?

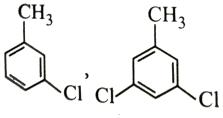
A.



B.



C. (c) 

D. (d) 

Answer: A

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6. 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.

Answer: D

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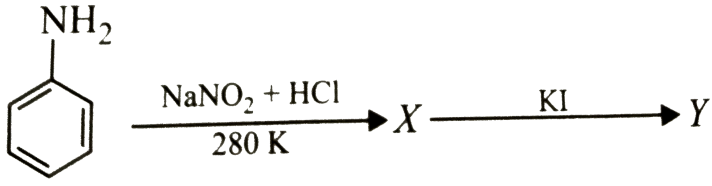
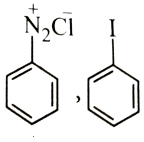
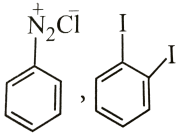
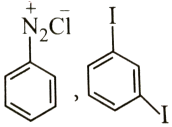
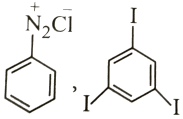
7. 

X and Y in the reaction are

A. (a) 

B. (b) 

C. (c) 

D. (d) 

Answer: A

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8. The reaction $CH_2 = CH - CH_3 + HBr \rightarrow CH_3 - \overset{Br}{\overset{|}{C}}HCH_3$ is

A. nucleophilic addition

B. free radical addition

C. electrophilic addition

D. electrophilic substitution

Answer: C

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9. 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

Answer: C

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10. 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. $C_3H_6 + Br_2$

Answer: C

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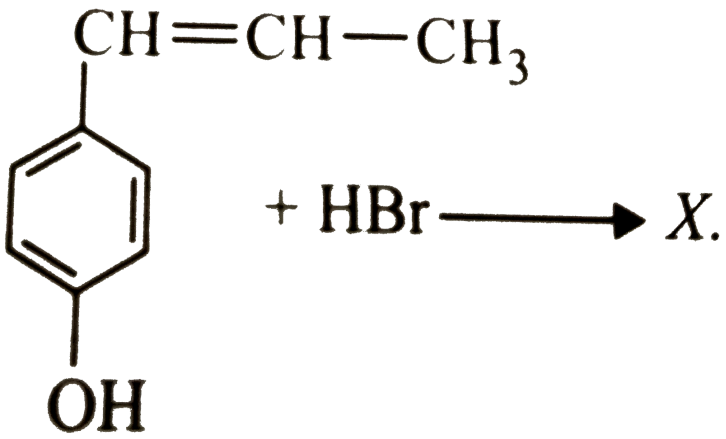
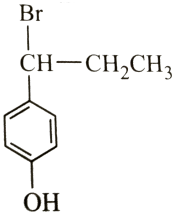
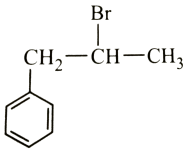
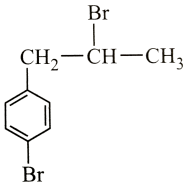
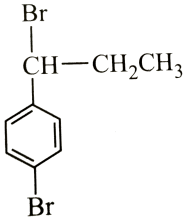
11. 

X in the reaction is

A. (a) 

B. (b) 

C. (c) 

(d) 

D.

Answer: A

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12. Identify the products X and Y formed in the following reaction.

$$CH_3 - CH_2 - CH = CH - CH_3 + HCl = X + Y$$

A. a. $X = CH_3CH_2CH_2CH_2CH_2Cl,$

$$Y = CH_3CH_2 - \underset{Cl}{CH} - CH_2CH_3$$

B. b.

$$X = CH_3CH_2 - \underset{Cl}{CH} - CH_2CH_3, Y = CH_3CH_2CH_2 - \underset{Cl}{CH} - CH_3$$

C. c.

$$X = CH_3CH_2 - \underset{Cl}{CH} - CH_2CH_3, Y = CH_3 - \underset{Cl}{CH} - \underset{Cl}{CH} - CH_2C$$

D. d.

$$X = ClCH_2 - CH_2 - CH = CH - CH_3, Y = CH_3CH_2 - CH =$$

Answer: B

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13. Methyl bromide reacts with AgF to give methyl fluoride and silver bromide. This reaction is called

A. Fitting reaction

B. Swart reaction

C. Wurtz reaction

D. Finkelstein reaction

Answer: B

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Physical Properties

1. Which of the following molecules has highest dipole moment?

A. CH_3Cl

B. CH_2Cl_2

C. $CHCl_3$

D. $\mathbb{C}Cl4$

Answer: A

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

A. $CH_3CH_2CH_2Cl$

B. $CH_3CH_2CH_2CH_2Cl$

C. $CH_3CH(CH_3)CH_2Cl$

D. $(CH_3)_3CCl$

Answer: B

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3. Which one of the following is not the correct order of boiling points of alkyl / aryl halides ?

A. $CHCl_3 > CH_2Cl_2$

B. $CH_3(CH_2)_3Cl > CH_3(CH_2)_2Cl$

C. $(CH_3)_3\mathbb{C}l > (CH_3)_2CHCH_2Cl$

D. $CH_3(CH_2)_3Cl > CH_2CH_2CHClCH_3$

Answer: C

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4. Arrange the following compounds in decreasing order of their boiling points. (i) CH_3Br

CH_3CH_2Br

$CH_3CH_2CH_2Br$

$CH3CH_2CH_2CH_2Br$

A. (i)>(ii)>(iii)>(iv)

B. (iv)>(iii)>(ii)>(i)

C. (i)gt(iii)gt(ii)gt(iv)

D. (iii)gt(iv)gt(i)gt(ii)

Answer: B

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5. Which of the following compounds will have highest melting point?

A. Chlorobenzene

B. o-Dichlorobenzene

C. m-Dichlorobenzene

D. p-Dichlorobenzene

Answer: D

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6. Choose the correct increasing order of density of the following compounds.

A. $C_3H_7Cl < C_3H_7i < CH_2Cl_2 < \mathbb{C}l_2$

B. $C_3H_7I < C_3H_7Cl < CH_2CL_2 < \mathbb{C}l_4$

C. $C_3H_7i < C_3H_7Cl < \mathbb{C}l_4 < CH_2Cl_2$

D. $CCl_{34} < CH_2Cl_2 < C_3H_7i < C_3H_7Cl$

Answer: A

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7. 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.

Answer: B

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Chemical Reactions

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

A. It act 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.

Answer: A

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

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

$RX + KCN \rightarrow \underline{(A)} + KX$

A. (A)-RCN, (B)- RCN

B. (A)-RCN, (B)-RNC

C. (A)-RNC, (B)-RCN

D. (A)-RNC, (B)-RNC

Answer: C

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3. Butanenitrile may be prepared by heating

A. propyl alcohol with KCN

B. butyl chloride with KCN

C. butyl alcohol with KCN

D. propyl chloride with KCN

Answer: D

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4. Ethyl alcohol is obtained when ethyl chloride is boiled with :

A. alcoholic KOH

B. aqueous KOH

C. water

D. aqueous $KMnO_4$

Answer: B

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5. 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. $CH_3CH_2CH(Br)CH_3$

Answer: D

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6. 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. $\underset{\underset{CN}{|}}{Cl\,C}\,HCH_2CH_2Br$

Answer: A

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7. The alkyl halide is converted into an alcohol by

A. elimination

B. dehydrohalgenation

C. addition

D. substitution

Answer: D

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8. An alkyl halide, RX reacts with KCN to give propane nitrile. RX is

A. C_3H_7Br

B. C_4H_9Br

C. C_2H_5Br

D. $C_5H_{11}Br$

Answer: C

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9. In S_{N^2} reactions the sequence of bond breaking and bond formation is as follows

A. bond breaking is followed by formation

B. bond formation is followed by breaking

C. bond breaking and formation occur simultaneously.

D. bond breaking and formation take place randomly.

Answer: C

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10. Which of the following statement is not correct about S_{N^2} 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_{N^2} mechanism is predominant in tertiary alkyl halides.

