CBSE Class 11 Chemistry
Important Questions
Chapter 13
Hydrocarbons

1 Marks Questions

1.Classify the hydrocarbons according to the carbon – carbon bond

Ans . Hydrocarbons are categorized into three categories according to the carbon – carbon bond that exists between then-

(a) saturated hydrocarbon

(b) Unsaturated hydrocarbon

(c) Aromatic hydrocarbon.

2.What are cycloalkanes?

Ans When carbon atoms form a closed chain or a ring, they are termed as cycloalkanes.

3. Why carbon does have a larger tendency of catenation than silicon although they have same number of electrons?

Ans . It is due to the smaller size C-C bond which is stronger (335 KJ mol^{-1}) than in Si bond (225.7 KJ mol^{-1}).

4. Write IVPAC names of the following

|$CH_3\ (CH_2)_4\ CH\ (CH_2)_3\ CH_3$

$CH_2 – CH\ (CH_3)_2$.

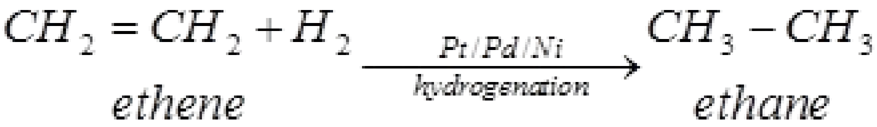
Ans 09. 5-(2 – Methyl propyl) – decane.

5.What is hydrogenation?

Ans . Dihydrogen gas gets added to alkenes and alkenes in the presence of finely divided catalysts like Pt, Pd or Ni to form alkanes. This process is called hydrogenation.

6. How would you convert ethene to ethane molecule?

Ans.



$$\underset{ethene}{CH_2 = CH_2 + H_2} \xrightarrow[hydrogenation]{Pt/Pd/Ni} \underset{ethane}{CH_3 - CH_3}$$

7.Give the IUPAC name of the lowest molecular weight alkane that contains a quaternary carbon.

Ans 03. 2, 2-dimethyl propane.

8.Methane does not react with chlorine in dark. Why?

Ans .Chlorination of methane is a free radical substitution reaction. In dark, chlorine is unable to be converted into free radicals, hence the reaction does not occur.

9.Which conformation of ethane is more stable?

Ans .Staggered conformation.

10. State Le chatelier’s principle.

Ans . It states that a change in any of the factors that determine the equilibrium conditions of a system will cause the system to change in such a manner so as to reduce or to counteract the effect of the change.

11.Can a catalyst change the position of equilibrium in a reaction?

Ans . No, a catalyst cannot change the position of equilibrium in a chemical reaction. A catalyst, however, affects the rate of reaction.

12.What is the effect of reducing the volume on the system described below?

$2C(s) + O_2(g) \rightleftharpoons 2CO(g)$

Ans . The forward reaction is accompanied by increase in volume. Hence according to Chatelier's principle, reducing the volume will shift the equilibrium in the forward direction.

13.What happens when temperature increases for a reaction?

Ans . The equilibrium constant for an exothermic reaction $\left(\Delta H - ve\right)$ decreases as the temperature increases.

14.Can a catalyst change the position of equilibrium in a reaction?

Ans . No, a catalyst cannot change the position of equilibrium in a chemical reaction. A catalyst affects the rate of reaction.

15.If Qc < Kc, when we continuously remove the product, what would be the direction of the reaction?

Ans. Continuous removal of a product maintains Qc at a value less than Kc and reaction continues to move in the forward direction.

16.What is a Lindlars' catalyst?

Ans. Partially deactivated palletized charcoal is known as Lindlar's catalyst.

17.How is alkene produced by vicinal dihalide?

Ans . Vicinal dihalide on treatment with Zn metal lose a molecule of ZnX_2 to from an alkene. This reaction is known as dehalogenation.

$CH_2Br\text{-}CH_2Br + Zn \rightarrow CH_2{=}CH_2 + ZnBr_2$.

18.Arrange the following halogen atom to determine rate of the reaction. Iodine, chlorine. Bromine.

Ans . iodine > bromine > chlorine.

19.What is β-elimination reaction?

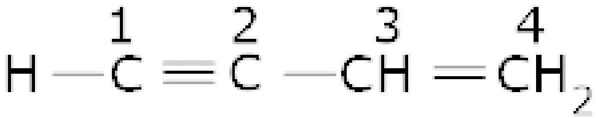
Ans. When hydrogen atom is eliminated from the β-carbon atom (carbon atom next to the carbon to which halogen is attached).

20.What is the number of σ and π bond in

N ≡ C – CH = CH – C ≡ N?

Ans .There are 7σ bonds and 5 π-bonds.

21.Name the type of hybridization in C (2) and C (3) in the following molecule



$H-\overset{1}{C}=\overset{2}{C}-\overset{3}{C}H=\overset{4}{C}H_2$

Ans..C(2) is sp-hybridized and C(3) is sp^2 hybridized.

22.Why do alkynes not show geometrical isomerism?

Ans. Alkynes have linear structure. So they cannot show geometrical isomerism.

23.Write the general formula for alkynes.

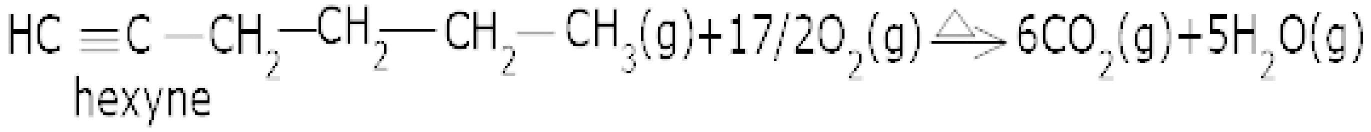
Ans .C_nH_{2n} −2.

24.Name the simplest alkyne

Ans . Ethyne is the simplest alkyne.

25.Write combustion reaction for hexyne.

Ans . Combustion reaction for hexyne.

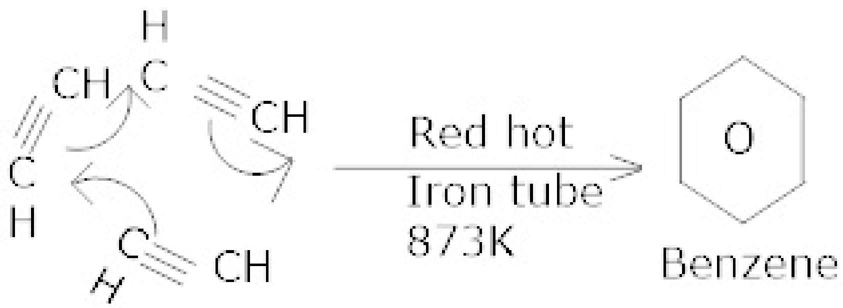


$$HC \equiv C-CH_2-CH_2-CH_2-CH_3(g)+17/2O_2(g) \xrightarrow{\Delta} 6CO_2(g)+5H_2O(g)$$

26.How will you convert ethyne to benzene?

Ans .

Or



27.What are benzenoids?

Ans . Aromatic hydrocarbon compound containing benzene ring are known as benzenoids.

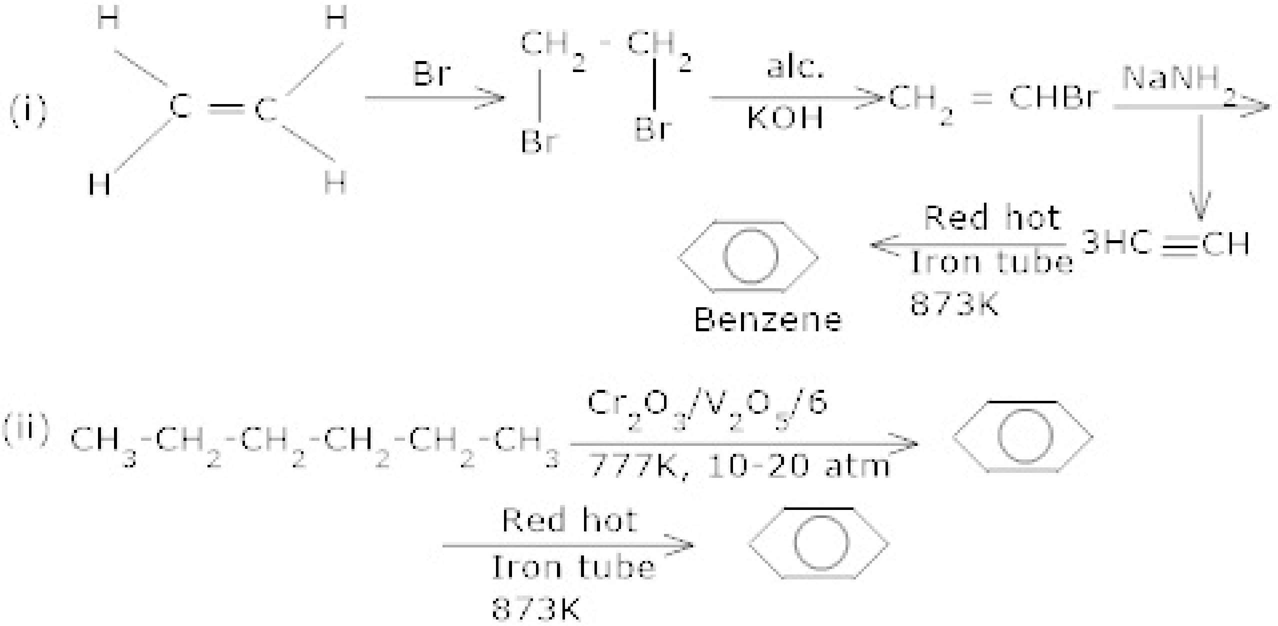
28.Although benzene is highly unsaturated; it does not undergo addition reactions. Give reason.

Ans . Unlike olefins, π-electrons of benzene are delocalized (resonance) and hence these are uncreative towards addition reactions.

29.How will you convert the following compounds into benzene?

(i) ethene (ii) hexane.

Ans:



CBSE Class 12 Chemistry
Important Questions
Chapter 13
Hydrocarbons

2 Marks Questions

1.The boiling point of hydrocarbons decreases with increase in branching. Give reason.

Ans. Branching result into a more compact (nearly spherical) structure. This reduces the effective surface area and hence the strength of the Vander wall's forces, thereby leading to a decrease in the boiling point.

2.Unsaturated compounds undergo addition reactions. Why?

Ans. Unsaturated hydrocarbon compounds contain carbon – carbon double or triple bonds. The π-bond is multiple bond is unstable and therefore addition takes place across the multiple bonds.

3.To which category of compounds does cyclohexane belong?

