



CHEMISTRY

BOOKS - KUMAR PRAKASHAN KENDRA CHEMISTRY (GUJRATI ENGLISH)

HALOALKANES AND HALOARENES

Example

1. Draw the structures of all the eight structural isomers that have the molecular formula $C_5H_{11}Br$. Name each isomer according to IUPAC system and classify them as primary, secondary or tertiary bromide.



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2. Write IUPAC names of the following :



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3. Identify all the possible monochloro structural isomers expected to be formed on free radical monochlorination of $(CH_3)_2CHCH_2CH_3$.

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4. Write the products of the following reactions.



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5. Haloalkanes react with KCN to form alkyl cyanides as main product while AgCN forms isocyanides as the chief product. Explain.





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6. In the following pairs of halogen compounds, which would undergo S_N2 reaction faster ?



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7. Predict the order of reactivity of the following compounds in S_N1 and S_N2 reactions :

(i) The four isomeric bromobutanes

(ii)

$C_6H_5CH_2Br$, $C_6H_5CH(C_6H_5)Br$, $C_6H_5CH(CH_3)Br$, $C_6H_5C(CH_3)(C_6H_5)Br$



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8. Identify chiral and achiral molecules in each of the following pair of compounds.



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9. Although chlorine is an electron withdrawing group, yet it is ortho - ,
paradirecting in electrophilic aromatic substitution reactions. Why ?

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Section A Questions

1. What are haloalkanes and haloarenes ?

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2. State the uses of halogen containing organic compounds.

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3. Explain classification of haloalkanes and haloarenes on the basis of number of halogen atoms.

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4. Explain classification of monohalogen compounds on the basis of $sp^3(C - X)$ bonds. ($X = F, Cl, Br, I$).

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5. Write a note on the halogen compounds containing $sp^2C - X$ bonds.

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6. Explain IUPAC nomenclature for halosubstituted hydrocarbons.

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7. Explain isomerism in Haloalkanes.

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8. Explain the nature of C - X bond in alkyl halides.

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9. Given preparation of alkyl halides from alcohols.

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10. Give preparation of haloalkanes from hydrocarbons.

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11. Explain preparation of alkyl halides by halogen exchange methods.

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12. Give preparation of aryl halides from aromatic hydrocarbons.

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13. Give preparation of haloarenes from amine compounds.

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14. Write a note on physical properties of haloalkanes and haloarenes.

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15. Explain the following terms :

Plane polarised light

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16. Explain the following terms :

Optical activity

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17. Explain the following terms :

Chirality

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18. Explain the following terms :

Chiral centre (atom) and Achiral molecule

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19. Explain the following terms :

Enantiomers

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20. Explain the following terms :

Diastereomers

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21. Explain the following terms :

Meso compounds

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22. Explain the following terms :

Plane of symmetry



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23. Explain the following terms :

Centre of symmetry

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24. Write a note on nucleophilic substitution reactions.

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25. Write a note on nucleophiles.

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26. Write a note on S_N2 mechanism.

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27. Explain the factors favouring S_N2 reaction.

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28. Write a note on S_N1 reaction.

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29. Explain the factors affecting S_N1 reaction.

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30. Enlist the main points of difference between S_N1 and S_N2 reactions.

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31. What is retention and inversion of configuration ? Explain with suitable example.

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32. Explain stereochemistry of S_N1 reaction with suitable example.

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33. Explain stereochemistry of S_N2 reaction with suitable example.

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34. Explain Elimination reactions of alkyl halides.

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35. Explain dehydrohalogenation (β - elimination) of alkyl halides.

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36. Explain how substitution and elimination reactions compete in the same reaction ?

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37. Write a note on Grignard Reagent.

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38. Write a note on Wurtz Reaction.

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39. Explain why aryl halides are extremely less reactive towards nucleophilic substitution reactions.

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40. Give the reaction of hydroxyl group with chlorobenzene.

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41. Explain why the electron withdrawing groups such as $-NO_2$ show its effect only at o - position and p - position and not at m - positions.

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42. Why aryl halides undergo electrophilic substitution reactions at o - and p - position ? Why it is less reactive than benzene ?

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43. Give following reaction of aryl halides :

(i) Halogenation

(ii) Nitration

(iii) Sulphonation

(iv) Friedel - crafts reaction



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44. Give reactions of aryl halides with metals.



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45. State the various uses of :

Dichloromethane (Methylene chloride)



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46. State the various uses of :

Trichloromethone (Chloroform)

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47. State the various uses of :

Tri - iodomethane (Iodoform)

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48. State the various uses of :

Tetrachloromethane (Carbon tetrachloride)

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49. State the various uses of :

Freons

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50. State the adverse effects of polyhalogenated compounds. How the adverse effects of chlorofluorocarbons can be prevented ?

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51. Write a note on DDT.

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Section B Intext Questions And Answers

1. Write the structures of the following compounds :

2-Chloro-3-methylentane

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2. Write the structures of the following compounds :

1-Chloro-4-ethylcyclohexane

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3. Write the structures of the following compounds :

4-tert, Butyl-3-iodoheptane

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4. Write the structures of the following compounds :

1,4 -Dibromobut-2-ene

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5. Write the structures of the following compounds :

1-bromo-4-sec, butyl-2-methylbenzene



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6. Why is Sulphuric acid not used during the reaction of alcohols with KI ?

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7. Write structures of different dihalogen derivatives of propane.

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8. Among the isomeric alkanes of molecular formula C_5H_{12} , identify the one that on photochemical chlorination yields.

- (i) A single monochloride
- (ii) Three isomeric monochlorides
- (iii) Four isomeric monochlorides

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9. Draw the structures of major monohalo products in each of the following reactions :



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10. Draw the structures of major monohalo products in each of the following reactions :



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11. Draw the structures of major monohalo products in each of the following reactions :



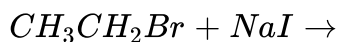
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12. Draw the structures of major monohalo products in each of the following reactions :



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13. Draw the structures of major monohalo products in each of the following reactions :



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14. Draw the structures of major monohalo products in each of the following reactions :



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15. Arrange the following set of compounds in order of increasing boiling points

(i) Bromomethane, Bromoform, Chloromethane, Dibromomethane

(ii) 1-Chloropropane, Isopropylchloride, 1-Chlorobutane.

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

(i) $CH_3CH_2CH_2CH_2Br$ OR $CH_3CH_2C \begin{array}{c} | \\ HCH_3 \end{array}$

(ii) $CH_3CH_2C \begin{array}{c} | \\ Br \end{array} HCH_3$ OR $H_3C - C \begin{array}{c} | \\ CH_3 \\ | \\ Br \end{array} - Br$

(iii) $CH_3C \begin{array}{c} | \\ CH_3 \end{array} HCH_2CH_2Br$ OR $CH_3CH_2C \begin{array}{c} | \\ CH_3 \end{array} HCH_2Br$

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



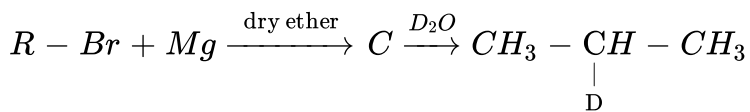
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18. Identify A, B, C, D, E, R and R^1 in the following :



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



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



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Section C Textual Exercise

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



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

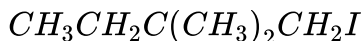
halides :



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

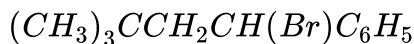
halides :



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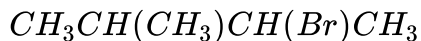
4. Name the following halides according to IUPAC system and classify them as alkyl, allyl, benzyl (primary, secondary, tertiary), vinyl or aryl

halides :



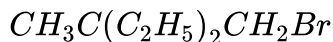
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5. Name the following halides according to IUPAC system and classify them as alkyl, allyl, benzyl (primary, secondary, tertiary), vinyl or aryl halides :



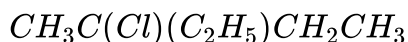
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6. Name the following halides according to IUPAC system and classify them as alkyl, allyl, benzyl (primary, secondary, tertiary), vinyl or aryl halides :



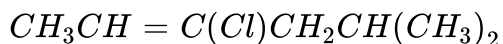
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7. Name the following halides according to IUPAC system and classify them as alkyl, allyl, benzyl (primary, secondary, tertiary), vinyl or aryl halides :



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



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



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

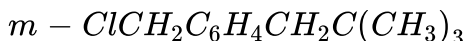
halides :



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

halides :



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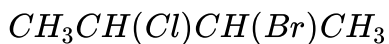
12. Name the following halides according to IUPAC system and classify them as alkyl, allyl, benzyl (primary, secondary, tertiary), vinyl or aryl

halides :



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13. Give the IUPAC names of the following compounds :



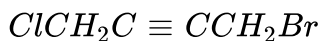
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14. Give the IUPAC names of the following compounds :



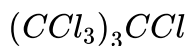
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15. Give the IUPAC names of the following compounds :



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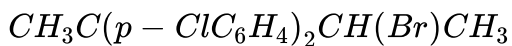
16. Give the IUPAC names of the following compounds :



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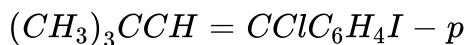
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17. Give the IUPAC names of the following compounds :



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18. Give the IUPAC names of the following compounds :



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19. Write the structures of the following organic halogen compounds.

2-Chloro-3-methylpentane



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20. Write the structures of the following organic halogen compounds.

p-Bromochlorobenzene

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21. Write the structures of the following compounds :

1-Chloro-4-ethylcyclohexane

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22. Write the structures of the following organic halogen compounds.

2-(2-Chlorophenyl)-1-iodooctane

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23. Write the structures of the following organic halogen compounds.

2-Bromobutane





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24. Write the structures of the following compounds :

4-tert, Butyl-3-iodoheptane



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25. Write the structures of the following compounds :

1-bromo-4-sec, butyl-2-methylbenzene



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26. Write the structures of the following compounds :

1,4 -Dibromobut-2-ene



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27. Which of the following has highest dipole moment:

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28. A hydrocarbon C_5H_{10} does not react with chlorine in dark but give a single monochloro compound C_5H_9Cl in bright sunligh. Identify the hydrocarbon.

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

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

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

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

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32. Which compound in each of the following pairs will react faster in

S_N2 reaction with ${}^{\ominus}OH$?

(i) CH_3Br or CH_3I

(ii) $(CH_3)_3CCl$ or CH_3Cl

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

(i) 1-Bromo-1-methylcyclohexane

(ii) 2-Chloro-2-methylbutane

(iii) 2,2,3-Trimethyl-3-bromopentane.



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34. How will you bring about the following conversions ?

Ethanol to but-1-yne



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35. How will you bring about the following conversions ?

Ethane to bromoethene



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36. How will you bring about the following conversions ?

Propene to 1-nitropropane



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37. How will you bring about the following conversions ?

Toluene to benzyl alcohol

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38. How will you bring about the following conversions ?

Propene to propyne

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39. How will you bring about the following conversions ?

Ethanol to ethyl fluoride

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40. How will you bring about the following conversions ?

Bromomethane to propanone





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41. How will you bring about the following conversions ?

But-1-ene to but-2-ene



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42. How will you bring about the following conversions ?

1-Chlorobutane to n-octane



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43. How will you bring about the following conversions ?

Benzene to biphenyl.



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44. Explain why :

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

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45. Explain why :

Alkyl halides, though polar, are immiscible with water ?

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46. Explain why :

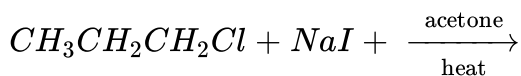
Grignard reagents should be prepared under anhydrous conditions ?

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47. Give the uses of freon 12, DDT, carbon tetrachloride and iodoform.

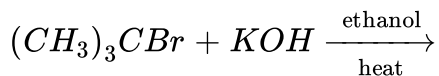
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48. Write the structure of the major organic product in each of the following reactions :



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



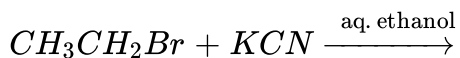
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50. Write the structure of the major organic product in each of the following reactions :



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



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



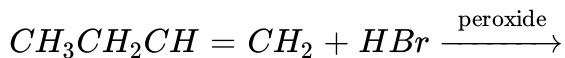
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53. Write the structure of the major organic product in each of the following reactions :



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



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



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56. Write the mechanism of the following reaction :



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

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

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

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

2-dimethylpropane,

1-Bromo-2-methylbutane,

1-Bromo-3-methylbutane.

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58. Out of $C_6H_5CH_2Cl$ and $C_6H_5CHClC_6H_5$, which is more easily hydrolysed by aqueous KOH.

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59. p-Dichlorobenzene has higher m.p. than those of o-and m-isomers.

Discuss.

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60. How the following conversions can be carried out ?

Propene to propan-1-ol

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61. How will you bring about the following conversions ?

Ethanol to but-1-yne

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62. How the following conversions can be carried out ?

1-Bromopropane to 2-bromopropane





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63. How will you bring about the following conversions ?

Toluene to benzyl alcohol



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64. How the following conversions can be carried out ?

Benzene to 4-bromonitrobenzene



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65. How the following conversions can be carried out ?

Benzyl alcohol to 2-phenylethanoic acid



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66. How the following conversions can be carried out ?

Ethanol to propanenitrile

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67. How the following conversions can be carried out ?

Aniline to chlorobenzene

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68. How the following conversions can be carried out ?

2-Chlorobutane to 3,4 - dimethylhexane

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69. How the following conversions can be carried out ?

2-Methyl-1-propene to 2-chloro-2-methyl-propane





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70. How the following conversions can be carried out ?

Ethyl chloride to propanoic acid



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71. How the following conversions can be carried out ?

But -1-ene to n-butyliodide



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72. How the following conversions can be carried out ?

2-Chloropropane to 1-propanol



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73. How the following conversions can be carried out ?

Isopropyl alcohol to iodoform

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74. How the following conversions can be carried out ?

Chlorobenzene to p - nitrophenol

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75. How the following conversions can be carried out ?

2-Bromopropane to 1-bromopropane

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76. How the following conversions can be carried out ?

Chloroethane to butane





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77. How will you bring about the following conversions ?

Benzene to biphenyl.



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78. How the following conversions can be carried out ?

tert-Butyl bromide to isobutyl bromide



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79. How the following conversions can be carried out ?

Aniline to phenylisocyanide



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

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

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82. What happens when
n-butyl chloride is treated with alcoholic KOH,

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83. What happens when bromobenzene is treated with Mg in the presence of dry ether,

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84. What happens when chlorobenzene is subjected to hydrolysis,

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85. What happens when ethyl chloride is treated with aqueous KOH,

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86. What happens when

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

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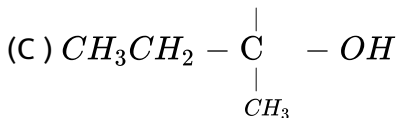
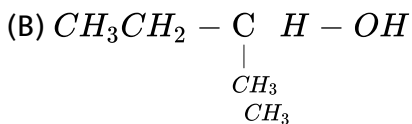
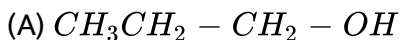
87. What happens when

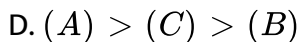
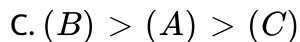
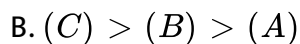
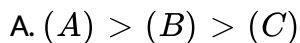
methyl chloride is treated with KCN ?

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Section D Ncert Exemplar Solution Multiple Choice Questions

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

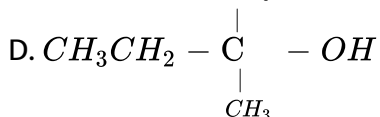
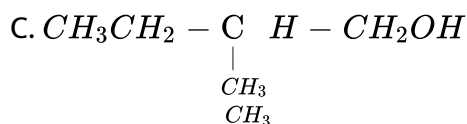
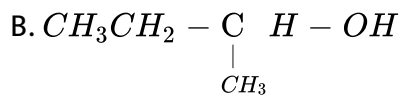
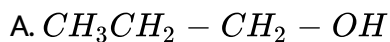




Answer: B

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



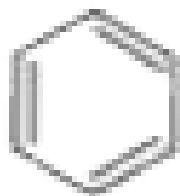
Answer: D

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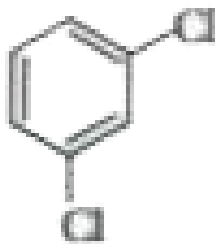
3. Identify the compound Y in the following reaction.



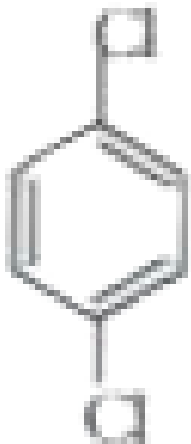
A.



B.



C.



D.

Answer: A



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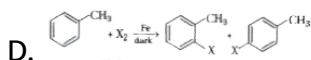
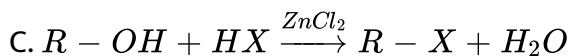
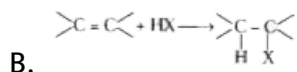
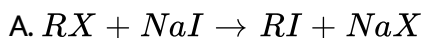
4. Toluene reacts with a halogen in the presence of iron (III) chloride giving ortho and para halo compounds. The reaction is

- A. Electrophilic elimination reaction
- B. Electrophilic substitution reaction
- C. Free radical addition reaction
- D. Nucleophilic substitution reaction

Answer: B

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5. Which of the following is halogen exchange reaction ?



