CHEMISTRY

BOOKS - MODERN PUBLISHERS CHEMISTRY (HINGLISH)

HYDROCARBONS

Solved Examples

1. Assign IUPAC names of the following compounds:

(i) $(H_3C)_4C$ $(ii)(H_3C)_2\underset{\underset{C_2H_5}{|}}{C}CH_2(CH_3)_3$

(iii) $(CH_3)_3CCH_2C(CH_3)_3$ (iv) $CH_3-(CH_2)_4CH(CH_2)_3CH_3$ with $CH_2-CH(CH_3)_2$ as a branch

(v) $(CH_3)_2C(C_2H_5)_2$ (vi) tetra-tert butylmethane

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2. Write the structural formulas for the following compounds whose IUPAC names are given:

(i) 3-Ethyl-2-methylpentane (ii) 3, 4, 8-Trimethyldecane

(iii) 3, 4, 4, 5--Tetramethylheptane, (iv) 2,5- Dimethylhexane

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3. The names of some compounds are given below:

(i) 5-Ethyl-3-methylheptane

(ii) 4-Isopropyl-5-sec-butyldecane

(iii) 2-Ethylpentane

Why are the given names incorrect?

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4. Write structures of different chain isomers of alkanes corresponding to the molecular formula C_6H_{14} Write their IUPAC names and classify each carbon atom as $1^\circ, 2^\circ, 3^\circ$ or 4°.

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5. Write the structures of different isomeric alkyl groups corresponding to the molecular formula C_6H_{11}. Write IUPAC names of alcohols obtained by attachment of -OH groups at different carbons of the chains.

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6. In the alkane $H_3C - CH_2 - C(CH_3)_2 - CH_2 - CH(CH_3)_2$, identify $1^\circ, 2^\circ, 3^\circ,$ carbon atoms and give the number of H atoms bonded to each one of these.

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7. Which of the following has the highest boiling point ?

(i) 2-Methylpentane (ii) 2, 3-Dimethylbutane (iii) 2, 2-Dimethylbutane

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8. Sodium salt of which acid will be needed for the preparation of propane ? Write chemical equation for the reaction.

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9. Complete the reactions

(i) $CH_3CH_3 + HNO_3 \xrightarrow{\text{vapour phase}}$

(ii) $CH_4 + O_2 \xrightarrow[723-773k]{\text{Copper tube}}$

(iii) $C_2H_5COONa + NaOH \xrightarrow{CaO}$

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10. Write IUPAC names of the following compounds

(i) $CH_3CH = C(CH_3)_2$

(ii) 

(iii)

$$CH_3 - CH = CH - CH_2 - CH = CH - \underset{\underset{C_2H_5}{|}}{C} H - CH_2 - CH = CH_2$$

(iv) 

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11. Write IUPAC names of the following compounds and calculate the number of sigma and pi bonds in these

(i) $(CH_3)_2CH - CH = CH - CH_2 - CH = CH - \underset{\underset{C_2H_5}{|}}{C} HCH_3$ " " (ii)

(iii) $CH_2 = C(CH_2CH_2CH_3)_2$ " " (iv)

$$\begin{array}{l} CH_3CH_2CH_2 \quad CH_2CH_2 \\ \quad\quad | \quad\quad | \\ CH_3 - CHCH = C = CH_2 - CH - CH_3 \\ \quad\quad\quad\quad\quad\quad\quad\quad | \\ \quad\quad\quad\quad\quad\quad\quad\quad CH_3 \end{array}$$

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12. Draw cis and trans isomers of the following compounds. Also write their IUPAC names :

(i) CHCl = CHCl

(ii) $C_2H_5CCH_3 = CCH_3C_2H_5$

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13. Draw the cis and trans structures of hex-2-ene. Which isomer will have higher b.p. and why?

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14. Write the structures and IUPAC names of different structural isomers of alkenes corresponding to the molecular formula C_5H_{10}.

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15. Which of the following compounds will show geometrical isomerism ?

(a)

$H_2C = CBr_2$ $(b)(H_3)C)_2C = CHCH_3$ $(c)C_6H_5CH = CH$

(d) $CH_3CH_2\underset{\underset{CH_3}{|}}{C} = CHCH_2CH_3$ $(e)H_3C - CH = CCl(CH_3)$

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16. Classify the following as Z or E isomers :

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17. The reductive ozonolysis of an alkene gave butanone and propanal. Write the structure of alkene and its IUPAC name.

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18. Write IUPAC names of the products obtained by addition reactions of HBr to hex-1-ene

(i) in the absence of peroxide and

(ii) in the presence of peroxide.

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19. Ozonolysis of an alkene 'X' followed by decomposition with water and a reducing agent gave a mixture of two isomers of the formula C_3H_6O Give the structure of the alkene and its IUPAC name.

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20. Propanal and pentan-3-one are the ozonolysis products of an alkene. What is the structural formula and IUPAC name of alkene.

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21. Write IUPAC names of the following:

(i) $CH_2 = CH - \underset{\underset{CH_3}{|}}{C}\ H - CH = CH - CH = CH_2$

(ii) $CH \equiv C - \underset{\underset{CH_3}{|}}{C}\ H - CH = CH_2$

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22. Write structures of different isomers corresponding to the 5th member of alkyne series. Also write IUPAC names of all the isomers. What type of isomerism is exhibited by different pairs of isomers?

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23. How would you separate propene from propyne ?

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24. How would you carry out the following conversions ?

(a) $H_3CCH_2 = CH_2 \rightarrow H_3C - CH_2CH_2CH_2OH$

(b) $H_3CCH_2 - CH = CH_2 \rightarrow H_3C - CH_2 - CH(OH)CH_2OH$

(c) $H_3CC \equiv CH \rightarrow H_3CCOCH_3$

(d) $Br_2CHCHBr_2 \rightarrow HC \equiv CH$

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25. Predict which of the following systems would be aromatic ?

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26. Is the following molecule aromatic or not?

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27. How will you convert ethanoic acid into benzene?

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28. How will you convert benzene into

(i) p-nitrobromobenzene

(ii) m-nitrochlorobenzene

(iii) p -nitrotoluene

(iv) acetophenone

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29. Calculate the percentages of all the monochlorinated products obtained from 2-methylbutane. The relative reactivity of $1^\circ, 2^\circ$ and 3° hydrogen towards chlorination is 1 : 3.8: 5.

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30. How will you distinguish pent-1-ene from n-pentane?

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31. Complete the following reactions :

(i) Isopropyl bromide $\rightarrow \xrightarrow[\text{Heat}]{\text{alc. KOH}} A \xrightarrow[\text{Peroxide}]{HBr} B$

(ii) n-Propyl alcohol $\xrightarrow[443K]{Conc.\,H_2O} A \xrightarrow[\text{Heat}]{O_2Ag} B$

(c) 1, 1, 2, 2-tetrachloroethane $\rightarrow \xrightarrow[\text{Heat}]{\text{Zn, alcohol}} A \xrightarrow[675K]{\text{Iron tube}} B$

(iv) Acetylene $\rightarrow \xrightarrow{NaNH_2} A \xrightarrow{CH_3CH_2Br} B$

(v) Propyne $\rightarrow \xrightarrow[\text{Quinoline}]{H_2, Pd, BaSO_4} A \xrightarrow[(ii)\,Zn, H_2O]{(i)\,O_3} B$

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32. An alkene on ozonolysis gives butan-2-one and 2-methylpropanal. What products will be obtained when it is treated with hot conc. $KMnO_4$?

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33. An alkyl halide C_5H_{11} (A) reacts with ethanolic KOH to give an alkene 'B' which reacts with Br_2 to give a compound 'C' which on dehydromination gives an alkyne 'D' . On treatment with sodium metal in

liquid ammonia one mole of 'D' give one mole of the sodium salt of 'D' and half a mole of hydrogen gas . Complete hydrogenation of 'D' yields a straight chain alkane. Identify A, B, C and D . Give the the reactions involved.

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34. An unsaturated hydrocarbon 'A' adds two molecules of H_2 and on reductive ozonolysis gives butane-1, 4-dial, ethanal and propanone. Give the structure of 'A' , write its IUPAC name and explain the reactions involved.

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35. How will you convert :

(a) Ethane to butane (b) Ethyne to methane

(c) Ethene to ethyne (d) Methane to ethane

(e) Propene to 2, 3-dimethylbutane (f) Ethane to ethyne

(g) Ethyne to but-2-yne

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36. A hydrocarbon containing two double bonds gave on reductive ozonolysis ethanol, glyoxal and propanone. Predict the structure of the hydrocarbon and give its IUPAC name.

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37. Assign structures for the following:

(a) An alkyne (X) has molecular formula C_5H_8. It reacts neither with sodamide nor with ammoniacal cuprous chloride.

(b) A hydrocarbon Y decolourises bromine water. On ozonolysis it gives 3-methyl butanal and formaldehyde. Give the name of the compound.

(c) A hydrocarbon (Z) has molecular formula C_8H_{10}. It does not decolourise bromine water and is oxidised to benzoic acid on heating with $K_2Cr_2O_7$. It can also have three other isomers A, B and C. Write the structures of Z, A, B and C.

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38. The hydrocarbon [A] adds one mole of hydrogen in the presence of a platinum catalyst to form n-hexane. When [A] is oxidised vigorously with $KMnO_4$, a single carboxylic acid containing three carbon atoms is isolated. Give the strucure of [A] and explain the reactions.

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39. A monosubstituted alkyl benzene of the formula $C_{10}H_{14}$ resists vigorous oxidation to an aryl carboxylic acid. Name the compound and write its various monosubstituted isomers.

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40. A hydrocarbon 'X' takes up two molecules of hydrogen and is converted into a saturated hydrocarbon. On ozonolysis, X gives a mixture of three carbonyl compounds namely, acetaldehyde, acetone and propan-1,3-dial. Assign structure to compound X.

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41. Suggest a method (a flow sheet) to separate a mixture of ethane, ethene and ethyne.

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42. Write chemical equations for combustion reaction of the following hydrocarbons:

(i) Butane

(ii) Pentene

(iii) Hexyne

(iv) Toluene

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43. For the following compounds, write structural formulas and IUPAC names for all possible isomers having the number of double or triple

bond as indicated:

(a) C_4H_8(one double bond)

(b) C_5H_8 (one triple bond)

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44. 896 mL of a hydrocarbon 'A' having carbon 87.80 % and hydrogen 12.19% weighs 3.28 g at STP. Hydrogenation of 'A' gives 2-methylpentane. Also 'A' on hydration in the presence of H_2SO_4 and $HgSO_4$ gives a ketone 'B' having molecular formula $C_6H_{12}O$. The ketone 'B' gives a positive iodoform test. Find the structure of 'A' and give the reaction involved.

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Practice Problems

1. Write the IUPAC names of the following structures :

(a)(a) $(C_2H_5)_4$

(b) $(CH_3)_2CHCH(CH_3)_2$

(c) $CH_3CH_2\underset{\underset{CH_3}{|}}{C}H(CH_2)_3\underset{\underset{CH_3}{|}}{C}H-\underset{\underset{CH_3}{|}}{C}H-CH_2CH_3$

(d) $(CH_3)_3, CCH_2C(CH_3)_3CH_3$

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2. Write the structure for the compounds having the IUPAC names :

(a) 3-Ethyl-2-methylpentane (b) 2, 3, 5-Trimethylhexane

(c) 2,3,5-Trimethyl-4-propylheptane

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3. Name the two extreme type of conformations of ethane.

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4. Arrange the different type of conformations of butane in the decreasing order of stability.

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5. Out of boat and chair form of cyclohexane, which is more stable ?

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6. Does the eclipsed conformation of propane has same energy or different as eclipsed conformation of ethane?

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7. Arrange the following in the decreasing order of boiling points

(i)n-Pentane (ii) Iso-pentane (iii) Neo-pentane

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

(i) $n - C_4H_{10}$ (ii) $1 - C_5H_{12}$ (iii) $n - C_3H_8$ (iv) $n - C_6H_{14}$

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9. Name the products which may be obtained when a mixture of methyl bromide and ethyl bromide is treated with sodium metal in ether.

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10. Which salt on treatment with soda lime gives ethane?

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11. Name the product obtained by heating butanoic acid with sodalime at 630 K. Name any other acid which also gives the same product under

similar conditions.

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12. Draw the structures of the following showing all C and H atoms:

i) 2-Methyl-3-isopropyl heptane

ii) Dicyclopropyl methane

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13. Classify the following as E or Z isomers :

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14. What is the formula of teflon ?

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15. An alkene 'A' on ozonolysis gives a mixture of ethanal and pentan-3-one. Write structure and IUPAC name of 'A'.

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16. How will propene react with HBr (i) in the presence of peroxide (ii) in the absence of any peroxide ?

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17. Name two tests to test the presence of double bond in a compound.

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18. Name an alkene which on reductive ozonolysis produces only acetone.

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19. Complete the reaction :

$CH_2 = CH_2 \xrightarrow{\text{alk.}KMnO_4}$

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20. Complete the reaction:

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21. How will you prepare acetaldehyde from acetylene ?

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22. Which of the following alkynes react with sodium in liquid ammonia ?

(i) Propyne (ii) But-2-yne (iii) Pent-3-yne (iv) Hex-1-yne

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23. Name the process which may be used to locate the position of a triple bond.