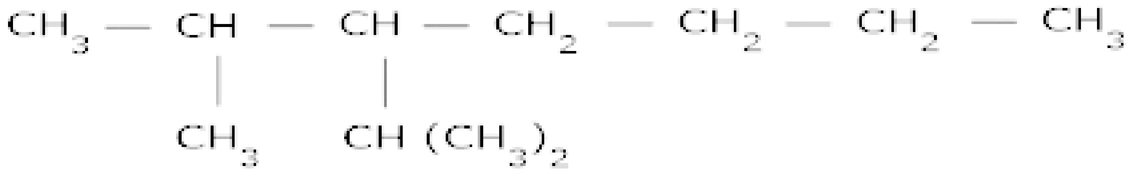
Ans. Saturated alicyclic hydrocarbons.

4.Draw the structure of the following compounds all showing C and H atoms.

(a) 2-methyl -3-iso propyl heptanes

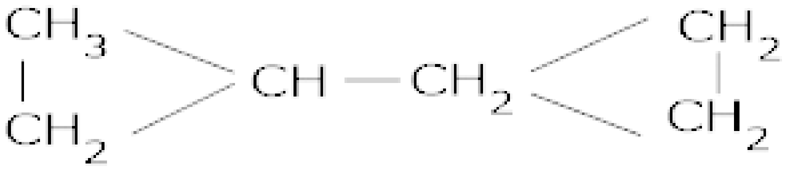
(b) Dicyclopropyl methane.

Ans.(a)



$$\begin{array}{ccccccccccccc} CH_3 & - & CH & - & CH & - & CH_2 & - & CH_2 & - & CH_2 & - & CH_3 \\ & & | & & | & & & & & & & & \\ & & CH_3 & & CH\,(CH_3)_2 & & & & & & & & \end{array}$$

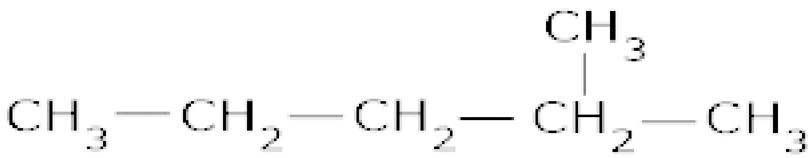
(b)



(dicyclopropyle methane)

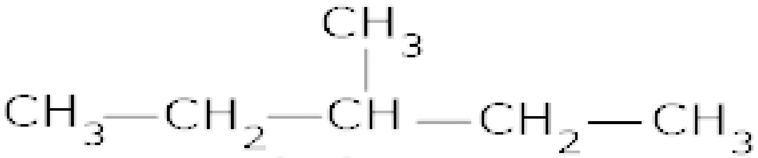
5.Draw all the possible structural isomers with the molecular formula C_6H_{14}, Name them.[2.5]

Ans. (i) $CH_3 – CH_2 – CH_2 – CH_2 – CH_2 – CH_3$(n– hexane)

(ii) 

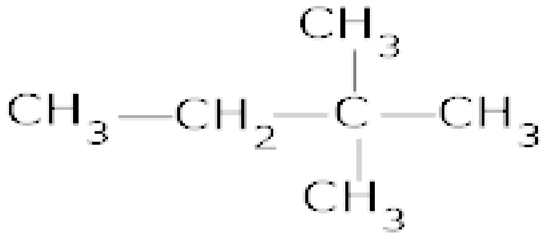
$CH_3-CH_2-CH_2-\overset{\overset{CH_3}{|}}{CH_2}-CH_3$

2-methyl pentane

(iii) 

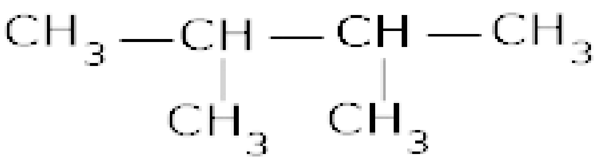
$CH_3-CH_2-\overset{\overset{CH_3}{|}}{CH}-CH_2-CH_3$

3-methyl pentane

(iv) 

$CH_3-CH_2-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}}-CH_3$

2,2-dimethyl butane

(v) 

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

2,3-dimethyl butane

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

Ans. Butanoic acid,

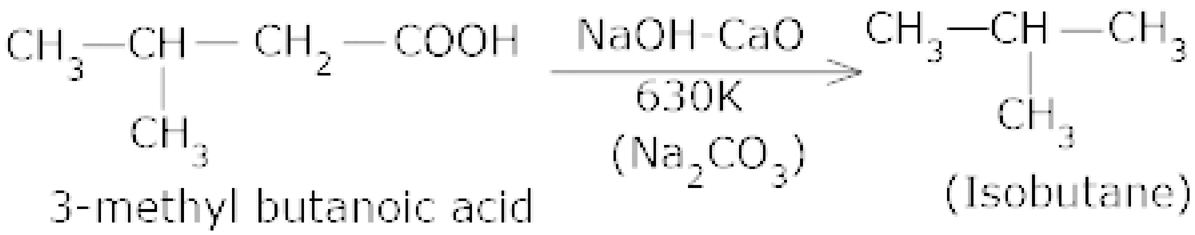
$CH_3CH_2CH_2COO\text{-}Na+NaOH \xrightarrow{Cao} CH_3CH_2CH_3+Na_2CO_3$.

7.Cyclobutane is less reactive than cyclopropane. Justify.

Ans . In cyclobutane molecule, the C-C-C bond angle is 90^0 while it is 60^0 in cycloprpane. This shows that the deviation from the tetrahedral bond angle ($109^0\ 28'$) in cyclobutane is less than in cyclopropane. In other words, cyclopropane is under great strain compared with cyclobutane and is therefore more reactive.

8.How will you prepare isobutane?

Ans . Isobutane is obtained by decarboxylation of 3-methyl butanoic acid with soda lime at 630K.



$$\underset{\substack{|\\CH_3}}{CH_3-CH}-CH_2-COOH \xrightarrow[\substack{630K\\(Na_2CO_3)}]{NaOH\text{-}CaO} CH_3-\underset{\substack{|\\CH_3}}{CH}-CH_3$$

9.The boiling point of alkanes shows a steady increase with increase in molecular mass. Why?

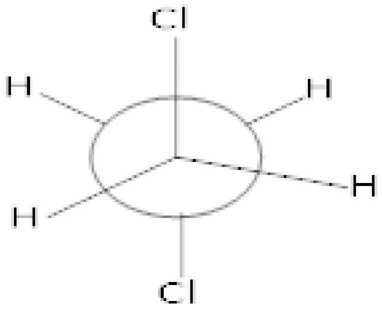
Ans . This is due to the fact that the intermolecular van der walls forces increase with increase of the molecular size or the surface area of the molecule.

10.Pentane has three isomers i.e; pentane, 2-methyl butane and 2,2-dimethyl propane . The b.p of pentane is 309.1K whereas 2,2-dimethyl propane shows a b.p of 282.5k. Why?

Ans . With the increase in number of branched chains, the molecule attains the shape of a sphere. This results in smaller area of contact and therefore weak inter molecular forest between spherical molecules, which are overcome a relatively lower temperatures.

11.Draw the New man’s projection formula of the staggered form of 1,2-dichloro ethane.

Ans.



staggared form of 1,2-dichloro ethane.

12.All the four C-H bonds in methane are identical. Give reasons.

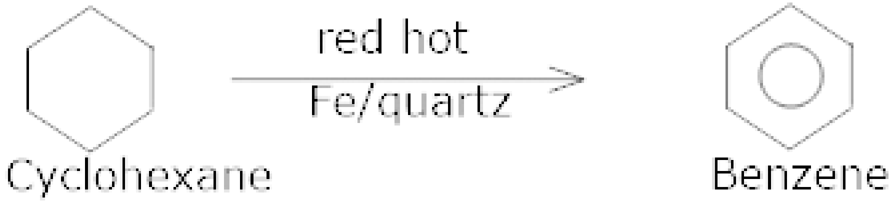
Ans . The four C-H bonds of methane are identical because all of these are formed by the overlapping of the same type of orbital's i.e; hybrid orbital's of carbon and s-orbital of hydrogen.

13.When alkanes are heated, the C-C bonds rather than the C-H bonds break. Give reason.

Ans. When alkanes are heated, the C-C bonds rather than the C-H bonds breaks because the C-C bond has a lower bond energy (ΔH=83K Cal/mole) than the C-H bond (ΔH=99 K Cal / mole).

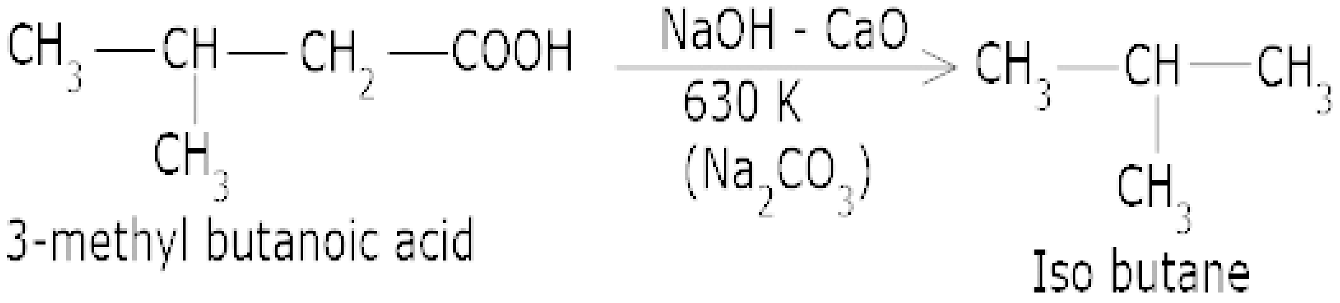
14.How would you convert cyclohexane to benzene?

Ans . Cyclohexane when treated with iron or quartz in a red hot tube undergoes oxidation to form benzene.



15.OEHow is iso-butane prepared?

Ans . By decarboxylation of 3 – methyl butanoic acid with soda lime at 630 K.



16.Why the addition of inert gas does does not change the equilibrium?

Ans. It is because the addition of an inert gas at constant volume does not change the partial pressures or the molar concentrations of the substance involved in the reaction.

17.The equilibrium constant of a reaction increases with rise in temperature. Is the reaction exo – or endothermic?

Ans. The equilibrium constant increases with a rise in temperature. Therefore, the reaction is endothermic.

18.Using Le – chatelier principle, predict the effect of

(a) decreasing the temperature

(b) increasing the temperature

in each of the following equilibrium systems:

(i) $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g) + \Delta$

(ii) $N_2(g) + O_2(g) + \Delta \rightleftharpoons 2NO(g)$

Ans.(i) For an exothermic reaction increase in temperature shifts the equilibrium to the left and decrease in temperature shifts it to the left.