Answer: A

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



A. Cl_2 / *UV* light

B. $\text{NaCl} + \text{H}_2\text{SO}_4$

C. Cl_2 gas in dark

D. Cl_2 gas in the presence of iron in dark

Answer: A



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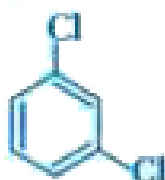
7. Arrange the following compounds in the increasing order of their densities.



(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

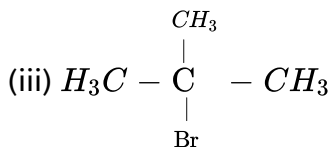
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8. Arrange the following compounds in increasing order of their boiling points.



(i)

(ii) $CH_3CH_2CH_2CH_2Br$



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

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

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

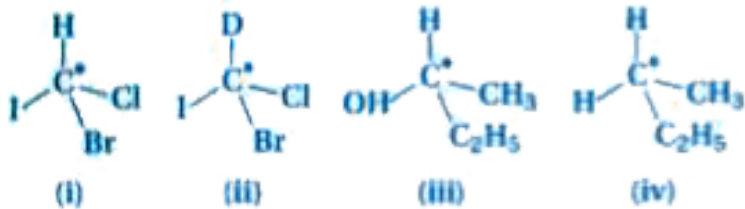
D. $(iii) < (ii) < (i)$

Answer: C



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



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

B. (i), (ii), (iii)

C. (ii), (iii), (iv)

D. (i), (iii), (iv)

Answer: B

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10. Which of the following structures is enantiomeric with the molecule

(A) given below :



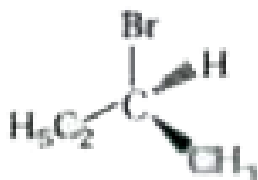
A.



B.



C.



D.

Answer: A

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11. Which of the following is an example of vicdihalide ?

- 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 $CH_3CH = CHC(Br)(CH_3)_2$ 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^+

C. $AlCl_3$

D. $[AlCl_4]^-$

Answer: B



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14. Ethylidene chloride is a/an

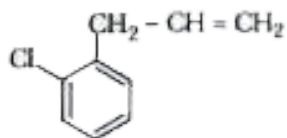
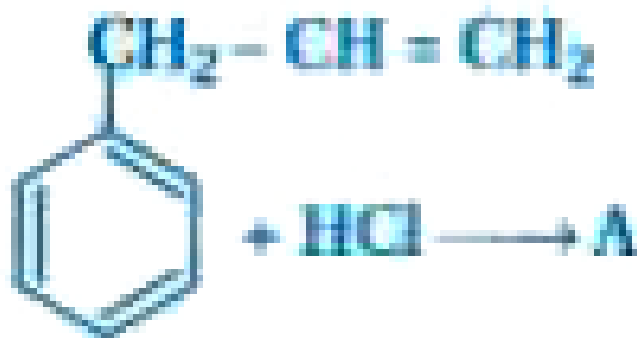
- A. vic-dihalide
- B. gem-dihalide
- C. allylic halide
- D. vinylic halide

Answer: B

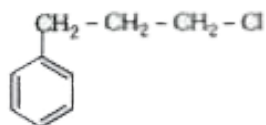


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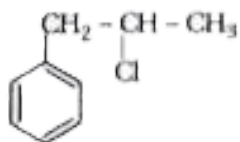
15. What is 'A' in the following reaction ?



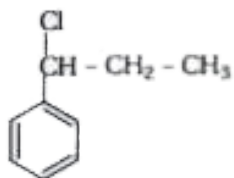
A.



B.



C.



D.

Answer: C

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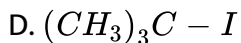
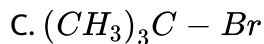
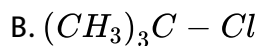
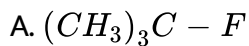
16. A primary alkyl halide would prefer to undergo :-

- A. S_N1 reaction
- B. S_N2 reaction
- C. α - Elimination
- D. Racemisation

Answer: B

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



Answer: D

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18. Which is the correct IUPAC name for $CH_3 - \underset{\substack{| \\ C_2H_5}}{C} H - CH_2 - Br$?

A. 1-Bromo-2-ethylpropane

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

C. 1-Bromo-2-methylbutane

D. 2-Methyl-1-bromobutane

Answer: C

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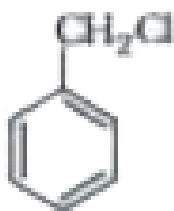
19. What should be the correct IUPAC name for diethylbromomethane ?

- A. 1-Bromo-1,1-diethylmethane
- B. 3-Bromopentane
- C. 1-Bromo-1-ethylpropane
- D. 1-Bromopentane

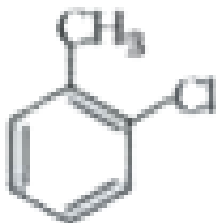
Answer: B

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



A. _____



B.



C.

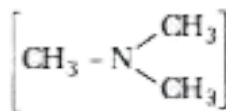
D. Mixture of (B) and (C)

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. Reaction of $C_6H_5CH_2Br$ with aqueous sodium hydroxide follows

.....

A. S_N1 mechanism

B. S_N2 mechanism

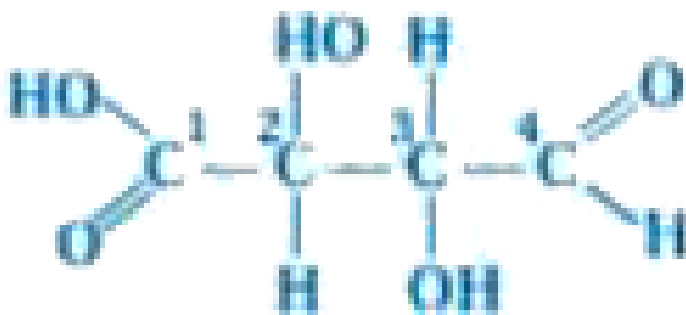
C. Any of the above two depending upon the temperature of reaction.

D. Saytzeff rule

Answer: A

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



A. 1,2,3,4

B. 2,3

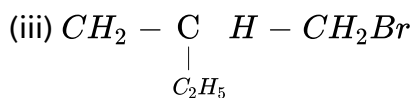
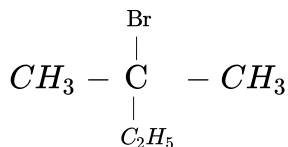
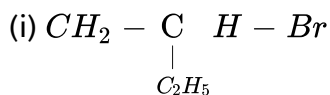
C. 1,4

D. 1,2,3

Answer: B

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



A. (i)

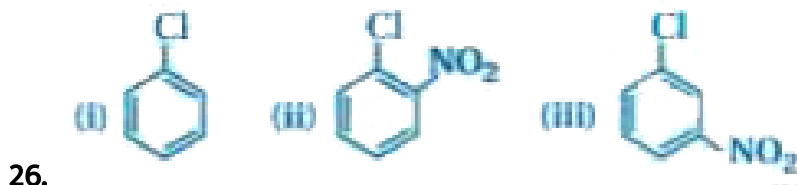
B. (i),(ii) and (iii)

C. (ii) and (iii)

D. (i) and (ii)

Answer: A

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

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

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

D. $(iii) < (i) < (ii)$

Answer: C

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27.

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

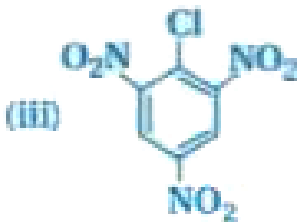
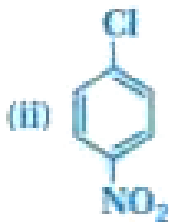
B. (i) < (iii) < (ii)

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

D. (ii) < (iii) < (i)

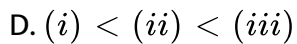
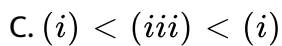
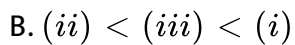
Answer: D

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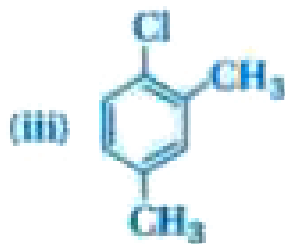
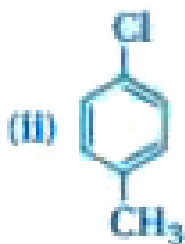
28.

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

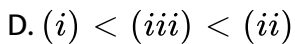
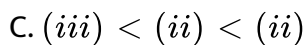
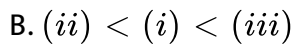
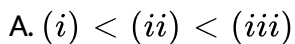


Answer: D

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29.



Answer: C



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

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

A. Butane < 1-Chlorobutane < 1-Bromobutane < 1-Iodobutane

B. 1-Iodobutane < 1-Bromobutane < 1-Chlorobutane < Butane

C. Butane < 1-Iodobutane < 1-Bromobutane < 1-Chlorobutane

D. Butane < 1-Chlorobutane < 1-Iodobutane < 1-Bromobutane

Answer: A



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

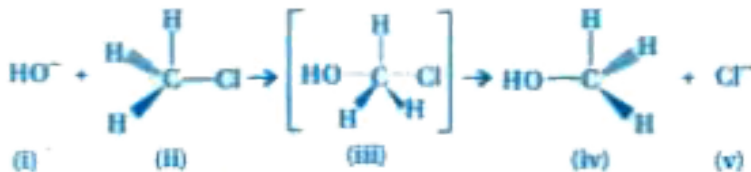
1-Bromoethane, 1-Bromopropane, 1-Bromobutane, Bromobenzene

- A. Bromobenzene < 1-Bromobutane < 1-Bromopropane < 1-Bromoethane
- B. Bromobenzene < 1-Bromoethane < 1-Bromopropane < 1-Bromobutane
- C. 1-Bromopropane < 1-Bromobutane < 1-Bromoethane < Bromobenzene
- D. 1-Bromoethane < 1-Bromopropane < 1-Bromobutane < Bromobenzene

Answer: D

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32.

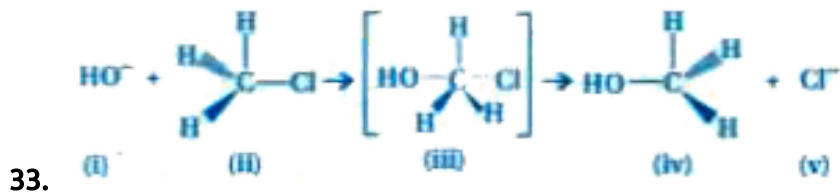


Which of the statements are correct about above reaction ?

- A. (i) and (v) both are nucleophiles.
- B. In (iii) carbon atom is sp^3 hybridized.
- C. In (iii) carbon atom is sp^2 hybridized.
- D. (i) and (v) both are electrophiles.

Answer: A:C

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Which of the following statements are correct about this reaction ?

- A. The given reaction follows S_N2 mechanism.
- B. (ii) and (iv) have opposite configuration.
- C. (ii) and (iv) have same configuration.
- D. The given reaction follows S_N1 mechanism.

Answer: A::B

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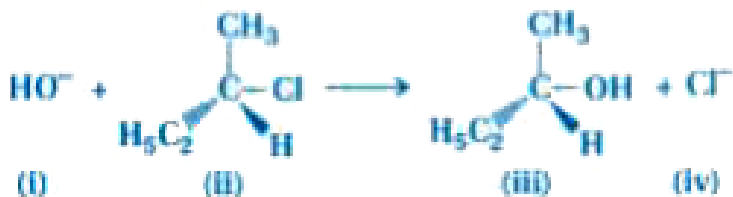
34.

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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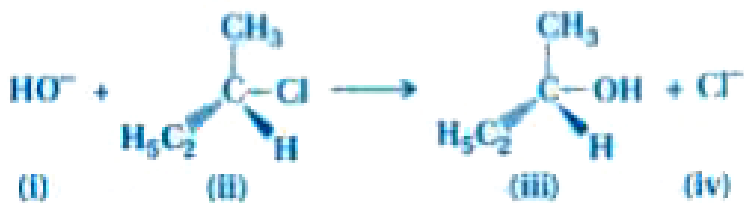


Which of the following statements are correct about the mechanism of this reaction ?

- A. A carbocation will be formed as an intermediate in the reaction.
- B. OH^- will attack 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. Reaction proceeds through S_N1 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. Molecularity 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 following compounds.

- A. 2-Bromopentane
- B. Vinyl chloride (chloroethene)
- C. 2-chloroacetophenone
- D. Trichloromethane

Answer: A::D

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

- A. Both the compounds form same product on treatment with alcoholic KOH.
- B. Both the compounds form same product on treatment with aq. NaOH.
- C. Both the compounds form same product on reduction.

D. Both the compounds are optically active.

Answer: A::C

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39. Which of the following compounds are gemdihalides ?

A. Ethylidene chloride

B. Ethylene dichloride

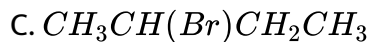
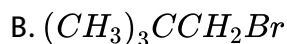
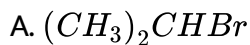
C. Methylene chloride

D. Benzyl chloride

Answer: A::C

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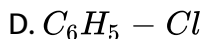
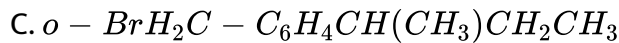
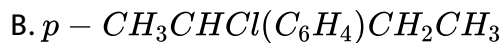
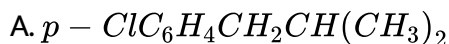
40. Which of the following are secondary bromides ?



Answer: A:C

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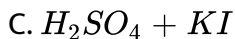
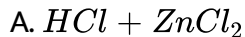
41. Which of the following compounds can be classified as aryl halides ?



Answer: A:D

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42. Alkyl halides are prepared from alcohols by treating with



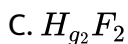
D. All of the above

Answer: A::B



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43. Alkyl fluorides are synthesised by alkyl chloride / bromide in presence of or



D. NaF

Answer: B::C

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Section D Ncert Exemplar Solution Short Answer Type Questions

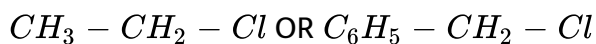
1. Aryl chlorides and bromides can be easily prepared by electrophilic substitution of arenes with chlorine and bromine respectively in the presence of Lewis acid catalysts. But why does preparation of aryl iodides requires presence of an oxidizing agent ?

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2. Out of o - and p - dibromobenzene which one has higher melting point and why ?

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3. Which of the compounds will react faster in S_N1 reaction with the ^-OH ion ?



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4. Why iodoform has appreciable antiseptic property ?

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

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6. Discuss the role of Lewis acids in the preparation of aryl bromides and chlorides in the dark.

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

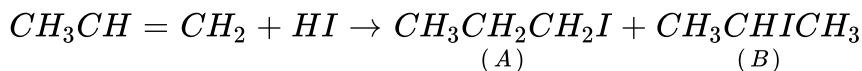
(i) $CH_3CH_2CH_2OH$



(ii)

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8. Which of the products will be major product in the reaction given below? Explain.

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



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

ortho, para directing or meta directing.



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11. 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



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

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

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

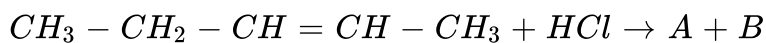


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13. Write the structures and names of the compounds formed when compound 'A' with molecular formula, C_7H_8 is treated with Cl_2 in the presence of $FeCl_3$.

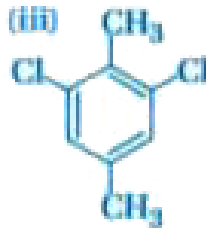
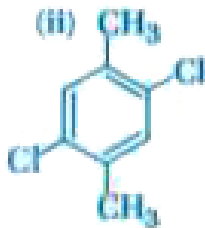
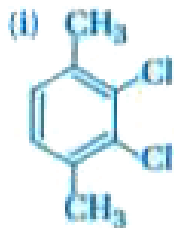
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14. Identify the products A and B formed in the following reaction :



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



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16. Write down the structure and IUPAC name for neo-pentylbromide.

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17. 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.

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

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

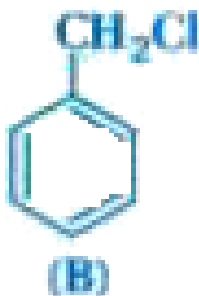
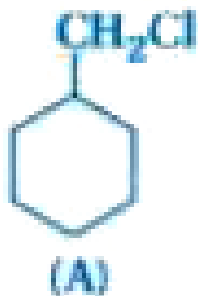
- (i) 1-Bromobutane
- (ii) 2-Bromobutane
- (iii) 2-Bromo-2-methylpropane
- (iv) 2-Chlorobutane

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20. Why can aryl halides not be prepared by reaction of phenol with HCl in the presence of $ZnCl_2$?

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21. Which of the following compounds would undergo S_N1 reaction faster and why ?



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22. Allyl chloride is hydrolysed more readily than n-propyl chloride. Why ?

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23. Why is it necessary to avoid even traces of misture during the use of a Grignard reagent ?

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24. How do polar solvents help in the first step in S_N1 mechanism ?

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25. Write a test to detect the presence of double bond in a molecule.

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26. Diphenyls are potential threat to the environment. How are these produced from aryl halides ?

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27. What are the IUPAC names of the insecticide DDT and benzenehexachloride ? Why is their use banned in India and other countries ?

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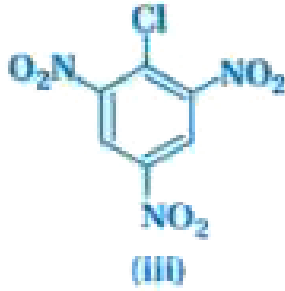
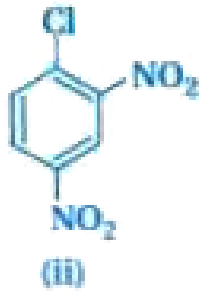
28. Elimination reactions (especially β -elimination) are as common as the nucleophilic substitution reaction in case of alkyl halides. Specify the reagents used in both cases.

