11Th CHEMISTRY

VOLUME - 2

UNIT - 13

BOOK BACK QUESTIONS WITH ANSWERS

NAME :_____

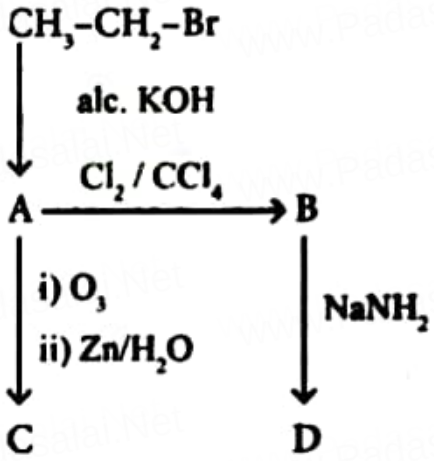
STD / SEC :_____

SCHOOL :_____

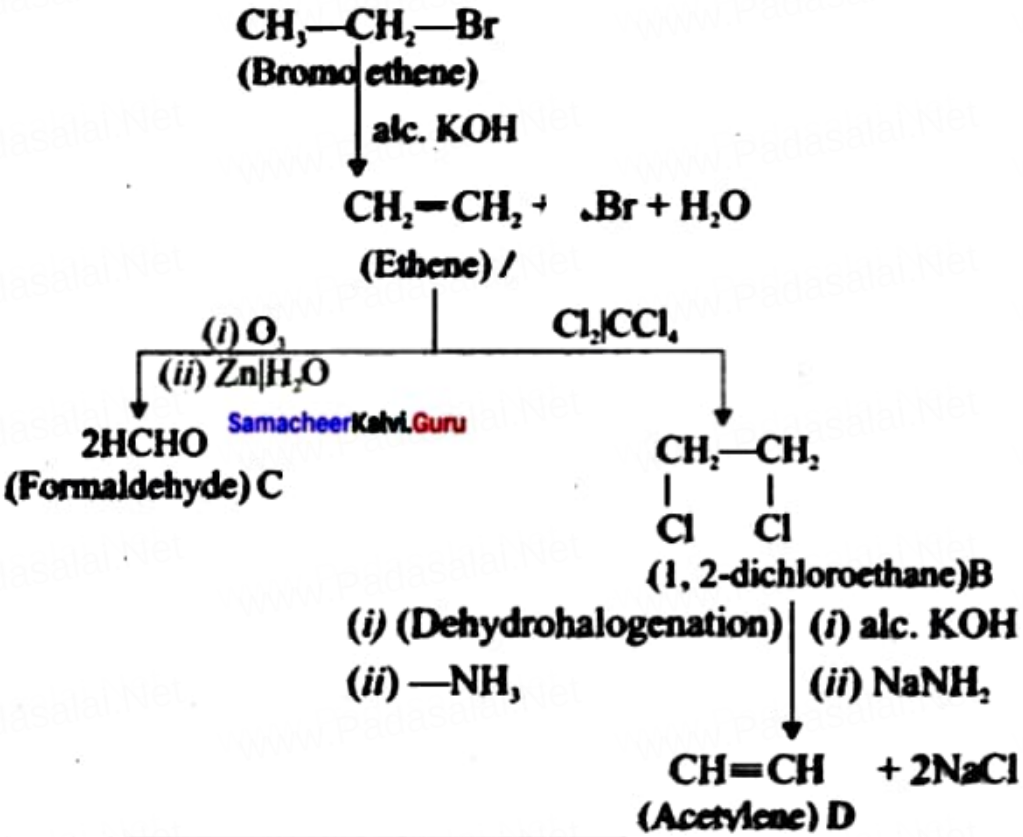
Prepared By
V.Durga Prasad

Question 32.

Identify the compound A. B, C and D in the following series of reactions.



Answer:



A	Ethene	$CH_2 = CH_2$
B	1, 2-dichloroethane	CH_2CH_2 | | Cl Cl
C	Formaldehyde	HCHO
D	Acetylene	$CH \equiv CH$

Question 33.

Write a short note on ortho – para directors aromat&c ϵ substitution reactions.