Answer: D

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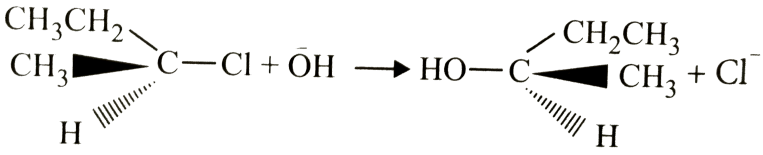
11. In the reaction given below:



Which of the following statements is corrects?

A. The reaction proceeds via S_{N^2} mechanism hence inversion of configuration takes place.

B. The reaction proceeds via S_{N^1} mechanism hence inversion of configuration takes place.

C. The reaction proceeds via S_{N^2} mechanism hence their is no change in the configuration.

D. The reaction proceeds via S_{N^1} mechanism hence there is no change in the configuration.

Answer: A

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12. Tertiary alkyl halide are practially inert to substitution by SN^2 mechanism because of-

A. the carbocation formed is unstable

B. there is steric hindrace

C. there is inductive effect

D. the rate of reaction is faster is S_{N^2} mechanism.

Answer: B

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13. Among the choices of alkyl bromide , the least reactive bromide in a S_{N^2} reaction is :

A. 1-bromopentane

B. 2-bromo-2-methylbutane

C. 1-bromo-3-methylbutane

D. 1-bromo-2-methylbutane.

Answer: B

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14. Arrange the following compounds in order of their reactivity towards S_{N^2} reaction.

(i) $CH_3(CH_2)_3CH_2Br$

(ii) $(CH_3)_2CHCH_2CH_2Br$

(iii) $CH_3CH_2 - \overset{CH_3}{\underset{|}{C}}H - CH_2Br$

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

A. (i)gt(ii)gt(iii)gt(iv)

B. (ii)gt(iii)gt(iv)gt(i)

C. (iii)gt(i)gt(ii)gt(iv)

D. (iv)gt(ii)gt(i)gt(iii)

Answer: A

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15. Which of the following haloalkanes is most reactive?

A. 1-Chloropropane

B. 1-bromopropane

C. 2-chloropropane

D. 2-bromopropane

Answer: D

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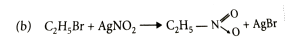
16. Which of the following reactions does not take place?

A. $C_2H_5Br + KNO_2 \rightarrow C_2H_5 - O - N = O + KBr$

B. 

C. $C_2H_5Br + AgCN \rightarrow C_2H_5NC + AgBr$

D. $C_2H_5Br + KCN \rightarrow C_2H_5NC + KBr$

Answer: D

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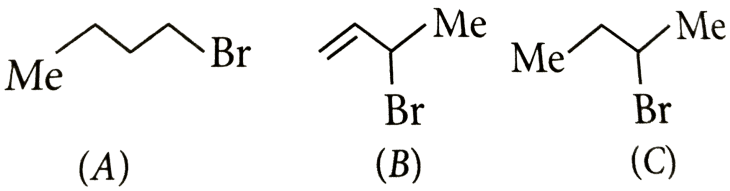
17. Consider the following bromides:



The correct order of S_{N1} reactivity is

A. A>B>C

B. B>C>A

C. B>A>C

D. C>B>A

Answer: B

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18. Which of the following statement regarding S_N1 reaction shown by alkyl halide is incorrect?

A. The added nucleophile plays no kinetic role in S_{N^1} reaction.

B. The S_{N^1} reaction involves the inversion of configuration of the optically active substrate.

C. The S_{N^1} reaction on the chiral starting material ends up with racemisation of the product.

D. The more stable the carbocation intermediate the faster the S_{N^1} reaction.

Answer: B

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19. Consider the following reaction:

$$C_6H_5 - \overset{\overset{CH_3}{|}}{\underset{\underset{H}{|}}{C}} - Br + H_2O \rightarrow OH - \overset{\overset{CH_3}{|}}{\underset{\underset{H}{|}}{C}} - C_6H_5 + HBr$$

The reaction proceeds with 98% racemistation. The reaction may follow

A. S_{N^1} mechanism

B. S_{N^2} mechanism

C. E1 mechanism

D. E2 mechanism

Answer: A

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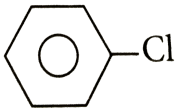
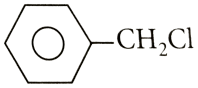
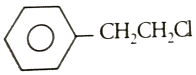
20. Which one of the following chlorohydrocarbons readily undergoes solvolysis?

A. (a) $CH_2 = CHCl$

B. (b) 

C. (c) 

D. (d) 

Answer: C

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21. 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

Answer: A

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22. S_{N^1} reaction is fastest in

A. CH_3CH_2Br

B. $CH_3 - \underset{\underset{Cl}{|}}{CH} - CH_3$

C. $CH_3 - \overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}} - Cl$

D. $CH_3 - \overset{\overset{CH_2}{|}}{\underset{\underset{CH_3}{|}}{CH}} - Cl$

Answer: C

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23. Which of the following alkyl halides is hydrolysed by S_{N^1} mechanism?

A. CH_3Cl

B. CH_3CH_2Cl

C. $CH_3CH_2CH_2Cl$

D. $(CH_3)_3CCl$

Answer: D

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24. Which of the following will give enantiomeric pair on reaction with water due to presence of asymeteric carbon atom?

A. $C_2H_5 - \underset{\underset{C_2H_5}{|}}{\overset{\overset{C_2H_5}{|}}{C}} - Br$

B. $C_2H_5 - \underset{\underset{CH_3}{|}}{\overset{\overset{C_2H_5}{|}}{C}} - Cl$

C. $C_2H_5 - \underset{\underset{CH_3}{|}}{\overset{\overset{H}{|}}{C}} - I$

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

Answer: C

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25. 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

Answer: B

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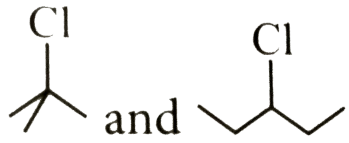
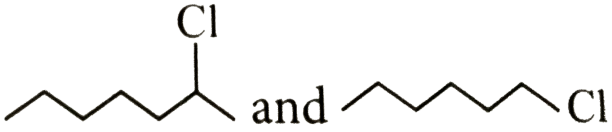
26. In the following pairs of halogen compounds, which compounds undergoes faster S_{N1} reaction?

(i) 

(ii) 

A. (a) (i)  (ii) 

B. (b) (i)  (ii) 

C. (c) (i)  (ii) 

D. (d) (i)  (ii) 

Answer: B

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27. Which of the following haloalkanes reacts with aqueous KOH most easily ? Explain giving reason.

(i). 1-Bromobutane

(ii) 2-Bromobutane

(iii) 2-Bromo-2-methylpropane

(iv). 2-Chlorobutane.