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29. How will you obtain monobromobenzene from aniline ?

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



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31. tert-Butylbromide reacts with aq. NaOH by S_N1 mechanism while n-butylbromide reacts by S_N2 mechanism. Why ?

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32. Predict the major product formed when HCl is added to isobutylene.

Explain the mechanism involved.

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33. Discuss the nature of C - X bond in the haloarenes.

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34. How can you obtain iodoethane from ethanol when no other iodine containing reagent except NaI is available in the laboratory ?

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



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Section D Ncert Exemplar Solution Matching The Columns

1. Match the compounds given in Column - I with the effects given in

Column - II.

Column - I	Column - II
(i) Chloramphenicol	(a) Malaria
(ii) Thyroxine	(b) Anaesthetic
(iii) Chloroquine	(c) Typhoid fever
(iv) Chloroform	(d) Goiter
	(e) Blood substituent



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2. Match the items of Column - I and Column - II.

Column - I	Column - II
(i) S_N1 reaction	(a) vic-dibromides
(ii) Chemicals is fire extinguisher	(b) gem-dihalides
(iii) Bromination of alkenes	(c) Racemisation
(iv) Alkylidene halides	(d) Saytzeff rule
(v) Elimination of HX from alkylhalide	(e) Chlorobromocarbons



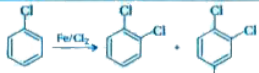
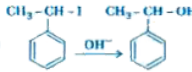
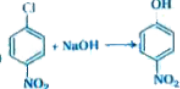
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3. Match the structures of compounds given in Column - I with the classes of compounds given in Column - II.

Column-I	Column-II
(i) $\text{CH}_3 - \underset{\text{X}}{\text{CH}} - \text{CH}_3$	(a) Aryl halide
(ii) $\text{CH}_2 = \text{CH} - \text{CH}_2 - \text{X}$	(b) Alkyl halide
(iii) 	(c) Vinyl halide
(iv) $\text{CH}_2 = \text{CH} - \text{X}$	(d) Allyl halide

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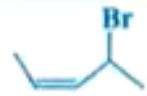
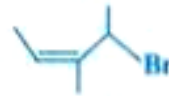
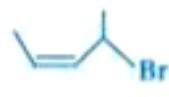

4. Match the reactions given in Column - I with the types of reactions given in Column - II.

Column-I	Column-II
(i) 	(a) Nucleophilic aromatic substitution
(ii) $\text{CH}_3 - \text{CH} = \text{CH}_2 + \text{HBr} \rightarrow \text{CH}_3 - \underset{\text{Br}}{\text{CH}} - \text{CH}_3$	(b) Electrophilic aromatic substitution
(iii) 	(c) Saytzeff elimination
(iv) 	(d) Electrophilic addition
(v) $\text{CH}_3 - \text{CH}_2 - \underset{\text{Br}}{\text{CH}} - \text{CH}_3 \xrightarrow[\text{KOH}]{\text{alkaline}} \text{CH}_3 - \text{CH} = \text{CH} - \text{CH}_3$	(e) Nucleophilic substitution ($\text{S}_{\text{N}}1$)




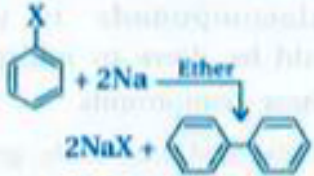

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5. Match the structures given in Column - I with the names in Column - II.

Column-I	Column-II
(i) 	(a) 4-Bromopent-2-ene
(ii) 	(b) 4-Bromo-3-methylpent-2-ene
(iii) 	(c) 1-Bromo-2-methylbut-2-ene
(iv) 	(d) 1-Bromo-2-methylpent-2-ene

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6. Match the reactions given in Column - I with the names given in Column - II.

Column-I	Column-II
(i) 	(a) Fittig reaction
(ii) 	(b) Wurtz Fittig reaction
(iii) 	(c) Finkelstein reaction
(iv) $C_2H_5-Cl + NaI \xrightarrow[\text{acetone}]{\text{dry}}$ $C_2H_5I + NaCl$	(d) Sandmeyer reaction

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1. 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.

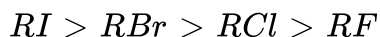
- A. Assertion and reason both are correct and reason is correct explanation of assertion.
- B. Assertion and reason both are wrong statements.
- C. Assertion is correct but reason is wrong statement.
- D. Assertion is wrong but reason is correct statement.

Answer: B



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2. Assertion (A) : The boiling points of alkyl halides decrease in the order :



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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3. 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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4. Assertion (A) : tert-Butyl bromide undergoes Wurtz reaction to give 2, 2, 3, 3 - tetramethyl butane.

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 and reason both are correct statements but reason is not correct explanation of assertion.

Answer: D

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5. Assertion (A) : Presence of a nitro group at ortho or para position increases the reactivity of haloarenes 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

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6. Assertion (A) : In monohaloarenes, further electrophilic substitution occurs at ortho and para positions.

Reason (R). 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



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

Reason (R) : 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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8. Assertion (A) : It is difficult to replace chlorine by -OH in chlorobenzene in comparison to that in chloroethane.

Reason (R) : 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



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9. 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

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10. 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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Section D Ncert Exemplar Solution Long Answer Type Questions

1. Some alkyl halides undergo substitution 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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2. 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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3. Why are aryl halides less reactive towards nucleophilic substitution reactions than alkyl halides ? How can we enhance the reactivity of aryl halides ?

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Section E Multiple Choice Questions

1. The derivatives that are not found in nature are

- A. Alkanes
- B. Carbohydrates
- C. Haloalkanes

D. Fats

Answer: C

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2. The compounds obtained by the substitution of hydrogen by halogen in alkane series is

A. Aryl halides

B. Alkyl halides

C. Carbon halides

D. All of these

Answer: B

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3. Which of the following is present in a hormone thyroxine ?

A. Fluorine

B. Iodine

C. Bromine

D. Chlorine

Answer: B



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4. Which of the following drug is used in treatment of typhoid fever ?

A. Bromopheneramine

B. Chloramphenicol

C. Chloroquine

D. Iodoform

Answer: B



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5. Deficiency of Thyroxine causes

- A. Beri - Beri
- B. Goiter
- C. Urticaria
- D. Dwansm

Answer: B



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6. Which of the following is not the use of haloalkanes and haloarenes ?

- A. Drugs

B. Solvent

C. Anaesthesia

D. Cement

Answer: D

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7. Which of the following is a primary halide ?

A. Neopentyl bromide

B. Isopropyl bromide

C. 2-Bromobutane

D. 2-Bromo-2-methyl propane

Answer: A

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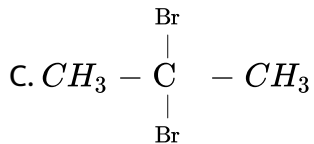
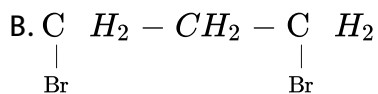
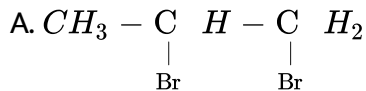
8. The nature of bond of carbon of alkyl group and halogen in alkyl halide is

- A. Covalent
- B. Co-ordinate covalent
- C. Metallic
- D. Ionic

Answer: A

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9. Which of the following is a vicinal dihalides ?



D. All of these

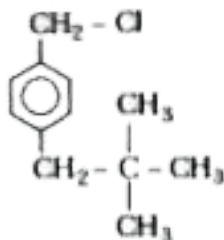
Answer: A

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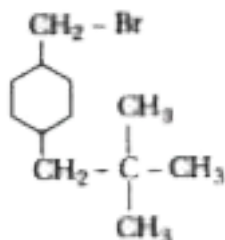
10. Which of the following is a benzylic halide ?



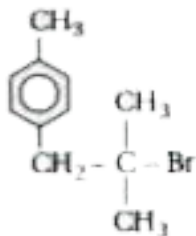
A.



B.



C.

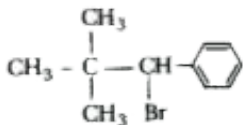
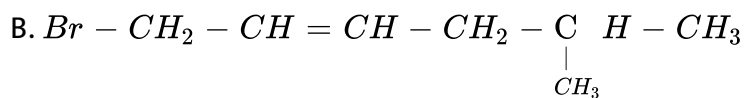
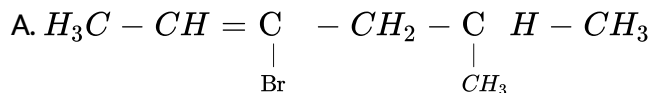


D.

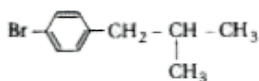
Answer: B

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11. Which of the following is allylic halide ?



C.

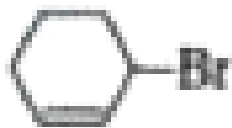
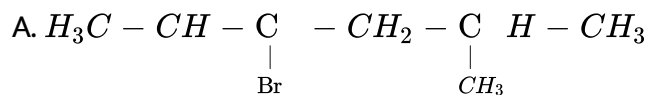


D.

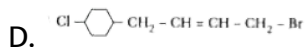
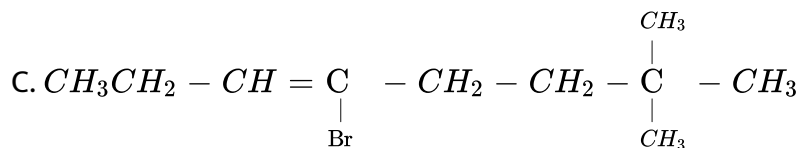
Answer: B

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12. Which of the following is vinylic halide ?



B.



Answer: C

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13. Which of the following is an aryl halide ?

A. 1-Chloromethyl-3-(2,2-dimethylpropyl) benzene

B. 1-Bromo-2-(1-methylpropyl) benzene

C. 1-Bromo-3,3-dimethyl-1-phenylbutane

D. 3-Bromo-3-methyl-1-phenylbutane

Answer: B

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14. Which of the following is the correct order of dipole moment ?

A. $CH_2Cl_2 > CHCl_3 > CCl_4$

B. $CHCl_3 > CH_2Cl_2 > CCl_4$

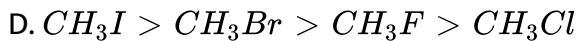
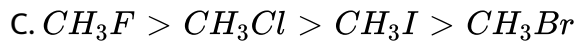
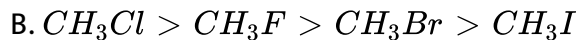
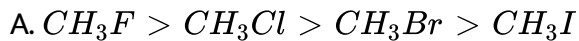
C. $CCl_4 > CH_2Cl_2 > CHCl_3$

D. $CHCl_3 > CH_2Cl_2 > CCl_4$

Answer: A

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15. Which of the following is the correct order of dipole moment ?



Answer: B



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16. The correct structure of o-dihalobenzene is



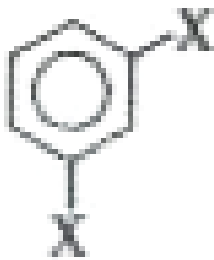
A.



B.



C.



D.

Answer: B

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17. The isomerism not shown by alkyl halides is

- A. Chain isomerism
- B. Functional isomersim
- C. Position isomerism
- D. Optical isomerism

Answer: B

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18. In which of the following compounds the halogen is not bonded to sp^3 carbon ?

- A. Ethylidene dichloride
- B. Chloroethyl benzene

C. 3-chlorocyclohex-1-ene

D. 1-chlorocyclohex-1-ene

Answer: D

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19. The IUPAC name of $\begin{array}{c} \text{C} \\ | \\ \text{Br} \end{array} \text{H}_2 - \begin{array}{c} \text{C} \\ | \\ \text{Br} \end{array} \text{H}_2$ is

A. Ethane-1,2-dibromide

B. 1,2-dibromo ethane

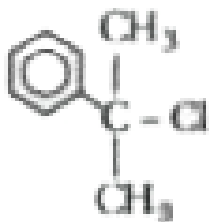
C. Ethylidene bromide

D. Ethylene dibromide

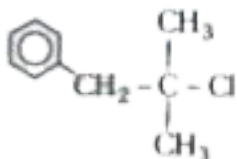
Answer: B

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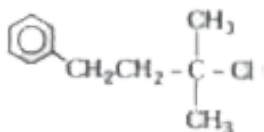
20. Which of the following is 3° - Benzylic halide ?



A.



B.



C.



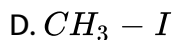
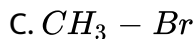
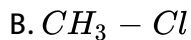
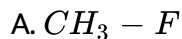
D.

Answer: A



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21. Which of the following has highest bond enthalpy ?



Answer: A



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22. The common name of vicinal dihalide is

A. 1, 2-dihaloalkane

B. Alkylene dihalide

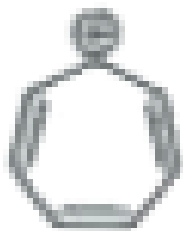
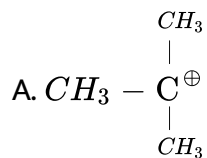
C. Alkulidene halide

D. Alkane -1,2- dihalide

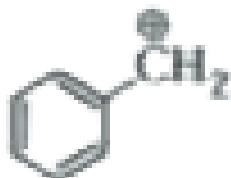
Answer: B

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23. Which of the following carbocation is maximum stable ?



B.



C.



Answer: B



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24. Which substances are used in aerosol mixtures of insecticide substance ?

A. Feron - 22

B. $CClF_3$

C. CCl_2F_2

D. All of these

Answer: D



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25. Alkyl halides are insoluble in

A. Water

B. Benzene

C. Hexane

D. Toluene

Answer: A

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26. Which of the following alkylhalides show optical isomerism ?

A. 2-Bromobutane

B. Isobutylbromide

C. Neopentylbromide

D. 1, 4-dichlorobutane

Answer: A

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27. The alkyl halides are best prepared from

A. Alcohols

B. Alkenes

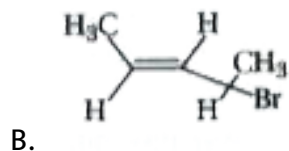
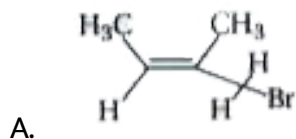
C. Ethers

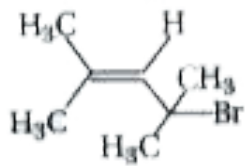
D. Alkanes

Answer: A

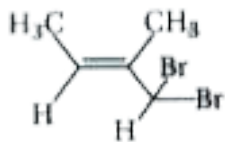
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28. Which of the following is optically active ?





C.

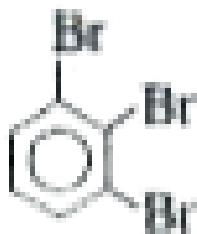


D.

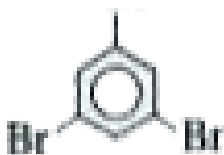
Answer: B

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29. Sym-Tribromobenzene is



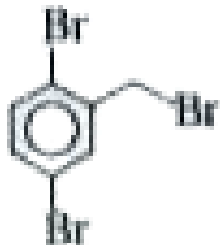
A.



B.



C.

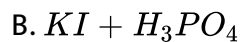
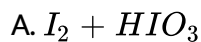


D.

Answer: B

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30. To prepare alkyl iodides from alcohols, which of following reagent is used ?



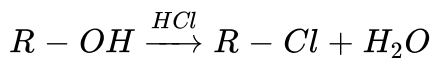
C. $\text{NaI} + \text{Acetone}$

D. $\text{KI} + \text{H}_2\text{SO}_4$

Answer: B

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31. In the following reaction :



the, ZnCl_2 is not required if R is

A. $\text{CH}_3 -$

B. $\text{CH}_3 - \underset{\text{CH}_3}{\overset{\text{CH}_3}{\text{C}}} -$

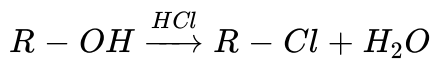
C. $\text{CH}_3 - \underset{\text{C}_2\text{H}_5}{\text{C}} \text{H} -$

D. $\text{CH}_3 - \text{CH}_2 -$

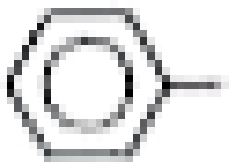
Answer: B

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32. Consider the following reaction :



The above reaction is not true if R is



A.

B. $CH_3 -$

C. $CH_3 - CH_2 -$

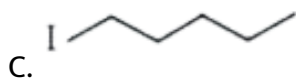
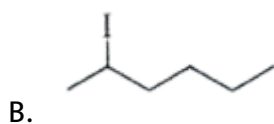
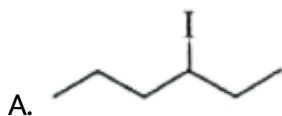
D. $CH_3 - \begin{array}{c} CH_3 \\ | \\ C \\ | \\ CH_3 \end{array} -$

Answer: A



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33. The major product in the reaction is



Answer: B



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34. In the given reaction the total number of products obtained are



- A. One
- B. Two
- C. Three
- D. Four

Answer: B

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35. High purity and more quantity of haloalkanes are obtained by

- A. reaction of alcohol with sodium halide and conc. H_2SO_4 .
- B. reaction of alcohol with phosphorus halide.

C. reaction of alcohol with HCl in presence of $ZnCl_2$.

D. reaction of alcohols with $SOCl_2$.

Answer: B

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36. The correct order of reactivity of alcohols with haloacids is

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

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

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

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

Answer: C

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37. Which of the following is not prepared directly from benzene ?