Answer:

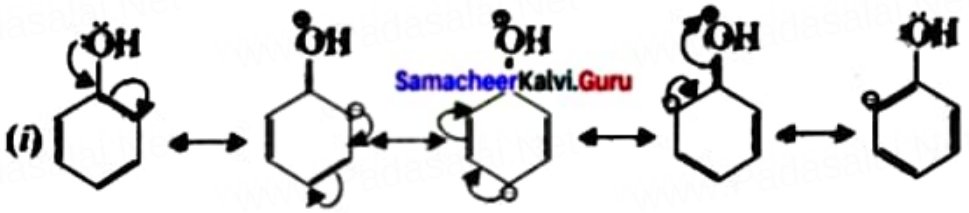
The group which increases the eleiron deity at oìo and para positions of the ring are known as ortho-para directors.

Example:

-OH, -NH_2 -NHR -CH_3, -OCH_3 etc.

Let us consider the directive influences of phenolic(-OH) group.

Phenol is the resonace hybrid of following structure.



In these resonance structures the negative charge residue is present on ortho and para posrtions of the ring structure. Therefore the electron density at ortho and para positions increases as compared to the metci position, thus phenolic group activities the benzene ring for electrophilic attack at ortho and para positions and hetice – OH group is an ortho-para direction or and an activator.

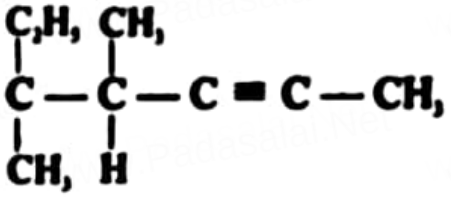
Question 34.

How is propyne prepared from an alkyene dihalide?

Question 31.

Give IUPAC names for the fllowing compounds .....

(i) $CH_3\,CH = CH - CH = CH - C \equiv C - CH_3$

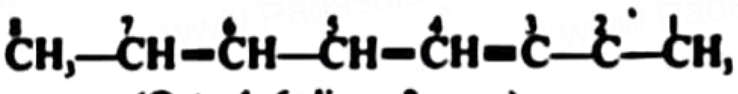
(ii) 

(iii) $(CH_3)_3\,C\text{-}C\equiv C\text{-}CH\,(CH_3)_2$

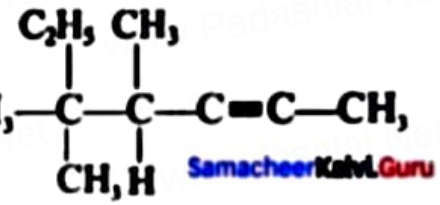
(iv) Ethyl – isopropyl – acetytene

(v) $CH\equiv C - C = C - C\equiv CH$

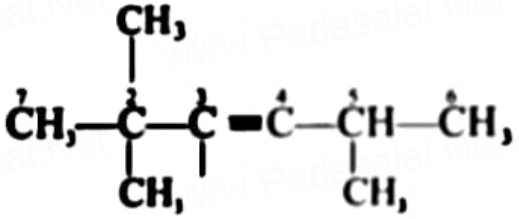
Answer:

(*i*) 

(Octa-4, 6-diene-3-yene)

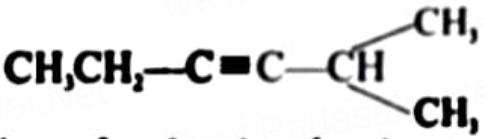
(*ii*) 

(4, 5, 5—trimethyl–hepta-2-yne)

(*iii*) 

(2, 2, 5—trimethyl–hexata-3-yne)