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24. Which of the following is most acidic

(i) Butane (ii) But-1-ene (iii) But-1-yne (iv) But-2-yne ?

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25. What happens when water is dropped on calcium carbide ?

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26. Name the reagent X' in the reaction :

$1,2-\text{Dibromoethane} \xrightarrow{X} \text{Acetylene}$

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27. Write chemical equation for the combustion of hexyne.

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28. Complete the reaction :

$$C_6H_6 \xrightarrow{O_3} A \xrightarrow{Zn, H_2O} B$$

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29. Complete the reaction :

$$B \xrightarrow{MnO_2, H^+} C_6H_5CH_3 \xrightarrow[\text{Heat}]{KmnO_4, H^+} A$$

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30. What is difference between alkylation and acylation ?

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31. What is halogen carrier ? Give one example.

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32. What is Huckel rule ?

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33. Which of the following are meta directors ?

$-NO_2,\ -SO_3H,\ -Cl,\ -OH,\ -NH_2,\ -CHO$

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34. Name an ortho-and para-directing deactivating group.

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Conceptual Questions

1. Why do alkynes not show geometrical isomerism?

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2. Is it possible to isolate pure staggered ethane or pure eclipsed ethane at room temperature?

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3. What is the difference between isomers and conformers?

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4. What is the cause of geometrical isomerism in alkenes ?

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5. Draw the two geometrical isomers of but-2-en-1, 4-dioic acid. Which of these will have higher dipole moment?

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6. How many isomers are possible for monosubstituted and disubstituted benzene?

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7. Which of the two trans-but-2-ene or trans-pent-2.ene is non polar?

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8. Write the structural formula of all the possible isomers of $C_2H_2Cl_2$ and indicate which of these is non polar?

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9. Arrange the following alkenes in the decreasing order of stability:

(I) $CH_3 - \overset{CH_3}{\underset{|}{C}} = CHCH_3$

(II) $CH_3 - \overset{CH_3}{\underset{|}{C}}H - CH = CH_2$

(III) $CH_2 = CH - CH_2 - CH_3$

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10. Why are 1,4 adducts of 1, 3-butadiene are more stable than 1, 2-adduet?

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11. Which of the following is acidic :

But-2-ene, But-2-yne, But-1-yne, But-1-ene

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12. Arrange the following in increasing order of their release of energy on combustion

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13. Arrange the following set of compounds in order of their decreasing relative reactivity with an electrophile, E^+.

(i) chlorobenzene, $2, 4-$ dinitrochlorobenzene, $p-$ nitrochloro benzene

(ii) toluene,

$p-H_3C-C_6H_4-CH_3, p-H_3C-C_6H_4-NO_2, p-O_2N-C_6H_4-$

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14. Write structures of all the alkenes which on hydrogenation give 2-methylbutane.

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15. What effect the branching of an alkane has on its boiling point?

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16. Why is benzene extra ordinarily stable though it contains three double bonds?

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17. Suggest the name of a Lewis acid other than anhydrous aluminium chloride which can be used during ethylation of benzene.

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18. Arrange benzene, n-hexane and ethyne in decreasing order ofacidic behaviour.

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19. Which of the following compounds are aromatic according to Huckel rule?

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20. How will you prepare deuteroisopropane ?

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Ncert File Ncert Textbook Exercise

1. How do you account for the formation of ethane during chlorination of methane ?

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2. Write IUPAC names of the following compounds:

(a) $CH_3CH = C(CH_3)_2$ (b) $CH_2 = CH - C \equiv C - CH_3$ (c) 

(f) $CH_3(CH_2)_4 \underset{\underset{CH_2-CH(CH_3)_2}{|}}{C} H(CH_2)_3CH_3$

(g)

$$CH_3 - CH = CH - CH_2 - CH = CH - \underset{\underset{C_2H_5}{|}}{C} H - CH_2 - CH = CH_2$$

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3. For the following compounds, write structural formulas and IUPAC names for all possible isomers having the number of double or triple bond as indicated:

(a) C_4H_8(one double bond)

(b) C_5H_8 (one triple bond)

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4. Write IUPAC names of the products obtained by the ozonolysis of the following compounds:

(i) Pent-2-ene (ii) 3,4-Dimethyl-hept-3-ene

(iii) 2-Ethylbut-1-ene (iv) 1-Phenylbut-1-ene

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5. An alkene 'A' on ozonolysis gives a mixture of ethanal and pentan-3-one. Write structure and IUPAC name of 'A'.

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6. An alkene 'A' contains three C – C, eight C – H (σ) bonds and one C – C (π) bond. 'A' on ozonolysis gives two moles of an aldehyde of molar mass 44 u. Write IUPAC name of 'A'.

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7. Propanal and pentan-3-one are the ozonolysis products of an alkene? What is the structural formula of the alkene?

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8. Write chemical equations for combustion reaction of the following hydrocarbons :

(i) Butane (i) Pentane (iii) Hexупе (iv) Toluene

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9. Draw the cis and trans structures of hex-2-ene. Which isomer will have higher b.p. and why?

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10. Why is benzene extra ordinarily stable though it contains three double bonds?

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11. What are the necessary conditions for any system to be aromatic?

A. The molecule should contain a cyclic cloud of delocalized π-electrons above and below the plane of the molecule

B. It should contain $(4n+2)\pi$ -electrons where n = 0, 1, 2, 3..etc.This is known as Huckcl rule

C. Only A

D. Both A and B

Answer:

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12. Explain why the following systems are not aromatic ?

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13. How will you convert benzene into

(i) p-nitrobromobenzene

(ii) m-nitrochlorobenzene

(iii) p -nitrotoluene

(iv) acetophenone

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14. In the alkane $H_3C - CH_2 - C(CH_3)_2 - CH_2 - CH(CH_3)_2$, identify $1^\circ, 2^\circ, 3^\circ,$ carbon atoms and give the number of H atoms bonded to each one of these.

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15. What effect does branching of an alkane chain has on its boiling point?

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16. Addition of HBr to propene yields 2-bromopropane, while in the presence of benzoyl peroxide, the same reaction yields 1-bromopropane. Explain and give mechanism.

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17. Write down the products of ozonolysis of 1, 2-dimethylbenzene (o-xylene). How does the result support Kekulé structure for benzene?

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18. Arrange benzene, n-hexane and ethyne in decreasing order of acidic behaviour. Also give reason for this behaviour.

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19. Why does benzene undergo electrophilic substitution reactions easily and nucleophilic substitutions with difficulty?

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20. How would you convert the following compounds into benzene?

(i) Ethyne

(ii) Ethene

(iii) Hexane

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21. Write structures of all the alkenes which on hydrogenation give 2-methylbutane.

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22. Arrange the following set of compounds in order of their decreasing relative reactivity with an electrophile, E+

(a) Chlorobenzene, 2,4-dinitrochlorobenzene, p-nitrochlorobenzene

(b) Toluene, $p - H_3C - C_6H_4 - NO_2$, $p - O_2N - C_6H_4 - NO_2$.

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23. Out of benzene, m-dinitrobenzene and toluene which will undergo nitration most easily and why ?

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24. Suggest the name of a Lewis acid other than anhydrous aluminium chloride which can be used during ethylation of benzene.

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25. Why is Wurtz reaction not preferred for the preparation of alkanes containing odd number of carbon atoms? Illustrate your answer by taking one example.

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Ncert File Ncert Exemplar Problems Multiple Choice Questions Type I

1. Arrange the following in decreasing order of their boiling points.

(A). n-butane

(B). 2-methylbutane

(C). n-pentane

(D). 2,2-dimethylpropane

A. $A > B > C > D$

B. $B > C > D > A$

C. $D > C > B > A$

D. $C > B > D > A$

Answer: D

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2. Arrange the halogens F_2, Cl_2, Br_2, I_2 in order of their increasing reactivity with alkanes.

A. $I_2 < Br_2 < Cl_2 < F_2$

B. $Br_2 < Cl_2 < F_2 < I_2$

C. $F_2 < Cl_2 < Br_2 < I_2$

D. $Br_2 < I_2 < Cl_2 < F_2$

Answer: A

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3. The increasing order of reduction of alkyl halides with zinc and dilute HCl is

A. $R-Cl<R-I<R-Br$

B. $R-Cl<R-Br<R-I$

C. $R-I<R-Br<R-Cl$

D. $R-Br<R-I<R-Cl$

Answer:

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4. The addition of HBr to but-1-ene gives a mixture of products A, B and C

(c) $CH_3-CH_2-CH_2-CH_2-Br$

The mixture consists of

A. A and B as major and C as minor products

B. B as major, A and C as minor products

C. B as minor, A and C as major products

D. A and B as minor and C as major products

Answer:

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5. Which of the following will not show geometrical isomerism ?

A. 

B. 

C. 

D. 

Answer:

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6. Arrange the following hydrogen halides in order of their decreasing reactivity with propene.

A. $HCl > HBr > HI$

B. $HBr > HI > HCl$

C. $HI > HBr > HCl$

D. $HCl > HI > HBr$

Answer: C

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7. Arrange the following carbanions in order of their decreasing stability.

(A) $H_3C - C \equiv C^-$

(B) $H - C \equiv C^-$

(C) $H_3C - CH_2^-$

A. $A > B > C$

B. $B > A > C$

C. $C > B > A$

D. $C > A > B$

Answer: B

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8. Arrange the following alkyl halides in decreasing order of the rate of β-elimination reaction with alcoholic KOH.

A. $CH_3 - \underset{\underset{CH_3}{|}}{\overset{\overset{H}{|}}{C}} - CH_2Br$

B. $CH_3 - CH_2 - Br$

C. $CH_3 - CH_2 - CH_2 - Br$

A. $A > B > C$

B. $C > B > A$

C. $B > C > A$

D. $A > C > B$

Answer: D

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9. Which of the following reactions of methane is incomplete combustion:

A. $2CH_4 + O_2 \xrightarrow{\text{Cu//523K//100atm}} 2CH_3OH$

B. $CH_4 + O_2 \xrightarrow{Mo_2O_3} HCHO + H_2O$

C. $CH_4 + O_2 \rightarrow C(s) + 2H_2O(l)$

D. $CH_4 + 2O_2 \rightarrow CO_2(g) + 2H_2O(l)$

Answer: C

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Ncert File Ncert Exemplar Problems Multiple Choice Questions Type Ii

1. Some oxidation reactions of methane are given below. Which of them is/ are controlled oxidation reactions?

A. $CH_4 + 2O_2 \rightarrow CO_2(g) + 2H_2O(l)$

B. $CH_4 + O_2 \rightarrow C(s) + 2H_2O(l)$

C. $CH_4 + O_2 \xrightarrow{Mo_2O_3} HCHO + H_2O$

D. $2CH_4 + O_2 \xrightarrow{\text{Cu//523K//100atm}} 2CH_3OH$

Answer:

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2. Which of the following alkenes on ozonolysis give a mixture of ketones only?

A. $CH_2 - CH = CH - CH_3$

B. $CH_3 - \underset{\underset{CH_3}{|}}{C} - CH = CH_2$

C. 

D. 

Answer:

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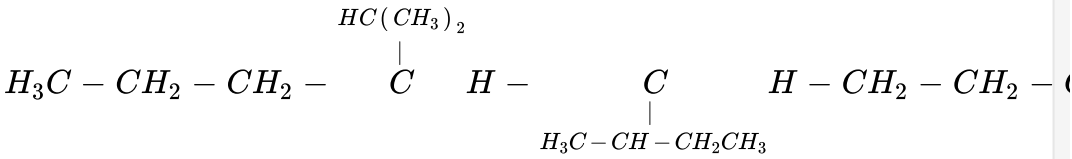
3. Which are the correct IUPAC names of the following compound?



A. 5-Butyl-4-isopropyldecane

B. 5-Ethyl-4-propyldecane

C. 5-sec-Butyl -- 4-iso-propyldecane

D. 4- (1-methylethyl)-5- (1-methylpropyl) -decane

Answer:

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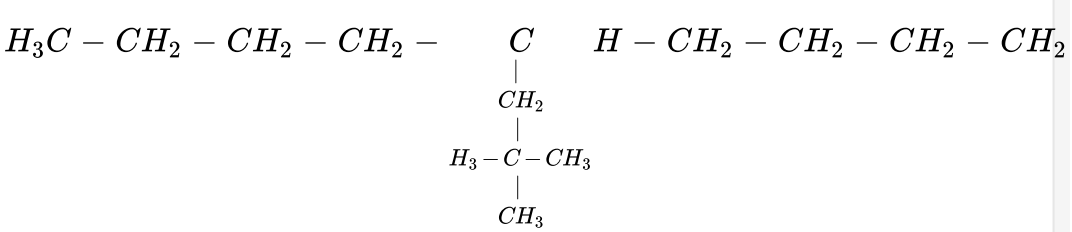
4. Which are the correct IUPAC names of the following compound?



A. 5-2, 2-Dimethylpropyl) -decane

B. 4-Butyl-2,2-dimethylnonane

C. 2, 2-Dimethyl-4-pentyloctane

D. 5-neo-Pentyldecane

Answer:

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5. For an electrophilic substitution reaction , the presence of a halogen atom in the benzene ring .....