A. Chlorobenzene

B. Bromobenzene

C. Methylbenzene

D. Fluorobenzene

Answer: D



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38. Which of the following reagent is not used to prepare alkyl halides from alcohols ?

A. Br_2 / CCl_4

B. Red P + Br_2

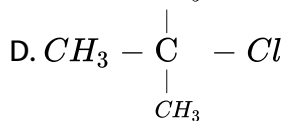
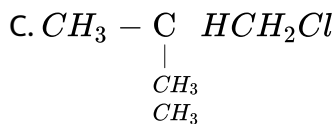
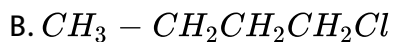
C. $NaBr / H_2SO_4$

D. $KI + H_3PO_4$

Answer: A

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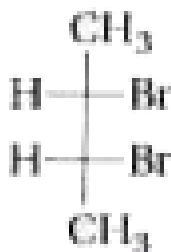
39. Which of the following have the maximum boiling point ?



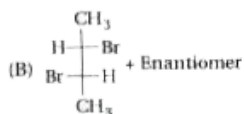
Answer: A

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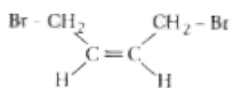
40. The major product in the reaction is



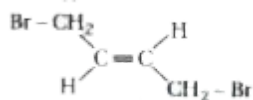
A.



B.



C.



D.

Answer: B



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41. The metallic fluoride used in a Swartz reaction is

A. NaF

B. CuF_2

C. Hg_2F_2

D. MgF_2

Answer: C



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42. Which of the following has maximum density ?

A. $n - C_3H_7Cl$

B. CCl_4

C. $CHCl_3$

D. $n - C_3H_7Br$

Answer: B

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43. Which of the following cannot be prepared from benzene diazonium halide ?

- A. Chlorobenzene
- B. Fluorobenzene
- C. Iodobenzene
- D. None of these

Answer: D

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44. $CH_3CH_2 - Br + NaI \xrightarrow{\text{Acetone}} X + NaBr$ The (X) in above reaction is

A. Iodomethane

B. Iodoethane

C. Iodopropane

D. Iodubutane

Answer: B

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45. Alkyl Fluorides are prepared by

A. Finkelstein reaction

B. Hunsdiecker reaction

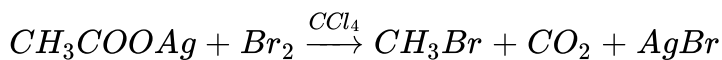
C. Wurtz reaction

D. Swartz reaction

Answer: D

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46. The reaction :



is known as

- A. Finkelstin reaction
- B. Hunsdiecker reaction
- C. Birnbaum - Simonini reaction
- D. Balz-Schiemann reaction

Answer: B

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47. The reaction :



is known as

- A. Sandmeyer's reaction
- B. Balz-schiemann reaction
- C. Birnbaum - Simonini reaction
- D. Gatterman reaction

Answer: B

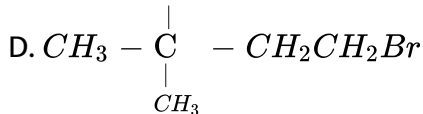
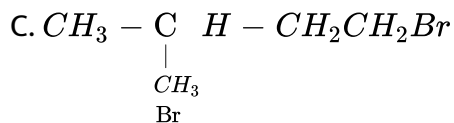
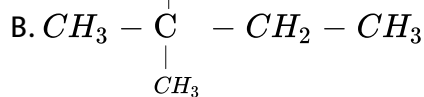
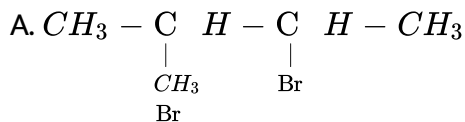
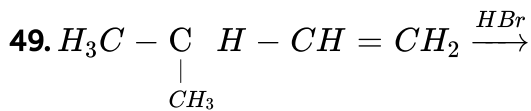
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48. C_2H_5Br can be obtained in a laboratory by the action of ethyl alcohol with

- A. KBr
- B. KBr + conc. H_2SO_4
- C. NH_4Br
- D. Br_2

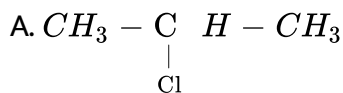
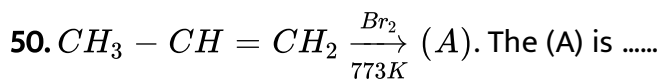
Answer: B

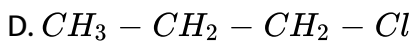
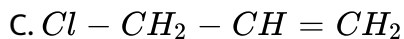
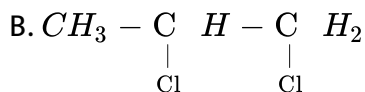
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Answer: B

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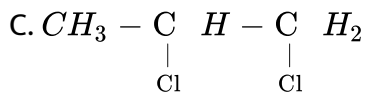
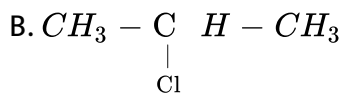
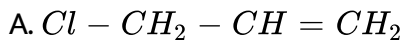




Answer: C

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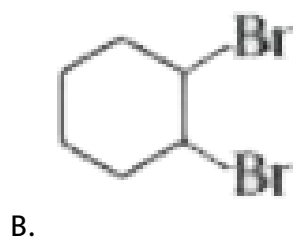
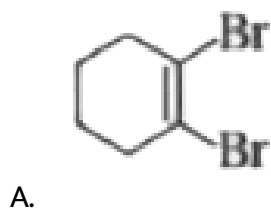
51. $\text{CH}_3 - \text{CH} = \text{CH}_2 \xrightarrow[\text{light}]{\text{SO}_2\text{Cl}_2}$ (A). The (A) is ...

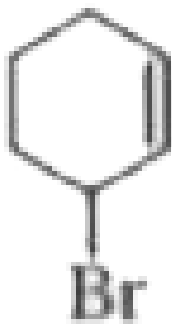


Answer: A

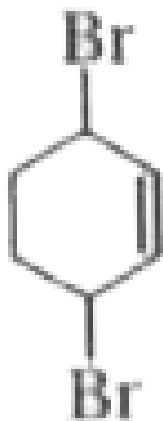
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52. In the reaction :





C.



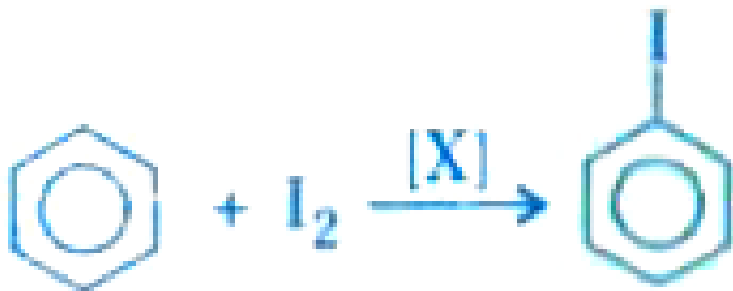
D.

Answer: C



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53. In the reaction :



The [X] is

- A. FeI_3
- B. HNO_3
- C. HI
- D. H_3PO_4

Answer: B

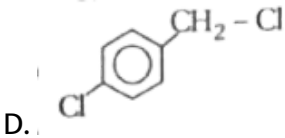
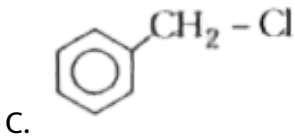
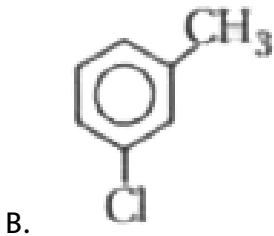
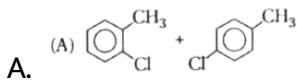


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54. In the reaction :



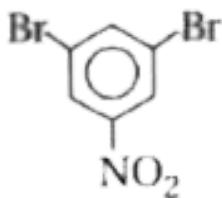
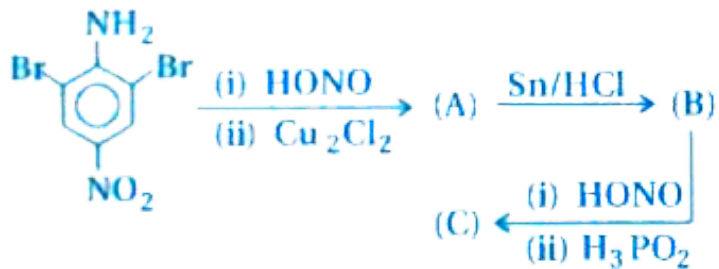
The product (P) is



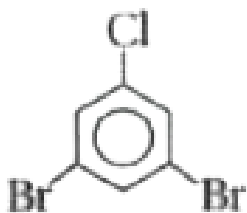
Answer: C



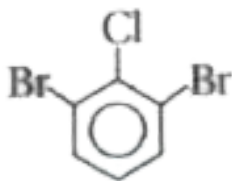
55. The product (C) obtained in the following sequence of reaction is :



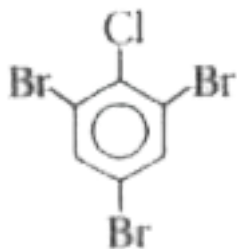
A.



B.



C.

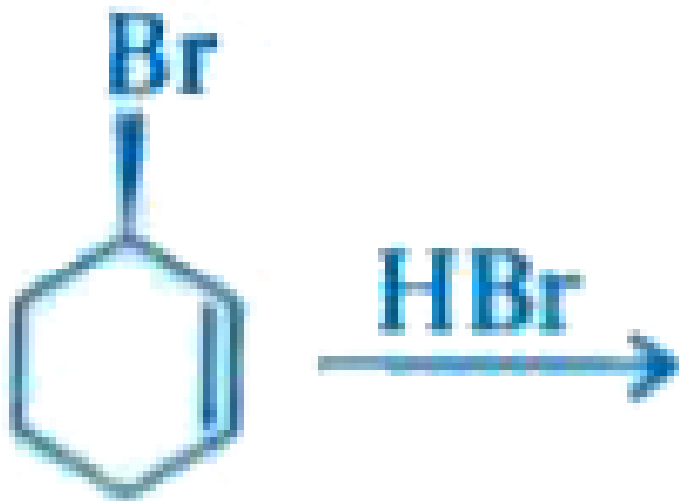


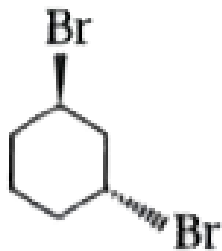
D.

Answer: C

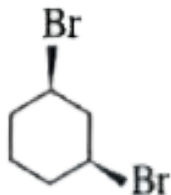
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56. The major product in the reaction is

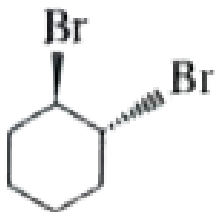




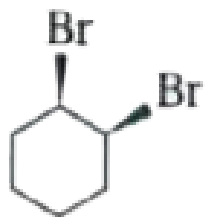
A.



B.



C.



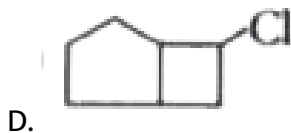
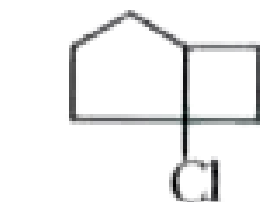
D.

Answer: A



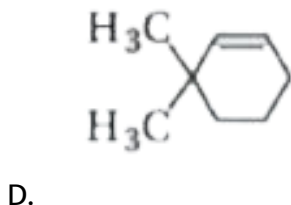
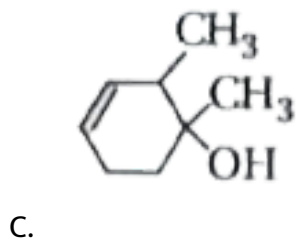
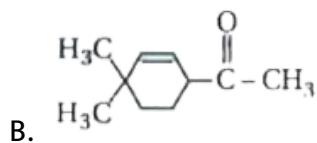
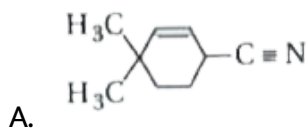
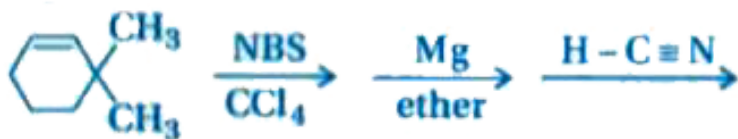
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57. The major product obtained by the following reactions is



Answer: C

58. The final product (P) in the following reaction sequence is



Answer: D

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59. Consider the following reaction



If r_1 is the rate of reaction and r_2 is the rate of racemisation then which of the following relation is true ?

A. $r_1 = r_2$

B. $r_1 = 2r_2$

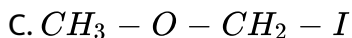
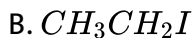
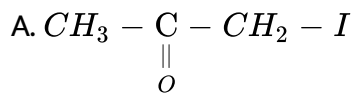
C. $r_2 = 2r_1$

D. $r_2 = 4r_1$

Answer: C

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60. Which of the following will undergo S_N2 most readily ?



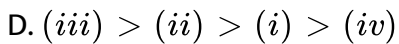
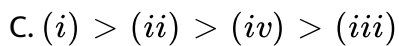
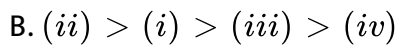
Answer: A

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61. Arrange the following in decreasing order of their S_N2 reactivity :



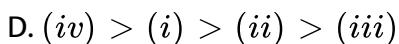
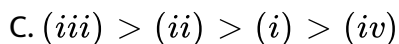
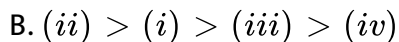
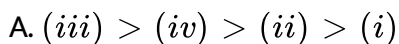
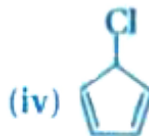
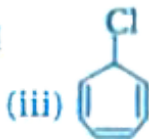
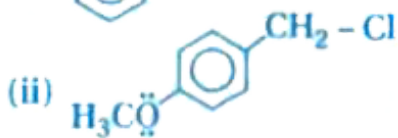
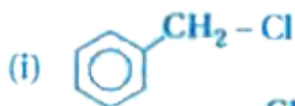
A. (iv) > (iii) > (i) > (ii)



Answer: B

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62. Which of the following is correct order of hydrolysis ?



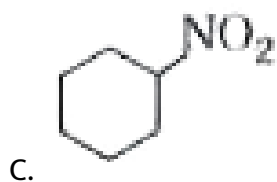
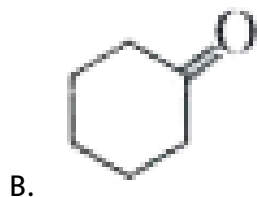
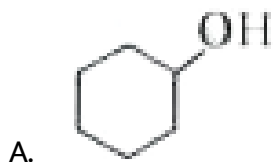
Answer: C

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63.

The product (P) in the reaction is



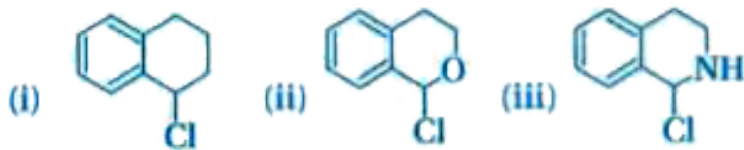


D.

Answer: B

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64. Identify the correct reactivity order of S_N1 reaction :



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

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

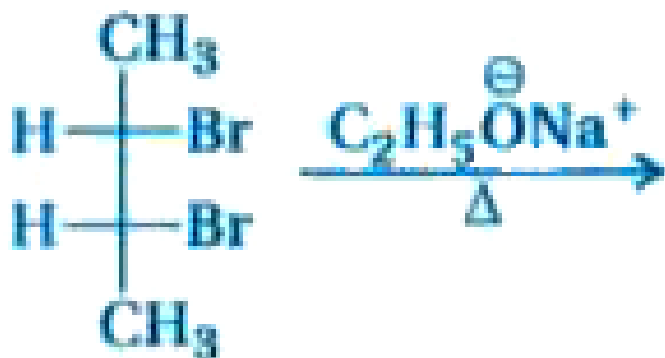
C. (i) > (iii) > (ii)

D. (i) > (ii) > (iii)

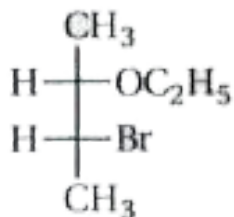
Answer: A

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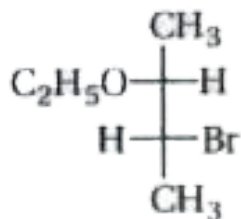
65. The major product of the reaction is



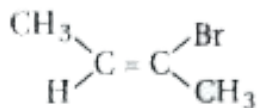
A.

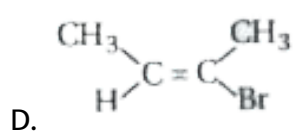


B.



C.