A. 1-Bromobutane

B. 2-Bromobutane

C. 2-Bromo-2-methylpropane

D. 2-Chlorobutane

Answer: C

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28. Which alkyl halide exhibits complete racemisation in S_{N^1} reaction?

A. $(CH_3)_2CHCl$

B. $CH_3CH_2CH_2CH_2Cl$

C. CH_3CH_2Cl

D. $C_6H_5CH_2Cl$

Answer: D

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29. The order of reactivity of various alkyl halides towards nucleophilic substitution follows the order

A. R-IgtR-BrgtR-ClgtR-F

B. R-FgtR-ClgtR-BrgtR-I

C. R-ClgtR-BrgtR-IgtR-F

D. R-BrgtR-IgtR-ClgtR-F

Answer: A

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30. Alkyl halides are formed when thionyl chloride and ____ are refluxed in presence of pyridine. The order of reactivity $(3^\circ > 2^\circ > 1^\circ)$ is due to +1 effect of the alkyl group which___ the polarity of C-X bond.

A. acids, decreases

B. alcohols, increases

C. aldehydes, changes

D. ketones, decreases

Answer: B

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31. 2-Bromo-3,3- dimethylbutane on reaction with aqueous KOH yields X as the major product. X is

A. 2,3,-trimethylpropan-1-ol

B. 2,2-dimethlbutan-3-ol

C. 2,3- dimethylbutan-2-ol

D. 2,2-dimethylpropan-2-ol

Answer: C

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

(i) 2,2-Dimethy-1-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. (ii) only

Answer: D

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33. 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.

Answer: A

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34. The major product formed in the following reaction is

$$CH_3 - \overset{\overset{CH_3}{|}}{\underset{\underset{H}{|}}{C}} - CH_2Br \xrightarrow[CH_3OH]{CH_3O^-}$$

A. $CH_3 - \overset{\overset{CH_3}{|}}{\underset{\underset{H}{|}}{C}} - CH_2OCH_3$

B. $CH_3 - \underset{\underset{OCH_3}{|}}{CH} - CH_2CH_3$

C. $\overset{\overset{CH_3}{|}}{CH_3 - C} = CH_2$

D. $CH_3 - \overset{\overset{CH_3}{|}}{\underset{\underset{OCH_3}{|}}{C}} - CH_3$

Answer: D

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

$$CH_3 - \underset{\underset{Br}{|}}{CH_2CH} - CH_3 \xrightarrow[\text{heat}]{alc.KOH} \underset{(A)}{CH_3 - CH = CH} + \underset{(B)}{CH_3 - CH_2 - CH}$$

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.

Answer: A

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36. The products (A) and (B) are respectively.

(i) $CH_3 - \underset{\underset{Br}{|}}{CH} - \underset{\underset{CH_3}{|}}{CH} - CH_3 \xrightarrow{C_2H_5ONa} (A)$

(ii) $CH_2 = \underset{\underset{CH_3}{|}}{C} - CH_2CH_3 \xrightarrow[\text{Peroxide}]{HBr} (B)$

A. $CH_3 - \underset{\underset{Br}{|}}{CH} - \underset{\underset{CH_3}{|}}{C\ H} - CH_3 \xrightarrow{C_2H_5ONa} (A)$

B. $CH_2 = \underset{\underset{CH_3}{|}}{C} - CH_2CH_3 \xrightarrow[\text{Peroxide}]{Hbr} (B)$

C. $CH_3CH_2 - \overset{\overset{CH_3}{|}}{\text{CH}} - CH_3, CH_3(CH_2)_2CH_3$

D. $CH_3CH_2 - \underset{\underset{OC_2H_5}{|}}{C}\ (CH_3), \underset{\underset{Br}{|}}{CH_2} - \underset{\underset{CH_3}{|}}{\text{CH}} - CH_2 - CH_2$

Answer: B

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

A. prop-1-ene

B. prop-2-ene

C. a mixture of prop-1-ene and prop-2 ene

D. propanol.

Answer: A

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

$$\underset{X}{CH_3CH_2CH_2I} \xrightarrow{alc.KOH} \underset{Y}{X} \xrightarrow{HBr} Y$$

A. $CH_2CH = CH_2$ $CH_3 - \underset{\underset{Br}{|}}{CH} - CH_3$

B. $CH_3 - \underset{\underset{OH}{|}}{C}H - CH_3$ $CH_3 - \underset{\underset{Br}{|}}{CH} - CH_3$

C. $CH_3CH = CH_2$ $CH_3CH = CH_2$ $CH_3CH_2CH_2Br$

D.

Answer: A

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39. An alkyl halide with molecular formula $C_6H_{13}Br$ on dehyrohalogenation gives two isomeric alkenes X and Y with molecular formula C_6H_{12}. On reductive ozonolysis X and Y gives four compounds CH_3COCH_3, 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-1-bromobutane

Answer: B

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40. Arrange the following alkyl halides in order of dehydrohalgenation, C_2H_5I , C_2H_5Cl, C_2H_5Br , C_2H_5F`

A. $C_2H_5F > C_2H_5Cl > C_2H_5Br > C_2H_5I$

B. $C_2H_5I > C_2H_5Br > C_2H_5Cl > C_2H_5F$

C. $C_2H_5I > C_2H_5Cl > C_2H_5Br > C_2H_5F$

D. $C_2H_5F > C_2H_5I > C_2H_5Br > C_2H_5Cl$

Answer: B

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41. 2-Chloro-2-methylpropane on reaction with aqueous KOH gives X as the major product. X is

A. but-2-ene

B. 2-methylbut-1-ene

C. 2-methylprop-1-ene

D. 2-methylbutan-2-ol

Answer: C

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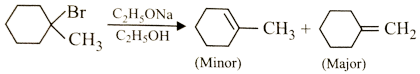
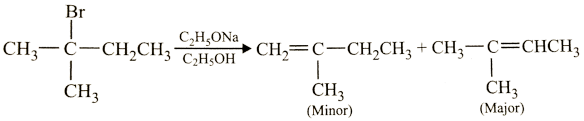
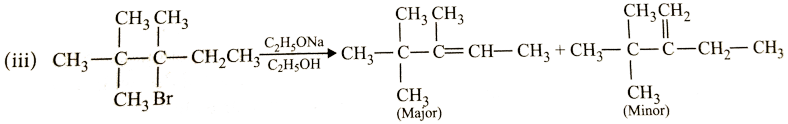
42. Which of the following products as shown by the dehydrohalogenation of alkyl halides with sodium ethoxide in ethanol is correctly marked as major product?