(ii) For an endothermic reaction increase in temperature shifts the equilibrium to the right and decrease in temperature shifts it to the right.

19.(i) In the reaction equilibrium

$A + B \rightleftharpoons C + D$,

What will happen to the concentrations of A, B and D if concentration of C is increased.

(ii) what will happen if concentration of A is increased?

Ans. (i) For an equilibrium reaction

$A + B \rightleftharpoons C + D$

$$Kc = \frac{[C][D]}{[A][B]}$$

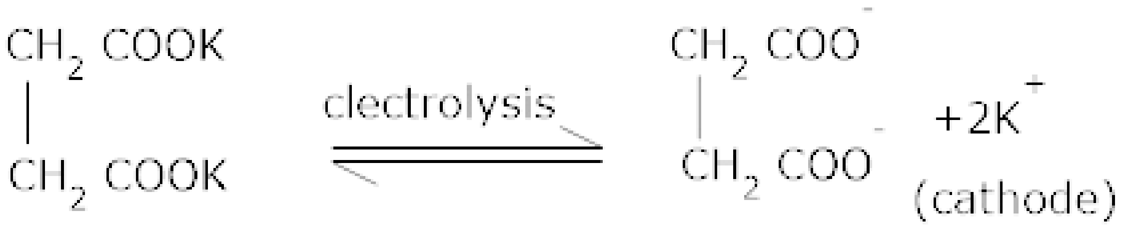
If the concentration of a product is increased, the concentration of other components changes in such a way that the conc of C decreases and vice – versa.

If the conc of C is increased the conc of D will decrease and those of A and B will increase simultaneously so that the numerical value of Kc is the same and vice – versa. The equilibrium shifts to the left.

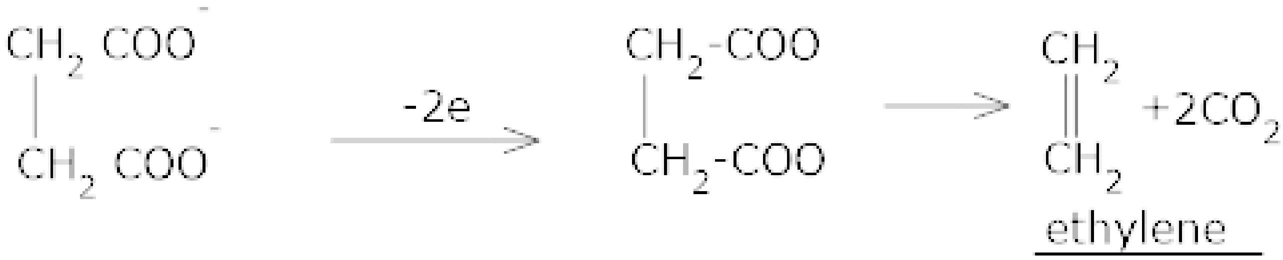
(ii) If the conc of A is increase, conc of B will decrease and those of C and D will increase simultaneously so that the numerical value of Kc is the same and vice – versa. The equilibrium shifts to the right

20.How is alkene produced by Kolbe's electrolytic method?

Ans.

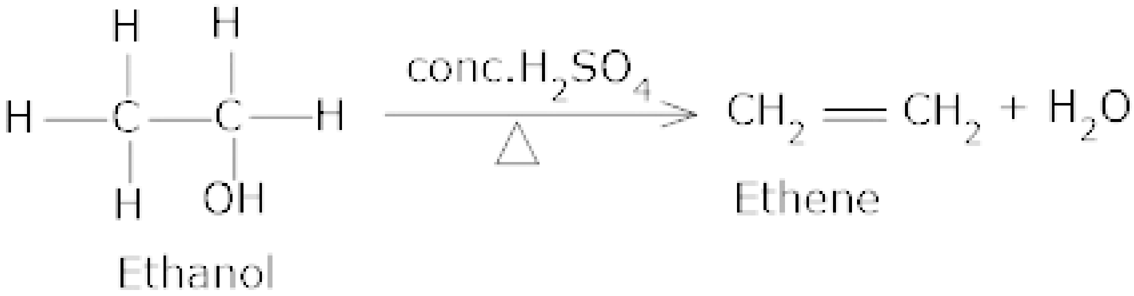


$$\begin{matrix} CH_2\,COOK \\ | \\ CH_2\,COOK \end{matrix} \xrightleftharpoons{\text{electrolysis}} \begin{matrix} CH_2\,COO^- \\ | \\ CH_2\,COO^- \end{matrix} \underset{\text{(cathode)}}{+2K^+}$$



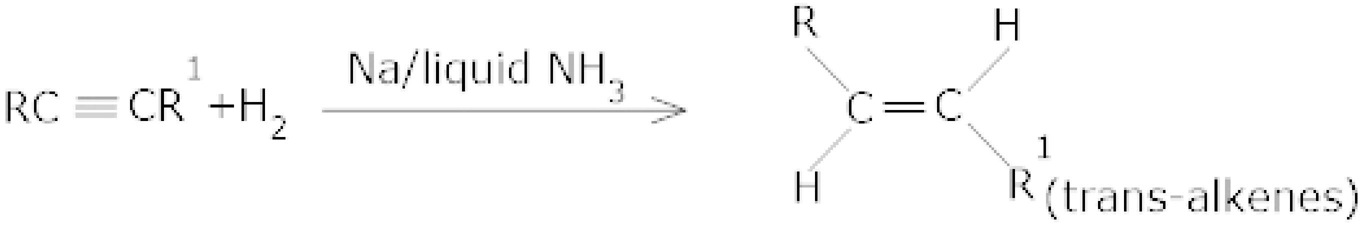
21.How is alkene prepared from alcohol by acidic dehydration?

Ans . Alcohols on heating with concentrated sulphuric acid form alkenes with the elimination of one water molecule.



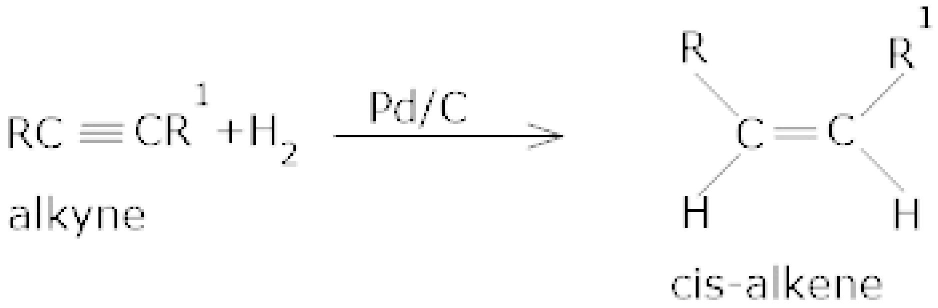
22.How are trans alkenes formed by alkynes?

Ans. Alkynes on reduction with sodium in liquid ammonia form trans alkenes.



23.How are cis – alkenes formed by alkynes?

Ans. Alknes on partial reduction with calculated amount of dihydrogen in the presence of palladised charcoal partially deactivated with poisons like sulphur compounds or quinoline give cis-alkene.

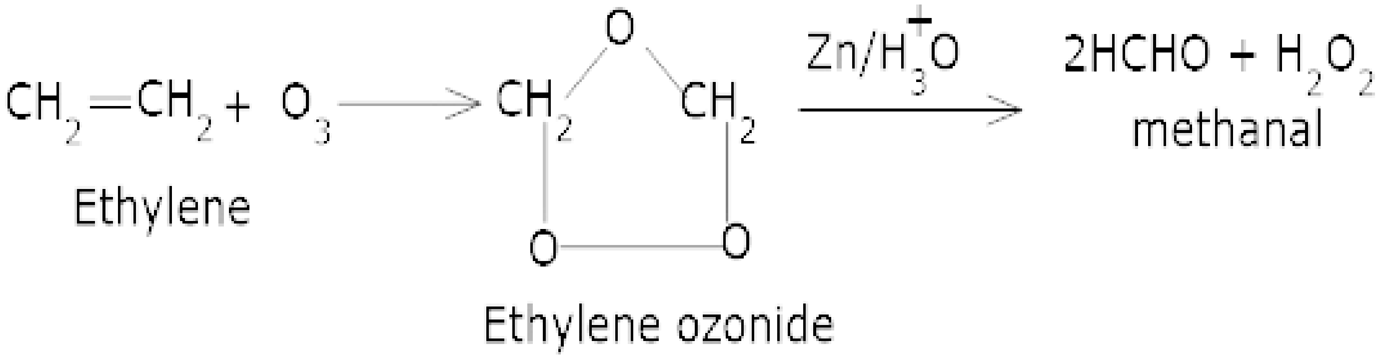


24.Stale Markownikov's Rule.

Ans. It states that when a polar compound is added to an unsymmetrical alkenes, or alkynes positive part goes to the most substituted carbon atom and negative part goes to the least substituted carbon atom.

25.Write the chemical equations of reactions involved in ozonolysis of alkenes.

Ans. It is a process in which alkenes react with ozone to form ozonide which on reduction in presence of Zn give aldehyde and ketones. E.g;



26.How will you distinguish between butene – 1 and butene – 2?

Ans. Butene – 1 and butene – 2 can be distinguished either by ozonolysis or by oxidation with acidic $KMnO_4$ solution which they give different carbonyl compounds.

$$CH_3 - CH_2 - CH = CH_2 \xrightarrow{O_3} CH_3\ CH_2\ CHO + HCHO$$

Butane Propionaldehyde formaldehyde.

$$CH_3 - CH = CH\ CH_3 \xrightarrow{O_3} CH_3\ CHO + CH_3\ CHO$$

Butane – 2 acetaldehyde (2 moles)

27.State kharasch effect.

Ans. It states that in presence of peroxides such as benzoyl peroxide, addition of HBr (but not of HCl or HI) to unsymmetrical alkenes occurs contrary to Markontkov's rule.

$CH_3CH = CH_2 + HBr \xrightarrow{\text{Peroxide}} CH_3 – CH_2 – CH_2$- Br (1 – bromopropane)

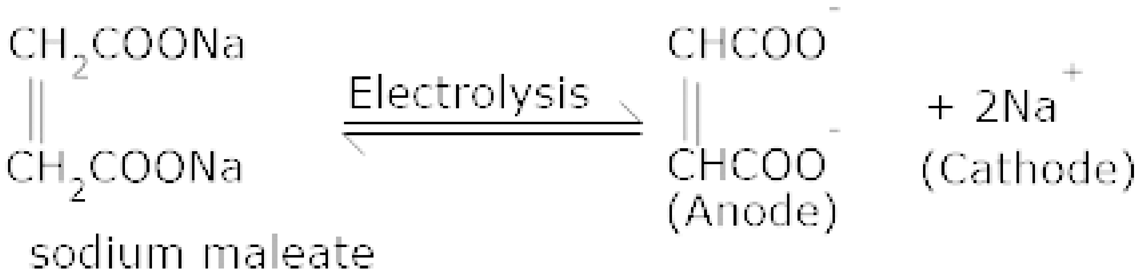
28.How is alkyne prepared from calcium carbide?