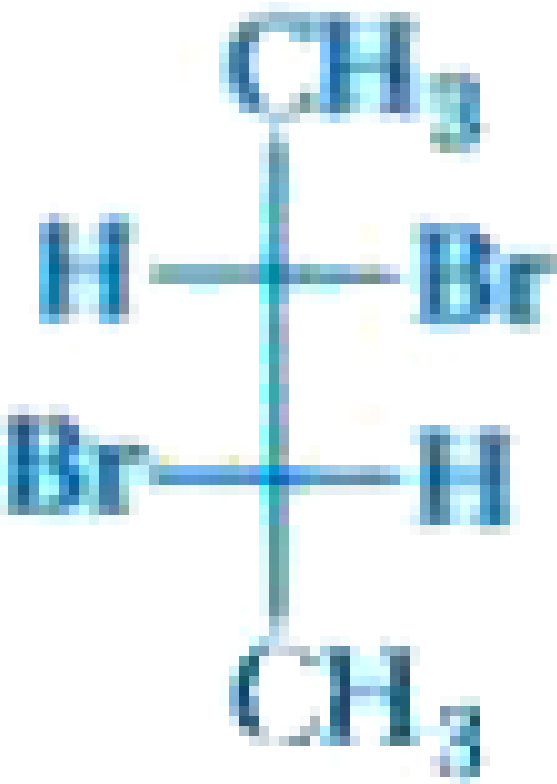


Answer: D



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66. The correct configuration of the compound is



A. (2R, 3R)

B. (2R, 3S)

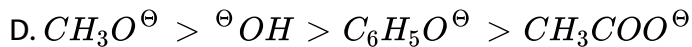
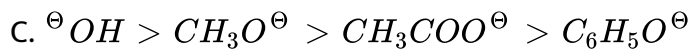
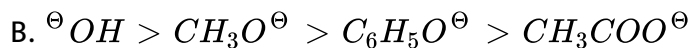
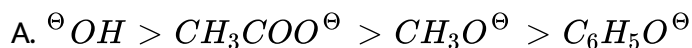
C. (2S, 3R)

D. (2S, 3S)

Answer: D

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67. The correct order of nucleophilic strength is



Answer: D

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68. Toluene is obtained by reaction of mixture of chlorobenzene and methyl chloride with Na metal in dry ether. This reaction is called

A. Wurtz Fitting reaction

B. Fitting reaction

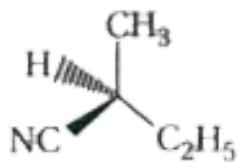
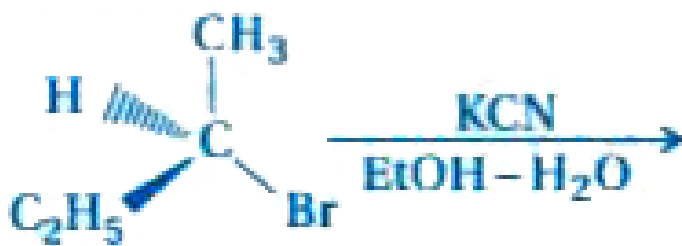
C. Grignard reaction

D. Friedel crafts reaction

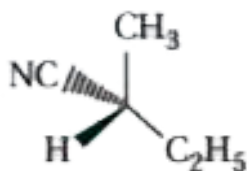
Answer: A

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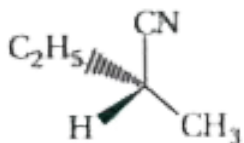
69. Identify the major product in the given reaction :



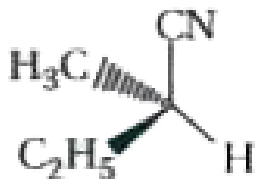
A.



B.



C.



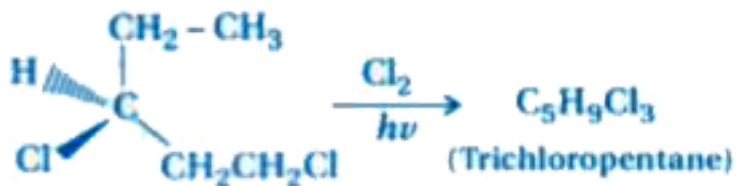
D.

Answer: A

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70. If a pure enantiomer of 1,3-dichloropentane shown below is subject to free radical chlorination to obtain trichloropentane how many different

isomers would be formed ?



A. 7

B. 5

C. 3

D. 9

Answer: A

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71. Which of the following compounds will not undergo elimination reaction in presence of $\text{C}_2\text{H}_5\text{O}^\ominus \text{Na}^\oplus / \text{C}_2\text{H}_5\text{OH}$?

A. Isobutyl bromide

B. Neopentyl bromide

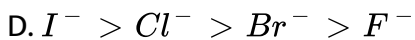
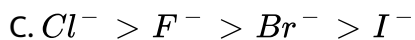
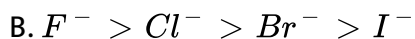
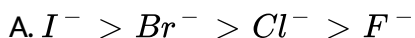
C. Secbutyl bromide

D. Isopentyl bromide

Answer: B

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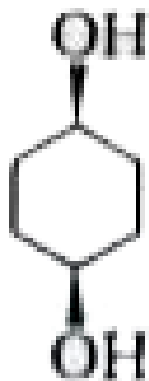
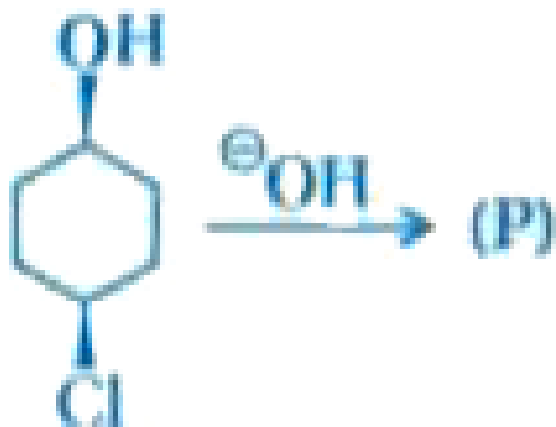
72. The correct order of leaving group tendency is



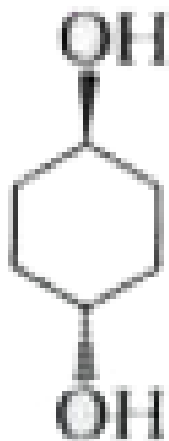
Answer: A

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73. The final product in the reaction is :



A.



B.



C.

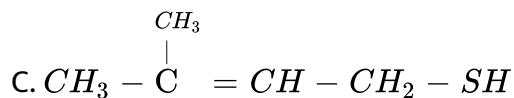
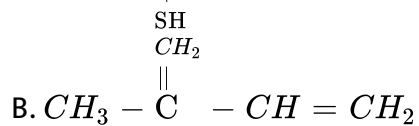
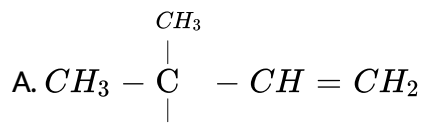
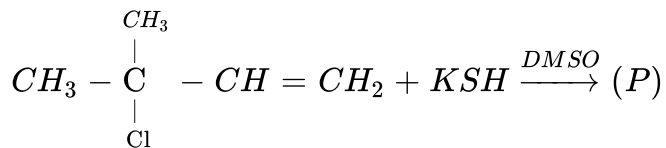


D.

Answer: B

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74. In the following reaction, the major product formed will be

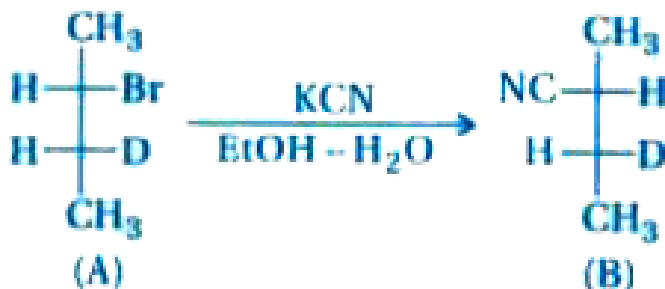


D. None of these

Answer: C

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75. Which of the following is true for the given reaction ?



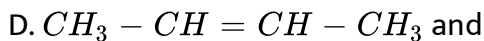
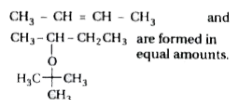
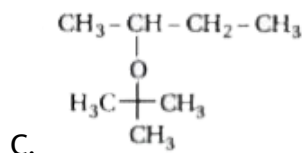
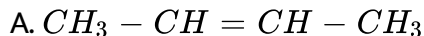
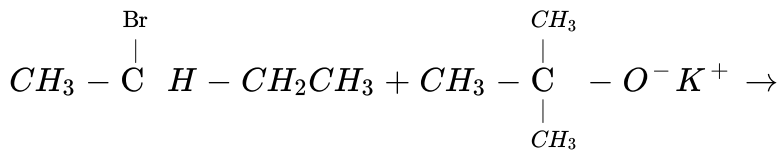
- A. The reactant (A) and product (B) are diastereomers of each other.
- B. The reactant (A) and product (B) are enantiomers of each other and both are optically active.
- C. Under the same reaction conditions the diastereomers of (A) will produce the diastereomer of (B).
- D. The reactants (A) and product (B) have the same optical rotation but in opposite direction.

Answer: C



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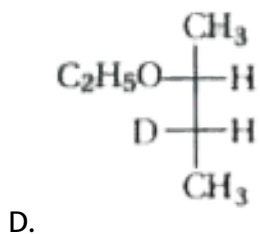
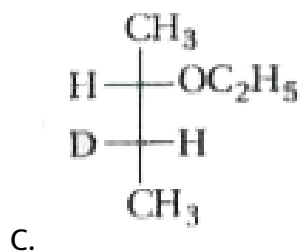
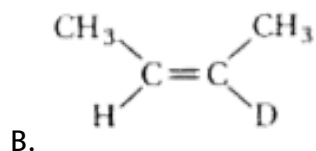
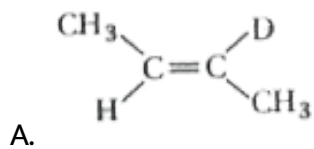
76. The major product in the given reaction will be



Answer: B

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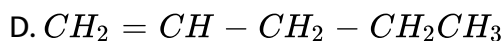
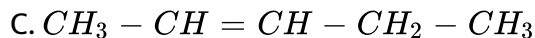
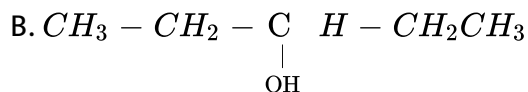
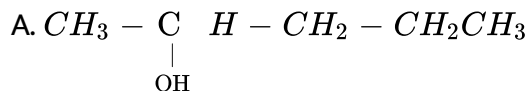
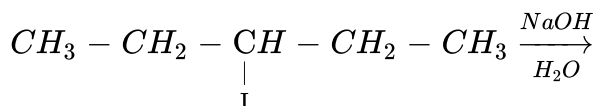
77. The major product of the reaction is



Answer: A

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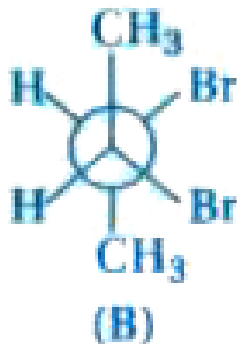
78. The major product in the given reaction is



Answer: A

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79. The stereochemical relation between two compounds (A) and (B) is



- A. Identical
- B. Diastereomers
- C. Enantiomers
- D. Constitutional isomers

Answer: B



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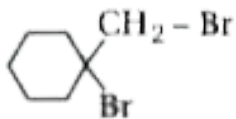
80. In the following reaction :



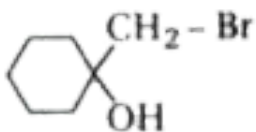
X is



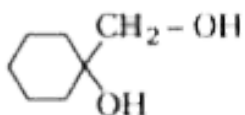
A.



B.



C.



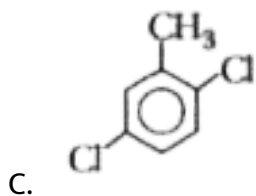
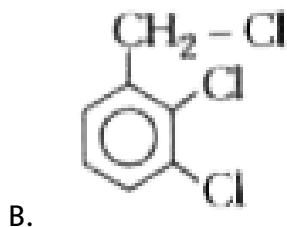
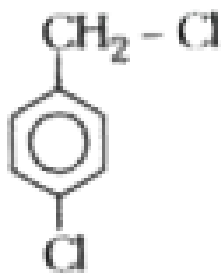
D.

Answer: C



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81. An aromatic compound $C_7H_6Cl_2$ (A) gives $AgCl$ on boiling with alcoholic $AgNO_3$ solution and yields C_7H_7OCl on treatment with sodium hydroxide (A) on oxidation gives monochlorobenzoic acid. The compound (A).



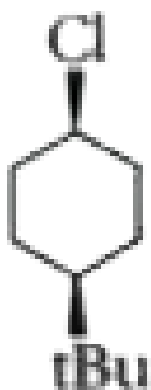


D.

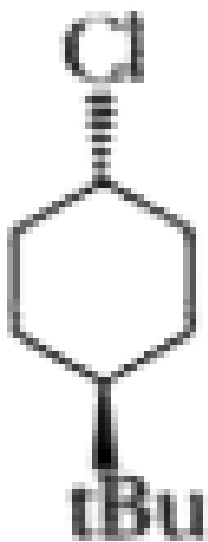
Answer: A

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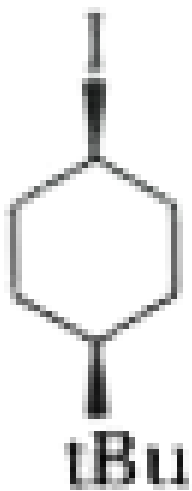
82. Which of the following is most reactive by S_N1 ? (tBu = tert-Butyl group)



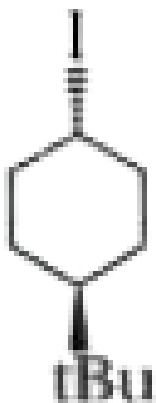
A.



B.



C.



D.

Answer: C

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83. What is mixture of dextro and levo isomers called ?

- A. Racemic mixture
- B. Optical active
- C. Resonance mixture
- D. All of the given

Answer: A



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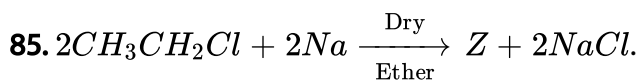
84. The reaction that take place is aryl halide is

- A. Nucleophilic substitution
- B. Electrophilic addition
- C. Electrophilic substitution
- D. Nucleophili addition

Answer: C



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The (Z) in the reaction is

- A. Ethane
- B. Propane

C. Sodiummethyl

D. Butane

Answer: D

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86. Chlorination of carbon disulphide gives

A. Methyl chloride

B. Carbon tetrachloride

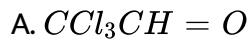
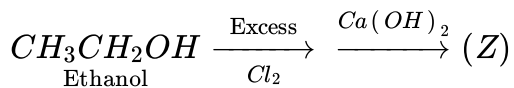
C. Chloroform

D. Freon

Answer: B

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87. In the given reaction, the product (Z) is



Answer: B



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88. Iodoform is used as

A. Anaesthetic

B. Analgesic

C. Antiseptic

D. Anti-allergic

Answer: C



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89. To prevent oxidation of chloroform is added.

A. Orthophosphoric acid

B. Ethanol

C. Urea

D. Acetone

Answer: B



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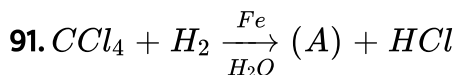


The product (Z) is

- A. Toluene
- B. Ethyl benzene
- C. Styrene
- D. Nitrobenzene

Answer: B

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The product (A) is

- A. CH_2Cl_2



Answer: B

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92. When chloroform is kept open in air, a poisonous gas phosgene is formed. The molecular formula of phosgene is



Answer: B

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93. Which polyhalogen compound is used as a fire extinguisher in case of fire caused by oils, fats etc. ?



Answer: D



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94. Which product is obtained when chlorobenzene react with 6 to 8% aq. NaOH at 633 K and 300 bar pressure in presence of acid catalyst ?

A. Benzene

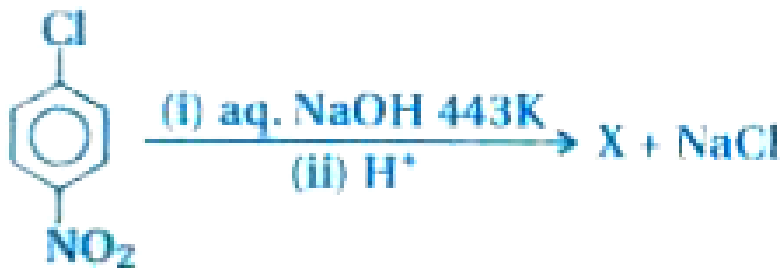
B. Phenol

C. 2,4,6-trinitrophenol

D. Aniline

Answer: B

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95.

What is 'X' in given reaction ?

A. 2, 4- dinitrophenol

B. 4 - nitrophenol

C. 2,4,6 - trinitrophenol

D. Benzophenone

Answer: B

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96. Which product is obtained when chlorobenzene react with NaCN in presence of $Cu_2(CN)_2$ at 473 K temp and high pressure ?

- A. Phenyl cyanide
- B. Phenol
- C. Both (A) and (B)
- D. 2,4 dinitro phenol

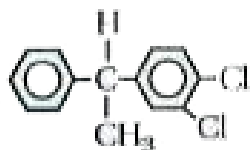
Answer: A

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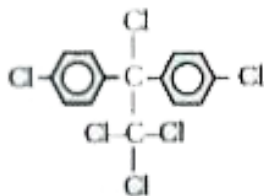


97.

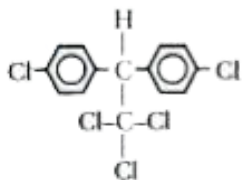
What is Z given reaction ?



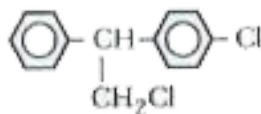
A.



B.



C.



D.

Answer: C



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98. Which factor is important to determine stability of carbocation ?