(i) 

(ii) 

(iii) 

A. (i) and (ii) only

B. (i) and (iii) only

C. (ii) and (iii) only

D. (ii) only

Answer: C

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43. 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)	$CH_3-\underset{Br}{CH}-\underset{CH_3}{CH}-CH_3 + C_2H_5ONa \longrightarrow CH_3CH_2-\underset{CH_3}{\overset{OC_2H_5}{C}}-CH_3$	(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)	$CH_3-CH_2Br + \text{alc. KOH} \longrightarrow CH_2=CH_2$	(iv)	Kharasch effect

A. $(A) \rightarrow (iv), (B) \rightarrow (i), (C) \rightarrow (ii), (D) \rightarrow (iii)$

B. $(A) \rightarrow (ii), (B) \rightarrow (iii), (C) \rightarrow (iv), (D) \rightarrow (i)$

C. $(A) \rightarrow (i), (B) \rightarrow (ii), (C) \rightarrow (iv), (D) \rightarrow (iii)$

D. $(A) \rightarrow (iii), (B) \rightarrow (i), (C) \rightarrow (ii), (D) \rightarrow (iv)$

Answer: B

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44. 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. $CH_3C(Cl)(CH_3)CH_2CH_3$

Answer: C

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45. Trans-2-phenyl-1-bromocyclopentane on reaction with alcoholic KOH produces

A. 4-phenylcyclopentene

B. 2-phenylcyclopentene

C. 1-phenylcyclopentene

D. 3-phenylcyclopentene

Answer: D

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

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

A. $CH_3 - CH_2 - CN$

B. $\underset{\underset{CN}{|}}{CH_2} - \underset{\underset{CN}{|}}{CH_2}$

C. $\underset{\underset{Br}{|}}{CH_2} - \underset{\underset{CN}{|}}{CH_2}$

D. $\underset{\underset{Br}{|}}{CH} = \underset{\underset{CN}{|}}{CH}$

Answer: B

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47. The ease of dehydrohalogenation of alkyl halide with alcoholic KOH is-

A. $3^\circ < 2^\circ < 1^\circ$

B. $3^\circ > 2^\circ > 1^\circ$

C. $3^\circ < 2^\circ > 1^\circ$

D. $3^\circ > 2^\circ < 1^\circ$

Answer: B

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48. Elimination of bromine from 2-bromobutane results in the formation of

(i)equimolar mixture of 1 and 2-butane

(ii)predominantly2-butene

(iii)predominantly 1-butene

(iv)predominantly 2-butyne.

A. equimolar mixture of 1 and 2 butene

B. predominantly 1-butene

C. predominantly 1-butene

D. predominantly 2-butyne

Answer: B

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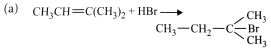
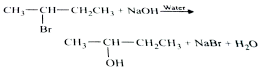
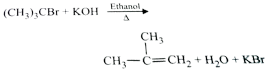
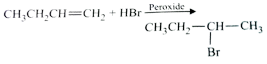
49. Which of the following products does not match correctly with the reaction?

A. 

B. 

C. 

D. 

Answer: D

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50. In the reaction ,

$$CH_3 - \underset{\underset{Br}{|}}{CH} - CH_3 \xrightarrow{alc.KOH} (A) \xrightarrow[\text{Peroxide}]{HBr} (B) \xrightarrow[\text{Acetone}]{NaI} (C)$$

The compound (C) is :

A. $CH_3CH_2CH_2I$

B. CH_3CHICH_2I

C. $CH_3CH_2CH_2CH_2CH_3$

D. $CH_3CH_2CHI_2$

Answer: A

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51. 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 a solution of 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.

Answer: B

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52. The order of reactivities of methyl halide 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. $CH_3Br > CH_3I > CH_3Cl$

Answer: A

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

$$CH_3 - \underset{Br}{\underset{|}{CH}} - CH_3 + Mg \xrightarrow{\text{Dry ether}} X \xrightarrow{D_2O} Y$$

A. $X = CH_3 - \underset{Br}{\underset{|}{CH}} - CH_2Mg, Y = CH_3CH_2CH_2OH$

B. $X = CH_3 - \underset{MgBr}{\underset{|}{C}}\ H - CH_3, Y = CH_3, Y = CH_3 - \underset{D}{\underset{|}{CH}} - CH_3$

C. $X = CH_3 - \underset{Br}{\underset{|}{CH}} - CH_2Mg, Y = CH_3 - \underset{OD}{\underset{|}{C}}\ H - CH_3$

D. $X = CH_3 - \underset{Br}{\underset{|}{CH}} - CH_2Mg, Y = CH_3 - \underset{OH}{\underset{|}{C}}\ H - CH_3$

Answer: B

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54. Alkyl halides react with metallic sodium in dry ether producing

A. alkanes with same number of carbon atoms

B. alkanes with double the number of carbon atoms

C. alkenes with triple the number of carbon atoms

D. alkenes with same number of carbon atoms.

Answer: B

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55. On treating a mixture of two alkyl halides with sodium metal in dry ether, 2-methylpropane was obtained. The alkyl halides are

A. 2-chloropropane and chloromethane

B. 2-chloropropane and chloroethane

C. chloromethane and chloroethane

D. chloromethane and 1-chloropropane.

Answer: A

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56. Chlorobenzene on treatment with sodium in dry ether gives diphenyl.

The name of the reaction is

A. Fitting reaction

B. Wurtz-Fitting reaction

C. Sandmeyer reaction

D. Gattermann reaction

Answer: A

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

A.

$$\overset{X}{CH_3-\underset{CH_3}{\underset{|}{CH}}-CH_2Br} \quad \overset{Y}{CH_3-\underset{CH_3}{\underset{|}{C}}=CH_2} \quad \overset{Z}{CH_3-\underset{CH_3}{\overset{Br}{\overset{|}{C}}}-CH_3} \quad C_8$$

B.

$$\overset{X}{CH_3CH_2CH_2CH_2Br} \quad \overset{Y}{CH_3CH=CHCH_3} \quad \overset{Z}{CH_3-\underset{Br}{\underset{|}{CH}}-CH_2CH}$$

C.

$$\overset{X}{CH_3-\underset{Br}{\underset{|}{CH}}-CH_2CH_3} \quad \overset{Y}{CH_3CH=CHCH_3} \quad \overset{Z}{CH_3CH_2CH_2CH_2B}$$

D.

$$\overset{X}{CH_3-\underset{CH_3}{\underset{|}{CH}}-CH_2Br} \quad \overset{Y}{CH_3CH=CHCH_3} \quad \overset{Z}{CH_3-\underset{Br}{\underset{|}{CH}}-CH_2C}$$

Answer: A

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58. The main difference in C-X bond of a haloalkane and a haloarene is

A. C-X bond in haloalkanes is shorter than halorenes.

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 halarenes 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 haloalkanes.

Answer: B

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59. Aryl halides are less reactive towards nucleophilic substitution reaction as compared to alkyl halides due to

A. formation of a less stable carbonium ion in aryl halides

B. resonance stabilisation in ary halides

C. presence of double bonds in alkyl halides

D. inductive effect in aryl halides.

Answer: B

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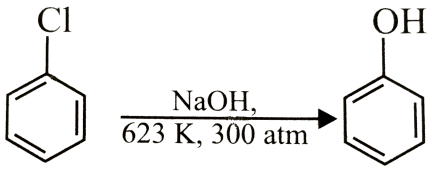
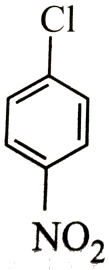
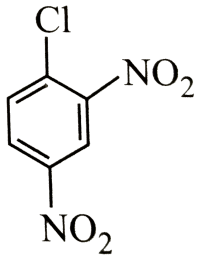
60. Chlorobenzene can be converted into phenol by heating in aqueous sodium hydroxide solution at temperature of 623K and a pressure of 300atm. However the rate of reaction can be increased by presence of certain groups in benzene ring. What will be the order of reactivity of following compounds towards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



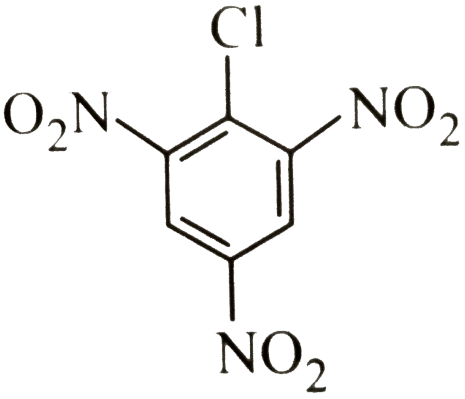
(i)