(*iv*) Ethyl isopropyl acetylene

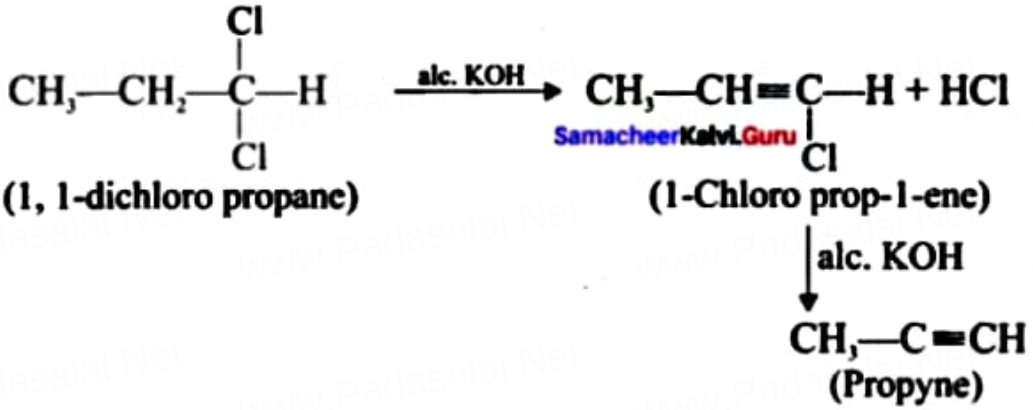


IUPAC name : 2-methylhex-3-yne

(*v*) 

(1, 3, 5-hexa triyne)

Answer:



(1, 1-dichloro propane)

(1-Chloro prop-1-ene)

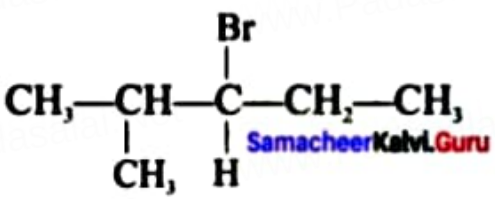
(Propyne)

Question 35.

An alkyl halide with molecular formula $C_6H_{13}Br$ on dehydrohalogenation gave two isomeric alkenes X and Y with molecular formula C_6H_{12}. On reductive ozonolysis, X and Y gave four compounds CH_3COCH_3. CH_3CHO, CH_3CH_2CHO and $(CH_3)_2$ CHCHO. Find the alkyl halide.

Answer:

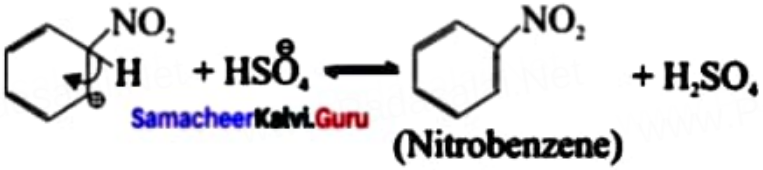
1. $C_6H_{13}Br$ is 3 – Bromo – 4 methylpentanc.



2. 3 – Bromo -4 methylpentane on dehydrogenation give two isomers X and Y as follows:

Step-3:

Rearomatisation of arenium ion.



(Nitrobenzene)

Overall Reaction:

(Benzene) (Nitrobenzene)

Question 37.

How does Huckel rule help to decide the aromatic character of a compound?

Answer:

A compound is said to be aromatic, if it obeys the following rules:

- The molecule must be cyclic.
- The molecule must be co-planar.
- Complete delocalisation of it-electrons in the ring.
- Presence of (4n + 2) π electrons in the ring where n is an integer (n = 0,1,2 ...)

This is known as Huckel's rule.

Example:

—Benzene

1. It is cyclic one.
2. It is a co-planar molecule.
3. It has six delocalised ir electrons.

4. $4n + 2 = 6$

$4n = 6 - 2$

$4n = 4$

$n = 1$

It obey Huckel's rule, with n = 1, hence benzene is aromatic in nature.

Question 38.

Suggest the route for the preparation of the following from benzene.