- A. Rate of reaction
- B. Transition state
- C. Resonance
- D. Temperature

Answer: C



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99. Which compounds enters the body and create possibility of cancer ?

- A. $CHCl_3$
- B. CCl_2F_2
- C. CH_2Cl_2

D. DDT

Answer: D

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100. Which device is used to measure the magnitude of rotation of the plane of polarized light ?

A. pH meter

B. Potentiometer

C. Spectrometer

D. Polarimeter

Answer: D

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101. Which polyhalo compound is obtained by reduction of $CHCl_3$ in presence of $(Zn + HCl)$?

A. CCl_4

B. CH_2Cl_2

C. CHI_3

D. DDT

Answer: B



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102. An acyl halide is formed when PCl_5 reacts with

A. amide

B. alcohol

C. acid

D. ester

Answer: C

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103. The compounds obtained by the substitution of hydrogen by halogen in alkane series is

- A. Chlorobenzene, Vinyl chloride, Chloroethane
- B. Chloroethane, Chlorobenzene, Vinyl chloride
- C. Vinyl chloride, Chlorobenzene, Chloroethane
- D. Vinyl chloride, Chloroethane, Chlorobenzene

Answer: A

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104. Allyl chloride is hydrolysed more readily than n-propyl chloride. Why ?

A. Propadiene

B. Propylene

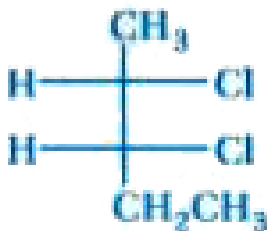
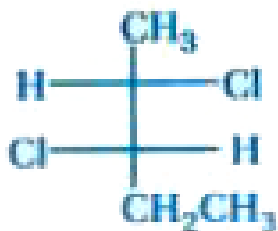
C. Alkyl alcohol

D. Acetone

Answer: A

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105. The two optical isomers given below are namely ?



A. Enantiomers

B. Diastereomers

C. Position isomerism

D. Meso compound

Answer: B

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106. A : Benzyl bromide when kept in acetone water it produces benzyl alcohol.

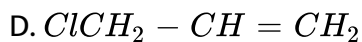
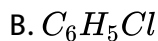
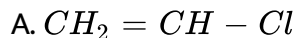
R : The reaction follows S_N2 mechanism.

- 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

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107. Which of the following is least reactive in a nucleophilic substitution reaction ?



Answer: D



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108. Chlorination of toluene in the presence of light and heat followed by treatment with aqueous $NaOH$ gives

A. o-cresol

B. p-cresol

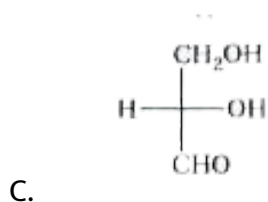
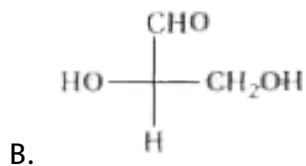
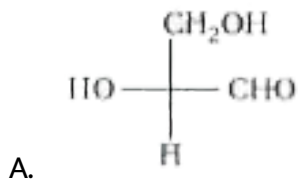
C. Mixture of o-cresol and p-cresol

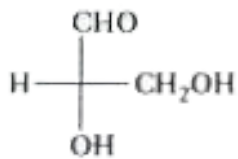
D. Benzoic acid

Answer: D

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109. Which of the following Fisher projection formula is identical to D-glyceraldehyde ?



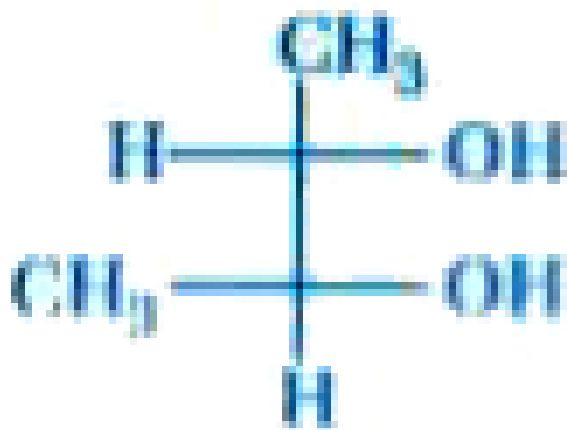


D.

Answer: B

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110. The configuration of the following is



A. 1S, 2S

B. 1S, 2R

C. 1R, 2S

D. 1R, 2R

Answer: A

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111. If acceleration of A is $2m/s^2$ which is smaller than acceleration of B then the value of frictional force applied by B on A is :-



A. Enantiomers

B. Diastereomers

C. Meso Compound

D. Identical

Answer: D

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112. The major product obtained on treatment of $CH_3CH_2CH(F)CH_3$ with CH_3O^- / CH_3OH is

- A. $CH_3CH_2CH(OCH_3)CH_3$
- B. $CH_3CH = CHCH_3$
- C. $CH_3CH_2CH = CH_2$
- D. $CH_3CH_2CH_2CH_2CH_2OCH_3$

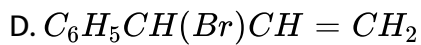
Answer: B



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113. 3-methylbut-1-ene on reaction with HBr gives (as major product) ?

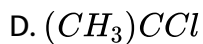
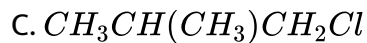
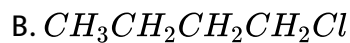
- A. $C_6H_5CH_2CH(Br)CH_3$
- B. $C_6H_5CH(Br)CH_2CH_3$
- C. $C_6H_5CH_2CH_2CH_2Br$



Answer: B

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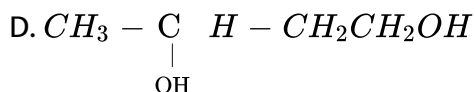
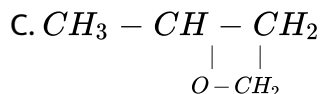
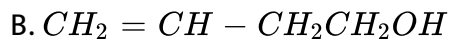
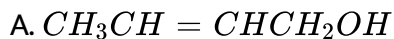
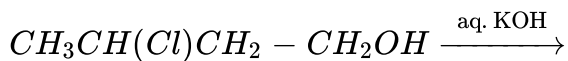
114. Which of the following compounds has the highest boiling point ?



Answer: B

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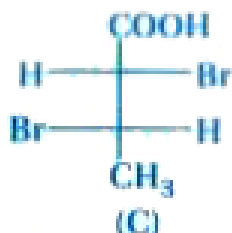
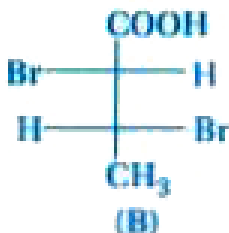
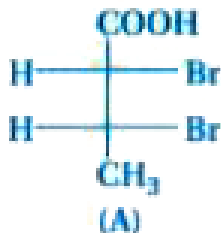
115. The major product formed in the following reaction is



Answer: D

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116. Which of the following is correct for structures A, B and C ?



A. (B) and (C) are identical

B. (A) and (B) are diastereomers

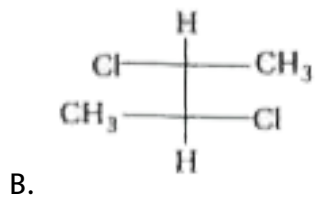
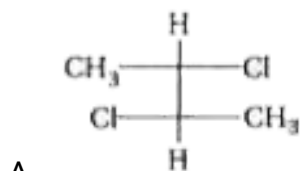
C. (A) and (C) are enantiomers

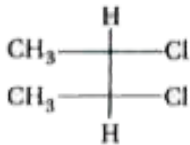
D. (A) and (B) are enantiomers

Answer: B

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117. Which one of the following is optically inactive ?





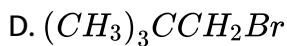
C.

D. None of these

Answer: C

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118. 3-methylbut-1-ene on reaction with HBr gives (as major product) ?



Answer: B

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119. A : Chloral reacts with phenyl chloride to form DDT.

R : It is an electrophilic substitution reaction.

- 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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120. A compound is formed by substitution of two chlorine for two hydrogens in propane. The number of possible isomeric compounds is

A. 4

B. 3

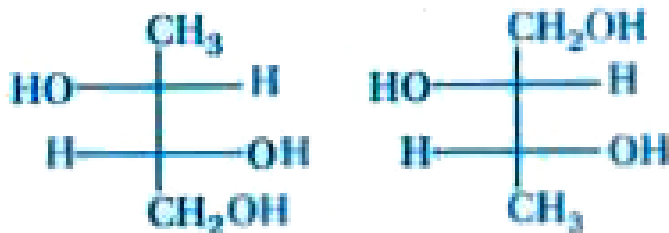
C. 5

D. 2

Answer: C

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121. The two structures written below represent ,



A. pair of diastereomers

B. pair of enantiomers

C. same molecule

D. both are optically inactive

Answer: C

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122. Which of the following compound possess antiseptic properties ?

- A. Dichloro methane
- B. Trifluoro methane
- C. Tri Iodo methane
- D. Tetrachloro methane

Answer: C

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123. In presence of which compound, benzene reacts with I_2 to give iodo benzene ?

A. HNO_3

B. HI

C. SO_2

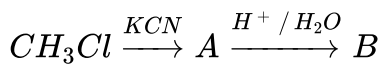
D. H_2O

Answer: A



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124. In the following reactions, the final product B is



A. CH_3COOH

B. H COOH

C. CH_3NH_2

D. CH_3COCH_3

Answer: A



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125. When you heat chloroform with silver powder is formed.

- A. ethene
- B. ethyne
- C. methane
- D. ethane

Answer: B



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126. is obtained when 1- chloro butane reacts with alcoholic potash ?

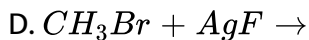
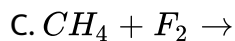
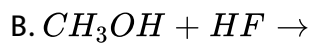
- A. 1-butanol
- B. 2-butene
- C. 1-butene

D. 2-butanol

Answer: C

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127. Which of the following reaction is true for preparation of methyl fluoride ?



Answer: D

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128. Chlorobenzene reacts with sodium metal in presence of dry ether to prepare diphenyl the name of the reaction is

- A. Fittig reaction
- B. Wurtz - Fitting reaction
- C. Sandmeyer reaction
- D. Gattermann reaction

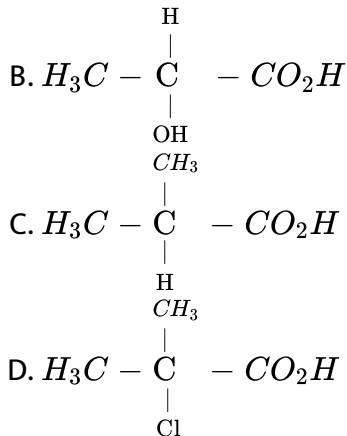
Answer: A



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129. Which of the following will react faster through S_N1 mechanism ?

- A. $CH_2 = CHCH_2Cl$
- B. C_6H_5Cl
- C. $C_6H_5CH_2Cl$
- D. $C_6H_5CH(CH_3)Cl$



Answer: B

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132. Rate of formation SO_3 in this reaction is $1.6 \times 10^{-3} \text{ kg/ min}$

$2SO_2 + O_2 \rightarrow 2SO_3$ then rate at which SO_2 reacts is :-

- 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

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133. The (R) - (S) - enantiomers of an optically active compound differ in

- A. their reactivity with achiral reagents.
- B. their optical rotation of plane polarized light.
- C. their melting points.
- D. their solubility in achiral reagents.

Answer: B

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134. Isopropyl chloride undergoes hydrolysis by

- A. SN^1 mechanism
- B. SN^2 mechanism
- C. SN^1 and SN^2 mechanism
- D. Neither SN^1 nor SN^2 mechanism

Answer: C

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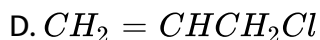
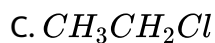
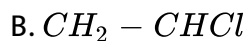
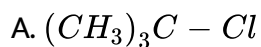
135. When alkyl halides are treated with alcoholic KOH, the products are

- A. an isocyanide.
- B. an aldehyde.
- C. an cyanide.
- D. an alcohol.

Answer: A

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136. Which of the following is least reactive in a nucleophilic substitution reaction ?



Answer: B



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137. Which represents nucleophilic aromatic substitution reaction ?

A. Reaction of benzene with Cl_2 in sunlight

B. Benzyl bromide hydrolysis

C. Reaction of NaOH with dinitro fluoro benzene

D. Sulphonstion of benzene

Answer: C

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138. Which of the following compounds is not chiral ?

A. 1-chloropentane

B. 2-chloropentane

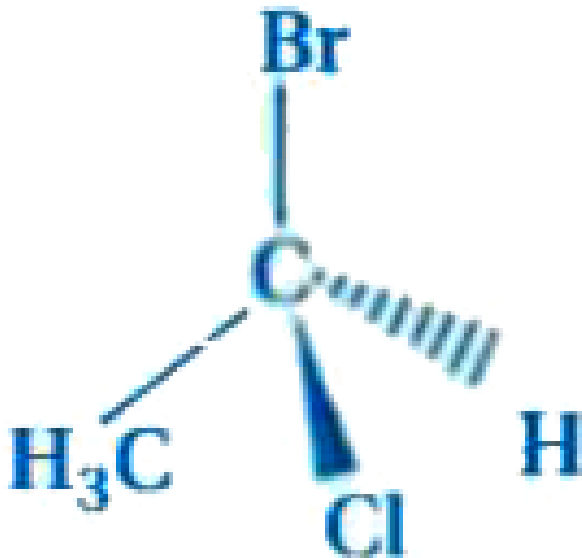
C. 1-chloro-2-methylpentane

D. 3-chloro-2-methylpentane

Answer: A

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139. The absolute configuration of the compound is



A. E

B. R

C. S

D. Z

Answer: B

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140. For the following : (a) I^- (b) Cl^- (c) Br^- the increasing order of nucleophilicity would be



Answer: C

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141. The reaction of toluene with Cl_2 in presence of $FeCl_3$ gives predominantly.

A. m-chlorotoluene

B. Benzoyl chloride

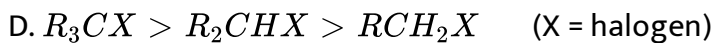
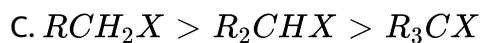
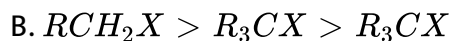
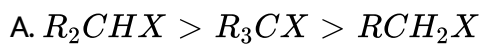
C. p-chlorotoluene

D. o- and p- chlorotoluene

Answer: D

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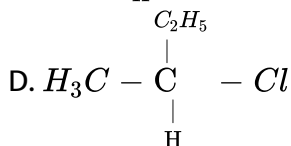
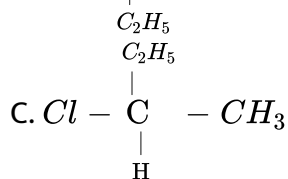
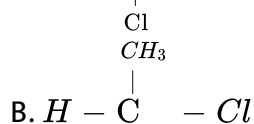
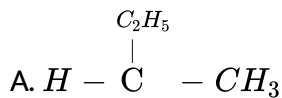
142. Which of the following is correct order of decreasing S_N2 reactivity ?



Answer: C

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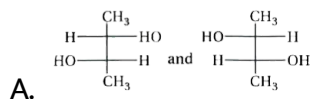
143. $CH_3 - CHCl - CH_2 - CH_3$ has a chiral centre. Which one of the following represents its R - configuration ?

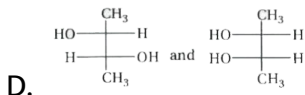
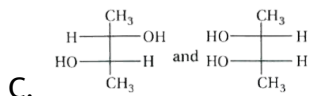
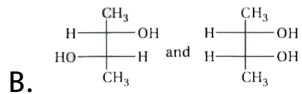


Answer: C

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144. Which of the following compounds are gemdihalides ?

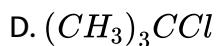
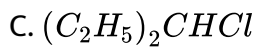
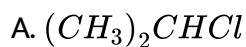




Answer: A

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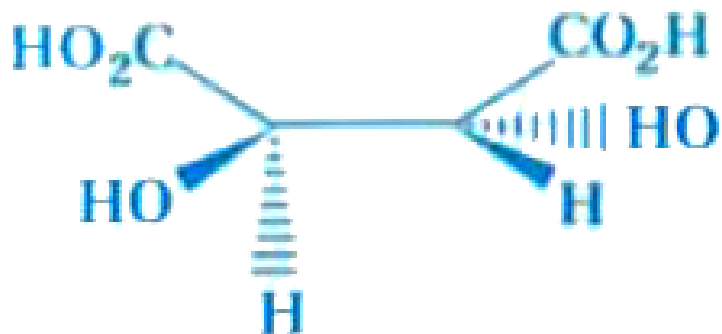
145. The organic compound that undergoes carbylamine reaction is



Answer: B

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146. The absolute configuration of



is

A. R, S

B. S, R

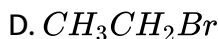
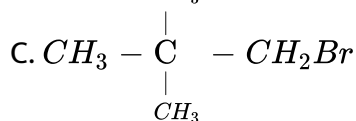
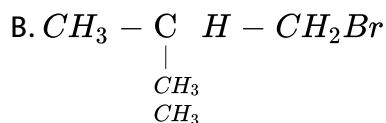
C. S, S

D. R, R

Answer: D

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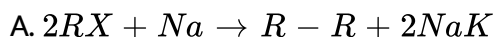
147. In a S_N2 substitution reaction of the type $R - Br + Cl^- \xrightarrow{DMF} R - Cl + Br^-$ which one of the following has the highest relative rate ?