(ii)



(iii)



A. (iii)gt(ii)gt(i)

B. (ii)gt(iii)gt(i)

C. (i)gt(ii)gt(iii)

D. (i0gt(iii)gt(ii)

Answer: A

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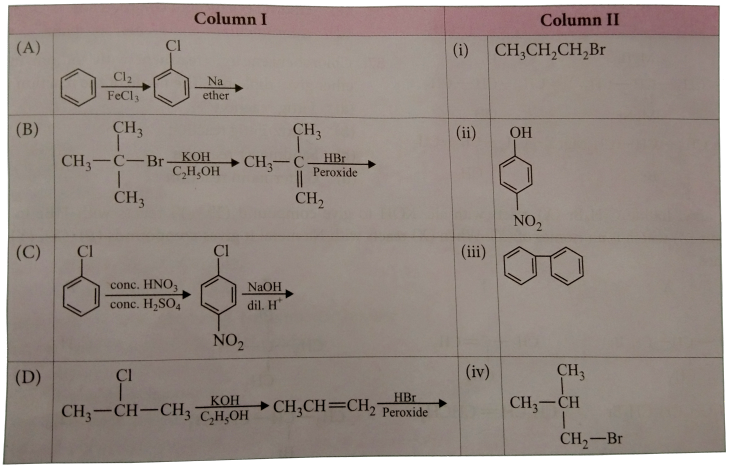
61. Match the column I with column II and mark the appropriate choice.



A. $(A) \rightarrow (iv), (B) \rightarrow (ii), (C) \rightarrow (i), (D) \rightarrow (iii)$

B. $(A) \rightarrow (iii), (B) \rightarrow (iv), (C) \rightarrow (ii), (D) \rightarrow (i)$

C. $(A) \rightarrow (i), (B) \rightarrow (iii), (C) \rightarrow (iv), (D) \rightarrow (ii)$

D. $(A) \rightarrow (i), (B) \rightarrow (iii), (C) \rightarrow (iv), (D) \rightarrow (ii)$

Answer: B

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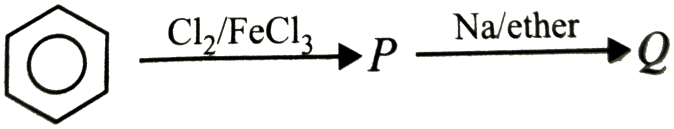
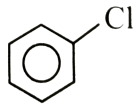
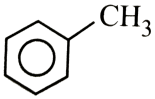
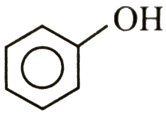
62. The end product (Q) in the following sequence of reaction is



A. (a) 

B. (b) 

C. (c) 

D. (d) 

Answer: C

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63. Which of the following reactions is not correctly matched ?

A. $2C_2H_5Br + 2Na \xrightarrow{\text{dry ether}} C_4H_{10} + 2NaBr$: Wurtz reaction

B. $CH_3Br + AgF \rightarrow CH_3F + AgBr$: Etard reaction

C. $C_6H_5Br + 2Na + BrC_2H_5 \xrightarrow{\text{dry ether}} C_6H_5C_2H_5 + 2NaBr$: Wurtz-Fitting reaction

D. $2C_6H_5Br + 2Na \xrightarrow{\text{dry ether}} C_6H_5 - C_6H_5 + 2NaBr$: Fitting reaction

Answer: B

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64. Chloroform is stored in dark coloured bottles. Explain in not more than two sentences.

A. it reacts with clear glass

B. it undergoes chlorination in tranparent glass bottles

C. it is oxidised to poisonous gas, phosgene in sunlight

D. it starts burning when exposed to sunlight.

Answer: C

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65. Triiodomethane has antiseptic property because of

A. liberation of iodoform

B. liberation of free iodine

C. formation of phosgene gas

D. none of these

Answer: B

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66. The fire extinguisher 'pyrene' contains

A. Carbon dioxide

B. Carbon disulphide

C. Carbon tetrachloride

D. Chloroform

Answer: C

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67. An organic halogen compound which is used as refrigerant in refrigerators and air conditioners is

A. BHC

B. CCl_4

C. freon

D. $CHCl_3$

Answer: C

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68. Which one is correct?

A. Freon-14 is CF_4, Freon-13 is CF_3Cl , Freon-12 is CF_2Cl_2 and Freon-11 is $CFCl_3$.

B. Freons are chlorofluorocarbons.

C. Freon are used as refrigerants.

D. All of these.

Answer: D

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Higher Order Thinking Skills

1. Consider the following S_{N^2}j reactions

I. $RX + Y^- \rightarrow R - Y + X^-$

II. $RX + Y^- \rightarrow R - Y^+ + X^-$

III. $RX^+ + Y^- \rightarrow R - Y + X$

IV. $RX^+ + Y \rightarrow R - Y^+ + X$

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

Answer: A

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2. In two separate experiments equal quantities of 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 reaction were the same. The most likely structure of halide is

A. $CH_3CH_2CH_2CH_2Cl$

B. $CH_3CH(Cl)CH_2CH_3$

C. $(CH_3)_2CHCH_2Cl$

D. $(CH_3)_3CCl$

Answer: D

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3. 1,1,2,2- tetrachloropropane was heated with zinc dust and the product was bubbled through ammonical $AgNO_3$. What is the weight of precipitate obtained?

A. 30.0g

B. 29.4g

C. 28.0g

D. 25.7g

Answer: B

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4.

$$C_8H_8Cl_2(A) \xrightarrow{\text{Aq. NaoH}} (B) \xrightarrow{\text{Mild reduction}} (C) \xrightarrow{l_2/NaOH} \text{iodoform} + \text{acid salt}(D)$$

A. $PhCOCH_3$

B. $PhCH(OH)CH_3$

C. PhCOONa

D. $PhC(Cl)_2CH_3$

Answer: D

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5. Cyclobutyl bromide on treatment with magnesium in dry ether forms an organometallic compound (A). The organometallic compound (A) reacts with ethanal to give an alcohol (B) after mild acidification. Prolonged treatment of alcohol (B) with an equivalent amount of HBr gives 1-bromo-1-methylcyclopentane (C) Write the structures of (A) and (B), and explain how (C) is obtained from (B).

A. 1-Chloro-1-ethylcyclopentane

B. 1-Bromo-1-methycyclopentane

C. 3-Bromo-2-methycyclopentane

D. none of these

Answer: B

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6. Bottles containing C_6H_5I and $C_6H_5 - CH_2I$ lost their original lables. They were labelled A and B for festing. A and B were separately taken in a test tube and boiled with $NaOH$ solution. The end solution in each tube was made acidic with dilute HNO_3 and then some $AgNO_3$ solution was added. Substance B gave a yellow precipitate. Which one of the following statements is true for this experiment.

A. Addition of HNO_3 was unnecessary

B. A was $C_6H_5CH_2I$

C. A was $C_6H_5CH_2I$

D. B was C_6H_5I

Answer: B

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7. A 10g mixture of iso-butane and iso-butene requires 20g of Br_2(in $\mathbb{C}l_4$) for complete addition. If 10g 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?