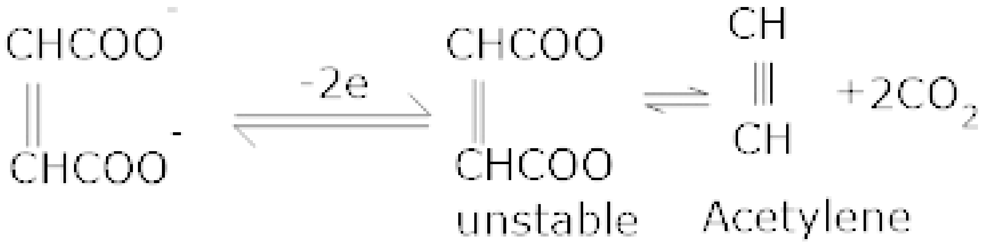
Ans. Calcium carbide is treated with water to get ethyne.

$CaC_2 + 2H_2O \rightarrow Ca(OH)_2 + C_2H_2$

29.How is alkyne prepared by Kolbe's method?

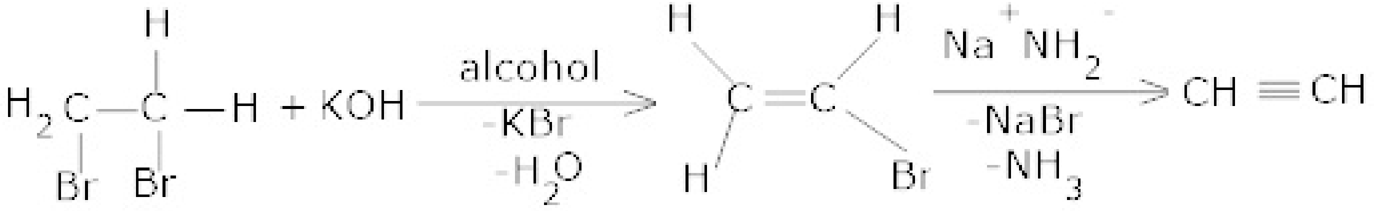
Ans.





30.How is alkyne prepared from vicinal dihalides?

Ans. Vicinal dihalides on treatment with alcoholic potassium hydroxide undergo dehydrohalogenation. One molecule of hydrogen halide is eliminated to form alkenyl halide which on treatment with sodiumamide gives alkynes.



31.How will you distinguish between ethylene and methane?

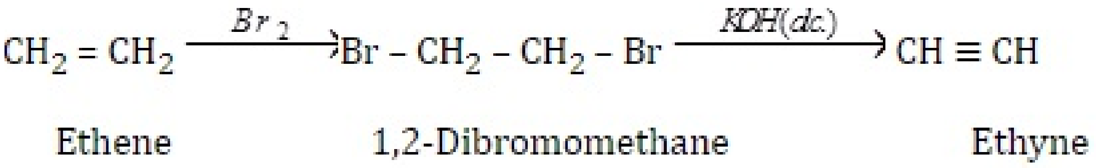
Ans. Ethylene discharges bromine water colour and Baeyer's reagent colour while methane does not.

32.Although acetylene is acidic in nature, it does not react with NaOH or KOH. Give reason?

Ans. Acetylene is a very weak acid (pKa=25) and hence only an extremely strong base like amide ion (NH_2^-) can successfully remove a proton.

33.Write the conversion of ethene to ethyne.

Ans.

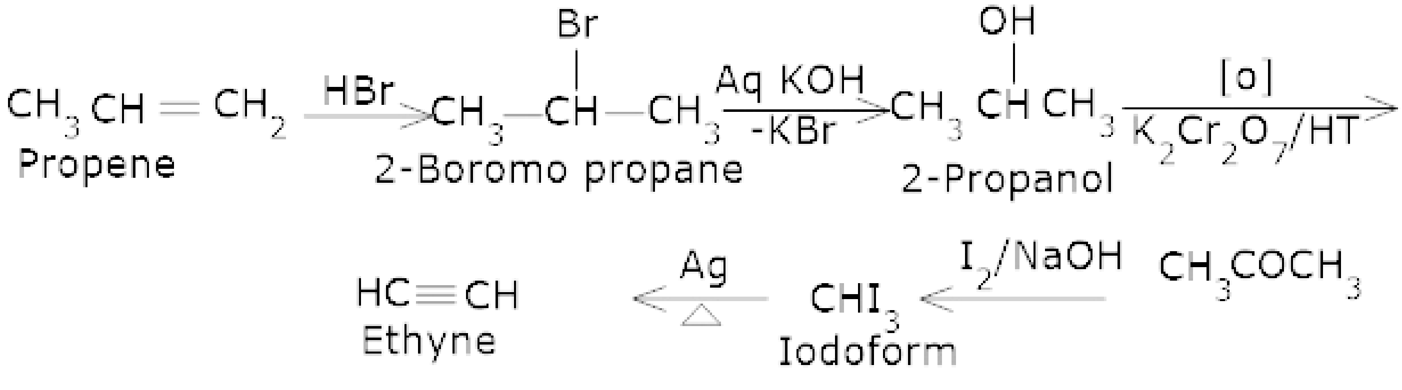


34.How would you distinguish between butyne – 1 and butyne – 2?

Ans. Butyne – 1 ($CH_3CH_2C \equiv CH$), having an acetylene hydrogen atom will give white precipitate with ammonical silver nitrate and red precipitate with ammonical cuprous chloride. On the other hand, butyne – 2 ($CH_3C \equiv C\,CH_3$) having no acetylene hydrogen atom does not respond to either of the two reagent.

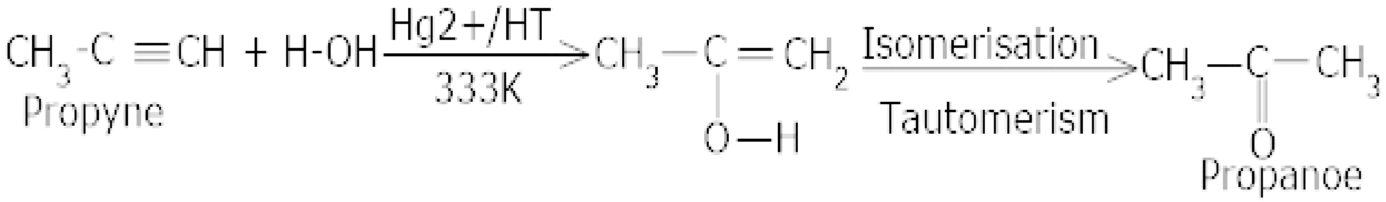
35.How would you carry out the following conversion propene to ethyne.

Ans.



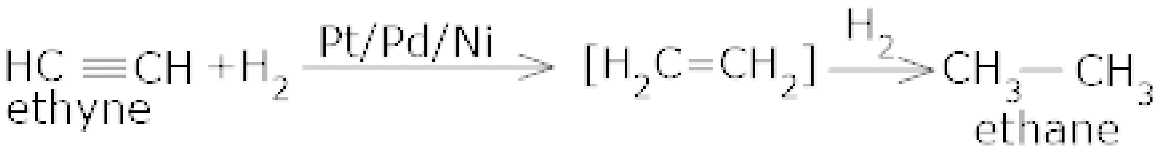
36.How will you convert propyne to propanone?

Ans.



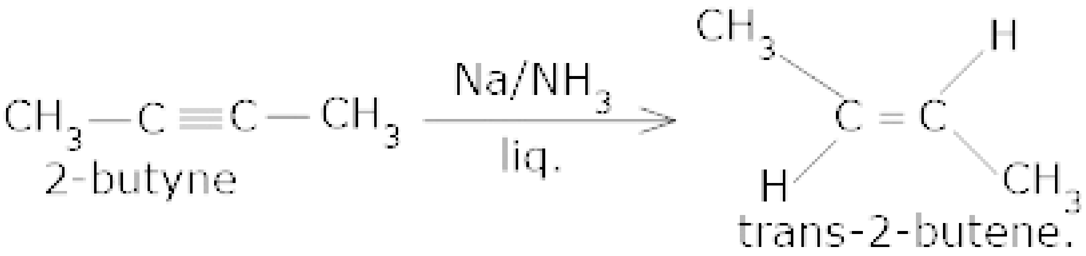
37.How will you convert ethyne to ethane?

Ans.



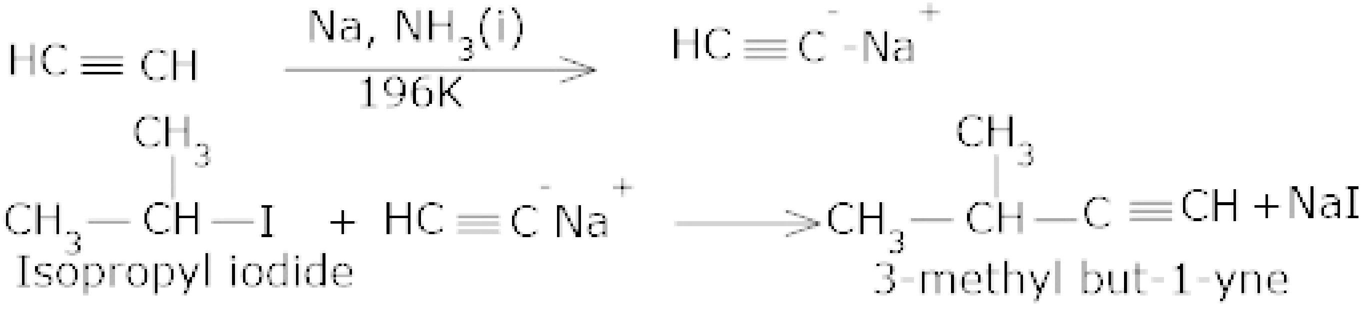
38.Convert 2- butyne to trans – 2- butane.

Ans.



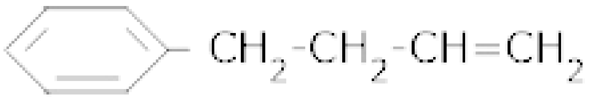
39.How will you prepare 3-methyl but -1 – yne by starting with ethyne?