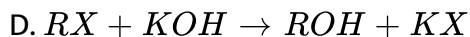
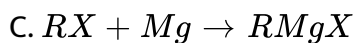
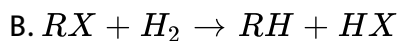


Answer: D

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148. Which of the following reaction is an example of nucleophilic substitution reaction ?

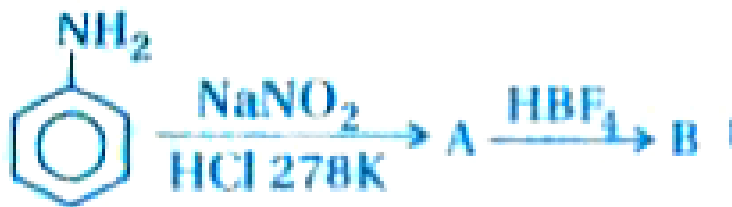




Answer: D

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149. In the chemical reaction,



the compounds 'A' and 'B' respectively are

A. Nitrobenzene and chlorobenzene

B. Nitrobenzene and fluorobenzene

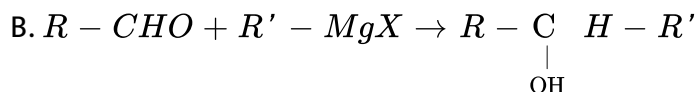
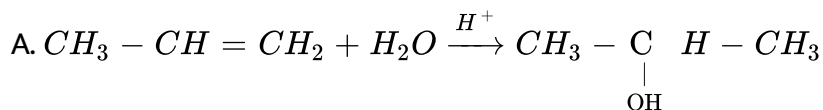
C. Phenol and Benzene

D. Benzene diazonium chloride and fluorobenzene

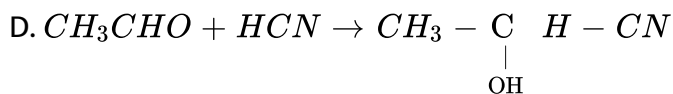
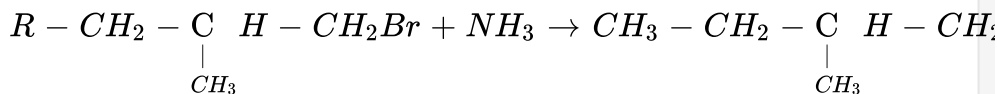
Answer: D

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150. Which of the following is nucleophilic addition reaction ?



C.



Answer: C

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151. Which of the following is /are the method (s) of determining the molecular mass ?

- A. Neopentane
- B. Isohexane
- C. Neohexane
- D. Tertiary butyl chloride

Answer: A



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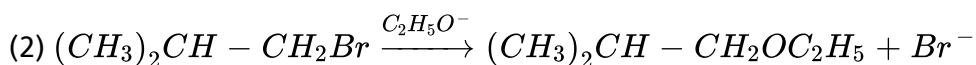
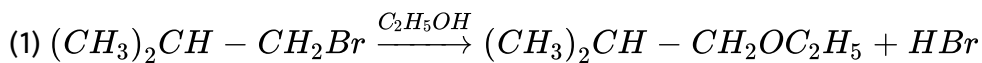
152. What is DDT among the following

- A. A fertilizer
- B. Biodegradable pollutant
- C. Non-biodegradable pollutant
- D. Greenhouse gas

Answer: C

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153. Consider the reactions :



The mechanisms of reactions (i) and (ii) are respectively :

A. S_N1 and S_N2

B. S_N1 and S_N1

C. S_N2 and S_N2

D. S_N2 and S_N1

Answer: A

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154. A solution of (-)-chloro-1-phenylethane in toluene racemises slowly in the presence of a small amount of $SbCl_5$, due to the formation of:-

- A. carbanion
- B. carbene
- C. carbocation
- D. free radical

Answer: C

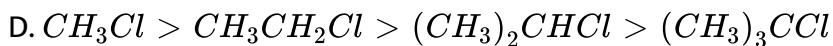
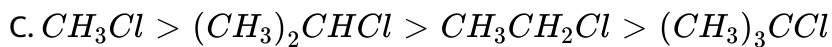


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155. In S_N2 reactions, the correct order of reactivity for the following compounds :

CH_3Cl , CH_3CH_2Cl , $(CH_3)_2CHCl$ and $(CH_3)_3CCl$ is :

- A. $CH_3CH_2Cl > CH_3Cl > (CH_3)_2CHCl > (CH_3)_3CCl$
- B. $(CH_3)_2CHCl > CH_3CH_2Cl > CH_3Cl > (CH_3)_3CCl$



Answer: D

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156. The major organic compound formed by the reaction of 1,1,1-trichloroethane with silver powder is :

A. 2-Butyne

B. 2-Butene

C. Acetylene

D. Ethene

Answer: A

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157. The synthesis of alkyl fluoride is best accomplished by:

- A. Free radical fluorination
- B. Sandmeyer's reaction
- C. Finkelstein reaction
- D. Swarts reaction

Answer: D



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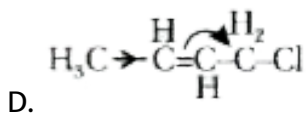
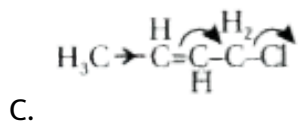
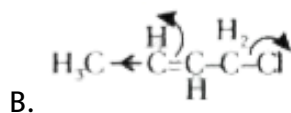
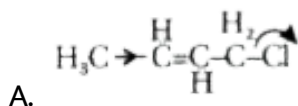
158. Which of the following compounds will not undergo hydrolysis ?

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

Answer: C

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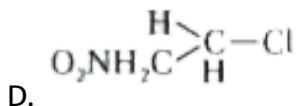
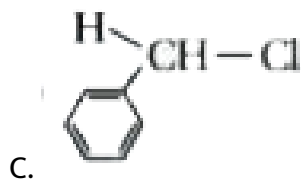
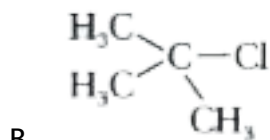
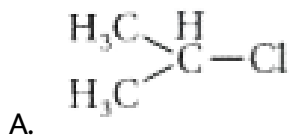
159. Which of the following is the most correct electron displacement for a nucleophilic reaction to take place ?



Answer: C

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



Answer: C

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161. Which of the following statements is not correct for a nucleophile ?

A. Nucleophiles attack low e^- density sites

B. Nucleophiles are not electron seeking

C. Nucleophile is a Lewis acid

D. Ammonia is a nucleophile

Answer: C

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162. Two possible stereo-structures of $CH_3CHOH.COOH$, which are optically active, are called :

A. Enantiomers

B. Mesomers

C. Diastereomers

D. Atropisomers

Answer: A

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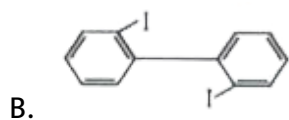
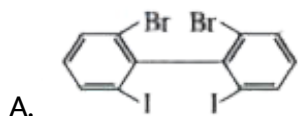
163. In an S_N1 reaction on chiral centres, there is :

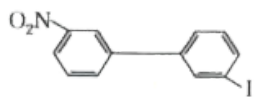
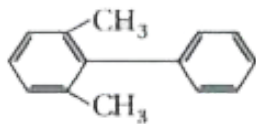
- A. 100 % retention
- B. 100 % inversion
- C. 100 % racemization
- D. inversion more than retention leading to partial racemization.

Answer: D

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164. Which of the following biphenyls is optically active ?

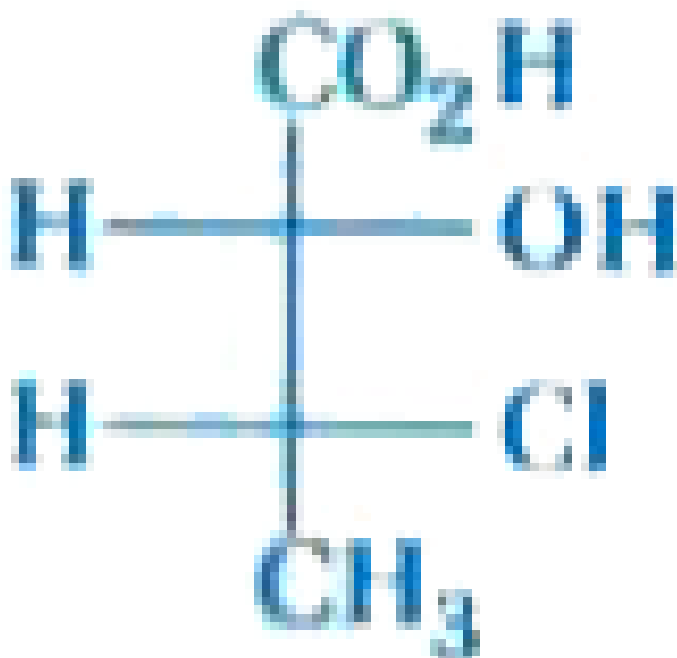




Answer: A

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165. The absolute configuration of



A. (2R, 3R)

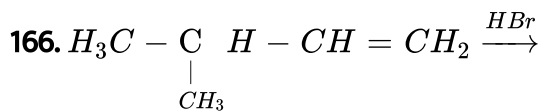
B. (2R, 3S)

C. (2S, 3R)

D. (2S, 3S)

Answer: C

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

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

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

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

Answer: B

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167. Which of the following upon treatment with tert-BuONa followed by addition of bromine water, fails to decolourize the colour of bromine ?

A. 

B. 

C. 

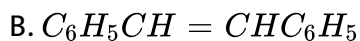
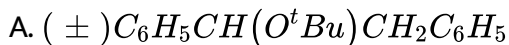
D. 

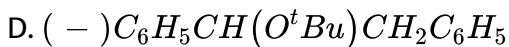
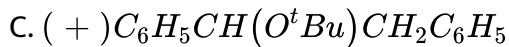
Answer: A



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168. The major product obtained in the following reaction is

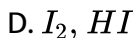
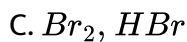
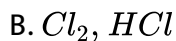
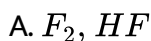




Answer: B

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169. Which of the following pairs shows highest bond dissociation enthalpy among halogens and lowest bond dissociation enthalpy among hydrogen halides ?



Answer: D

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170. Among halogens, the one which can oxidise water to oxygen is

- A. chlorine
- B. bromine
- C. fluorine
- D. iodine

Answer: C



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171. The letter 'D' in D-glucose signifies.

- A. configuration at all Chiral Carbons.
- B. dextrorotatory.
- C. that it is a monosaccharide.
- D. configuration at the penultimate Chiral Carbon.

Answer: D

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172. Which of the compounds will react faster in S_N1 reaction with the ^-OH ion ?

$CH_3 - CH_2 - Cl$ OR $C_6H_5 - CH_2 - Cl$

A. $H_2C = CH - CH_2Cl$

B.

C. $CH_2 = CHCl$

D. CH_3CH_2Cl

Answer: A

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



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174. Which of the following carbocations is expected to be most stable ?

A. 

B. 

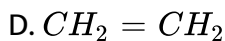
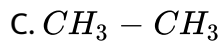
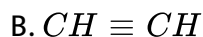
C. 

D. 

Answer: C

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175. Which is the final product obtained by the reaction of a grignard reagent ethyl Magnesium bromide with propanone ?



Answer: A



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176. Compound A, $C_8H_{10}O$ is found to react with NaOI (produced by reacting Y with NaOH) and yields a yellow precipitate with characteristic smell. A and Y are respectively.



C. 

D. 

Answer: C

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177. The increasing order of reactivity of the following compounds towards reaction with alkyl halides directly is



A. $(ii) < (i) < (iv) < (iii)$

B. $(ii) < (i) < (iii) < (iv)$

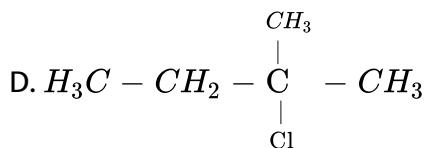
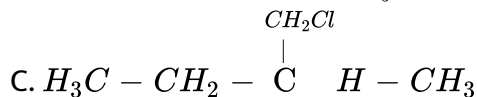
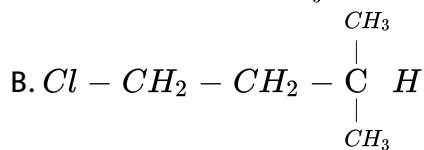
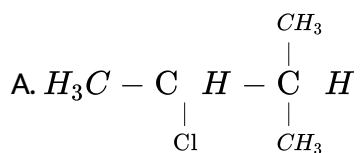
C. $(i) < (iii) < (iv) < (ii)$

D. $(i) < (ii) < (iii) < (iv)$

Answer: B

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178. An alkene "A" on reaction with O_3 and $Zn - H_2O$ gives propanone and ethanal in equimolar ratio. Addition of HCl to alkene "A" gives "B" as the major product. The structure of product "B" is :



Answer: D



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179. Among the following, the reaction that proceeds through an electrophilic substitution, is :

A. 

B. 

C. 

D. 

Answer: C

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180. 

A. 

B. 

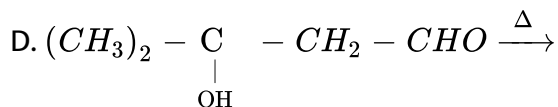
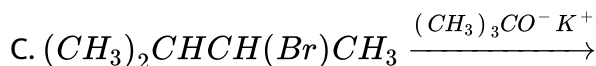
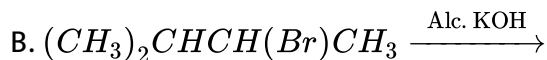
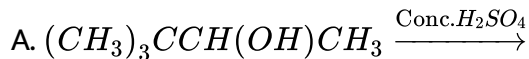
C. 

D. 

Answer: A

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181. By which of the following reactions, chlorine gas will not be obtained as the product ?



Answer: C



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182. The decreasing order of reactivity towards dehydrohalogenation (E_1) reaction of the following compounds is :



A. $B > A > D > C$

B. $B > D > A > C$

C. $B > D > C > A$

D. $D > B > C > A$

Answer: D

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183. How many numbers of possible stereo-isomers are there of 2,3,4 tri chloro pentanoic acid ?

A. 8

B. 12

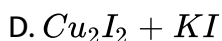
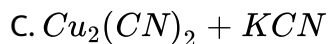
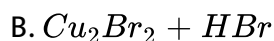
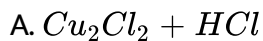
C. 16

D. 4

Answer: A

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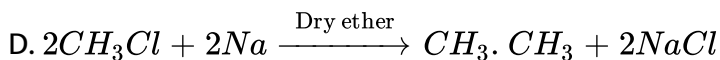
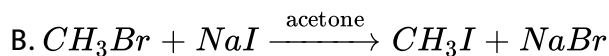
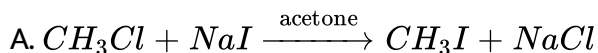
184. Which one is not a Sandmeyer reagent ?



Answer: D

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185. Which one of the Swartz reaction from the following ?



Answer: C

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186. Which of the following statement is incorrect for bimolecular nucleophilic substitution reaction (S_N2) ?

- A. It is a second order reaction.
- B. In S_N2 reaction the substrate does not undergo heterolytic fission.
- C. The rate of S_N2 reaction does not depends on concentrations of both substrate and nucleophilic reagent.
- D. S_N2 reaction occurs in single step without forming intermediate.

Answer: C

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187. Which of the following is allylic halide?

- A. Benzyl chloride
- B. (1-bromo ethyl) benzene
- C. 1-bromo benzene
- D. 3-chloro cyclo hex-1-ene

Answer: D

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188. 50% of the reagent is used for dehydrohalogenation of 6.45 gm CH_3CH_2Cl . What will be the weight of the main product obtained?

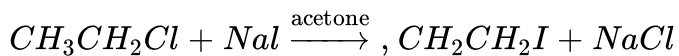
(At. mass of H, C and Cl are 1, 12 & 35.5 $gm / mole^{-1}$ respectively]

- A. 0.7 gm
- B. 1.4 gm
- C. 2.8 gm
- D. 5.6 gm

Answer: B

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189. Name the following reaction



- A. Swartz reaction
- B. Finkelstein reaction
- C. Wurtz reaction
- D. Hell - Volhard Zelinsky reaction

Answer: B

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190. Which of following structure shows R configuration ?

A. 

B. 

C. 

D. 

Answer: A

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191. Which statement is improper for tetrachloro methane ?

A. When it comes in direct contact of skin, red rashes are formed.

B. At high temperature on reaction with water forms phosgene.

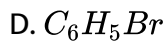
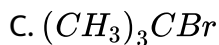
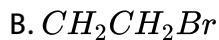
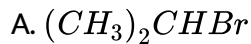
C. It is used for extinguishing the fire in substances like oil and petrol

D. It is insoluble in water and gives fragrance.

Answer: A

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192. The reaction of $(CH_3)_3COONa$ with ___ reagent is the most easy?

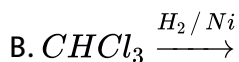
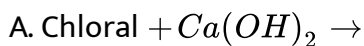


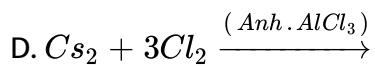
Answer: B



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193. The organic product of which reaction from the following is used as anaesthetic?





Answer: A

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194. Which of the following compound gives only one monochloro product on its chlorination in presence of sunlight?

- A. Iso pentane
- B. n - pentane
- C. Neo pentane
- D. n - butane

Answer: C

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195. Which is the oxidized product obtained when benzene diazonium chloride reacts with phosphonic acid in presence of water?