1. 3 – chioro – nitrobenzene
2. 4- chlorotoluene
3. Bromobenzene
4. in – dinitrobenzene

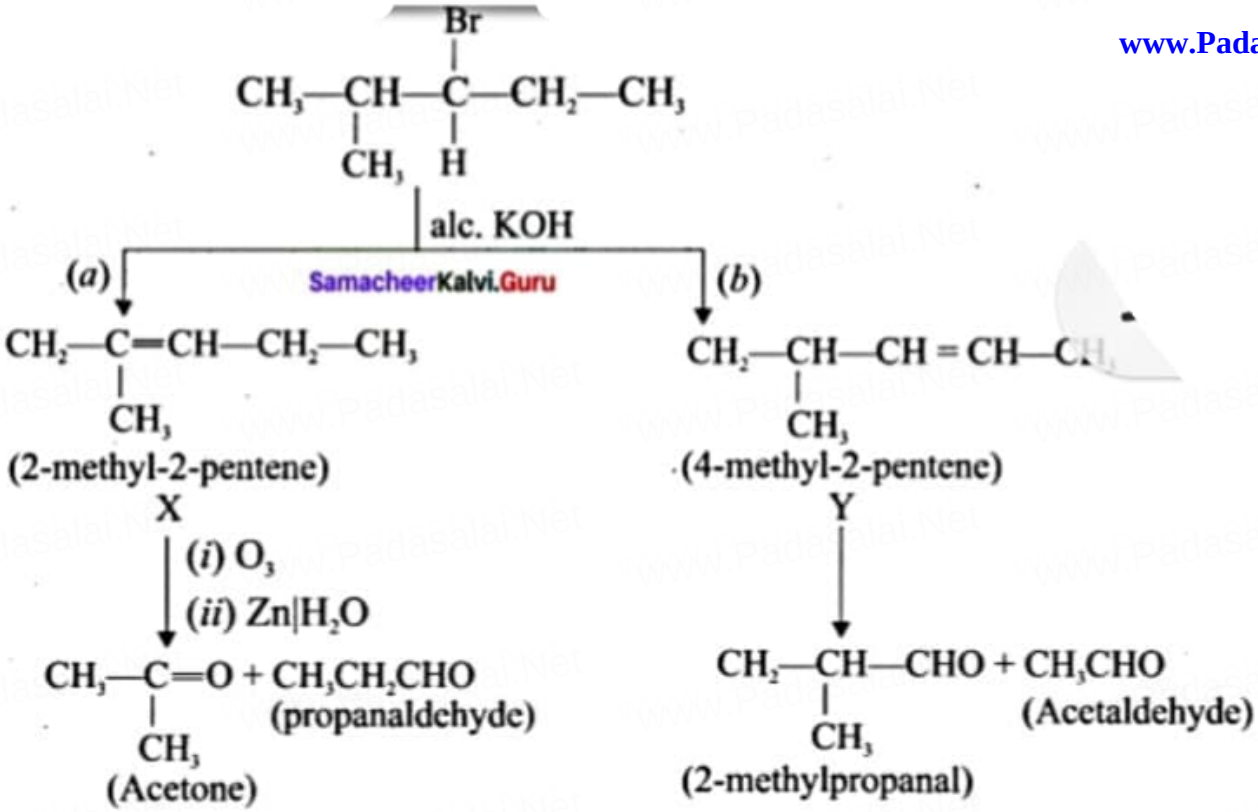
Answer:

1. Preparation of 3 – chloronitro – benzene from benzene:

Benzene undergoes nitration and followed by chlorination and it leads to the formation of 3- chloronitrobenzene.

2. Preparation 4-chiorotoluene from benzene:

Benzene undergoes Fnedel crafi's alkylation followed by chlorination



There fore C_6H_{13} Br is 3 – Bromo – 4 – methy ipentane.

Question 36.

Describe the mechanism of Nitration of benzene.

Answer:

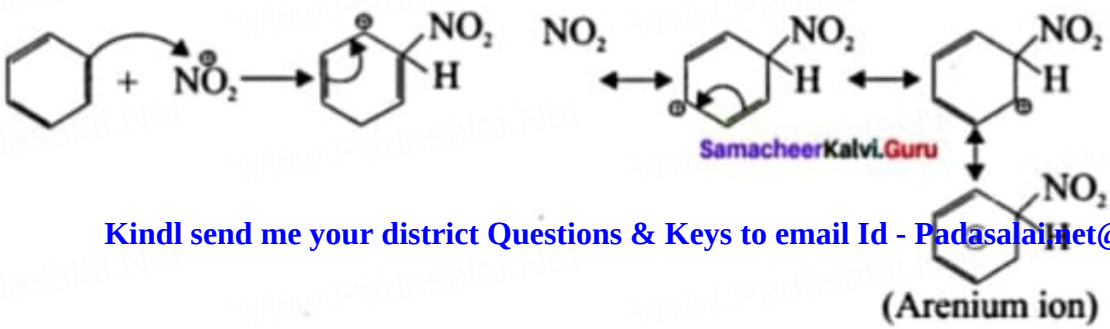
Step-1 :

Generation of $\overset{\oplus}{N}O_2$ electrophile.