A. doactivates the ring by inductive effect

B. deactivates the ring by resonance

C. increases the charge density at ortho and para position relative to meta position by resonance

D. directs the incoming electrophile to meta position by increasing the charge density relative to ortho and para position

Answer:

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6. In an electrophilic substitution reaction of nitrobenzene, the presence of nitro group

A. deactivates the ring by inductive effect.

B. activates the ring by inductive effect.

C. decreases the charge density at ortho and para position of the ring relative to meta position by resonance.

D. increases the charge density at meta position relative to the ortho and para positions of the ring by resonance.

Answer: C

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7. Which of the following are correct?

A. $CH_3 - O - CH_2^{\oplus}$ is more stable than $CH_3 - CH_2^{\oplus}$

B. $(CH_3)_2CH^{\oplus}$ is less stable than $CH_3 - CH_2 - CH_2^{\oplus}$

C. $CH_2 = CH - CH^{\oplus}$ is more stable than $CH_3 - CH_2 - CH_2^{\oplus}$

D. $CH_2 = CH^{\oplus}$ is more stable than $CH_3 - CH_2^{\oplus}$

Answer:

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8. Four structures are given in options (a) to (d) . Examine them and select the aromatic structures.

A. 

B. 

C. 

D. 

Answer:

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9. The molecules having dipole moment are :

A. 2,2-Dimethylpropane

B. trans-Pent-2-ene

C. cis-Hex-3-ene

D. 2, 2, 3, 3-Tetramethylbutane,

Answer:

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1. Why do alkenes prefer to undergo electrophilec addition reaction while arenes prefer electrophilic substitution reactions ? Explain.

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2. Alkynes on reduction with sodium in liquid ammonia form trans alkenes. Will the butene thus formed on reduction of but-2-yne show the geometrical isomerism?

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3. Rotation around carbon-carbon single bond of ethane is not completely free. Justify the statement.

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4. Draw Newman and Sawhorse projections for the eclipsed and staggered conformations of ethane. Which of these conformations is more stable and why ?

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5. The intermediate carbocation formed in the reactions of HI, HBr, and HCl with propene is the same and the bond energy of HCl, HBr, and HI is $430.5KJmol^{-1}$, $363.7KJmol^{-1}$ and $296.8KJmol^{-1}$ respectively. What will be the order of reactivity of these halogen acids?

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6. What will be product obtained as a result of following reaction and why?

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7. How will you convert benzene into:

(i) p-nitrobromobenzene

(ii) m-nitrobromobenzene

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8. Arrange the following set of compounds in the order of decreasing reactivity with an electrophile. Give reason.

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9. Despite their $-I$ effect, halogens are o- and p- directing in haloarenes. Explain .

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10. Why does presence of a nifro group make the benzene ring less reactive in comparison to the unsubstituted benzene ring . Explain .

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11. Suggest a route for the preparation of nitrobenzene starting from acetylene?

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12. Predict the major product(s) of the following reactions and explain their formation.

$$H_3C - CH = CH_2 \xrightarrow[\text{HBr}]{Ph - CO - O_2H}$$

$$H_3C - CH = CH_2 \xrightarrow{\text{HBr}}$$

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13. Nucleophiles and electrophiles are reaction intermediates having electron rich and electron deficient centres respectively . Hence, they tend to attack electron deficient and electron rich centres respectively. Classify the following species as electrophiles and uncheophiles.

(i) H_3CO^-

(ii) $H_3C-\overset{\overset{O}{||}}{C}-O^-$

(iii)Cl

(iv)$Cl_2C:$

(v) $(H_3C)_3C^+$

(vi) Br^-

(vii) H_3COH

(viii) R-NH-R

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14. The relative reactivity of $1^\circ, 2^\circ$ and 3° hydrogen's towards chlorination is $1:3.8:5$. Calculate the percentages of all monochlorinated products obtained from 2-methylbutane.

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15. Write the structures and names of products obtained in the reactions of sodium with a mixture of 1-iodo-2-methylpropane and 2-iodopropane.

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16. Write hydrocarbon radicals that can be formed as intermediates during monochlorination of 2-methylpropane ? Which of them is more stable? Give reasons.

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17. An alkane C_8H_{18} is obtained as the only product on subjecting a primary alkyl halide to Wurtz reaction. On monobromination this alkane yields a single isomer of a tertiary bromide. Write the structure of alkane and the tertiary bromide.

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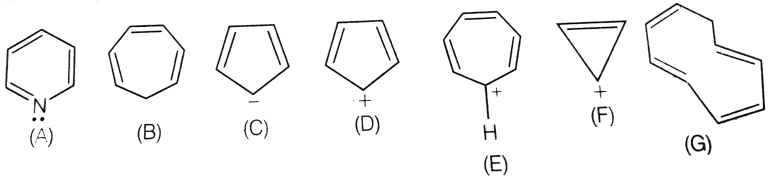
18. The ring systems having following characteristics are aromatic.

(i) Planar ring containing conjugated π bonds .

(ii) Complete delocalisation of the π -electron in ring system i.e. , each atom in the ring has unhybridised p-orbital , and

(iii) Presence of $(4n+2)\pi$-electrons in the ring where n is an integer(n = 0, 1, 2, ...) [Huckel rule]. Using this information classify the following compounds as aromatic/non-aromatic.



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19. Which of the following compounds are aromatic according to Huckel's rule?

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20. Suggest a route to prepare ethyl hydrogensulphate $(CH_3 - CH_2 - OSO_2 - OH)$ starting from ethanol (C_2H_5OH) .

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Ncert File Ncert Exemplar Problems Match Type Questions

1. Match the reagent from Column I which on reaction with $CH_3 - CH = CH_2$, gives some product given in Column II as per the codes given below:

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2. Match the hydrocarbons in Column I with the boiling points given in Column II.

View Text Solution

3. Match the following reactants in Column I with the corresponding reaction products in Column II.

View Text Solution

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

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Ncert File Ncert Exemplar Problems Assertion And Reason Type Questions

1. Assertion (A) : Toluene on Friedel-Crafts Methylation gives o - and p-xylene.

Reason (R) : CH_3 group bonded to benzene ring increases density at o - and p- position.

A. Both A and R are correct and R is the correct explanation of A.

B. Both A and R are correct but R is not the correct explanation of A.

C. Both A and R are not correct.

D. A is not correct but R is correct.

Answer: A

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2. S-I: Nitration of benzene with nitric acid requires the use of concentrated sulphuric acid

S-II: The mixture of concentrated sulphuric acid and concentrated nitric acid produces the electrophile, nitronium ion.

A. Both A and R are correct and R is the correct explanation of A.

B. Both A and R are correct but R is not the correct explanation of A.

C. Both A and R are not correct.

D. A is not correct but R is correct.

Answer: A

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3. Assertion (A) : Among isomeric pentanes, 2, 2- dimethylpentane has highest boiling point.

Reason (R) : Branching does not affect the boiling point.

A. Both A and R are correct and R is the correct explanation of A.

B. Both A and R are correct but R is not the correct explanation of A.

C. Both A and R are not correct.

D. A is not correct but R is correct.

Answer: C

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Ncert File Ncert Exemplar Problems Long Answer Questions

1. An alkyl halide $C_5H_{11}Br$ (A) reacts with ethanolic KOH to give an alkene 'B' which reacts with Br_2 to give a compound 'C' which on dehydrobromination gives an alkyne 'D'. On treatment with sodium metal in liquid ammonia one mole of 'D' give one mole of the sodium salt of 'D' and half a mole of hydrogen gas. Complete hydrogenation of 'D' yields a straight chain alkane. Identify A, B, C and D. Give the the reactions involved.

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2. An unsaturated hydrocarbon 'A' adds two molecules of H_2 and on reductive ozonolysis gives butane-1, 4-dial, ethanal and propanone. Give

the structure of 'A' , write its IUPAC name and explain the reactions involved.

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3. In the presence of peroxide addition of HBr to propene takes place according to anti Markownikoff's rule but peroxide effect is not seen in the case of HCl and HI. Explain.

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Revision Exercises Passage Based Questions

1. Benzene is a planar molecule and has 6 (4n + 2)π electrons. Inspite of three double bonds, it is extra ordinarily stable and does not undergo addition reactions as expected. It undergoes electrophilic substitution reactions in which one or more hydrogen atoms of the ring are replaced by other atoms or groups :

What product is obtained when benzene is treated with acetyl chloride in the presence of $AICI_3$?

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2. Benzene is a planar molecule and has 6 (4n + 2)π electrons. Inspite of three double bonds, it is extra ordinarily stable and does not undergo addition reactions as expected. It undergoes electrophilic substitution reactions in which one or more hydrogen atoms of the ring are replaced by other atoms or groups :

Why is benzene extraordinarily stable though it contains three double bonds?

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3. Benzene is a planar molecule and has 6 (4n + 2)π electrons. Inspite of three double bonds, it is extra ordinarily stable and does not undergo

addition reactions as expected. It undergoes electrophilic substitution reactions in which one or more hydrogen atoms of the ring are replaced by other atoms or groups :

Complete the reaction :

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4. The alkenes have π-bonds which make them highly reactive. These undergo electrophilic addition reactions, Addition of HX to unsymmetrical alkenes gives two products and follow Markovnikov rule and anti- Markovnikov rule. The addition occure through the formation of carbocation in Markovnikov rule and free radicals in anti-Markovnikov zule. The ozonolysis reaction of alkenes helps to locate the position of double bond.

Predict the major product in the following reaction:

$$CH_3 - CH = CH_2 \xrightarrow[(PhCOO)_2]{HBr}$$

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5. The alkenes have π-bonds which make them highly reactive. These undergo electrophilic addition reactions, addition of HX to unsymmetrical alkenes gives two products and follow Markovnikov rule and anti- Markovnikov rule. The addition occurs through the formation of carbocation in Markovnikov rule and free radicals in anti-Markovnikov rule. The ozonolysis reaction of alkenes helps to locate the position of double bond.

Write the major product in the following reaction:

$$CH_3 - \overset{CH_3}{\overset{|}{C}}H - CH = CH_2 \xrightarrow{HBr}$$

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6. The alkenes have π-bonds which make them highly reactive. These undergo electrophilic addition reactions, Addition of HX to unsymmetrical alkenes gives two products and follow Markovnikov rule and anti- Markovnikov rule. The addition occure through the formation of

carbocation in Markovnikov rule and free radicals in anti-Markovnikov zule. The ozonolysis reaction of alkenes helps to locate the position of double bond.

What product is obtained when propene reacts with CI_2 in the presence of water?

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7. The alkenes have π-bonds which make them highly reactive. These undergo electrophilic addition reactions, Addition of HX to unsymmetrical alkenes gives two products and follow Markovnikov rule and anti- Markovnikov rule. The addition occure through the formation of carbocation in Markovnikov rule and free radicals in anti-Markovnikov zule. The ozonolysis reaction of alkenes helps to locate the position of double bond.

Name the products formed when 2-methylpropene is treated with ozone followed by Zn, H_2O.

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8. The alkenes have π-bonds which make them highly reactive. These undergo electrophilic addition reactions, Addition of HX to unsymmetrical alkenes gives two products and follow Markovnikov rule and anti- Markovnikov rule. The addition occure through the formation of carbocation in Markovnikov rule and free radicals in anti-Markovnikov zule. The ozonolysis reaction of alkenes helps to locate the position of double bond.

Ozonolysis of an alkene 'A' followed by decomposition with water and a reducing agent gave a mixture of two isomers of the formula C_3H_6O. Give the structure of the alkene and its IUPAC name.

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9. Alkynes have a triple bond between carbon-carbon in their molecules. Terminal alkynes are acidic. They undergo addition reactions like alkenes. But in alkynes the addition occurs in two steps:

An alkyne having molecular formula C_6H_8 neither reacts with sodamide nor with ammoniacal cuprous chloride. Write the name of alkyne.

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10. Alkynes have a triple bond between carbon-carbon in their molecules. Terminal alkynes are acidic. They undergo addition reactions like alkenes. But in alkynes the addition occurs in two steps:

State the hybridisation of C-2, C-5 and C-6 of the compound.

$$CH_3-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}}-CH=CH-\overset{\overset{CH_3}{|}}{C}H-C\equiv CH$$

View Text Solution

11. Alkynes have a triple bond between carbon-carbon in their molecules. Terminal alkynes are acidic. They undergo addition reactions like alkenes. But in alkynes the addition occurs in two steps:

Complete the reaction :

$CH_3 - C \equiv CH \xrightarrow{HOCl}$

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12. Alkynes have a triple bond between carbon-carbon in their molecules.

Terminal alkynes are acidic. They undergo addition reactions like alkenes.

But in alkynes the addition occurs in two steps:

Which of the following reagent will convert but-2-yne into cis-but-2-ene?

(i) Pd, $BaSO_4$, quinoline

(ii) Na in liquid NH_3 at 196-200 K ?

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Revision Exercises True Or False Questions

1. The boiling point of 2, 3-dimethylbutane is higher than that of 2,2-dimethylbutane.

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2. The staggered conformation of ethane is more stalble than its elispsed conforamtion by about

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3. Cyclohexane mainly exists in boat conformation

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4. Write a note on the following reactions.

Electrolysis of potassium succinate

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5. Bromine water can be used to distinguish between ethene and ethyne.