- A. Chloro benzene
- B. Phenol
- C. Benzene
- D. Phosphorus acid

Answer: D



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196. Which of the following compound is the most basic?

A. 

B. 

C. 

D. 

Answer: B

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197. The number of σ and π bonds in orange azo dye is and
Respectively.

- A. 27 and 7
- B. 24 and 7
- C. 26 and 7
- D. 26 and 6

Answer: C

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198. 1,2-dichloro ethane is which type of halide?

- A. Geminal halide
- B. Vicinal halide
- C. Alkylidene halide
- D. Allylic halide

Answer: B

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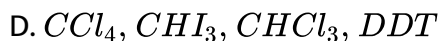
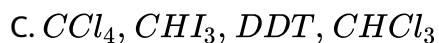
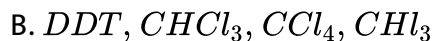
199. Polarimeter is used to determine _____ of compounds.

- A. D and L configuration
- B. d and l configuration
- C. R and S configuration
- D. Both D and L as well as d & l configuration

Answer: B

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200. Which of the following group of compounds are extinguisher, antiseptic, insecticide and anesthetic respectively?



Answer: C



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201. How many σ and π bonds are present in Vinyl Chloride ?



D. 4σ and 1π

Answer: A

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202. In which of the following, halogenated carbon possesses sp^3 hybridization ?

A. 

B. 

C. $CH_2 = CH - Cl$

D. 

Answer: D

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203. The rate of second order reaction depends on

- A. only concentration of substrate
- B. concentration of two reactants
- C. concentration of product
- D. concentration of neucleophile

Answer: B



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204. Williamson synthesis is

- A. SN reaction
- B. S_N1 reaction
- C. S_N2 reaction
- D. None of the given

Answer: C

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205. Addition reaction of alkene with hydrogen halide is known as

- A. halogenation
- B. hydrohalogenation
- C. Sandmeyer reaction
- D. hydration

Answer: B

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206. Which carbon - halogen bond has the lowest bond enthalpy ?

- A. C - Cl

B. C - Br

C. C - F

D. C - I

Answer: D



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207. Choose the correct option about the following sentences. (T = True and F = False)

(i) In S_N1 reaction always racemic mixture is formed and for S_N2 reaction in 50% cases racemic mixture is formed.

(ii) S_N1 reaction occurs through carbonium ion mechanism, while S_N2 reaction occurs through free radical mechanism.

A. F, F

B. T, T

C. F, T

D. T, F

Answer: A



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208. How many chiral carbon atoms are there in 1-chloro-2,5 dimethyl cyclohexane ?

A. 1

B. 0

C. 2

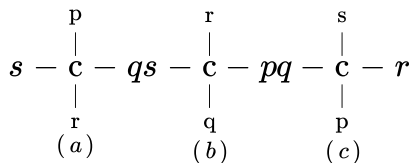
D. 3

Answer: D



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209. Determine the correct configuration of following structures :



p = I, q = Br, r = H, S = Cl

A. (a) S (b) S (c) R

B. (a) S (b) R (c) S

C. (a) R (b) R (c) S

D. (a) S (b) R (c) R

Answer: C

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210. Mention the compound not containing any chiral carbon atom ?

A. 2-methyl Butanal

B. 2,2-dimethyl propanoic acid

C. 2-hydroxy propanoic acid

D. 1,2-dichloro propane

Answer: B

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211. Which of the following is an example of a geminal Halide ?

A. 1, 2 - dichloropropane

B. 1,4 - dichlorobutane

C. 2-chlorobutane

D. 1,1-dichloropropane

Answer: D

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212. Chlorobenzene can be prepared by reacting Aniline with :

- A. Hydrochloric acid
- B. Chlorine in presence of anhydrous $AlCl_3$
- C. Cuprous chloride
- D. Nitrous acid followed by heating with Cuprous chloride

Answer: D



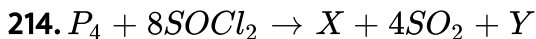
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213. Which two reagents are required to produce D.D.T. ?

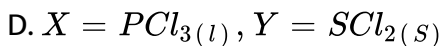
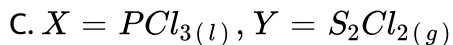
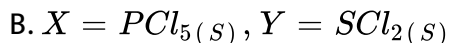
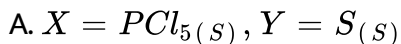
- A. Chloral and Chloroform
- B. Chloral and Chlorobenzene
- C. Chloroform and Chlorobenzene
- D. Chloroform and CCl_4

Answer: B

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In this equation mention formula of X and Y

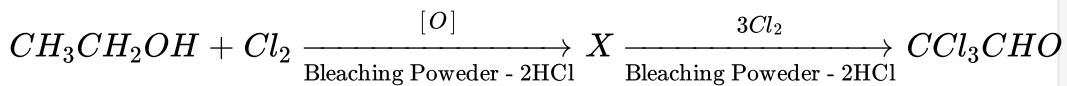


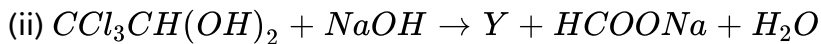
Answer: C

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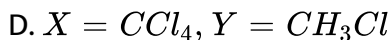
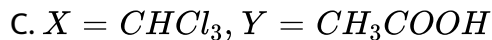
215.

(i)





The compound 'X' and 'Y' in the above two reactions are :

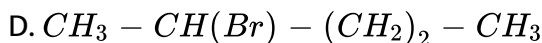


Answer: A



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216. Which is the correct IUPAC name for $\text{CH}_3 - \underset{\text{C}_2\text{H}_5}{\text{C}} \text{H} - \text{CH}_2 - \text{Br}$?



Answer: A

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217. The compounds with highest ionic character in metal halides, highest stability in halogen acids and highest acidic strength in halogen acids respectively are :

- A. MI, HCl, HF
- B. MF, HF, HI
- C. HI, HCl, HBr
- D. MF, HBr, HI

Answer: B

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218. Which of the following is a free radical Halogenation reaction ?

- A. Benzene converted to Bromobenzene
- B. Phenol converted to chlorobenzene
- C. Benzene diazonium chloride converted to chlorobenzene
- D. Propane converted to 1-chloropropane and 2-chloropropane

Answer: D

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219. How the following conversions can be carried out ?

2-Chloropropane to 1-propanol

- A. Wurtz reaction
- B. Wurtz - Fitting reaction
- C. Finkelstein reaction
- D. Swartz reaction

Answer: A

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220. Which of the following compound is obtained by Sandmeyer reaction ?

- A. Benzyl chloride
- B. Aniline
- C. Chlorobenzene
- D. Phenol

Answer: C

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221. The degree of halide in isobutyl chloride is :

- A. 4°
- B. 2°

C. 3°

D. 1°

Answer: D

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222. Which of the following has less bond enthalpy ?

A. $CH_3 - I$

B. $CH_3 - F$

C. $CH_3 - Cl$

D. $CH_3 - Br$

Answer: A

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223. Which of following compound causes red rashed, if it comes in direct contact with skin ?



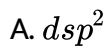
Answer: D



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224. The hybridization of carbon attached to chlorine in benzyl chloride is

:



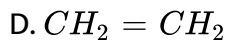
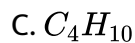
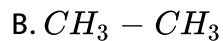
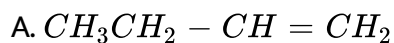
D. sp^2

Answer: B



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225. Which of the following is obtained by hydrolysis of ethylmagnesium bromide ?



Answer: B



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226. What is B in $3R - OH + PX_3 \rightarrow 3R - X + B$?

- A. Meta phosphoric acid
- B. Phosphorous acid
- C. Pyro phosphorous acid
- D. Phosphoric acid

Answer: B

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227. Select the correct order of some important group for absolute configuration of chiral compound.

- A. $-SO_3H > -CH_2OH > -COOR > -OCOR$
- B. $-SO_3H > -OCOR > -COOR > -CH_2OH$
- C. $-CH_2OH > -COOR > -OCOR > -SO_3H$
- D. $-SO_3H > -COOR > -OCOR > -CH_2OH$

Answer: B



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228. Match the proper pairs :

[A]

(a) Cyclo hexyl chloride

(b) 4-chloro pent-2-ene

(c) Chloro ethene

(d) 1-chloro 2-phenyl methane

[B]

(e) Vinylic halide

(f) Benzylic halide

(g) 2° halide

(h) Allylic halide

A. $a \rightarrow g, b \rightarrow h, c \rightarrow e, d \rightarrow f$

B. $a \rightarrow h, b \rightarrow f, c \rightarrow g, d \rightarrow e$

C. $a \rightarrow f, b \rightarrow e, c \rightarrow g, d \rightarrow h$

D. $a \rightarrow e, b \rightarrow g, c \rightarrow f, d \rightarrow h$

Answer: A



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229. How many number of σ - bond π - electron, chlorine atom and hydrogen atom is structural formula of DDT, respectively ?

A. 21, 6, 5, 9

B. 29, 12, 5, 9

C. 28, 6, 5, 9

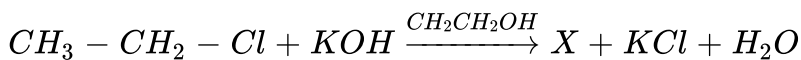
D. 24, 12, 5, 8

Answer: B



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230. What is 'X' in the following reaction ?



A. Butane

B. Ethane

C. Ethene

D. Diethyl ether

Answer: C

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231. Which of the following alcohols yields corresponding alkyl chloride on reaction with conc. HCl + anhyd $ZnCl_2$ at room temperature ?

A. propane-1-ol

B. iso butyl alcohol

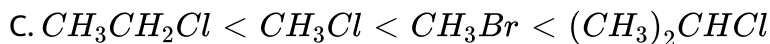
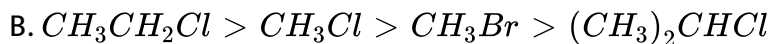
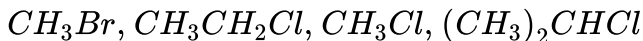
C. 2-methyl propan-1-ol

D. 2-methyl butane-2-ol

Answer: D

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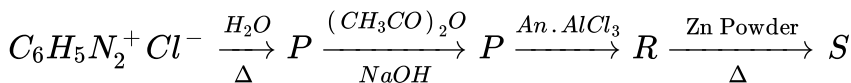
232. Arrange the following halides in increasing order of SN^2 reactivity.



Answer: A

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233. In following reaction what are P, Q, R and S.



A. P - Aniline, Q - Acetanilide, R - P - amino acetophenone, S - Benzene

B. P - Phenol, Q - Phenyl acetate, R - 2-Hydroxy acetophenone, S -

Acetophenone

C. P - Phenol, Q - Acetophenone, R - 2-Hydroxy acetophenone, S -

Benzene

D. P - Phenol, Q - P-methyl acetophenone, R - 2-Hydroxy acetophenone,

S - Acetophenone

Answer: B

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234. Which is not a polyhalogen ?

A. Methyl chloride

B. Dichloro methane

C. Chloroform

D. Carbon tetrachloride

Answer: A

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235. Which of the following is used in fire extinguisher ?

- A. Pyrene
- B. Phosgene
- C. Phosphine
- D. Ammonia

Answer: A



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236. What is the product of Wurtz reaction of methyl iodide ?

- A. Methane
- B. Ethane
- C. Propane

D. Butane

Answer: B

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237. Which poisonous compound is formed if Chloroform is kept in open air ?

A. Phosphine

B. Phosgene

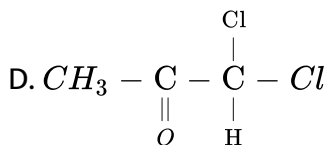
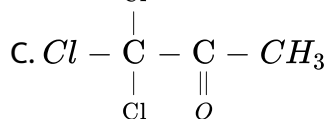
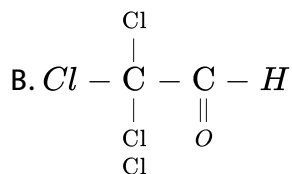
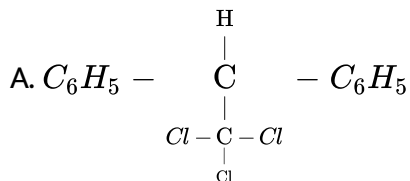
C. Freone

D. Carbon tetrachloride

Answer: B

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238. Which is the structural formula of "Chloral" ?

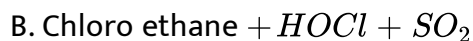
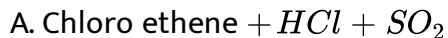


Answer: B



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239. Ethanol reacts with thionyl chloride to gives -



C. Chloro ethane + HCl + SO_3

D. Chloro ethane + HCl + SO_2

Answer: D

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240. How many σ (sigma) bond and π (pi) bond are present in benzene diazonium chloride [$C_6H_5N_2Cl$] ?

A. 6 - σ , 3 - π

B. 14 - σ , 4 - π

C. 14 - σ , 6 - π

D. 13 - σ , 4 - π

Answer: B

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241. Which reaction is used to prepare Toluene from chlorobenzene ?

- A. Wurtz reaction
- B. Wurtz - Fitting reaction
- C. Fitting reaction
- D. Friedel-Crafts alkylation

Answer: B



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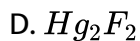
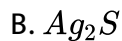
242. What is the formula of "Pyrene" ?

- A. $CCl_3CH(OH)_2$
- B. $CHCl_3$
- C. CCl_4
- D. CH_3Cl

Answer: C

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243. Which reagent is used to prepare fluoromethane by Swartz reaction.



Answer: D

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244. S_N1 reaction undergoes in which type of fission ?

A. Homolytic fission

B. Heterolytic fission

C. Heterolytic fusion

D. Nuclear fission

Answer: B

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245.  What is A & B ?

A. A = o-chloro toluene, B = Toluene

B. A = p-chloro toluene, B = (o + p) dichloro benzene

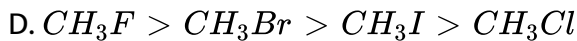
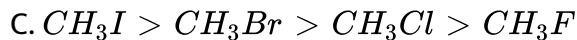
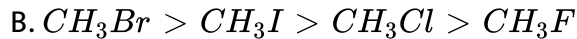
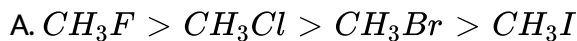
C. A = Toluene, B = (o + p) chloro toluene

D. A = Toluene, B = Benzyl chloride

Answer: C


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246. Which is the correct order of boiling point of halomethane ?



Answer: C

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247.  What is A and B ?

A. 

B. A = Chloro benzene, B = Ethyl benzene

C. 

D. A = Benzoyl chloride, B = Ethoxy benzene

Answer: B



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248. How many Carbon, Hydrogen and Chlorine atoms are present in DDT ?

A. C = 13, H = 8, Cl = 3

B. C = 14, H = 9, Cl = 5

C. C = 14, H = 8, Cl = 5

D. C = 13, H = 9, Cl = 3

Answer: B



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249. Match the proper pairs :

[A]	[B]
(P) S_N2	(i) Freon
(Q) TNP	(ii) Hetrolytic fission
(R) CFC	(iii) No Hetrolytic fission
(S) S_N1	(iv) Picric acid
	(v) Fire extinguisher

A. (P - ii), (Q - iv), (R - i), (S - iii)

B. (P - iv), (Q - ii), (R - iii), (S - v)

C. (P - ii), (Q - i), (R - iv), (S - v)

D. (P - iii), (Q-iv), (R -i), (S - ii)

Answer: D

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250. Which of the following substance is used to extinguish fire in substances like oil, fat and petrol ?

A. $CHCl_3$



Answer: D



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251. How many σ - and π - bonds are present in the structure of D.D.T. respectively ?

A. 17, 6

B. 20, 6

C. 21, 6

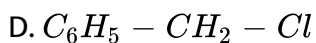
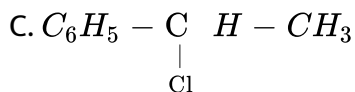
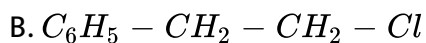
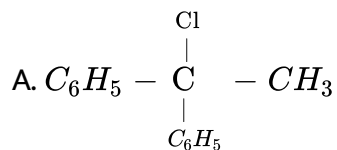
D. 29, 6

Answer: D



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252. Which compound will give unimolecular nucleophilic substitution reaction easily with aqueous NaOH ?



Answer: A

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253. Which of the following compound is optically inactive ?

A. Lactic acid

B. Propanoic acid

C. Glyceraldehyde

D. Glucose

Answer: B

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254. Which compound is optically active ?

A. 2-methylpropan-1-amine

B. Butan-2-amine

C. Butan-1-amine

D. 2-methylpropan-2-amine

Answer: B

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255. Which of the following substance does not produce Triiodomethane with the mixture of alkali and I_2 ?

A. Ethanol

B. Dimethyl ketone

C. Propan-1-ol

D. Ethanal

Answer: C



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256. Which substance is added in chloroform before the use of it as anesthetic ?

A. Methyl ethyl ketone

B. Ethyl alcohol

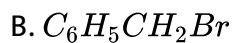
C. Acetone

D. Methylene chloride

Answer: B

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257. Which of the following compound has highest reactivity towards S_N1 reaction ?



Answer: A

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258. Which of the following has the highest dipole moment ?



Answer: A



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259. The position of -Br in the compound in

$CH_3CH = CHC(Br)(CH_3)_2$ can be classified as

A. Benzyl

B. Aryl

C. Vinyl

D. Allyl

Answer: D

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260. The IUPAC name of the major organic product of the reaction :



- A. 1,2- Dibromobutane
- B. 2,2-Dibromobutane
- C. 1-Bromobutane
- D. 2-Bromobutane

Answer: C

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