Ans.

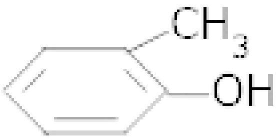


40.Write the IUPAC name of the following compound-

(i)



(ii)



Ans.(i) 4 – phenyl – but – 1 – ene.

(ii) 2 – Methyl phenol.

41.What do you mean by delocalization?

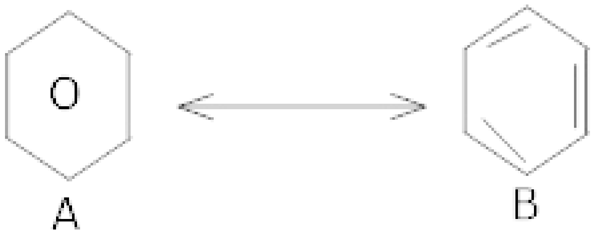
Ans. Delocalisation – Delocalisation implies that pairs of bonding electrons extend over three or more atoms and belong to the whole molecule. Delocalized π-orbitals are much larger than the localized π-orbitals and are therefore more stable.

42. What do you understated by Resonance energy?

Ans.The difference between the energy of the most stable contributing structure and the energy of the resonance hybrid is known as resonance energy. In case of benzene, the resonance hybrid has ($147KJ/mol^{-1}$) less energy than either A to B. Thus resonance energy of benzene is 147KJ/mole.

43.How is phenol reduced to benzene?

Ans.



44.How is aromaticity of a compound judged?

Ans. The following characteristics decides aromaticity of a compound-:

(i) Planarity

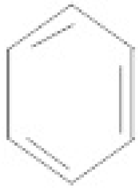
(ii) Complete delocalization of the π-electrons in the ring.

(iii) Presence of (4n+2) π electrons in the ring where n is an integer (n=0, 1, 2 ----)

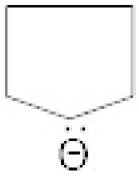
This is often referred to as Huckel Rule.

45.Give some examples of aromatic compounds.

Ans.

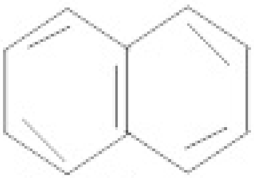


Benzene

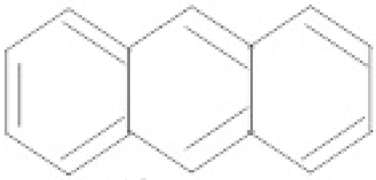


Cyclopentadienyl anion

Cycloheptatrienyl cation



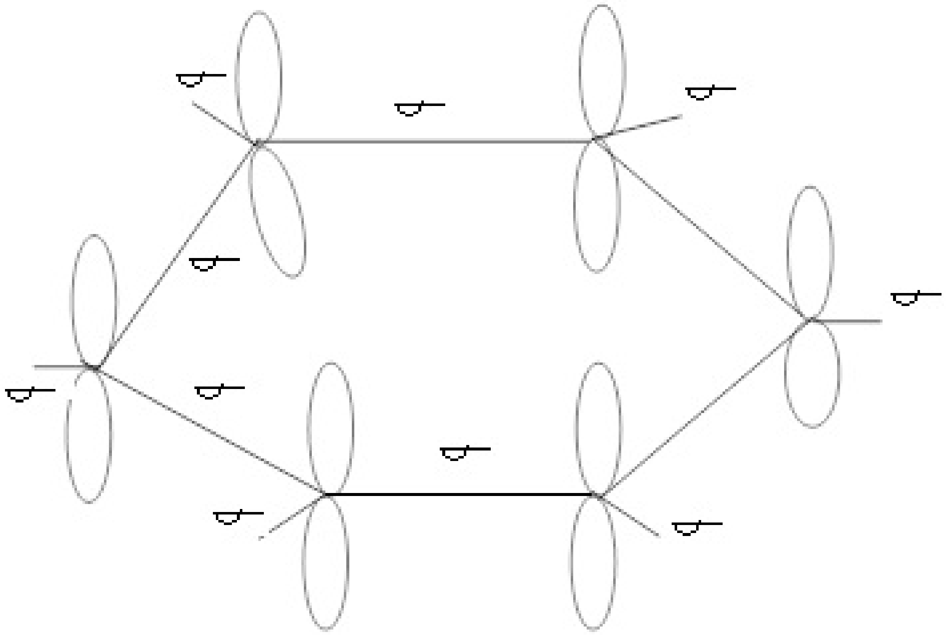
Napthalene



Anthracene

46.How will you account for the structure of benzene?

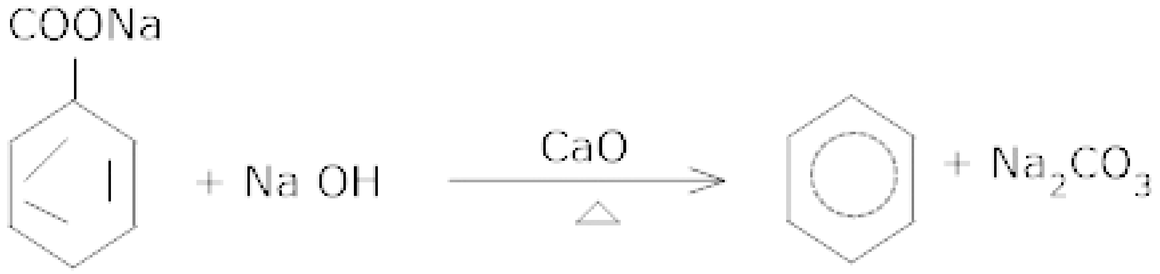
Ans. All the six carbon atoms in benzene are sp2 hydridised. Two sp2 hydrid orbitals of each carbon atom overlap with sp2 hydrid orbitals of adjacent carbon atoms to form six C-C sigma bonds with are in the hexagonal plane. The remaining sp2 hybrid orbital of each carbon atom overlaps with s-orbital of a hydrogen atom to form six C-H sigma bonds. Each carbon atom is now left with one hybridized p-orbital perpendicular to the plane of the ring.



The unhybridized p-orbital of C-atoms are close enough to form a π bond by lateral overlap.

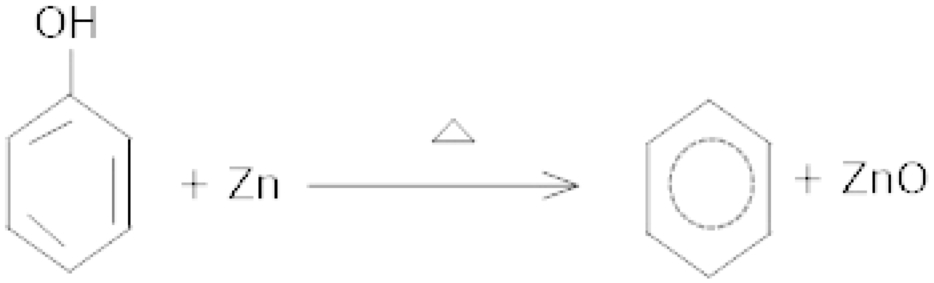
47.How is benzene prepared from aromatic acids?

Ans. Sodium salt of benzoic acid on heating with soda lime gives benzene.



48.How is phenol reduced to benzene?

Ans. Phenol is reduced to benzene by passing its vapours over heated zinc dust.

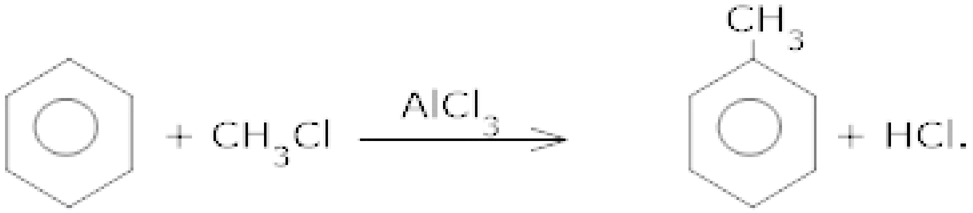


49.Why is benzene extra ordinarily stable though it contains three double bounds?

Ans. Due to resonance.

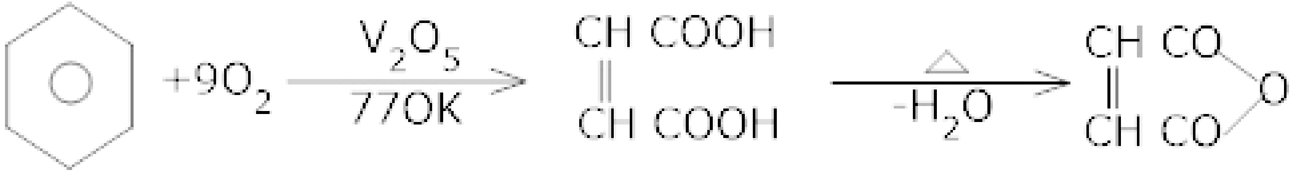
50.What is friedel craft's reaction? Give an example.

Ans. When benzene or its derivative reacts with alkyl halide in presence of $AlCl_3$, we get alkyl benzene.



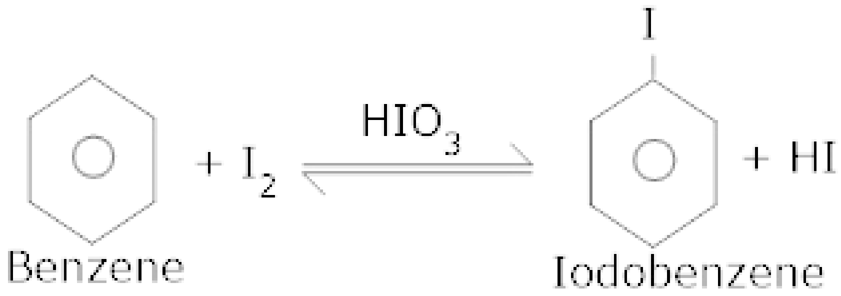
51.What happens when benzene is oxidized at 770K in presence of V_2O_5? Give chemical equation.

Ans.



52.How will you convert benzene to iodobenzene? Give chemical equation.

Ans.