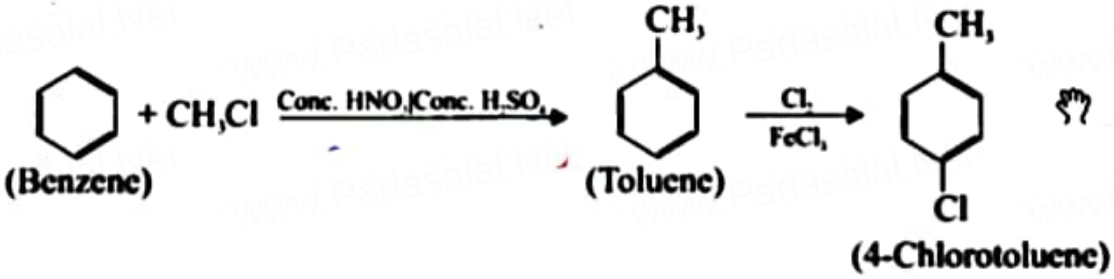
$HNO_3 + H_2SO_4 \rightarrow \overset{\oplus}{N}O_2 + H\overset{\oplus}{S}O_4 + H_2O$

Step-2:

Attack of the electrophile on benzene ring to form arenium ion.

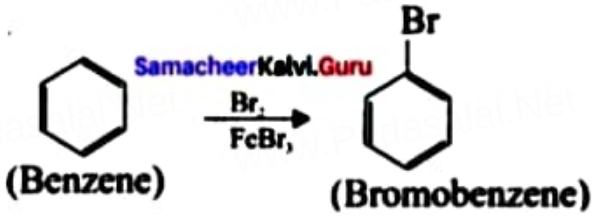


and it leads to the formation of 4-chiorotoluene.



3. Prepar2tion of Bromobenzene from benzene:

Bezene undergo bromination to give bromobenzene.



4. Preparation of m-dinitrobenzene from benzene:

Benzene undergo twice the time nitration to give m-dinitrobenzene.

Question 39.

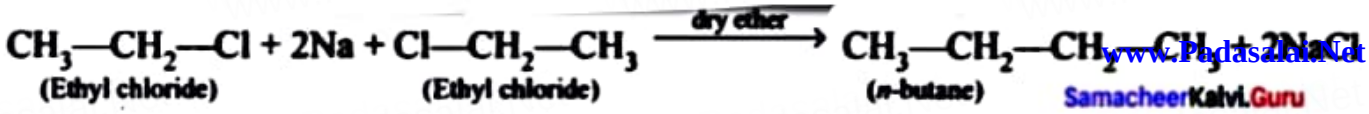
Suggest a simple chemical test to distinguish propane and propene.

Answer:

Chemical test to distinguish between propane and propene:

1. Bromine water test:

Propene contains double bond, therefore when we pour the bromine water to propene sample, it decolounses the bromine water whereas propane which is a saturated hydrocarbon does not decolourise the bromine water.



Question 42.

Describe the conformers of n-butane.

Answer:

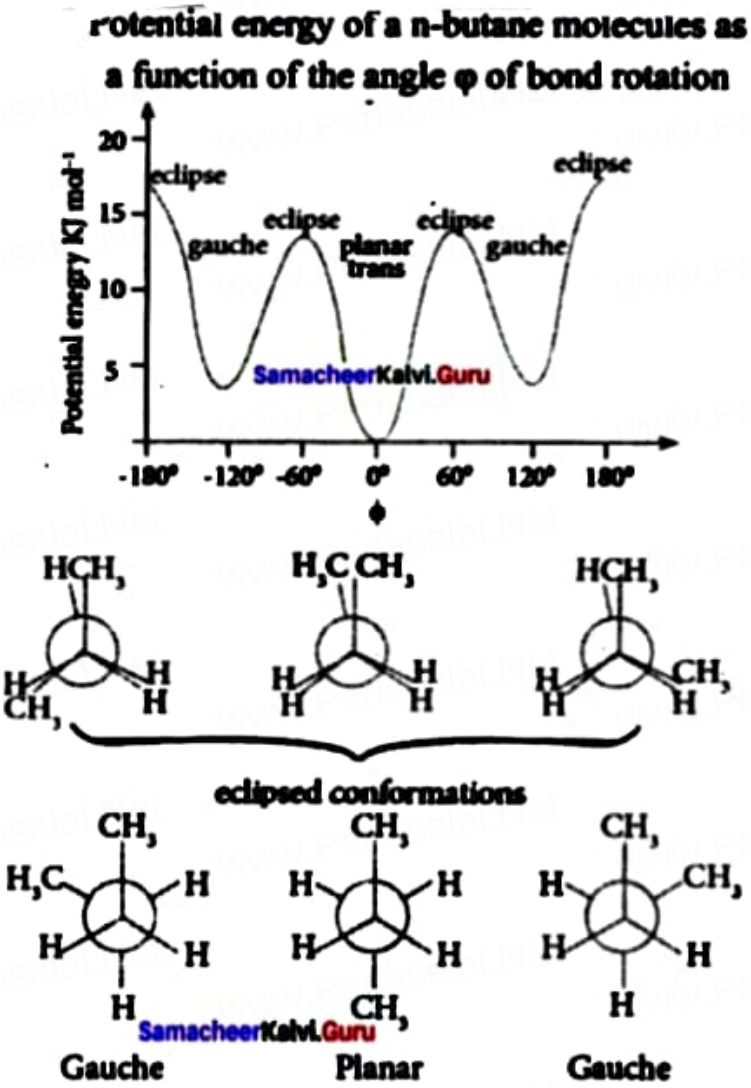
n-butane may be considered as a derivative of ethane as one hydrogen on each carbon atom is replaced by a methyl group.

Edipsed conformation:

In this conformation, the distance between the two methyl groups is minimum so there is maximum repulsion between them and it is the least stable conformer.

Anti or staggered form:

In this conformation, the distance between the two methyl groups is maximum and so there is minimum repulsion between them. It is the most stable conformer. The following potentially energy diagram shows the relative stability of various conformers of n-butane.



Question 43.

Write the chemical equations for combustion of propane.

Answer:

Chemical equations for combustion of propane:

The general combustion reaction for any alkane is:

$$C_nH_{2n+2} + \left(\frac{3n+1}{2}\right)O_2 \longrightarrow nCO_2 + (n+1)H_2O$$

SamacheerKalvi.Guru

$$C_3H_8 + \left(\frac{3(3)+1}{2}\right)O_2 \longrightarrow 3CO_2 + 4H_2O$$

SamacheerKalvi.Guru

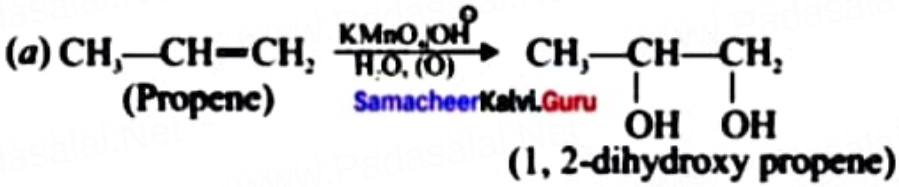
$$\underset{\text{(Propane)}}{CH_3-CH_2-CH_3} + 5O_2 \longrightarrow 3CO_2 + 4H_2O$$

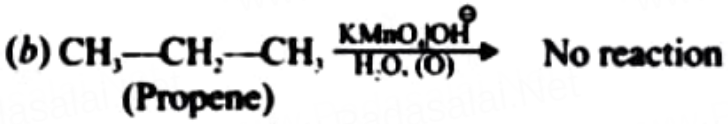
Question 44.

Explain Markovnikoffs rule with suitable example.