(Atom weight of bromine=80)

A. 24.21g

B. 20.0g

C. 30.0g

D. 12g

Answer: A

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8. 0.0852g of an organic halide (A) when dissolved in 2.0g of camphor, the melting point in the mixture was found to be 167° C. Compound (A) when heated with sodium gives a gas (B). 280mL of gas (B) at STP weight 0.375g. What would be 'A' in the whole process? K_f for comphor=40, m.pt. of camphor=179° C.

A. C_2H_5Br

B. CH_3I

C. $(CH_3)_2CHI$

D. C_3H_7Br

Answer: B

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Exemplar Problems

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

$CH_3CH_2-CH_2-OH$

$CH_3CH_2-\underset{\underset{CH_3}{|}}{\overset{CH_3}{|}}{CH}-OH$

$CH_3CH_2-\underset{\underset{CH_3}{|}}{\overset{CH_3}{|}}{C}-OH$

A. (I)gt(II)gt(III)

B. $(III) > (II) > (I)$

C. (II)gt(I)gt(III)

D. (I)gt(III)gt(II)

Answer: B

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2. 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. $CH_3CH_2 - \underset{\underset{CH_3}{|}}{C}H - CH_2OH$

C. $CH_3CH_2 - \underset{\underset{CH_3}{|}}{C}H - CH_2OH$

D. $CH_3CH_2 - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - OH$

Answer: D

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

A. electrophilic elimination reaction

B. electrophilic substitution reaction

C. free radical addition reaction

D. nucleophilic substitution reaction

Answer: B

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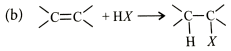
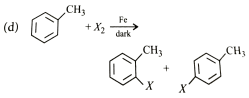
4. Which of the following is halogen exchange reaction ?

A. $RX + NaI \rightarrow RI + NaX$

B. 

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

D. 

Answer: A

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5. 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

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

A. Dichloromethane

B. 1,2-Dichloroethane

C. Ethylidene chloride

D. Allyl chloride

Answer: B

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7. 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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8. Cholorobenzene 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. $[AlCl_4]^-$

Answer: B

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9. Ethylidene chloride is a/an.....

A. vic-dihalide

B. gem-dihalide

C. allylic halide

D. vinylic halide

Answer: B

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

A. S_{N1} reaction

B. S_{N^2} reaction

C. $\propto$ -elimination

D. racemisation

Answer: B

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11. Which of the following alkyl halides will undergo S_N1 reaction most redily ?

A. $(CH_3)_3C - F$

B. $(CH_3)_3C - Cl$

C. $(CH_3)_3C - Br$

D. $(CH_3)_3C - I$

Answer: D

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12. What is the correct IUPAC name for

$$CH_3 - \underset{\underset{C_2H_5}{|}}{\text{CH}} - CH_2 - Br\,?$$

A. 1-Bromo-2-ethylpropane

B. 1-Bromo-2-ethyl-2-methylethane

C. 1-Bromo-2-methylbutane

D. 2-Methyl-1-bromobutane

Answer: C

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

A. 1-Bromo-1,1-diethylmethane

B. 3-Bromopentane

C. 1-Bromo-1-ethypropane

D. 1-Bromopentane

Answer: B

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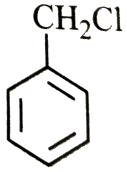
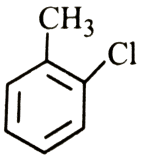
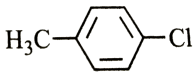
14. The reaction of toluene with chlorine in the presence of iron and in the absence of light yields .....

A. (a) 

B. (b) 

C. (c) 

D. mixture of (b) and (c)

Answer: D

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15. Chloromethane on treatment with excess of ammonia yields mainly

A. N,N-dimethylmethanamine

(a) *N, N*-dimethylmethanamine ($CH_3-N<^{CH_3}_{CH_3}$)

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

C. methanamine (CH_3NH_2)

D. mixture containing all these in equal proportion.

Answer: C

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16. 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-Bromopropane-2-ol

Answer: A

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17. 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

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

$(I) CH_3 - \underset{\underset{C_2H_5}{|}}{CH} - Br$

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

A. (I)

B. (II)

C. (I),(II)

D. None

Answer: A

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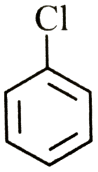
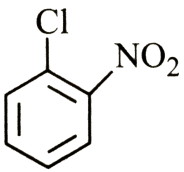
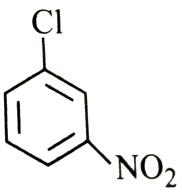
19.

(I) 

(II) 

(III) 

A. Most reactive towards Nucleophilic substitution reaction

B.

C.

D.

Answer: C

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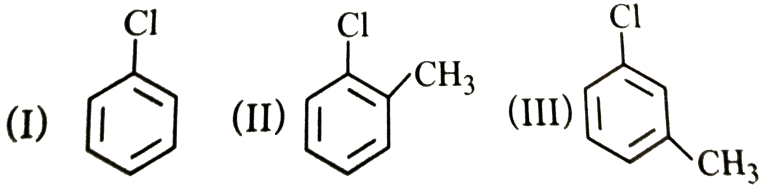
20. Which statement is true



A. Reactivity order of Nucleophilic substitution reaction

B.

C.

D.

Answer: D

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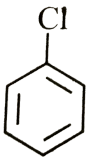
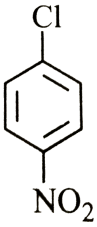
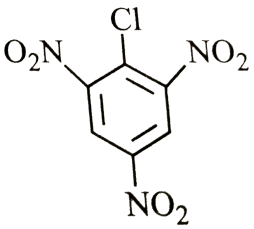
21. Which order is correct

(I) 

(II) 

(III) 

A. Reactivity order for nucleophilic substitution reaction (III)<(II)<(I)

B. (II)<(III)<(I)

C. (I)<(III)<(II)

D. (I)<(II)<(III)

Answer: D

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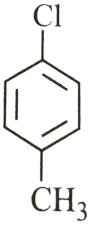
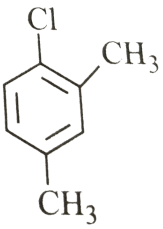
22. Which order is correct

(I) 

(II) 

(III) 

A. Reactivity towards nucleophilic substitution (I)<(II)<(III)

B. (II)<(I)<(III)

C. (III)<(II)<(I)

D. (I)<(III)<(II)

Answer: C

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23. Which of the correct increasing order of boiling points of the following compounds?

1-Iodobutane,1-Bromobutane,1-Chlorobutane, Butane

A. Butanelt1-Chlorobutanelt1-Bromobutanelt1-Iodobutane

B. 1-Iodobutanelt1-Bromobutanelt1-ChlorobutaneltButane

C. Butanelt1-Iodobutanelt1-Bromobutanelt1-Chlorobutane

D. Butanelt1-Chlorobutanelt1-Iodobutanelt1-Bromobutane

Answer: A

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24. Which is the correct increasing order of boiling points of the following compounds?

1-Bromoethane,1-Bromopropane,1-Bromobutane,Bromobenzene

A. Bromobenzenelt1-Bromobutanelt1-Bromopropanelt1-Bromoethane

B. Bromobenzenelt1-Bromoethanelt1-Bromopropane,1-Bromobutane

C. 1-Bromopropanelt1-Bromobutanelt1-BromoethaneltBromobenzene

D. 1-Bromoethanelt1-Bromopropanelt1-BromobutaneltBromobenzene

Answer: D

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Assertion And Reason

1. Assertion : $CH_2 = CH - CH_2 - X$ is an examples of allyl halides.

Reason: These are the compounds in which the halogen atom is called to an sp^2 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 assetion is true but reason is false.