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6. Moist ethene can be dried by passing it through conc. H_2SO_4.

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7. Butan-1-ol reacts with cone. H_2SO_4 to give but-2-ene.

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8. Propyne is less acidic than acetylene.

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9. Nitration of nitrobenzene gives mainly m-dinitro benzene.

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10. Chlorobenzene on reduction with $Ni - Al\text{alloy} / NaOH$ give toluene.

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Revision Exercises Fill In The Blanks Questions

1. All the carbon atoms in benzene are ..... hybridised.

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2. When ..... is passed through red hot iron tube at 878 K, benzene is formed.

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3. Propyne on ozonolysis gives .....

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4. The reaction of ethene with bromine is ..... reaction.

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5. The addition of HBr to propene in the presence of peroxides follows .....rule.

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6. The alkaline potassium permanganate solution is known as .....

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7. The chain isomer of pent-1-yne is .....

Watch Video Solution

8. Alkynes are ..... acidic than alkenes.

Watch Video Solution

9. 2-Butyne on catalytic reduction with Lindlar's catalyst gives mainly ..... product.

Watch Video Solution

10. Electrolysis of potassium fumarate gives .....

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Revision Exercises Assertion Reason Questions

1. Assertion: Addition of Br_2 to 1-butane gives two optical isomers.

Reason: The product contains one asymmetric carbon atoms.

A. Assertion and reason both are correct statements and reason is correct explanation for assertion.

B. Assertion and reason both are correct statements but reason is not correct explanation for assertion

C. Assertion is correct statement but reason is wrong statement

D. Assertion is wrong statement but reason is correct statement

Answer: A

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2. Assertion : Alkyl benzene is not prepared by Friedel — Crafts alkylation of benzene.

Reason : Alkyl halides are more reactive than acyl halides.

A. Assertion and reason both are correct statements and reason is correct explanation for assertion.

B. Assertion and reason both are correct statements but reason is not correct explanation for assertion

C. Assertion is correct statement but reason is wrong statement

D. Assertion is wrong statement but reason is correct statement

Answer: A

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3. Assertion : Lactic acid shows geometrical isomerism.

Reason : it has C = C bond.

A. Assertion and reason both are correct statements and reason is correct explanation for assertion.

B. Assertion and reason both are correct statements but reason is not correct explanation for assertion

C. Assertion AND reason is wrong statement

D. Assertion is wrong statement but reason is correct statement

Answer: B

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4. Assertion : trans $-2-$ Butene on reaction with Br_2 gives meso $-2,3-$ dibromobutane.

Reason : The reaction involves syn $-$ addition of bromine.

A. Assertion and reason both are correct statements and reason is correct explanation for assertion.

B. Assertion and reason both are correct statements but reason is not correct explanation for assertion

C. Assertion is correct statement but reason is wrong statement

D. Assertion is wrong statement but reason is correct statement

Answer: D

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5. Assertion : Acetylene is more acidic than ethylene.

Reason : Acetylene has sp character of carbon and, therefore, more s-character.

A. Assertion and reason both are correct statements and reason is correct explanation for assertion.

B. Assertion and reason both are correct statements but reason is not correct explanation for assertion

C. Assertion is correct statement but reason is wrong statement

D. Assertion is wrong statement but reason is correct statement

Answer: A

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6. Assertion : Propene reacts with HBr in the presence of peroxides to give 1-bromopropane.

Reason : Alkenes react with HBr in the presence of peroxides according to anti Markovnikov's rule.

A. Assertion and reason both are correct statements and reason is correct explanation for assertion.

B. Assertion and reason both are correct statements but reason is not correct explanation for assertion

C. Assertion is correct statement but reason is wrong statement

D. Assertion is wrong statement but reason is correct statement

Answer: A

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7. Assertion : Terminal alkynes on oxidation with Bayer's reagent give a mixture of carboxylic acid and CO_2

Reason : Terminal alkynes show acidic character.

A. Assertion and reason both are correct statements and reason is correct explanation for assertion.

B. Assertion and reason both are correct statements but reason is not correct explanation for assertion

C. Assertion is correct statement but reason is wrong statement

D. Assertion is wrong statement but reason is correct statement

Answer: B

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8. Assertion: Nitration of benzene leads to the formation of m-nitro benzene.

Reason: $-NO_2$ roup is a m-directing group.

A. Assertion and reason both are correct statements and reason is correct explanation for assertion.

B. Assertion and reason both are correct statements but reason is not correct explanation for assertion

C. Assertion is correct statement but reason is wrong statement

D. Assertion is wrong statement but reason is correct statement

Answer: C

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9. Assertion :  is aromatic.

Reason : It contains 4π electrons.

A. Assertion and reason both are correct statements and reason is correct explanation for assertion.

B. Assertion and reason both are correct statements but reason is not correct explanation for assertion

C. Assertion is correct statement but reason is wrong statement

D. Assertion is wrong statement but reason is correct statement

Answer: D

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10. Assertion : Buta-1, 3-diene and but-1-yne can be distinguished with Tollen's reagent.

Reason : But-1-yne gives ppt. with Tollen's reagent but buta-1, 3-cliene does not.

A. Assertion and reason both are correct statements and reason is correct explanation for assertion.

B. Assertion and reason both are correct statements but reason is not correct explanation for assertion

C. Assertion is correct statement but reason is wrong statement

D. Assertion is wrong statement but reason is correct statement

Answer: A

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Revision Exercises Very Short Answer Questions

1. Define conformations.

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2. Name the stable conformation of cyclohexane.

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3. Can ethene show conformations? Why?

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4. What is the number of σ and π-bonds in a molecule of ethyne?

Watch Video Solution

5. Why do alkenes undergo electrophilic addition reactions ?

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6. What are conjugated dienes? Give one example.

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7. What is CNG? What is its use?

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8. Why are all C to C bond lengths in benzene equal ?

Watch Video Solution

9. Why do alkynes not show geometrical isomerism ?

Watch Video Solution

10. What type of hybridisation of carbon is involved in benzene?

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11. Which of the two can exhibit geometrical isomerism ? But-2-ene or But-1-ene.

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12. What is Markovnikov's rule ?

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13. What is Lindlar's catalyst?

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14. What is the chemical composition of teflon ?

Watch Video Solution

15. How will you convert benzene into nitrobenzene?

Watch Video Solution

16. Give a chemical test to distinguish between ethane and ethene.

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17. What happens when a mixture of methyl bromide and ethyl bromide is treated with dry sodium in the presence of anhydrous ether?

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18. What happens when water is added to calcium carbide ?

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19. Prepare from acetylene : Propyne

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20. Complete the reaction :

$CH_3CH = CH_2 \xrightarrow{HBr}$

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21. What does LPG represent?

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22. Why alkenes are known as olefins?

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23. How does HBr react with 1- butene?

Watch Video Solution

24. Out of ethyne and ethene, which is more acidic in nature?

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25. Name the metal which is the constituent of Grignard reagent.

Watch Video Solution

26. What is Wurtz reaction? Give example.

Watch Video Solution

27. Give the chemical test to distinguish between 2-butyne and 1-butyne.

Watch Video Solution

28. How will you convert acetylene to but-1-ene?

Watch Video Solution

29. What is peroxide effect in electrophilic addition of alkenes ?

Watch Video Solution

30. Why do alkenes undergo electrophilic addition reactions ?

Watch Video Solution

31. How is isopropyl benzene prepared from Grignard reagent?

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32. Benzene reacts with fuming sulphuric acid to give

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Revision Exercises Short Answer Questions Carrying 2 Or 3 Marks

1. How do you account for the formation of ethane during chlorination of methane ?

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2. Account for the order of acidity:

$\text{Acetylene} > \text{Benzene} > \text{Hexane}$

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3. Why does benzene undergo electrophilic substitution reactions easily and nucleophilic substitutions with difficulty?

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4. How will you explain that there exists two varieties of 1,2-dichloroethene while there is only one variety of 1,2-dichloroethane ?

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5. Explain the stability of alkenes.

Watch Video Solution

6. Why do alkenes show geometrical isomerism ?

Watch Video Solution

7. What happens when

(i) ethyl alcohol is heated in the presence of H_2SO_4 at 443 K?

(ii) ethyl bromide is heated with alcoholic KOH?

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8. How will you detect the presence of double bond in a hydrocarbon?

Watch Video Solution

9. What are substitution reactions? Give two examples of substitution reactions of benzene.

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10. Which of the following polymerises most readily and why?

(i) Acetylene (ii) Ethene

(iii) Buta-1,3-diene.

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11. Addition of HBr to propene yields 2-bromopropane, while in the presence of benzoyl peroxide, the same reaction yields 1-bromopropane. Explain and give mechanism.

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12. How does ethylene react with :

(i) bromine

(ii) alkaline potassium permanganate

(iii) ozone (iv) hydrogen?

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13. How does acetylene react with :

(i) oxygen

(ii) bromine

(iii) ozone

(iv) water

(v) HBr.

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14. How will you convert benzene into:

(i) bromobenzene (ii) berzone sulphonic acid

(iii) acetophenone (iu) toluene

Watch Video Solution

15. Explain the mechanism of electrophilic addition reactions of alkenes.

Watch Video Solution

16. Explain the mechanism of nitration of benzene.

Watch Video Solution

17. Complete the reactions :

(i) $CH_3 - C \equiv CH + H_2 \xrightarrow[\text{quinoline}]{Pd, BaSO_4}$

(ii) $CaC_2 + H_2O \rightarrow$

(iii) $CH_3CH = CHCH_3 \xrightarrow[Zn, H_2O]{O_3}$

(iv) $HC \equiv CH \xrightarrow{\text{Alk.}KMnO_4}$

(v) $CH_3C \equiv CH \xrightarrow{\text{hot.}KMnO_4}$

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18. Give the main products of the reactions :

(a) $C_6H_6 \xrightarrow[H_2SO_4]{HNO_3}$

(b) $C_6H_5CH_3 \xrightarrow{CrO_2Cl_2}$

(c) $C_6H_5CH_2CH_2CH_3 \xrightarrow{\text{Alk.}KMNO_4}$

(d) $C_6H_6 + Cl_2 \xrightarrow{\text{sunlight}}$

(e) $C_6H_6 + CH_3COOCl \xrightarrow{\text{Anhyd.}AlCl_3}$

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19. How will you convert:

(a) acetylene to acetaldehyde

(b) ethylene to acetylene

(c) isopropylbromide to n-propylbromide

(d) acetic acid to methane ?

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20. Write brief notes on:

(i) Markovnikov's rule (ii) Peroxide effect.

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21. Which out of ethylene or propylene is more reactive to the addition of HBr ? Explain.

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22. Explain the terms substitution and addition reactions ? Methane gives substitution reaction while ethylene gives addition reaction. Justify the statement giving two examples in each case.

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23. Why do alkenes undergo electrophilic addition reactions ? Explain the mechanism of HBr to ethylene.

Watch Video Solution

24. How do you account for acidic nature of alkynes as compared to alkenes ? Give two reactions in which acetylene behaves as an acid.

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25. Discuss the general mechanism of the electrophilic substitution in benzene. What is the role played by the catalyst?

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26. Discuss the structure of benzene in terms of resonance and orbital concept.

Watch Video Solution

27. Why does benzene undergo electrophilic substitution reaction instead of electrophilic addition reaction ? Discuss the mechanism of chlorination of benzene,

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28. How will you convert benzene into acetophenone ? Discuss the mechanism of the reaction.

Watch Video Solution

29. How is benzene converted into nitrobenzene ? Discuss the mechanism of this reaction.

Watch Video Solution

30. Explain the directive influence of substituents on benzene and their effect on reactivity,

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31. Explain the term polymerisation with two examples.

Watch Video Solution

32. Explain the following:

(i) Alkynes are acidic in nature.

(ii) Alkenes show geometrical isomerism.

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33. Give four important reactions of benzene and explain the mechanism of any one of these reactions.

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34. Explain the mechanism of the following reactions : (i) Sulphonation of benzene (ii) Addition of HBr to ethene.

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35. Draw the structures of six isomeric pentenes, C_5H_{10} Specify as E or Z to each geometric isomer.

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36. Write down the products of ozonolysis of 1, 2-dimethylbenzene (o-xylene). How does the result support Kekulé structure for benzene?

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37. If one mole of HBr is added to the following compounds, write down the structures of the product/products expected to be formed:

(i) Buta-1, 3-diene

(ii) Penta-1, 3-diene

(iii) Penta -1, 4-diene

(iv) But-1-ene.

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38. Write structures of all the alkenes which on hydrogenation give 2-methyl butane.

Watch Video Solution

39. Which of the following polymerises most readily and why?

(i) Acetylene

(ii) Ethene

(iii) Buta-1, 3-diene

Watch Video Solution

40. Why does benzene undergo electrophilic substitution reactions easily and nucleophilic substitutions with difficulty?

Watch Video Solution

41. Why do alkynes undergo addition reactions while simple alkenes do not?

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42. hy propane has only one eclipsed contirmation while butane has three? Explain.

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43. Out of benzene, m–dinitrobenzene and toluene which will undergo nitration most easily and why?

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44. Why is Wurtz reaction not preferred for the preparation of alkanes containing odd number of carbon atoms? Illustrate your answer by taking one example.