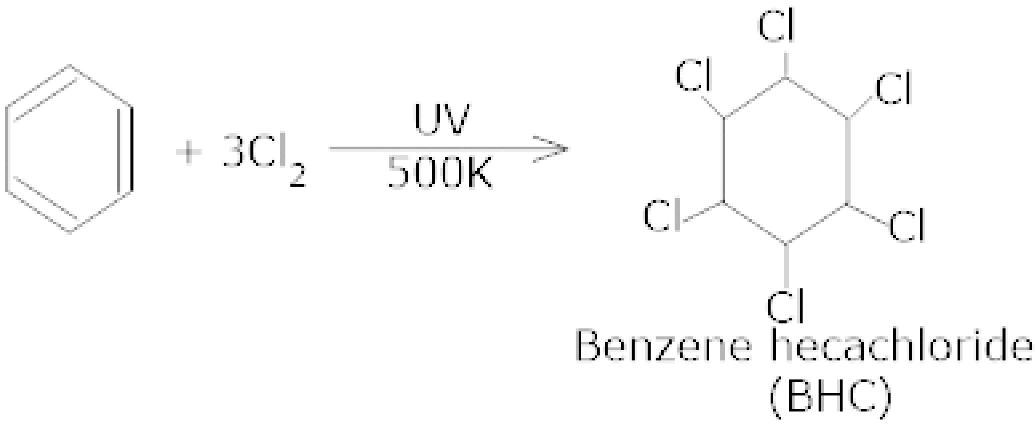
53.What are electrophilic substitution reactions?

Ans. Those reactions in which weaker electrophile are replaced by a stronger electrophile are called electrophilic substitution reactions.

54.How will you distinguish between Ethene and benzene

Ans. Ethene discharges bromine water colour and Baeyer's reagent colour while benzene does not.

55.How is benzene converted to benzene hexachloride?
Ans. Under ultra-violet light, three chlorine molecules add to benzene to produce benzene hexachloride, $C_6H_6Cl_6$ which is also called gammaxane.



56.How will you convert benzene to hexachlorobenzene?
Ans. Benzene on treatment with of chlorine in the presence of anhydrous $AlCl_3$ in dark yields hexachloroben - zene (C_6Cl_6)

CBSE Class 12 Chemistry
Important Questions
Chapter 13
Hydrocarbons

3 Marks Questions

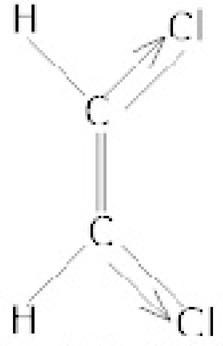
1. N – pentane has higher boiling point than neopentane but the melting point of neopentane is higher than that of n – pentane.

Ans.Because of the presence of branches in neo-pentane the surface area and van der walls forces of attraction are very weak in neopentane than in n-pentane. Therefore the b.p of neopentane is lower than that of n-pentane.

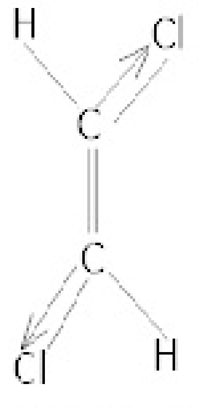
M.P depends upon the packing of the molecules in the crystal lattice. Since neopentane are more symmetrical than n-pentane therefore, it packs much more closely in the crystal lattice than n-pentane and hence neopentane has much higher m.p than n-pentane.

2.The dipole moment of trans 1,2-dichloroethane is less than the cis – isomer. Explain.

Ans. The structure of trans isomer is more symmetrical as compared to the cis – isomer. In the trans – isomer, the dipole moments of the polar C-Cl bonds are likely to cancel effect of each other and the resultant dipole moment of the molecule is nearly zero. But in the cis – isomer, these do not cancel. Therefore, the cis isomer has a specific moment but is zero in case of trans isomer.



cis-1,2-dichloro ethane



trans -1,2-dichloro ethane

3.Explain wurtz reaction with an example.

Ans. Wurtz reaction – This reaction is employed to obtain higher alkanes from the halides of lower alkanes. The halides of lower alkanes are treated with sodium metal in ether:

$$RX + 2Na + XR^1 \xrightarrow{ether} R - R^1 + 2Na - X$$

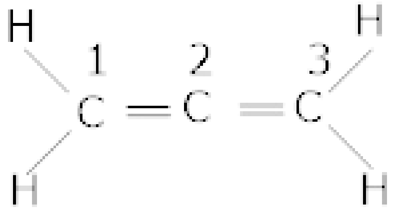
alkyl halide   alkyl halide

$$CH_3I + 2Na + CH_3I \xrightarrow{ether} CH_3 - CH_3 + 2NaI$$

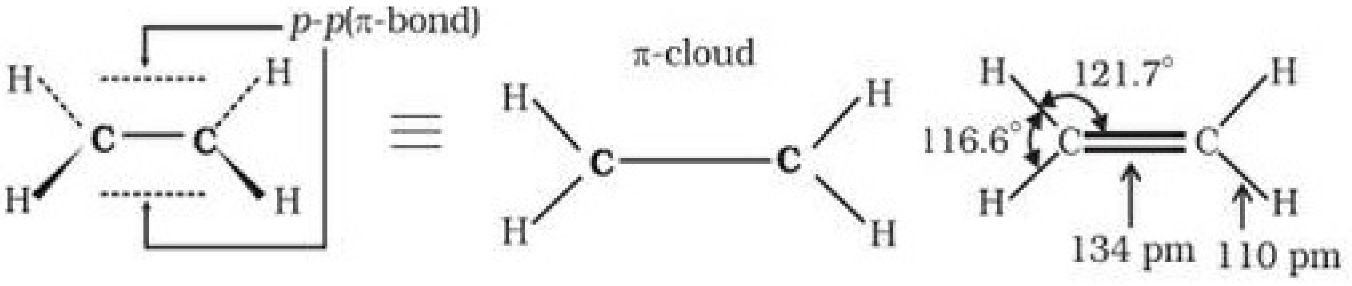
(methyl iodide)   (ethane)

4.Discuss the hybridization of carbon atoms in alkene C_3H_4 and show the π-orbital overlaps.

Ans. The structure of alkene (C_3H_4) is given here.



The carbon atom 1 and 3 are sp^2 hybridised since each one of them is joined by a double bond. In contrast, carbon atom 2 is sp hydridiesed since it has two double bonds thus the two double bonds in



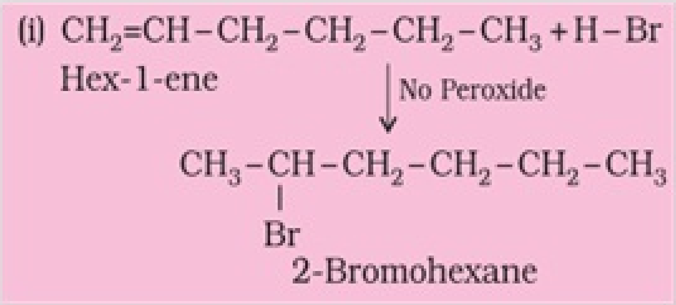
alkenes are perpendicular to each other.

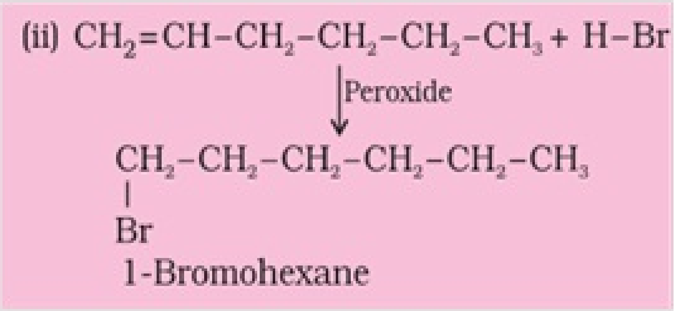
5.Write IUPAC name of the products obtained by addition reactions of HBr to hex – 1 – ene.

(i) in the absence of peroxide, and

(ii) in the presence of peroxide.

Ans.





6.Explain the term polymerization with two examples.

Ans . Polymerization – when two or more molecules of unsaturated compounds are made to combine under suitable conditions to form a bigger compound, the compound formed is known as the polymer and the process is known as polymerization.

(a) Addition polymerization –

The bigger molecule i.e; polymer is an exact multiple of the smaller molecule and nothing is lost during the reaction

$nCH_2 = CH_2 \xrightarrow{\text{Polymerization}} (..... CH_2 - CH_2 ...)_n$

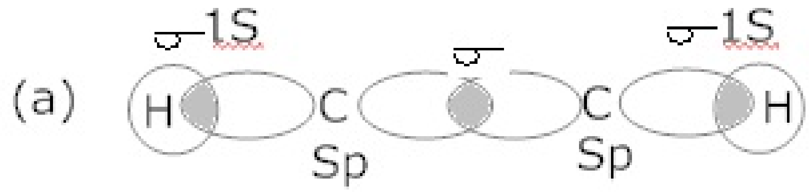
(b) Condensation polymerization : There is generally the loss of molecules such as water, hydrochloric acid etc. During the polymerization, the polymer is not an exact multiple of the smaller molecule.

7.Draw the orbital picture of ethyne showing.

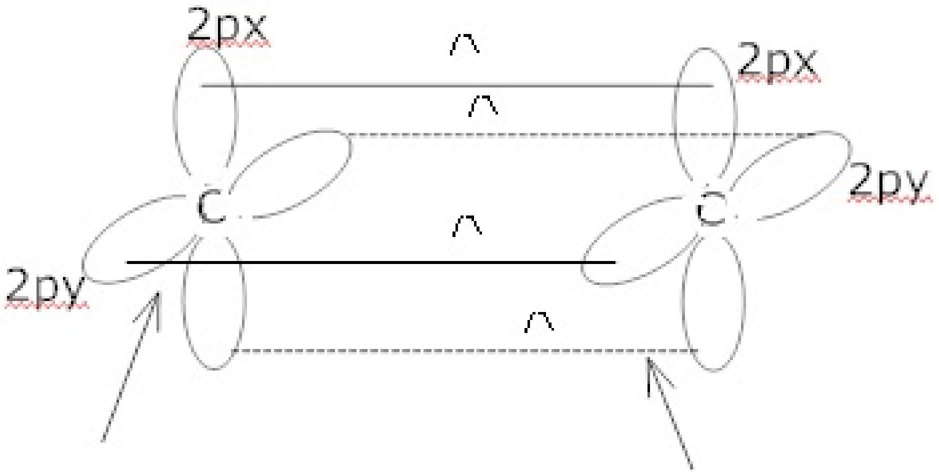
(a) sigma overlaps

(b) pi – overlaps.

Ans.