D. If both assertion and reason are false.

Answer: C

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2. Assertion: Common name of 1,1-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 assetion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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3. 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 assetion is true but reason is false.

D. If both assertion and reason are false.

Answer: C

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4. Assertion: On free radical monochlorination of $(CH_3)_2CHCH_2CH_3$ four monochloro structural isomers are possible.

Reason: In $(CH_3)_2CHCH_2CH_3$ 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 assetion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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5. 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 assetion is true but reason is false.

D. If both assertion and reason are false.

Answer: D

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6. Assertion: The boiling point of the compounds increases in the order: Isopropylchloridelt1-Chloropropane,1-Chlorobutane. ltbr. 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 assetion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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7. 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 assetion is true but reason is false.

D. If both assertion and reason are false.

Answer: C

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8. Assertion: The order of reactivity of alkyl halides towards S_{N^1} reaction in tertiary halidegtsecondary halidegtprimary 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 assetion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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9. Assertion: S_{N^1} 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_{N^1} 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 assetion is true but reason is false.

D. If both assertion and reason are false.

Answer: C

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10. Assertion: S_{N1} reaction proceeds with racemisation while S_{N1} reaction proceeds with complete stereochemical inversion.

Reason: S_{N2} is two steps reaction while S_{N1} 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 assetion is true but reason is false.

D. If both assertion and reason are false.

Answer: D

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11. Assertion : $CH_3 - \overset{Br}{\overset{|}{C}}H - CH_2CH_3$ 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 assetion is true but reason is false.

D. If both assertion and reason are false.

Answer: C

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12. Assertion: Aryl halides are highly reactive towards nucleophilic substitution reactions.

Reason: In case of halorenes, 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 assetion is true but reason is false.

D. If both assertion and reason are false.

Answer: D

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13. Assertion: Replacement fo -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 assetion is true but reason is false.

D. If both assertion and reason are false.

Answer: C

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14. Assertion: Electophilic 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 assetion is true but reason is false.

D. If both assertion and reason are false.

Answer: B

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15. Assertion: Chloroform is stored in dark coloured bottles.

Reason: Chronic chloroform exposure may cause damage to the liver and kidneys.

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 assetion is true but reason is false.

D. If both assertion and reason are false.

Answer: B

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Polyhalogen Compounds

1. Chloroform is stored in dark coloured bottles. Explain in not more than two sentences.

A. it reacts with clear glass

B. it undergoes chlorination in tranparent glass bottles

C. it is oxidised to poisonous gas, phosgene in sunlight

D. it starts burning when exposed to sunlight.

Answer: C

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2. Triiodomethane has antiseptic property because of

A. liberation of iodoform

B. liberation of free iodine

C. formation of phosgene gas

D. none of these

Answer: B

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3. The fire extinguisher 'pyrene' contains

A. Carbon dioxide

B. Carbon disulphide

C. Carbon tetrachloride

D. Chloroform

Answer: C

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4. An organic halogen compound which is used as refrigerant in refrigerators and air conditioners is

A. BHC

B. CCl_4

C. freon

D. $CHCl_3$

Answer: C

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5. Which one is correct?

A. Freon-14 is CF_4, Freon-13 is CF_3Cl , Freon-12 is CF_2Cl_2 and Freon-11 is $CFCl_3$.

B. Freons are chlorofluorocarbons.

C. Freon are used as refrigerants.

D. All of these.

Answer: D

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6. 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. $(A) \rightarrow (ii), (B) \rightarrow (iii), (C) \rightarrow (i), (D) \rightarrow (iv)$

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. $(A) \rightarrow (iii), (B) \rightarrow (i), (C) \rightarrow (iv), (D) \rightarrow (ii)$

Answer: D

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Ncert Exemplar

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

$CH_3CH_2 - CH_2 - OH$

$CH_3CH_2 - \underset{\underset{CH_3}{|}}{CH} - OH$

$CH_3CH_2 - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - OH$

A. (I)gt(II)gt(III)

B. $(III) > (II) > (I)$

C. (II)gt(I)gt(III)

D. (I)gt(III)gt(II)

Answer: B

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2. 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. $CH_3CH_2 - \underset{\underset{CH_3}{|}}{C}H - CH_2OH$

C. $CH_3CH_2 - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}}H - CH_2OH$

D. $CH_3CH_2 - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - OH$

Answer: D

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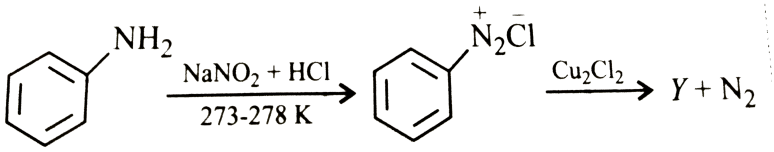
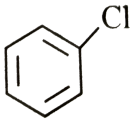
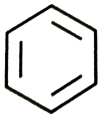
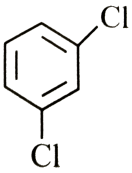
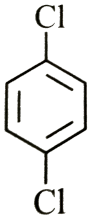
3. Identify the compound 'Y' in the following reaction.



A. (a) 

B. (b) 

C. (c) 

D. (d) 

Answer: A

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

A. electrophilic elimination reaction

B. electrophilic substitution reaction

C. free radical addition reaction

D. nucleophilic substitution reaction

Answer: B

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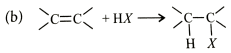
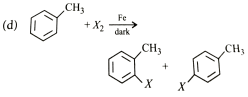
5. Which of the following is halogen exchange reaction ?

A. $RX + NaI \rightarrow RI + NaX$

B. 

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

D. 

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

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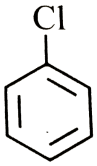
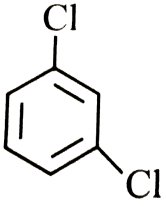
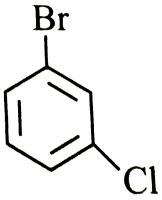
7. Arrange the following compounds in the increasing order in their densities.

(I) 

(II) 

(III) 

(IV) 

A. $(I) < (II) < (III) < (IV)$

B. $(I) < (III) < (IV) < (II)$

C. $(IV) < (III) < (II) < (I)$

D. $(II) < (IV) < (III) < (I)$

Answer: A

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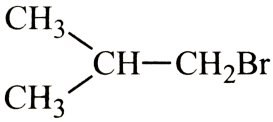
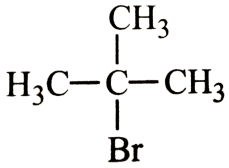
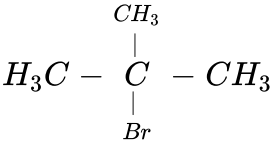
8. Arrange the following compounds in increasing order of their boiling points.