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Revision Exercises Long Answer Questions Carrying 5 Marks

1. What are conformations ? Discuss the different conformations of ethane. How will you account for their difference in their relative stability ?

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2. Write short notes on:

(i) Friedel Craft reaction

(ii) Markovnikov's rule

(iii) Wurtz reaction.

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3. What are alkenes ? Why do these show geometrical isomerism? Explain the mechanism of electrophilic addition reactions to alkenes.

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4. Explain the structure of benzene and give its important chemical reactions.

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Hots Higher Order Thinking Skills

1. Explain: $CH_2 = CH^-$ is more basic than $HC \equiv C^-$.

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2. Why is cyclopropane more reactive than propane ?

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3. Out of but-1-yne or but-1-ene which has higher dipole moment?

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4. What alkyne would you start with and what reagents would you use to prepare:

(i) cis-but-2-ene (ii) trans-pent-2-ene

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5. Show steps to prepare (E) -pent-2-ene from acetylene.

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6. When ethene gas is passed through an aqueous solution containing bromine and sodium chloride, three products are formed. Predict the products.

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7. When 3, 3-dimethylbutan-2-ol is treated with concentrated HI, a rearrangement occurs. Name the alkyl iodide formed showing the steps of the reaction.

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8. Write the alkenes that give the following compounds on ozonolysis:

(i) $CH_3COCH_2CH_3 + CH_3CHO$

(b)

Hunderset(O)underset(||)CCH_(2)CH_(2)CH_(2)underset(O)underset(||)CCH_(2)C

(c)CH_(3)-

underset(O)underset(||)CCH_(2)CH_(2)underset(O)underset(||)CH+Hunderset(C

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9. An organic compound 'X' of molecular formula C_6H_{12} , absorbs one mole of bromine to give $C_6H_{12}Br_2$ Onreduction it gives 2-methylpentane, while on oxidation yieldsa mixture of acetic acid and isobutyric acid. Derive the structural formula of X and give its IUPAC name.

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10. One mole of a hydrocarbon $'A'$ reacts with $1mil$ of brominne giving a dibromo compound, $C_5H_{10}Br_2$. Compound $'A'$ on treatment with cold dilute alkaline potassium permanganate solution forms a compound, $C_5H_{12}O_2$. On ozonolysis, $'A'$ gives equimolar quantities of propanone and ethanal. Deduce the structural formula of $'A'$

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11. What product would you get from acid catalysed hydration of 1-methylcyclohexene? Explain.

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12. Predict the major product of the following reaction: $C_6H_6 + (CH_3)_2CHCH_2OH \xrightarrow{H_2SO_4}$

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13. Predict the structure of a hydrocarbon which gives one mole each of ethanedial and butanedial on ozonolysis.

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14. Predict the product of the reaction :

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15. Arrange the alkenes 2-methyl but-l-ene (I), 2-methyl but-2-ene (II) and 3-methylbut-1-one (III) in order of decreasing reactivity towards bromine.

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Competition File Objective Type Questions Multiple Choice Questions With Only One Correct Answer

1. The correct IUPAC name of the following alkane is

A. 3, 6-Diethyl-2-methyloctane

B. 3-Isopropyl-6-ethyloctane

C. 3-Ethyl-5-isopropyloctane

D. 5-Isopropyl-3-ethyloctane

Answer: A

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2. Which of the following has least boiling point ?

A. n-Hexane

B. n-Pentane

C. 2-Methylbutane

D. 2,2-Dimethyl propane

Answer: D

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3. The chlorination of methane is an example of

A. elimination reaction

B. substitution reaction

C. addition reaction

D. oxidation reaction

Answer: B

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4. Arrange the halogens F_2, Cl_2, Br_2, I_2, in order of their increasing reactivity with alkanes.

A. $I_2 < Br_2 < Cl_2 < F_2$

B. $Br_2 < I_2 < Cl_2 < F_2$

C. $Br_2 < Cl_2 < F_2 < I_2$

D. $F_2 < Cl_2 < Br_2 < I_2$

Answer: A

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5. In the reaction,

$CH_3COOH \xrightarrow[\text{Heat}]{\text{NaOH}} X \xrightarrow{\text{NaOH, CaO}} Y, Y$ is

A. CH_3CHO

B. CH_4

C. C_2H_6

D. CH_3COCH_3

Answer: B

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6. An aqueous solution of compound A gives ethane or electrolysis. The compound A is :

A. Ethyl acetate

B. Sodium acetate

C. Sodium propionate

D. Sodium ethoxide.

Answer: B

View Text Solution

7. Arrange the following in decreasing order of their boiling points.

(A). N-butane

(B). 2-methylbutane

(C). N-pentane

(D). 2,2-dimethylpropane

A. $A > B > C > D$

B. $B > C > D > A$

C. $C > B > D > A$

D. $D > C > B > A$

Answer: C

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8. Isopropyl bromide undergoes wurtz reaction to form-

A. Hexane

B. Propane

C. 2, 3-Dimethylbutane

D. Neohexane

Answer: C

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9. Which of the following will not show geometrical isomerism?

A. 

B. 

C. 

D. 

Answer: C

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10. The ozonolysis of $(CH_3)_2C = C(CH_3)_2$ followed by treatment with zinc and water will give

A. acetone

B. acetaldehyde and acetone

C. acetic acid

D. formaldehyde

Answer: A

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11. Ethylene reacts with Baeyer's reagent to given

A. glycol

B. acetaldehyde

C. oxalic acid

D. ethyl alcohol.

Answer: A

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12. A gas on passing through ammonical solution of $AgNO_3$ does not give any precipitate but decolourises alkaline $KMnO_4$ solution. The gas may be:

A. C_2H_6

B. C_2H_4

C. C_2H_2

D. C_3H_8

Answer: B

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13. The compound which forms only acetaldehyde upon ozonolysis is :

A. Ethene

B. Propene

C. But-1-ene

D. But-2-ene

Answer: D

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14. In the reaction :

$A \xrightarrow{\text{HBr}} B \xrightarrow{\text{alc. KOH}} C \xrightarrow[Zn\,,H_2O]{O_3} CH_3CHO + CO_2$ the compound A is

A. Ethylene

B. Acetic acid

C. Propene

D. 1-Butene.

Answer: C

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15. When $3,3-$ dimethyl$-2-$ butanol is heated with H_2SO_4 the major product obtained is

A. 3, 3-dimethylbut-1-ene

B. 2, 3-dimethylbut-2-ene

C. 2, 3-dimethylbut-1-ene

D. cis and trans isomers of product named under (b)

Answer: B

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16. Which of the following can exhibit geometrical isomerism

A. But-2-yrie

B. But-2-ene

C. But-1-ene

D. Butan-2-ol.

Answer: B

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17. Maleic acid and fumaric acid are :

A. Chain isomers

B. Conformations

C. Geometrical isomers

D. Optical isomers

Answer: C

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18. Which of the following has the smallest heat of hydrogenation per mole ?

A. But-1-ene

B. Trans- But-2-ene

C. Cis- But-2-ene

D. Buta-1,3-diene

Answer: D

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19. Reaction of HBr with propene in the presence of peroxide gives :-

A. 3-Bromopropane

B. alkyl bromide

C. n-propyl bromide

D. isopropyl bromide

Answer: C

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20. Oxidation of an alkene (X) gives a diol. Further oxidation gives a diketone. Which one of the following could be X?

A. $(CH_3)_2C = C(CH_3)_2$

B. $CH_3CH = C(CH_3)_2$

C. $(CH_3)_2CHCH = CH_2$

D. $C_6H_5CH = CHC_6H_5$

Answer: D

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21. Acetylene is obtained by the electrolysis of

A. sodium fumarate

B. sodium succinate

C. sodium maleate

D. both (a) and (c)

Answer: D

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22. Arrange the following carbanions in order of their decreasing stability,

(A) $H_3C - C \equiv C^-$ (B) $H - C \equiv C^-$ (c) $H_3C - CH_2^-$

A. $B > A > C$

B. $A > B > C$

C. $C > A > B$

D. $C > B > A$

Answer: A

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23. Which of the following will not react with an ammoniacal silver nitrate solution ?

A. $CH_3C \equiv CH$

B. $(CH_3)_2CH - C \equiv CH$

C. $CH_3C \equiv \mathbb{C}H_3$

D. $HC \equiv CH$

Answer: C

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24. In the reaction :

$$HC \equiv CH \xrightarrow{NaNH_2} \xrightarrow{CH_3I} Y \xrightarrow[H^+]{H_2O, Hg^{2+}} Z,$$

A. CH_3CHO

B. $CH_3CH_2CH = CH_2$

C. CH_3COCH_3

D. CH_3CH_2CHO

Answer: C

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25. Number of acidic hydrogen atoms in but-1-yne is

A. 1

B. 2

C. 3

D. 4

Answer: A

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26. The alkene which will react with $KMnO_4$ to give pyruvic acid is

A. Ethyne

B. Propyne

C. Butyne

D. Pent-2-yne

Answer: B

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27. Ethyne adds a molecule of methyl alcohol in the presence of alkali to give

A. Acetone

B. Methyl vinyl ether

C. Acetaldehyde

D. Acetic acid

Answer: B

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28. Which of the followig reagents may be used to distinguish between but-1-yne and but-2-yne?

A. alc. KOH

B. alc. $KMnO_4$

C. Br_2 water

D. Ag^+

Answer: D

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29. $C_2H_2 \xrightarrow[H_2SO_4]{Hg(OH)_2 1\%} A \xrightarrow{[O]} B$, B is :

A. an acid

B. an aldehyde

C. ketone

D. ethanol

Answer: A

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30. Products of the following reaction are

$$CH_3 - \underset{\underset{CH_3}{|}}{C} = CH - CH_3 \xrightarrow{KMnO_4 / H^-}$$

A. $CH_3COOH + CO_2$

B. $CH_3COOH + HOO\mathbb{C}H_2CH_3$

C. $CH_3CHO + CH_3CH_2CHO$

D. $CH_3COOH + CH_3COCH_3$

Answer: B

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31. Benzene molecule has

A. 6σ and 6π bonds

B. 16σ and 6π bonds

C. 12σ and 3π bonds

D. 6σ and 3π bonds

Answer: C

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32. Benzene reacts with acetyl chloride in the prescence of anhydrous $AlCl_3$ to give

A. acetophenone

B. toluene

C. benzophenone

D. ethyl benzene.

Answer: A

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33. An aromatic compound C_7H_7Cl on oxidation gives another aromatic compound which on soda lime deccarboxylation produces benzene. The original compound is

A. o-chlorotoluene

B. p-chlorotoluene

C. benzyl chloride

D. m-chlorotoluene

Answer: C

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34. Which of the following species is less reactive than benzene towards ring substitution reactions ?

A. Nitrobenzene

B. Aniline

C. Bromobenzene

D. Chlorobenzene

Answer: A

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35. In benzene, each carbon atom undergoes

A. sp hybridisation

B. sp^2 hybridisation

C. sp^3 hybridisation

D. sp^2 and sp^3 hybridisation

Answer: B

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36. Number of π-bonds in naphthalene is

A. 6

B. 3

C. 4

D. 5

Answer: D

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37. In the reaction,

$$C_6H_6 + RCOCl \xrightarrow{AlCl_3} C_6H_5COR + HCl$$

the attacking electrophile is:

A. $AICI_2^+$

B. R^+

C. RCO^+

D. $AICI_4$

Answer: C

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38. Benzene reacts with CH_3Cl in the presence of anyhydrous $AlCl_3$ to form

A. ethyl benzene

B. methyl benzene

C. n-propyl benzene

D. iso-propyl benzene

Answer: D

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39. Benzene reacts with CH_3COCl in the presence of anhydrous $AlCl_3$ to give

A. toluene

B. naphthalene

C. acetophenone

D. benzophenone

Answer: D

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40. The attacking reagent in electrophilic sulphonation of benzene is

A. SO_4^{2-}

B. SO_3^{2-}

C. SO_2

D. SO_3

Answer: D

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41. In Friedel Craft Reaction, anhydrous $AlCl_3$ is used. Its function is to

A. absorb HCl

B. absorb H_2O

C. produce electrophile

D. produce nucleophile

Answer: C

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42. The electrophile in nitration of benzene reaction is:

A. NO_2

B. N_2O

C. NO_2^+

D. NO

Answer: C

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43. Benzene to acetophenone

A. Acetone in the presence of HCI

B. Acetyl chloride in the presence of $AICI_3$

C. Methyl chloride in the presence of $AICI_3$

D. Acetaldehyde in the presence of Fe

Answer: B

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44. Which of the following is not o,p - directing group ?

A. $-Cl$

B. $-NH_2$

C. $-CH_3$

D. $-NO_2$

Answer: D

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45. Which of the following compound obey octet rule :

A. 

B. 

C. 

D. 

Answer: B

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Competition File Objective Type Questions Multiple Choice Questions From Competitive Examinations Aipmt Neet Other State Boards Medical Entrance

1. Which of the following is not aromatic?

A. Benzene

B. Cyclopentadienyl cation

C. Cyclopropenyl cation

D. Tropylium cation

Answer: B

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2. The most stable among the following is :

A. 

B. 

C. 

D. 