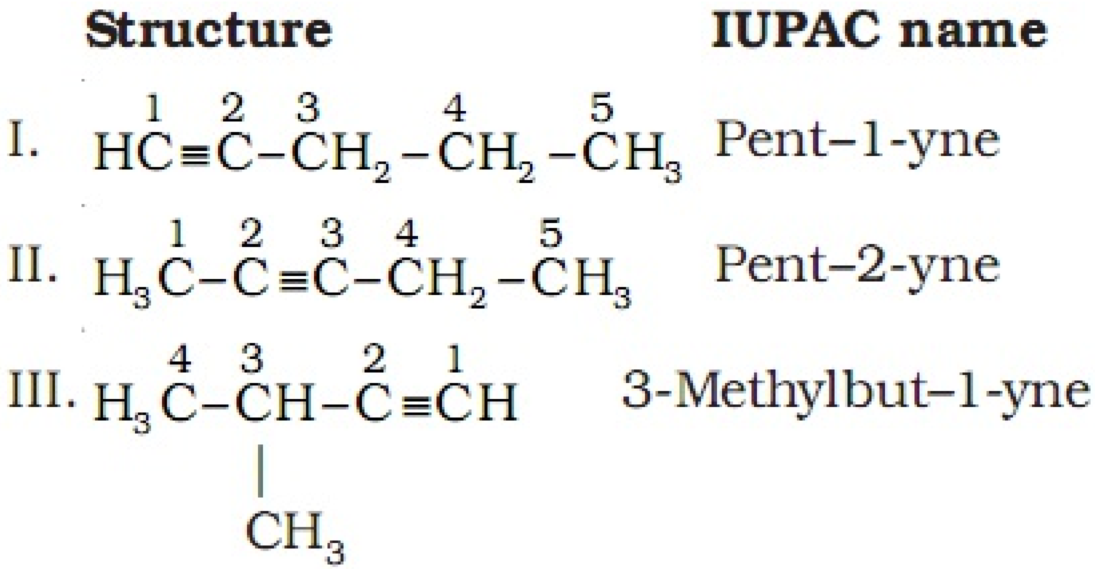


(b)



8.Give the different isomers formed by C_5H_8 along with their IUPAC name.

Ans.



	Structure	IUPAC name
I.	$\overset{1}{HC}\equiv\overset{2}{C}-\overset{3}{C}H_2-\overset{4}{C}H_2-\overset{5}{C}H_3$	Pent–1-yne
II.	$H_3\overset{1}{C}-\overset{2}{C}\equiv\overset{3}{C}-\overset{4}{C}H_2-\overset{5}{C}H_3$	Pent–2-yne
III.	$H_3\overset{4}{C}-\underset{CH_3}{\overset{3}{C}H}-\overset{2}{C}\equiv\overset{1}{C}H$	3-Methylbut–1-yne

Structures I and II are position isomers and structures I and III or II and III are chain isomers.

9.Write structures of different isomers formed by C_6H_{10}. Also write IUPAC names of the all the isomers

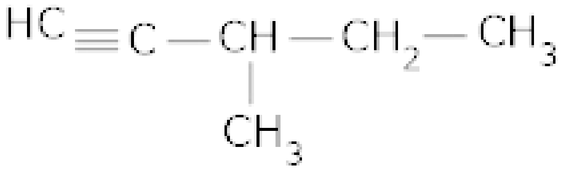
Ans. The possible isomers are

(a) $HC \equiv C - CH_2 - CH_2 - CH_2 - CH_3$ (Hex – 1- yne)

(b) $CH_3 - C \equiv C - CH_2 - CH_2 - CH_3$ (Hex – 2- yne)

(c) $CH_3 - CH_2 - C \equiv C - CH_2 - CH_3$(Hex-3- yne)

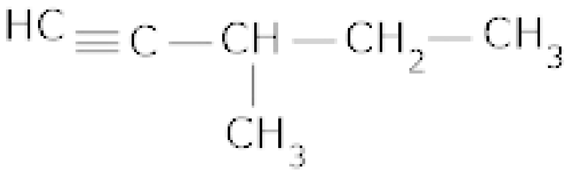
(d)



$HC \equiv C - \underset{\displaystyle CH_3}{\underset{|}{CH}} - CH_2 - CH_3$

3- Methyl-pent-1-yne

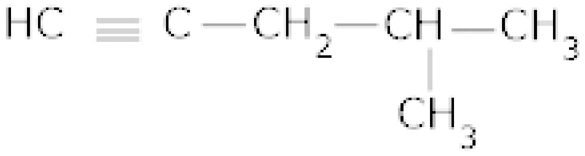
(d)



$HC \equiv C - \underset{\displaystyle CH_3}{\underset{|}{CH}} - CH_2 - CH_3$

3- Methyl-pent-1-yne

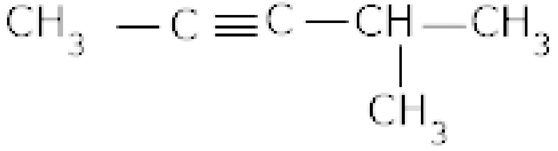
(e)



$HC \equiv C - CH_2 - \underset{\displaystyle CH_3}{\underset{|}{CH}} - CH_3$

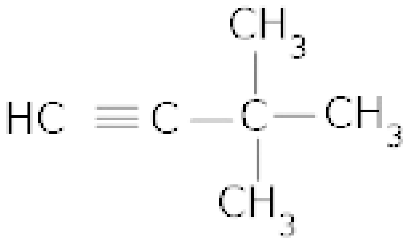
4- Methyl-pent-1-yne

(f)



$CH_3 - C \equiv C - \underset{\displaystyle CH_3}{\underset{|}{CH}} - CH_3$

4- Methyl-pent-2-yne

(g) 

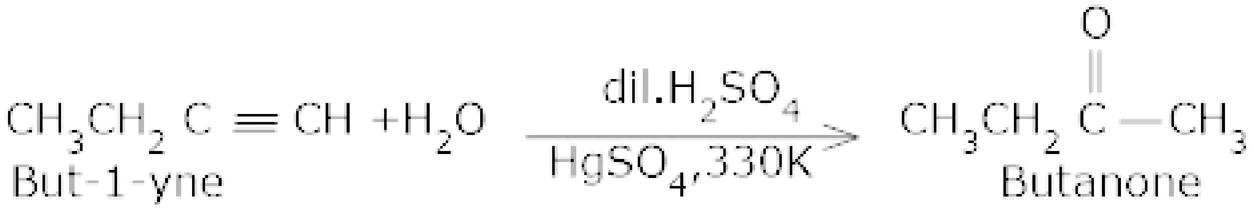
3,3-Dimethyl-but-1-yne

10.Ethyne is acidic in nature in comparison to ethene and ethane. Why is it so?

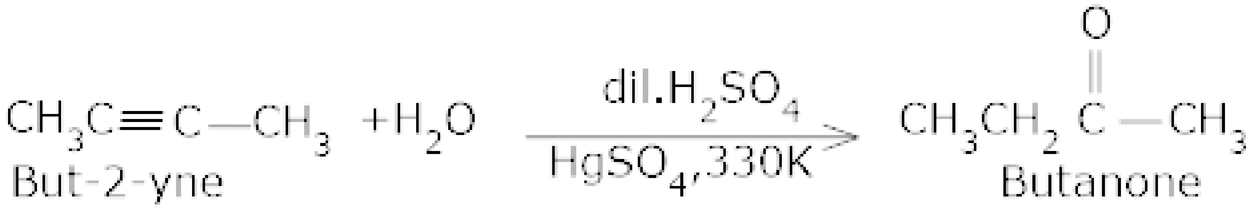
Ans . Hydrogen atoms in ethyne are attached to the sp hybirdised carbon atoms whereas they are attached to sp^2 hybridized carbon atoms in ethene and sp^3 hydridised carbons in ethane. Due to the maximum percentage of s – character (50%), the sp hybridized orbital's of carbon atoms in ethyne molecules have highest etcetronegativity : Which attracts the shared pair of the C-H bond of ethyne to a greater extent than that of the sp^2 hybridized orbital's of carbon in ethene and the sp3 hybridized orbital of carbon in ethane. Thus in ethyne molecule, hydrogen atoms can be liberated as protons more easily as compared to ethene and ethane.

11.Butanone is formed when an alkyne is passed through a dil sol of H_2SO_4 at 330K in presence of mercuric sulphate. Write the possible structure of the alkyne.

Ans. Since Butanone is a four carbon atom, therefore both but – 1- yne and but – 2 – yne on hydration will produce butanone.



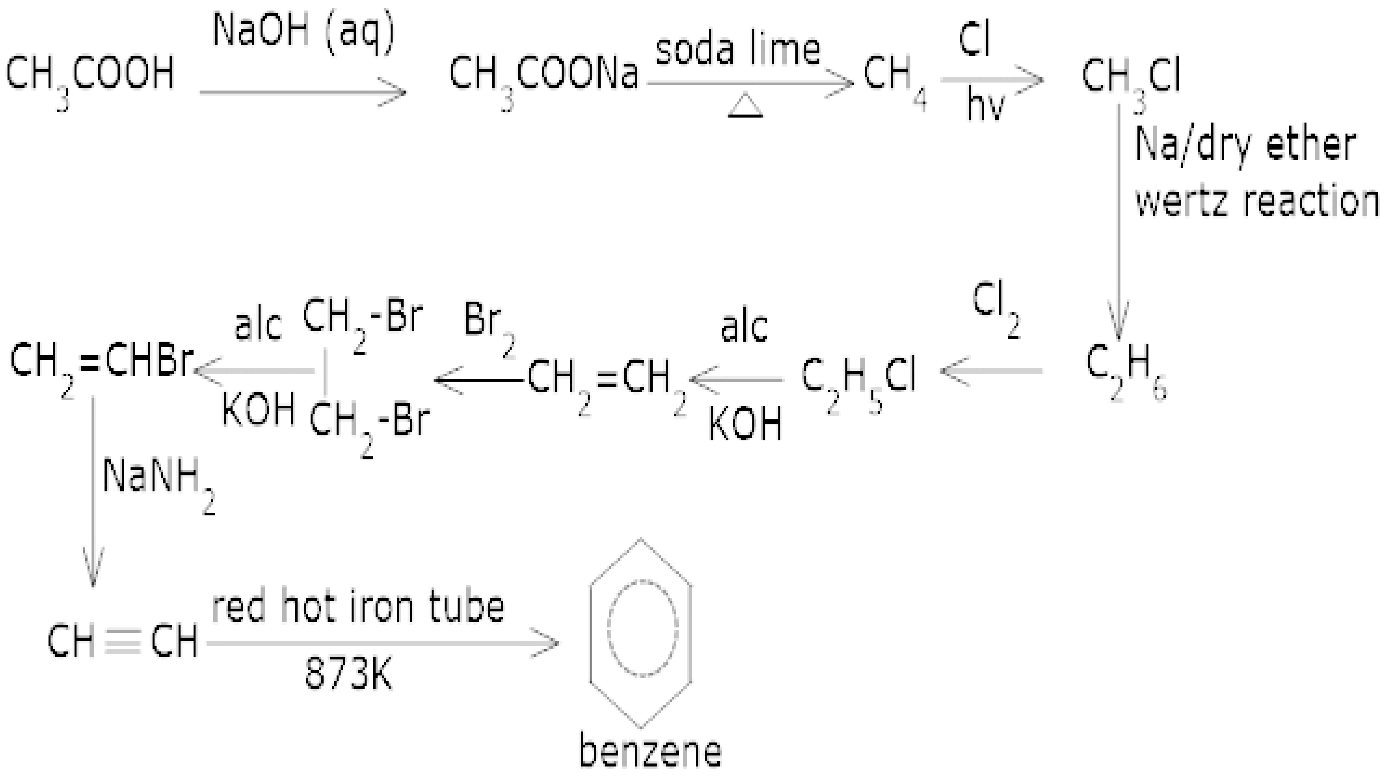
$$CH_3CH_2C\equiv CH + H_2O \xrightarrow[HgSO_4,330K]{dil.H_2SO_4} CH_3CH_2\overset{\overset{O}{\|}}{C}-CH_3$$



$$CH_3C\equiv C-CH_3 + H_2O \xrightarrow[HgSO_4,330K]{dil.H_2SO_4} CH_3CH_2\overset{\overset{O}{\|}}{C}-CH_3$$