(I) 

(II) $CH_3CH_2CH_2CH_2Br$

(III) 

$(ii) CH_3CH_2CH_2CH_2Br$



A. (II)lt(I)lt(III)

B. (I)lt(II)lt(III)

C. (III)lt(I)lt(II)

D. (III)lt(II)lt(I)

Answer: C

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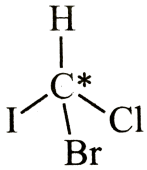
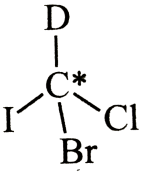
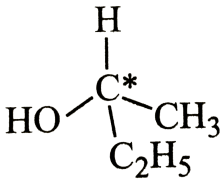
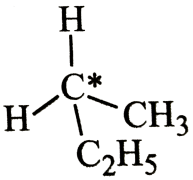
9. In which of the following molecules carbon atom marked with asterisk (*) is asymmetric?

(I) 

(II) 

(III) 

(IV) 

A. (I),(II),(III),(IV)

B. (I),(II),(III)

C. (II),(III),(IV)

D. (I),(III),(IV)

Answer: B

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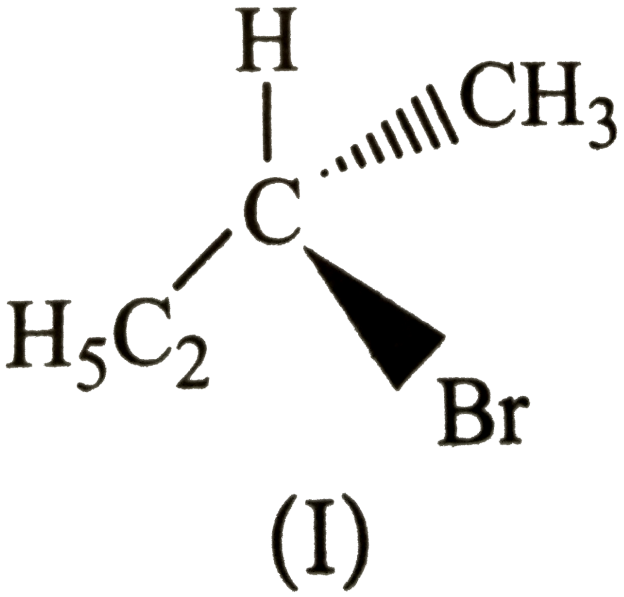
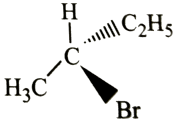
10. Which of the following structures is enantimetric with the molecular

(I) given below:

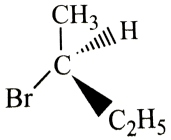


(I)

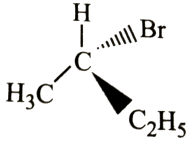
A. (a)

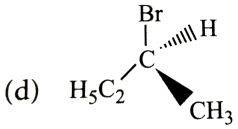


B. (b)



C. (c)



D. 

Answer: A

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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

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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. Cholorobenzene 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. $[AlCl_4]^-$

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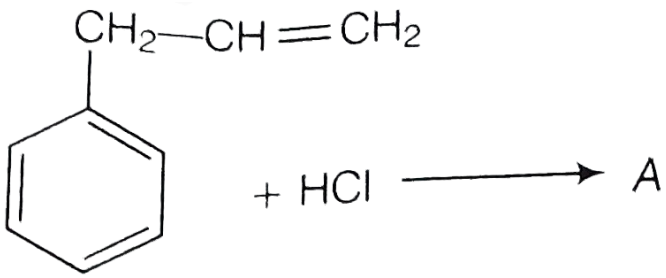
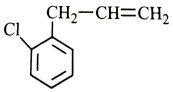
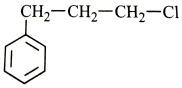
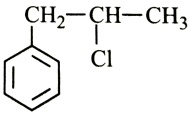
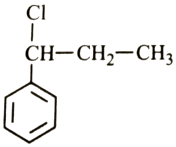
15. What is 'A' in the following reaction ?



A. (a) 

B. (b) 

C. (c) 

D. (d) 

Answer: C

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

A. S_{N^1} reaction

B. S_{N^2} reaction

C. $\propto$ -elimination

D. racemisation

Answer: B

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17. Which of the following alkyl halides will undergo S_N1 reaction most redily ?

A. $(CH_3)_3C - F$

B. $(CH_3)_3C - Cl$

C. $(CH_3)_3C - Br$

D. $(CH_3)_3C - I$

Answer: D

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18. What is the correct IUPAC name for

$$CH_3 - \underset{\underset{C_2H_5}{|}}{CH} - CH_2 - Br\,?$$

A. 1-Bromo-2-ethylpropane

B. 1-Bromo-2-ethyl-2-methylethane

C. 1-Bromo-2-methylbutane

D. 2-Methyl-1-bromobutane

Answer: C

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

A. 1-Bromo-1,1-diethylmethane

B. 3-Bromopentane

C. 1-Bromo-1-ethypropane

D. 1-Bromopentane

Answer: B

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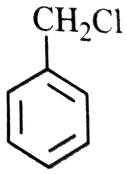
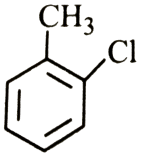
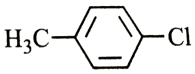
20. The reaction of toluene with chlorine in the presence of iron and in the absence of light yields .....

A. (a) 

B. (b) 

C. (c) 

D. mixture of (b) and (c)

Answer: D

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21. Chloromethane on treatment with excess of ammonia yields mainly

A. N,N-dimethylmethanamine

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

C. methanamine (CH_3NH_2)

D. mixture containing all these in equal proportion.

Answer: C

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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-Bromopropane-2-ol

Answer: A

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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

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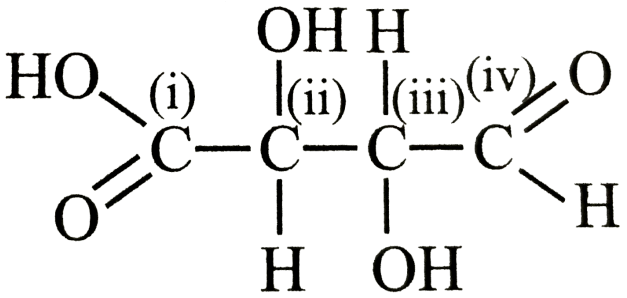
24. Which of the carbon atoms present in the molecule given below are asymmetric?



A. (i),(ii),(iii),(iv)

B. (ii),(iii)

C. (i),(iv)

D. (i),(ii),(iii)

Answer: B

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

$(I) CH_3 - \underset{\underset{C_2H_5}{|}}{CH} - Br$

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

A. (I)

B. (II)

C. (I),(II)

D. None

Answer: A

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26. Which of the correct increasing order of boiling points of the following compounds?

1-Iodobutane,1-Bromobutane,1-Chlorobutane, Butane

A. Butanelt1-Chlorobutanelt1-Bromobutanelt1-Iodobutane

B. 1-Iodobutanelt1-Bromobutanelt1-ChlorobutaneltButane

C. Butanelt1-Iodobutanelt1-Bromobutanelt1-Chlorobutane

D. Butanelt1-Chlorobutanelt1-Iodobutanelt1-Bromobutane

Answer: A

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27. Which is the correct increasing order of boiling points of the following compounds?

1-Bromoethane,1-Bromopropane,1-Bromobutane,Bromobenzene

A. Bromobenzenelt1-Bromobutanelt1-Bromopropanelt1-Bromoethane

B. Bromobenzenelt1-Bromoethanelt1-Bromopropane,1-Bromobutane

C. 1-Bromopropanelt1-Bromobutanelt1-BromoethaneltBromobenzene

D. 1-Bromoethanelt1-Bromopropanelt1-BromobutaneltBromobenzene

Answer: D

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