Answer: A

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3. The decreasing order of reactivity towards electrophilic substitution reaction of the following compounds is :

A. $1 > 2 > 4 > 2$

B. $4 > 1 > 3 > 2$

C. $4 > 1 > 2 > 3$

D. $4 > 2 > 1 > 3$

Answer: C

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4. When 2-chloro-2-methylbutane is heated with alcoholic KOH the possible products /s is/are?

$(i)(CH_3)_2C = CHCH_3$ $(ii)H_2C = C(CH_3)CH_2CH_3$

$(iii)(CH_3)_2CHCH = CH_2$

A. a,b,c

B. a and c

C. b and c

D. a and b

Answer: D

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5. $H_3C - \underset{\underset{CH_3}{|}}{CH} - CH = CH_2 + HBr \rightarrow A.$

A is predominantly

A. $H_3C - \underset{\underset{CH_3}{|}}{C}\ H - CH_2 - CH_2Br$

B. $CH_3 - \underset{\underset{CH_3}{|}}{\overset{\overset{Br}{|}}{C}} - CH_2 - CH_3$

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

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

Answer: B

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6. Base strength of the following

(i) $H_3CCH_2^-$, (ii) $H_2C=CH^-$

(iii) $HC\equiv C^-$

A. $b>a>c$

B. $c>b>a$

C. $a>c>b$

D. $a>b>c$

Answer: D

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7. Which of the following is the most reactive towards electrophilic attack ?

A. 

B. 

C. 

D. 

Answer: C

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8. Which of the following compound will exhibit cis-trans isomerism?

A. Butanol

B. But-2-enol

C. But-2-yne

D. toluene

Answer: B

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9. The state of hybridization of C_2, C_3, C_5 and C_6 of the hydrocarbon,

$$\underset{7}{CH_3} - \underset{6}{\overset{\overset{CH_3}{|}}{\underset{|}{C}}}{}_{CH_3} - \underset{5}{CH} = \underset{4}{CH} - \underset{3}{\overset{\overset{CH_3}{|}}{C}} H - \underset{2}{C} \equiv \underset{1}{CH}$$ is:

A. sp^3, sp^2, sp^2 and sp

B. sp, sp^2, sp^2 and sp^3

C. sp, sp^2, sp^3 and sp^2

D. sp, sp^3, sp^2 and sp^3

Answer: D

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10. The $IUPAC$ name of the compound having the formula $CH \equiv C - CH = CH_2$ is

A. 1-butyne-3-ene

B. but-1-yne-3-ene

C. 1-buten-3-yne

D. 3-buten-1-yne

Answer: C

Watch Video Solution

11. Benzene reacts with CH_3Cl in the presence of anyhydrous $AlCl_3$ to form

A. Chlorobenzene

B. Benzyl chloride

C. Xylene

D. Toluene

Answer: D

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12. What is the order of reactivity of these alkenes $(CH_3)_2C = CH_2(I), CH_3CH = CH_2(II)$ and CH_(2)=CH_(2)(III)` when subject to acid - catalysed hydration?

A. $III > II > I$

B. $I > III > II$

C. $I > II > III$

D. $II > I > III$

Answer: C

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13. In the eclipsed conformation of ethane, the dihedral ungle between the hydrogen atoms of adjacent methyl groups is

A. 60°

B. 120°

C. 0°

D. 180°

Answer: C

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14. The raction of toluene with CI_2 in presence of $FeCI_3$ gives X and reaction in presence of light gives Y Thus X and Y are .

A. X = 0- and p-chlorotoluene,

Y = Trichloromethyl benzene

B. X = Benzyl chloride, Y = m-chlorotoluene

C. X = Benzul chloride, Y = 0-chlorotoluene

D. X= m-chlorotoluene, Y = p-chlorotoluene

Answer: A

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15. In the following the most stable conformation of n-butane is:

A. 

B. 

C. 

D. 

Answer: D

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16. In a set of reactions, ethyl benzene yielded a product D.

'D' would be:

A. 

B. 

C. 

D. 

Answer: B

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17. Which of the following alkenes is most reactive towards electrophilic additon reaction?

A. 

B. 

C. 

D. 

Answer: C

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18. Liquid hydrocarbon can be converted to a mixture of gaswous hydrocarbon by

A. Distillation under reduced pressure

B. Hydrolysis

C. Oxidation

D. Cracking

Answer: D

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19. When one mole of an alkene or ozonolysis produces 2 moles of propanone, the alkene is

A. 3-methylbut-1-ene

B. 2, 3-dimethylbut-1-ene

C. 2,3-dimethylpent-2-ene

D. 2,3-dimethylbut-2-ene

Answer:

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20. Which one of the following has the lowest boiling point

A. 2-methylbutane

B. 2-methyl propane

C. 2,2-dimethyl propane

D. 1-pentane

Answer: B

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21. Reaction of hydrogen bromide with propene in the absence of peroxide is a/an

A. free radical addition

B. nucleophilic addition

C. electrophilic substitution

D. electrophilic addition

Answer: D

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

A. Propane

B. 2, 2-Dimethylpropane

C. 2-Methylpropane

D. n-Butane

Answer: B

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23. Arrange the following conformations of ethane in the order of decreasing stability

A. $\text{eclipsed} > \text{gauche} > \text{staggered}$

B. $\text{eclipsed} > \text{staggered} > \text{gauche}$

C. $\text{staggered} > \text{gauche} > \text{eclipsed}$

D. $\text{gauche} > \text{staggered} > \text{eclipsed}$

Answer: C

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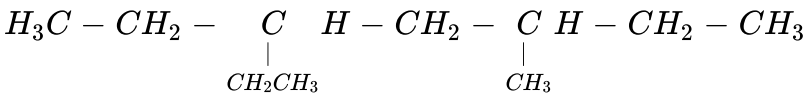
24. The IUPAC name of the following compound



A. 3-ethyl-5-methylheptane

B. 5-ethyl-3-methylheptane

C. 3,5-dicthylhexane

D. 1, 1-diethyl-3-methylpentane

Answer: A

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25. 2-Bromopentane is treated with alcoholic KOH solution. The major product formed in this reaction and the type of reaction respectively are

A. pent-2-ene, β-elimination

B. pent-l-ene, β-elimination

C. pentan-2-ol, nucleophilic substitution

D. pent-1-ene, nucleophilic substitution

Answer: A

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26. In the following reaction

$$H_3C - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - CH = CH_2 \xrightarrow{H_2O / H^{\oplus}} \underset{\text{Major product}}{A} \quad \underset{\text{Minor product}}{B}$$

The major product is

A. $H_3C - \underset{\underset{OH}{|}}{\overset{\overset{CH_3}{|}}{C}} - \underset{\underset{CH_3}{|}}{C}H - CH_3$

B. $\underset{\underset{OH}{|}}{CH_2} - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - CH_2 - CH_3$

C. $H_3C - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - \underset{\underset{OH}{|}}{C}H - CH_3$

D. $H_3C - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - CH_2 - \underset{\underset{OH}{|}}{C}H_3$

Answer: A

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27. The ozonolysis of an olefin gives only propanone. The olefin is:

A. but-1-ene

B. but-2-ene

C. 2, 3-dimethylbut-2-ene

D. propene

Answer: C

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28. The radical,  is aromatic because it has

A. 7 p-orbitals and 7 unpaired electrons

B. 6 p-orbitals and 7 unpaired electrons

C. 6 p-orbitals and 6 unpaired electrons

D. 7 p-orbitals and 6 unpaired electrons

Answer: C

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29. Some meta-directing substituents in aromatic substitution are given which one is the most deactivating?

A. — COOH

B. $-NO_2$

C. $-C \equiv N$

D. $-SO_3H$

Answer: B

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30. Arrange the following molecules in the correct order of decreasing C-C bond length:

$C_2H_6, C_2H_4, C_2H_2, C_6H_6$

A. $C_2H_6 > C_6H_6 > C_2H_4 > C_2H_2$

B. $C_2H_6 > C_2H_4 > C_6H_6 > C_2H_2$

C. $C_2H_4 > C_2H_2 > C_2H_6 > C_6H_6$

D. $C_2H_2 > C_6H_6 > C_2H_4 > C_2H_6$

Answer: A

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31. Which of the following organic compounds has same hybridization as its combustion product (CO_2)?

A. Ethane

B. Ethyne

C. Ethene

D. Ethanol

Answer: B

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32. Which one of the following is an aromatic compound?

A. Cyclopentadienyl cation

B. Cycloheptatrienyl cation

C. Cycloheptatrienyl anion

D. Cycloheptatriene

Answer: B

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33. n-Hexane on heating to 773 K at 10-20 atmospheric pressure in the presence of oxides of vanadium supported over alumina, yields

A. 1-hexene

B. 2-hexene

C. benzene

D. 2-methylpentane

Answer: C

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34. Which one of the following is not an isomer of 3-methylbut-1-yne?

A. Pent-1 yne

B. Buta-1, 3-diene

C. Pent-2-yne

D. Penta-1, 3-diene

Answer: B

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35. Upon ozonolysis, molecule of a hydrcarbon produces of ethanal and one molecule of ethane dial. Identify the hydrocarbon.

A. 1, 3-hexadiene

B. 1, 4 cyclohexadiene

C. 1, 4-hexadiene

D. 2, 4 hexadiene

Answer: D

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36. $2, 3 -$ Dimethyl$-2 -$ butene can be prepared by heating which of the following compounds with a strong acid ?

A. $(CH_3)_2C = CH - CH_2 - CH_3$

B. $(CH_3)_2CH - CH_2 - CH = CH_2$

C. $(CH_3)_2CH - \underset{\underset{CH_3}{|}}{C}\ H = CH_2$

D. $(CH_3)_2C - CH = CH_2$

Answer: D

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37. In the reaction with HCl, an alkene reacts in accordance with Markownikoff's rule to give a product 1-chloro-1-methylcyclohexane. The possible alkene is:

A. 

B. 

C. (A) and (B)

D. 

Answer: C

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38. The oxidation of benzene by V_2O_5 in the presence of aire produces

A. benzoic acid

B. benzaldehyde

C. benzoic anhydride

D. maleic anhydride

Answer: D

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39. The total number of π-bond electrons in the following structure is

A. 12

B. 16

C. 4

D. 8

Answer: D

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40. Given:

The enthalpy of hydrogenation of these compounds will be in the order as

A. $II > III > I$

B. $II > I > III$

C. $I > II > III$

D. $III > II > I$

Answer: D

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41. The correct statement regarding the comparison of staggered and eclipsed conformations of ethane, is

A. the eclipsed conformation of ethane is more stable than staggered conformation even though the eclipsed conformation has torsional strain

B. the staggered conformation of ethane is more stable than eclipsed conformation, because staggered conformation has no torsional strain

C. the staggered conformation of ethane is less stable than eclipsed conformation, because stuggered conformation has torsional strain

D. the eclipsed conformation of ethane is more stable than staggered conformation, because eclipsed conformation has no torsional

strain,

Answer: B

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42. Consider the nitration of benzene using mixed conc. H_2SO_4 and HNO_3. If a large amount of $KHSO_4$ is added to the mixture, the rate of nitration will be :

A. unchanged

B. doubled

C. faster

D. slower

Answer: D

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43. In the reaction

$$H-C\equiv CH \xrightarrow[(ii)\,CH_3CH_2Br]{(i)\,NaNH_2/liq.NH_3} X \xrightarrow[(ii)\,CH_3CH_2Br]{(i)\,NaNH_2/liq.NH_3} Y$$

A. X = but 2-ync, Y = hex-2-yne

B. X = but-1-yne, Y = hex-2-yne

C. X = but-1-yne, Y = hex-3-yne

D. X = but-2-yne, Y = hex 3-yne.

Answer: C

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44. The compound that will react most readily with gaseous bromine has the formula

A. C_3H_6

B. C_2H_2

C. C_4H_{10}

D. C_2H_4

Answer: A

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45. Which of the following can be used as the halide component for Freidel-Crafts reaction-

A. Chlorobenzene

B. Bromobenzene

C. Chloroethene

D. Isopropyl chloride

Answer: D

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46. Which one is the correct order of acidity ?

A. $CH \equiv CH > CH_3 - C \equiv CH > CH_2 = CH_2 > CH_3 - CH_3$

B. $CH \equiv CH > CH_2 = CH_2 > CH_3 - C \equiv CH > CH_3 - CH_3$

C. $CH_3 - CH_3 > CH_2 = CH_2 > CH_3 - C \equiv CH > CH \equiv CH$

D. $CH_2 = CH_2 > CH_3 - CH_3 > CH_3 - C \equiv CH > CH \equiv CH$

Answer: A

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47. With respect to the conformers of ethane, which of the following statements is true ?

A. Bond angle changes but bond length remains same.

B. Both bond angle and bond length change.

C. Both bond angle and bond length remain same.

D. Bond angle remains same but bond length changes.

Answer: C

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48. Predict the correct intermediate and product in the following reaction.

$$H_3C - C \equiv CH \xrightarrow[HgSO_4]{H_2O, H_2SO_4}$$

$$\underset{(A)}{\text{Intermediate}} \rightarrow \underset{(B)}{\text{Product}}$$

A. A: $H_3C\,\underset{SO_4}{\underset{|}{C}} = CH_2$ B: $H_3C - \underset{O}{\underset{||}{C}} - CH_3$

B. A: $H_3C - \underset{OH}{\underset{|}{C}} = CH_2$ B: $H_3C - \underset{SO_4}{\underset{|}{C}} = CH_2$

C. A: $H_3C - \underset{O}{\underset{||}{C}} = CH_3$ B: $H_3C - C \equiv CH$

D. A: $H_3C - \underset{OH}{\underset{|}{C}} = CH_2$ B: $H_3C - \underset{O}{\underset{||}{C}} - CH_3$

Answer: D

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49. Which of the following molecules represents the order of hybridisation sp^2, sp^2, sp, sp from left to right atoms ?

