CHEMISTRY

NCERT - NCERT CHEMISTRY(TELUGU)

HYDROCARBONS

Problem

1. Write structures of different chain isomers of alkanes corresponding to the molecular formula C_6H_{14}. Also write their IUPAC names.

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2. Write structures of different isomeric alkyl groups corresponding to the molecular formula C_5H_{11}. Write IUPAC names of alcohols obtained by attachment of –OH groups at different carbons of the chain.

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3. Write IUPAC names of the following compounds :

(i)$(CH_3)_3CCH_2C(CH_3)_3$, (ii)$(CH_3)_2C(C_2H_5)_2$,

(iii) tetra – tert-butylmethane

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4. Write structural formulas of the following compounds :

(i) 3, 4, 4, 5–Tetramethylheptane

(ii) 2,5-Dimethyhexane

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5. Write structures for each of the following compounds. Why are the given names incorrect? Write correct IUPAC names.

(i) 2-Ethylpentane

(ii) 5-Ethyl – 3-methylheptane

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

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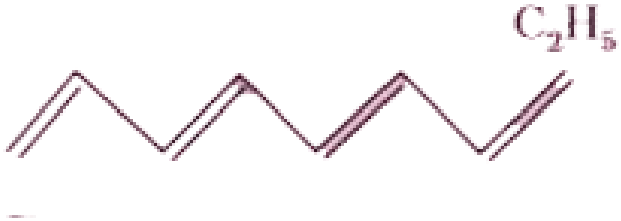
7. Write IUPAC names of the following compounds:

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

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



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

(iv)

$$CH_3CH_2CH_2\underset{|}{C}H_2 \qquad \underset{|}{C}H_2CH_3$$

$$CH_3 - CHCH = C - CH_2 - \underset{\underset{CH_3}{|}}{C}\ HCH_3$$

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8. Calculate number of sigma (σ) and pi (π) bonds in the above structures (i-iv).

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9. Write structures and IUPAC names of different structural isomers of alkenes corresponding to C_5H_{10} .

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10. 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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11. Which of the following compounds will show cis-trans isomerism?

(i)$(CH_3)_2C = CH - C_2H_5$

(ii)$CH_2 = CBr_2$

(iii)$C_6H_5CH = CH - CH_3$

(iv)$CH_3CH = CClCH_3$

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12. 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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13. Write structures of different isomers corresponding to the 5^{th} 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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14. How will you convert ethanoic acid into benzene?

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Exercises

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.

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

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3. Write the structural formulas and IUPAC names for all possible isomers having the number of double or triple bond as indicated:

C_4H_8 (one double 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-Dimethylhept-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 bonds and one C=C bond. 'A' on ozonolysis gives two moles of an aldehyde of molar mass 44. Write the 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.

Butane

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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?

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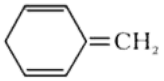
12. Explain why the following systems are not aromatic?

(I) 

(II) 

(III) 

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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 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 with one example.

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Questions A Choose The Correct Answer

1. Alkanes can be represented by the formula

A. C_nH_{2n+2}

B. C_nH_{2n-2}

C. C_nH_{2n}

D. C_nH_{2n-3}

Answer:

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2. Alkenes are represented by the formula

A. C_nH_{2n+2}

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D. C_nH_{2n-3}

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3. Alkynes are represented by the formula

A. C_nH_{2n+2}

B. C_nH_{2n-2}

C. C_nH_{2n}

D. C_nH_{2n-3}

Answer:

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4. The type of substitution reaction that takes place when methane is treated with Cl_2 in presence of light

A. ionic

B. nucleophilic

C. electrophilic

D. radial

Answer:

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5. When n-hexane is passed over hot alumina supported chromium, vanadium or molybdenum oxide the compound formed is

A. cyclopentaene

B. toluene

C. cyclohexane

D. benzene

Answer:

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6. When the identical groups are on the same or opposite sides of the bonds in alkenes the isomerism is called as

A. chain isomerism

B. geometrical isomerism

C. position isomerism

D. optical isomerism

Answer:

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7. Diels-Alder reaction is the reaction between

A. diene and dienophile

B. electrophile and nucleophile

C. oxidant and reductant

D. none.

Answer:

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8. Unsaturated compounds with two double bonds are called as

A. diene

B. olefins

C. alkadiene

D. paraffins.

Answer:

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9. The hybridization of carbons in ethylene is

A. sp^2

B. sp^3

C. sp

D. dsp^2

Answer:

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10. Alcohols can be dehydrated to olefins using

A. H_2SO_4

B. Pd

C. $SOCl_2$

D. Zn/Hg

Answer:

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

A. olefins

B. olefins

C. alkanes

D. aldehydes

Answer:

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12. Witting reaction is used to prepare

A. an alkene

B. an alkyne

C. an alkane

D. none of the above

Answer:

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13. Electrolysis of potassium succinate gives a. Ethylene b. Acetylene c. Ethane d. None of the above

A. ethylene

B. acetylene

C. ethane

D. none of the above

Answer:

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Questions B Fill Up The Blanks

1. In alkanes, the carbon atoms are connected by _____bonds.

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2. Treatment of 1,2-dibromopropane with zinc and ethanol gives _____.

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3. Cis But-2-ene is an _____isomer.

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4. Addition of HCl to an olefin follows _____rule.

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5. An alkene reacts with ozone to form

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6. CaC_2 on hydrolysis gives a.Ethane b.Ethylene c.Methane d.Acetylene

A. a.Ethane

B. b.Ethylene

C. c.Methane

D. d.Acetylene

Answer:

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7. Ethylenedibromide on treatment with KOH gives

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8. Electrolysis of sodium maleate gives

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Questions C Explain Briefly On The Following

1. Mention any five chemical properties of alkanes.

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2. Discuss the general methods of preparing alkanes.

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3. What is hydroboration?

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4. What is ozonolysis? Write equation for the ozonolysis of ethylene. Draw the structure of the

ozonide.

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5. What is wittig reaction?

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6. Define the term polymerisation.

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