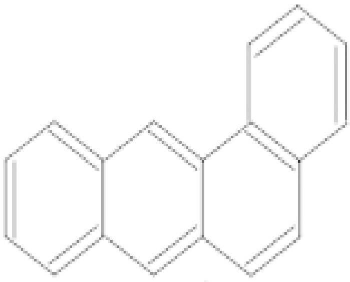
12.How would you convert ethanoic acid into benzene?

Ans.

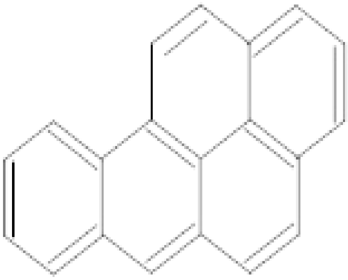


13..Name some carcinogenic hydrocarbons.

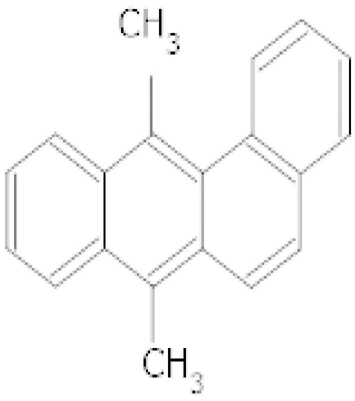
Ans.



1,2-Benzanthracene



1,2-Benzpyrene



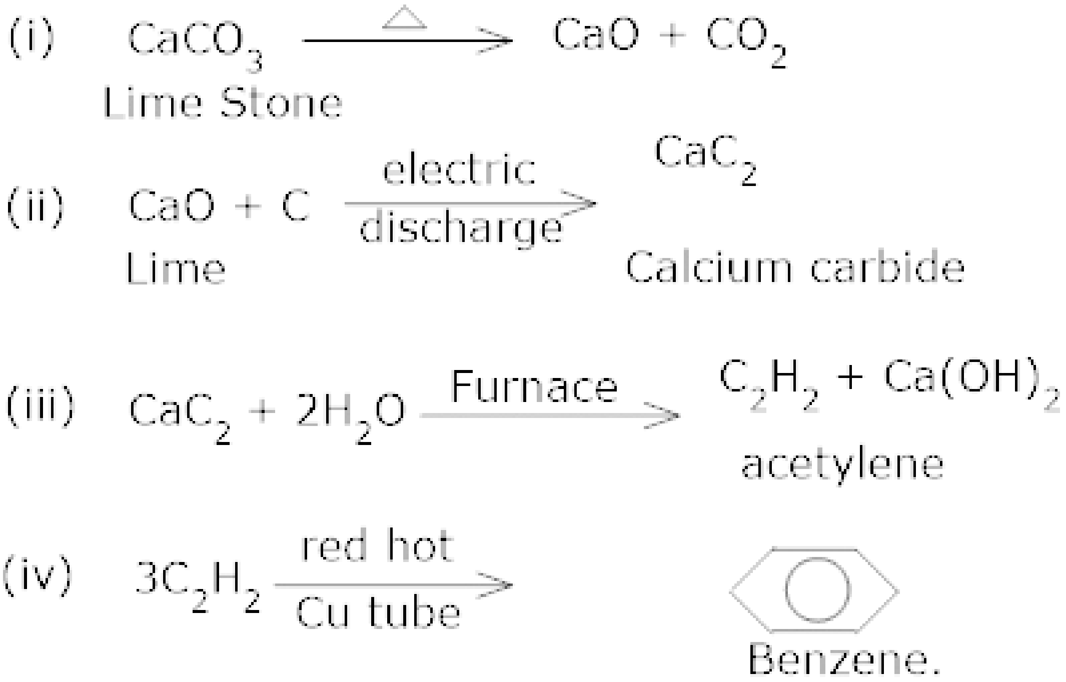
9,10-Dimethyl-1,2-benzanthracene

CBSE Class 12 Chemistry
Important Questions
Chapter 13
Hydrocarbons

4 Marks Questions

1. How would you prepare benzene from lime?

Ans. Benzene can be prepared from lime by the following methods:



(i) $\underset{\text{Lime Stone}}{CaCO_3} \xrightarrow{\triangle} CaO + CO_2$

(ii) $\underset{\text{Lime}}{CaO + C} \xrightarrow[\text{discharge}]{\text{electric}} \underset{\text{Calcium carbide}}{CaC_2}$

(iii) $CaC_2 + 2H_2O \xrightarrow{\text{Furnace}} \underset{\text{acetylene}}{C_2H_2} + Ca(OH)_2$

(iv) $3C_2H_2 \xrightarrow[\text{Cu tube}]{\text{red hot}}$

Benzene.

2. p-chloro nitro benzene has less dipole moment (2.4 D) than p-nitro toluene (4.4 D). Why?

Ans. In p-chloral nitro benzene the individual moments are in opposite directions and hencepartially cancel. When in p-nitro toluene, both moments are in the same direction and hence add each

CBSE Class 12 Chemistry
Important Questions
Chapter 13
Hydrocarbons

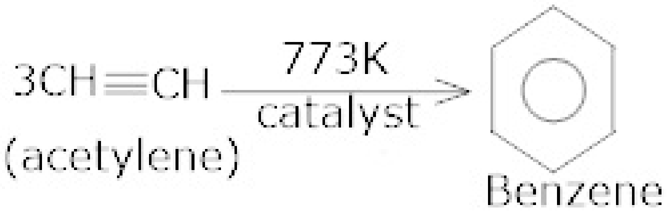
8 Marks Questions

1. How will you convert the following compounds to benzene?

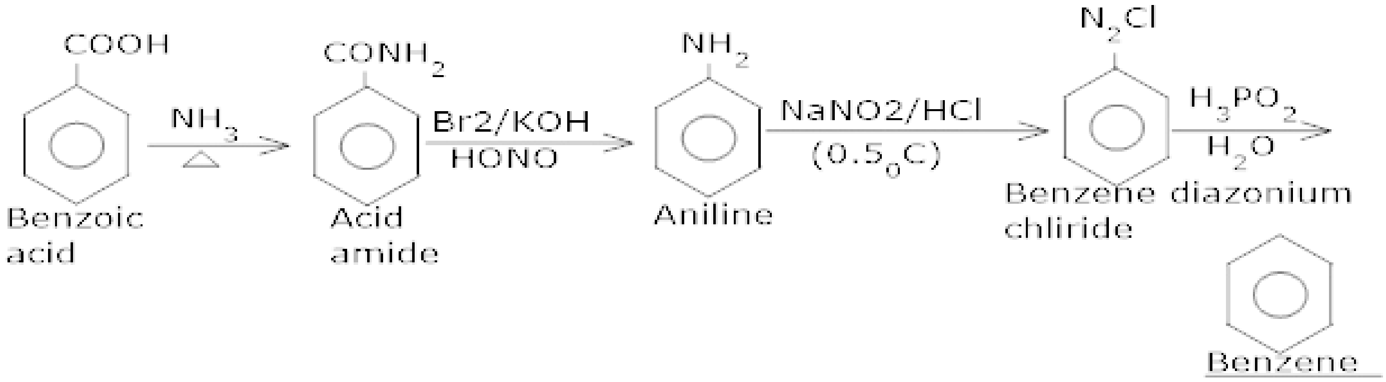
(i) Acetylene (ii) Benzoic acid

(iii) Cyclohexane (iv) Benzene diazonium chloride.

Ans. (i) When ethyne is heated at a higher temperature it polymerizes to give bnzene.

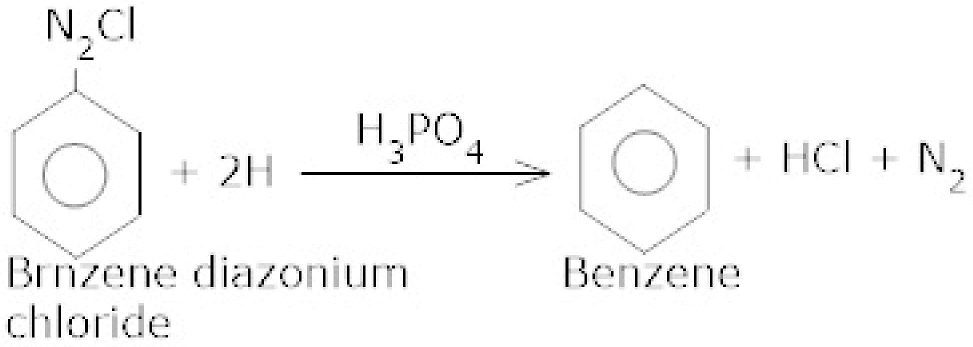


(ii) Benzoic acid when treated with NH_3 and heat changes to amide which on treatment with Br_2 / KOH gives aniline which converts to diazonium salt which on acid hydrolysis gives benzene.



(iii) Cyclohexane when treated with iron or quartz in a red hot tube under goes oxidation to form benzene.

(iv) In the presence of hypoposphorus acid benzene diazonium chloride is converted into benzene. (diazo group is replaced by H)



2. How will you convert benzene into

(i) p – Nitro bromo benzene
(ii) m – Nitrochloro benzene
(iii) p – Nitro toluene
(iv) Aceto phenone?

Ans . Under ultra-violet light, three chlorine molecules add to benzene to produce benzene hexachloride, $C_6H_6Cl_6$ which is also called gammaxane.