A. $HC \equiv C - C \equiv CH$

B. $CH_2 = CH - C \equiv CH$

C. $CH_2 = CH - CH = CH_2$

D. $CH_3 - CH = CH - CH_3$

Answer: B

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50. The most suitable reagent for the following conversion is

A. $Hg^{2+} / H^+, H_2O$

B. $Na / \text{liquid} NH_3$

C. H_2, Pd / C, quinoline

D. Zn / HCl

Answer: C

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Competition File Objective Type Questions Multiple Choice Questions From Competitive Examinations Jee Main And Other State Boards Engineering Entrance

1. Trans - 2 phenyl 1 - bromocyclopenta ne on reaction with alcoholic KOH produces

A. 2-phenylcyclopentene

B. 1-phenylcyclopentene

C. 3-phenylcyclopentene

D. 4-phenylcyclopentene

Answer: C

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2. The compound formed as a result of oxidation of ethyl benzene by $KMnO_4$ is :

A. acetophenone

B. benzoic acid

C. benzyl alcohol

D. benzophenone.

Answer: B

Watch Video Solution

3. Which of the following reactions will yield $2, 2-$ dibromopropane ?

A. $CH_3CH = CHBr + HBr \rightarrow$

B. $CH \equiv CH + 2HBr \rightarrow$

C. $CH_3 - CH = CH_2 + HBr \rightarrow$

D. $CH_3 - C \equiv CH + 2HBr$

Answer: D

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4. Presence of a nitro group in a benzene ring:

A. renders the ring basic

B. deactivates the ring towards nucleophilic substitution.

C. deactivates the ring towards electrophilic substitution

D. activates the ring towards electrophilic substitution

Answer: C

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5. An organic compound with molecular formula C_6H_{12} upon ozonolysis gives only acetone as the product. The compound is :

A. 2,3-dimethylbut-1-ene

B. hex-3-ene

C. hex-2-ene

D. 2,3-dimethylbut-2-ene

Answer: A

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6. The electrophile, $E^{\oplus}$ attacks the benzene ring to generate the intermediate σ-complex. Of the following, which σ-complex is of lowest energy ?

A. 

B. 

C. 

D. 

Answer: C

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7. The hydrocarbon which can react with sodium in liquid ammonia is

A. $CH_3CH_2C \equiv \mathbb{C}H_2CH_3$

B. $CH_3CH_2CH_2C \equiv \mathbb{C}H_2CH_2CH_3$

C. $CH_3CH_2C \equiv CH$

D. $CH_3CH \equiv CHCH_3$

Answer: C

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8. The treatment of CH_3MgX with $CH_3 - C \equiv C - H$ produces

A. CH_4

B. $CH_3 - CH = CH_2$

C. $CH_3C \equiv C - CH_3$

D. $CH_3 - CH = CH - CH_3$

Answer: A

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9. In which of the following species, all the three types of hybrid carbons are present ?

A. $CH_2 = C = CH_2$

B. $CH_3 - CH = CH - CH_2$

C. $CH_3 - C \equiv C - CH_2^+$

D. $CH_3 - HC = CH - CH_2$

Answer: C

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10. aqueous solution of sodium succinate are electrolysed using Pt-electrodes.

A. $CH_3 - CH_3$

B. $CH_2 = CH_2$

C. $CH \equiv CH$

D. CO_2

Answer: B

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11. The Z-isomers among the following are:

A. 

B. 

C. 

D. 

Answer: A

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12. When 3-phenylpropene reacts with HBr in the presence of peroxide, the major product formula is:

A. 2-bromo-l-phenylpropane

B. 1, 2-dibromo-3-phenylpropane

C. 3-(0-bromophenyl) propene

D. l-bromo-3-phenylpropane

Answer: D

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13. Ozonolysis of an organic compound gives formaldehyde as one of the products. This confirms the presence of

A. two ethylenic double bonds

B. a vinyl group

C. an isopropyl group

D. an acetylenic triple bond

Answer: B

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14. The non aromatic compound among the following is -

A. 

B. 

C. 

D. 

Answer: D

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15. The IUPAC name of 

A. 4-Hydroxypentan-2-one

B. 2-Hydroxypentan-4-one

C. 2-Oxopentan-4-ol

D. 4-Ketopentan-2-ol

Answer: A

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16. The number of sigma (σ) and pi (π) bonds present in 1,3,5,7-octatetraene respectively are:

A. 14 and 3

B. 17 and 4

C. 16 and 5

D. 15 and 4

Answer: B

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17. When HBr adds on hex-1-ene in the presence of benzoyl peroxide, the product is

A. 2-bromohexane

B. 2, 3-dibromohexane

C. 1,2-dibromohexane

D. 1-bromohexane

Answer: D

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18. $2-$ Hexyne gives trans $-2-$ hexene on treatment with :

A. Li/NH_3

B. $Pd/BaSO_4$

C. $LiAIH_4$

D. Pt/H_2

Answer: A

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19. An optically active compound having molecular formula C_8H_{16} on ozonolysis gives acetonic as one of the products. The structure of the compound is:

A. 

B. 

C. 

D. 

Answer: B

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20. The correct order of decreasing H-C-H bond angle in the following molecule is

A. $I > II > III$

B. $II > I > III$

C. $III > II > I$

D. $I > III > II$

Answer: B

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21. $n - C_7H_{16} \xrightarrow[10-20\text{atm.}]{V_2O_5, 500^\circ C} A \xrightarrow{Cl_2, hv} B$

What is B in the above reaction?

A. Benzyl chloride

B. Benzal chloride

C. Hexachlorobenzene

D. Benzene hexachloride

Answer: A

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22. The products obtained by the ozonolysis of 2-ethyl but-1-ene are:

A. propanone and ethanal

B. ethanal and pentan-3-one

C. butanal and ethanal

D. methanal and pentan-3-one.

Answer: D

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23. When but-2-yne is treated with Na in liquid ammonia:

A. cis-2-butene is obtained

B. trans-2-butene is formed

C. n-butane is the major product

D. it rearranges to but-1-yne

Answer: B

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24. 

The major product of the above reaction is

A. 

B. 

C. 

D. 

Answer: B

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25. Which of the following compounds will exhibit geometrical isomerism?

A. 2-Phenyl-1-butene

B. 1, 1-Diphenyl-1-propane

C. 1-Phenyl-2-butene

D. 3-Phenyl-1-butane

Answer: C

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26. Which compund will yield 5-keto -2 methyl hexanal upon treatment with O_3?

A. 

B. 

C. 

D. 

Answer: D

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27. The major products obtained on ozonolysis of 2,3-dimethyl-1-butene followed by reduction with Zn and H_2O are-

A. methanoic acid and 2-methylbutan-3-one

B. methanal and 3-methylbutan-2-one

C. methanol and 2, 3-dimethylbutan-3-one

D. methanoic acid and 2-methylbutan-3-one.

Answer: B

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28. Predict the product (B) in the following sequence of reactions:

$$\text{Ethylbenzene} \xrightarrow{KMnO_4 - KOH} A \xrightarrow{H_3O^+} B$$

A. Benzaldehyde

B. Benzophenone

C. Benzene

D. Benzoic acid

Answer: D

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29. The reaction of propene with $HOCI(CI_2 + H_2O)$ proceeds through the intermediate:

A. $CH_3 - CH^+ - CH_2 - OH$

B. $CH_3 - CH^+ - CH_2 - Cl$

C. $CH_3 - CH(OH) - CH_2^+$

D. $CH_3 - CH(Cl) + CH_2^+$

Answer: B

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30. The isomerism of 2-butyne to 1-butyne can be achieved by treatment with:

A. hydrochloric acid

B. ammoniacal silver nitrate

C. ammoniacal cuprous chloride

D. ethanolic potassium hydroxide

Answer: D

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31. The reaction of propene with HBr in presence of peroxide proceeds through the intermediate:

A. $H_3C - \dot{C}H - CH_3$

B. $H_3C - \dot{C}H - CH_2Br$

C. $H_3C - \overset{Br}{\overset{|}{C}}H - \dot{C}H_2$

D. $H_3C - CH_2 - CH_2$

Answer: B

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32. Which of the following molecules is least resonance stabilized ?

A. 

B. 

C. 

D. 

Answer: B

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33. The trans-alkenes are formed by the reduction of alkynes with

A. $H_2 - Pd/C, BaSO_4$

B. $NaBH_4$

C. $Na/liq.\ NH_3$

D. Sn-HCI

Answer: C

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34. What final product will form when alcoholic KOH is treated with 1, 1-dichloroethane?

A. Ethane-1,2-diol

B. Ethene

C. Ethyne

D. Acetaldehyde

Answer: C

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35. The reagent X' used for the following reaction is

A. Ni

B. Pd/C

C. $LAIH_4$

D. $Na/\text{liquid}NH_3$

Answer: B

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36. Number of possible constitutional isomers of alkane with formula C_6H_{14} is

A. 3

B. 2

C. 5

D. 10

Answer: C

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37. Phenylacetylene on treatment with $HgSO_4 / H_2SO_4, H_2O$ produces

A. acetophenone

B. phenylacetaldehyde

C. phenylacetic acid

D. 1-phenylethanol

Answer: A

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38. $CH_3 - C \equiv CMgBr$ can be prepared by the reaction of

A. $CH_3 - C \equiv C-- Br$ with $MgBr_2$

B. $CH_3 - C \equiv CH$ with $MgBr_2$

C. $CH_3 - C \equiv CH$with KBr and Mg metal

D. $CH_3 - C \equiv CH$ with CH_3MgBr

Answer: D

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39. The major product of the following reaction is :

$$CH_3CH_2\underset{\underset{Br}{|}}{CH} - \underset{\underset{Br}{|}}{CH_2} \xrightarrow[II.NaNH_2 \text{in liq.} NH_3]{I.KOH alc.}$$

A. $CH_3CH_2 \equiv CH$

B. $CH_3CH_2\underset{\underset{NH_2}{|}}{C} - \underset{\underset{NH_2}{|}}{C}H_2$

C. $CH_3CH = C = CH_2$

D. $CH_3CH = CHCH_2NH_3$

Answer: A

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40. The most stable conformation of cyclohexane is :

A. Boat conformation

B. Chair conformation

C. Skew conformation

D. Gauche conformation

Answer: B

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41. Reaction of sodium acetate with soda lime will produce which of the following?

A. Ethane

B. Methane

C. Propane

D. Butane

Answer: B

Watch Video Solution

42. The compound which does not lead to benzoic acid by oxidation with $KMnO_4$ is

A. toluene

B. benzyl alcohol

C. n-butylbenzene

D. t-butylbenzene

Answer: D

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43. Sulphonation of benzene with excess sulphuric acid provides

A. benzenesulphonic acid

B. p-benzenedisulphonic acid

C. o-benzenedisulphonic acid

D. m-benzenedisulphonic acid

Answer: D

Watch Video Solution

44. Propylene on treatment with HBr / H_2O_2 provides

A. 1-bromopropane

B. 2-bromopropane

C. 1,2-dibromopropane

D. 1-bromopropan-2-ol

Answer: A

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45. The alkyl halides required to prepare by Wurtz reaction are

A. 

B. 

C. 

D. 

Answer: C

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46. But-2-yne is reduced to trans-but-2-ene using

A. H_2 / Ni

B. Na in liq. NH_3

C. $H_2 / Pd - C$

D. Zn in dil. HCI

Answer: B

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47. The alkane formed on heating sodium butanoate with soda lime is

A. ethane

B. propane

C. butane

D. methane

Answer: B

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48. But-2-ene on reaction with alkaline $KMnO_4$ at elevated temperature followed by acidification will give :

A. one molecule of CH_3CHO and one molecule of CH_3COOH

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

C. 2 molecules of CH_3COOH

D. 2 molecules of CH_3CHO

Answer: C

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49. $CH_3 - CH = CH_2 \xrightarrow{Cl_2 / H_2O}$

The correct product is

A. $CH_3 - \underset{\underset{Cl}{|}}{CH} - \underset{\underset{OH}{|}}{C}H_2$

B. $CH_3 - \underset{\underset{OH}{|}}{C}H - \underset{\underset{Cl}{|}}{CH_2}$

C. 

D. 

Answer: B

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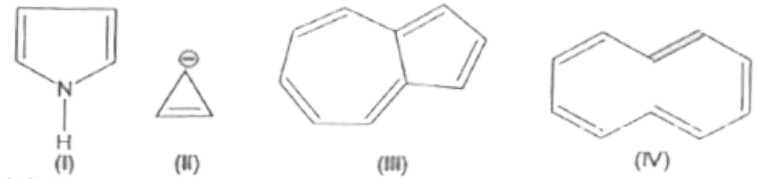
50. Which of the following compound is not aromatic?



(A) I
(C) III
(B) II
(D) IV

A. 

B. 

C. 

D. 

Answer: C

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Competition File Objective Type Questions Multiple Choice Questions From Competitive Examinations Jee Advance For Iit Entrance

1. $CH_3 - CH = CH_2 + NoCl \rightarrow (A)$

Which of the following is the structure of compound A?

A. $CH_3CHNO - CH_2Cl$

B. $ON - CH_2 - CH_2 - CH_2Cl$

C. $CH_3 - CHCI - CH_2NO$

D. $CH_2CI_CHNO - CH_2CH_3$

Answer: C

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2. The reagents(s) for the following conversion :

A. alcoholic KOH

B. alcoholic KOH followed by $NaNH_2$

C. aqueous KOH followed by $NaNH_2$

D. Zn/CH_3OH

Answer: B

View Text Solution

3. The synthesis of 3-octyne is achieved by adding a bromoalkane into a mixture of sodium amide and an alklyne. The bromo alkane and alkyne respectively are:

A. $BrCH_2CH_2CH_2CH_2CH_2CH_3$ and $CH_3C \equiv CH$

B. $BrCH_2CH_2CH_2CH_3$ and $CH_3CH_2CH_2C \equiv CH$

C. $BrCH_2CH_2CH_2CH_2CH_2CH_3$ and $CH_3C \equiv CH$

D. $BrCH_2CH_2CH_2CH_2CH_3$ and $CH_3CH_2C \equiv CH$

Answer: D

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4. In allene (C_3H_4) the type(s) of hybridisation of the carbon atoms is (are):

A. sp and sp^3

B. sp and sp^2

C. only sp^2

D. sp^2 and sp^3

Answer: B

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Competition File Objective Type Questions Multiple Choice Questions With More Than One Correct Answers

1. Alkanes can be obtained from carboxylic acids by

A. $LiAlH_4$

B. Decarboxylation

C. Kolbe's electrolysis

D. Clemmensen's reduction

Answer: B::C

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2. Which of the folllowing on treatment with warm dil. H_2SO_4 in the presence of $HgSO_4$ will give butan-2-one?

A. But-1-yne

B. But-1-ene

C. But-2-yne

D. Pent-1-yne

Answer: A::C

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3. The molecule that will have dipole moment is:

A. 2,2-Dimethylpropane

B. trans-pent-2-eno

C. cis hex-3-ene

D. 2,2,3,3- tetramethylbutane

Answer: B::C

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4. Toluene, when treated with Br_2 / Fe gives p-bromotoluene as the major product, because the CH_3 group:

A. is p-directing

B. is m-directing

C. activates the ring by hyperconjugation

D. deactivates the ring

Answer: A::C

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5. But-1-ene and but-2-ene can be distinguished by

A. Baeyer's reagent

B. hot alk. $KMnO_4$

C. Reductive ozonolysis

D. Tollen's reagent

Answer: B::C

View Text Solution

6. Which of the following can be used in Friedel Crafts acylation reactions ?

A. CH_3COOCH_3

B. CH_3CH_2COCl

C. CH_3CH_2Cl

D. $(CH_3CO)_2O$

Answer: B::D

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7. Which of the following undergoes electrophilic substitution reactions faster than benzene?

A. Phenol

B. Aniline

C. benzoic acid

D. Nitrobenzene

Answer: A::B

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8. Which of the following has almost zero dipole moment?

A. trans-dichloroethene

B. cis-but-2-ene

C. cis-dichloroethene

D. trans-but-2-ene

Answer: A::D

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9. Which of the following has/have aromatic character:

A. 

B. 

C. 

D. 

Answer: A::D

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10. Which one of the following exhibits geometrical isomerism ?

A. 1,2-dibromopropene

B. 2, 3-dimethylbut-2-ene

C. 2, 3-dibromobut-2-ene

D. 2-methylbut-2-ene

Answer: A::C

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11. Which of the following molecules, in pure form, is /are ustable at room temperature?

A. 

B. 

C. 

D. 

Answer: B::C

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12. Among the following reactions (s), which gives (give) tert-butyl benzene as the major product?

A. 

B. 

C. 

D. 

Answer: B::C::D

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13. Which of the following reaction produce propane as major product?

A. 

B. 

C. 

D. 

Answer: A::C

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Competition File Objective Type Questions Multiple Choice Questions Based On The Given Passage Comprehension

1. Alkenes undergo a variety of oxidation reactions. With cold and neutral or alkaline $KMnO_4$, alkenes are oxidised to give vicinal diols. Oxidation with hot $KMnO_4$ undergoes cleavage of C=C bond leading to the formation of carboxylic acids, ketones and carbon dioxide depending on

the nature ofalkene. Reductive ozonolysis of alkenes give aldehydes or ketones.

But-2-ene on treatment with cold alk. $KMnO_4$ gives

A. Butane-1, 2-diol

B. Butane-2, 3-diol

C. Ethylene glycol

D. Glyoxal

Answer: B

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2. Alkenes undergo a variety of oxidation reactions. With cold and neutral or alkaline $KMnO_4$, alkenes are oxidised to give vicinal diols. Oxidation with hot $KMnO_4$ undergoes cleavage of C=C bond leading to the formation of carboxylic acids, ketones and carbon dioxide depending on the nature ofalkene. Reductive ozonolysis of alkenes give aldehydes or ketones.

An alkene 'X' on treatment with hot alkaline $KMnO_4$ gives acetic acid. Alkene X' is

A. Hex-3-enc

B. But-2-ene

C. But-1-ene

D. Pent-1-ene

Answer: B

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3. Alkenes undergo a variety of oxidation reactions. With cold and neutral or alkaline $KMnO_4$, alkenes are oxidised to give vicinal diols. Oxidation with hot $KMnO_4$ undergoes cleavage of C=C bond leading to the formation of carboxylic acids, ketones and carbon dioxide depending on the nature ofalkene. Reductive ozonolysis of alkenes give aldehydes or ketones.

Reductive ozonolysis of alkene 'A' gives propanone. The alkene 'A' is

A. 2,3,-Dimethylbut-2-ene

B. 1,4-Dimethylpent-2-ene

C. 1,3-Dimethylbut-2-ene

D. 2-Methylpropene

Answer: A

Watch Video Solution

4. Alkenes undergo a variety of oxidation reactions. With cold and neutral or alkaline $KMnO_4$, alkenes are oxidised to give vicinal diols. Oxidation with hot $KMnO_4$ undergoes cleavage of C=C bond leading to the formation of carboxylic acids, ketones and carbon dioxide depending on the nature ofalkene. Reductive ozonolysis of alkenes give aldehydes or ketones.

2-Methyl propene on treatment with hot alkaline $KMnO_4$ gives

A. $(CH_3)_2CO, HCOOH$

B. $(CH_3)_2CO, CO_2$

C. $(CH_3)_2CO, CH_3CHO$

D. CH_3CHO, CH_3CH_2CHO

Answer: B

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5. Benzene and other aromatic hydrocarbons, though contain π-bonds, yet they behave as saturated hydrocarbons. They are stable because of delocalisation of cloud. These undergo electrophilic substitution reactions as :

$C_6H_5 - H + YZ \rightarrow C_6H_5Y + HZ$

The reactivity of aromatic hydrocarbons towards electrophilic substitution depends upon the electron density in the benzene ring

Which of the following is not compatible with arenes?

A. Greater stability

B. Delocalisation of π-electrons

C. Electrophilic addition

D. Resonance

Answer: C

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6. Benzene and other aromatic hydrocarbons, though contain π-bonds, yet they behave as saturated hydrocarbons. They are stable because of delocalisation of cloud. These undergo electrophilic substitution reactions as :

$C_6H_5 - H + YZ \rightarrow C_6H_5Y + HZ$

The reactivity of aromatic hydrocarbons towards electrophilic substitution depends upon the electron density in the benzene ring

In the reaction of C_6H_5Y, the major product is m-isomer. The group Y may be

A. $-COOH$

B. $-CI$

C. $-OH$

D. $-NH_2$

Answer: A

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7. Benzene and other aromatic hydrocarbons, though contain π-bonds, yet they behave as saturated hydrocarbons. They are stable because of delocalisation of cloud. These undergo electrophilic substitution reactions as :

$C_6H_5 - H + YZ \rightarrow C_6H_5Y + HZ$

The reactivity of aromatic hydrocarbons towards electrophilic substitution depends upon the electron density in the benzene ring

The electrophile in sulphonation of benzene is

A. SO_3^+

B. HSO_4^-

C. SO_3

D. $H_3SO_4^+$

Answer: C

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8. Benzene and other aromatic hydrocarbons, though contain π-bonds, yet they behave as saturated hydrocarbons. They are stable because of delocalisation of cloud. These undergo electrophilic substitution reactions as :

$C_6H_5 - H + YZ \rightarrow C_6H_5Y + HZ$

The reactivity of aromatic hydrocarbons towards electrophilic substitution depends upon the electron density in the benzene ring

Which reagent cannot be used in Friedel Craft alkylation of benzene?

A. $FeCl_3$

B. $SnCl_4$

C. $AlCl_3$

D. $LiAlH_4$

Answer: D

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9. Benzene and other aromatic hydrocarbons, though contain π-bonds, yet they behave as saturated hydrocarbons. They are stable because of delocalisation of cloud. These undergo electrophilic substitution reactions as :

$C_6H_5 - H + YZ \rightarrow C_6H_5Y + HZ$

The reactivity of aromatic hydrocarbons towards electrophilic substitution depends upon the electron density in the benzene ring

Nitration of benzene undergoes in the presence of

A. HCl

B. H_2SO_4

C. NO_2^+

D. HONO

Answer: B

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Competition File Objective Type Questions Integer Type Questions

1. The number of molecules having zero dipole moment is trans-but-2-ene, cis-pent-2-ene, cis-but-2-ene, propene, trans-1,2-dichloroethene, but-2-yne, cis-1,2-dichloroethene

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2. How many number of cis-trans isomer with molecular formula $C_2BrClFI$ are?

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3. How many of the following on reductive ozonolysis will give ethanal as one of the products?

2-Methylbut-2-ene, 2-methylpropene, but-2-ene, propene, ethene, pent-2-ene, pent-3-ene, hex-3-ene

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4. The number of tertiary hydrogens in 2, 3-dimethylbutane is

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Unit Practice Test

1. But-2-yne is reduced to trans-but-2-ene using

A. Zn in dil.HCI

B. H_2, Ni

C. $H_2 \mid Pd - BaSO_4$

D. Na in liq. NH_3

Answer: D

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2. Which of the following compound can give only one monochlorinated product upon free radical chlorination?

A. 2-Methylpropane

B. n-Butane

C. 2, 2-Dimethylpropane

D. 2, 3 dimethylpentane

Answer: C

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3. The compound formed on oxidation of ethyl benzene is

A. acetophenone

B. benzoic acid

C. benzophenone

D. benzyl alcohol

Answer: B

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4. When HBr is added to hex-1-ene in the presence of benzoyl peroxide, the product is

A. 1-bromohexane

B. 2-bromohexane

C. 2,3-dibromohexane

D. 3-bromohexane

Answer: A

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5. The products obtained by ozonolysis of 2-ethylbut-l-ene are

A. ethanal and pentan-3-one

B. methanal and pentan-3-one

C. propanone and propanal

D. methanal and pentan-2-one

Answer: B

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6. Assertion: Terminal alkynes on oxidation with acidic $KMnO_4$ at high temperature give CO_2 and carboxylic acids.

Reason: Terminal alkynes are acidic in nature

A. Assertion and reason both are correct statements and reason is correct explanation for assertion.

B. Assertion and reason both are correct statements but reason is not correct explanation for assertion.

C. Assertion is correct statement, but reason is wrong statement.

D. Assertion is wrong statement but reason is correct statement.

Answer: B

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7. Assertion: Benzene does not give electrophilic substition reactions.

Reason: Benzene ring has extraordinarily stability because of delocalisation of six π-electrons of three double bonds.

A. Assertion and reason both are correct statements and reason is correct explanation for assertion.

B. Assertion and reagon both are correct statements but reason is not correct explanation for assertion.

C. Assertion is correct statement, but reason is wrong statement.

D. Assertion is wrong statement but reason is correct statement.

Answer: D

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8. Which of the following has the highest boiling point ?

2-Methylpentane or 2,2-dimethylbutane

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9. Write the IUPAC name of

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10. Which of the two: cyclopentadienyl anion or cyclopentadienyl cation is not aromatic?

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11. Give two chemical tests to distinguish pent-1-ene from pentane.

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12. Write structural formulas and IUPAC names of all possible isomers having molecular formula C_5H_8 and one triple bond.

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13. Why is Wurtz reaction not preferred for the preparation of alkanes containing odd number of carbon atoms ? Illustrate with one example.

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14. Complete the following reactions :

(i) $C_6H_6 + CH_3Cl, anhyd.\ AlCl_3 \rightarrow$

(ii) $CH_3C \equiv CCH_3 \xrightarrow[(ii)\ Zn, H_2O]{(i)\ O_3}$

(iii) $CH_3CH_2C \equiv CH \xrightarrow[\text{Heat}]{\text{acidic}KmnO_4}$

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15. What is meant by electrophilic substitution reaction? Explain the mechanism of nitration of benzene.

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