2. Baeyer's test:

When propene reacts with Bayer's reagent it gives 1,2 dihydroxypropene. Propane does not react with Baeyer's reagent.



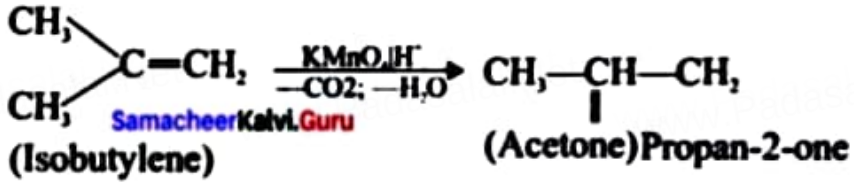


Question 40.

What happens when isobutylene is treated with acidified potassium permanganate?

Answer:

Isobutylene is treated with acidified $KMnO_4$ to give acetone.



Question 41.

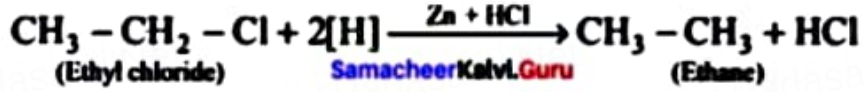
how will you convert ethyl chloride in to –

1. ethane

2. n – butane

Answer:

1. Conversion of ethyl chloride into ethane:



2. Conversion of ethyl chloride into n-butane:

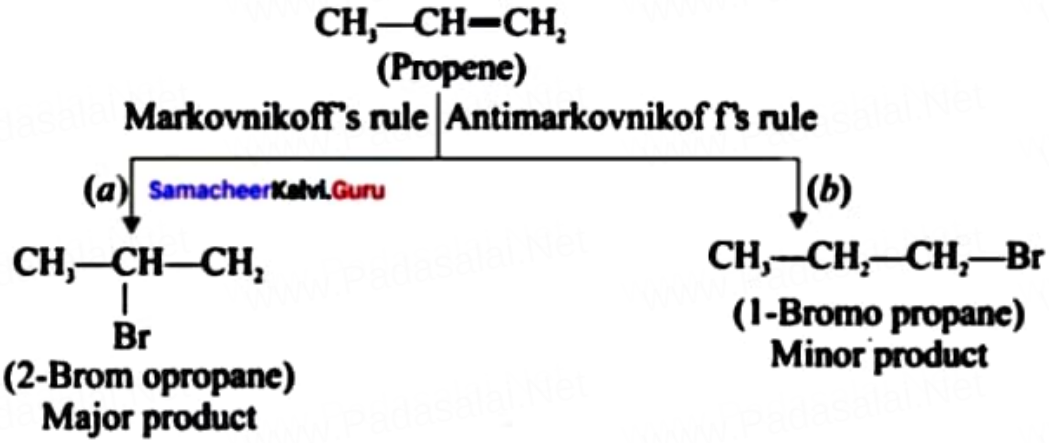
Wurtz reaction:

Answer:

Markovnikoff's rule: When an unsymmetrical alkene reacts with hydrogen halide, the hydrogen adds to the carbon atom that has more number of hydrogen and halogen adds to the carbon atom having fewer hydrogen atoms.

Example:

Addition of HBr to Propene:

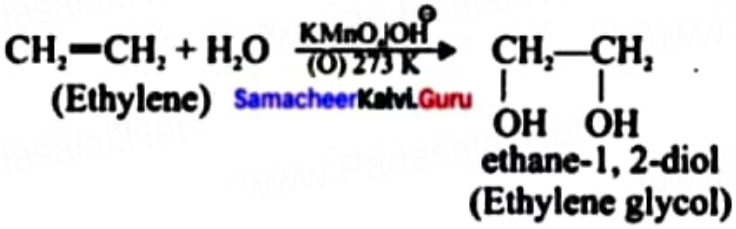


Question 45.

What happens when ethylene is passed through cold dilute alkaline potassium permanganate.

Answer:

Ethylene reacts with cold dilute alkaline $KMnO_4$ solution to give ethylene glycol:



Question 46.

Write the structures of following alkanes.

1. 2, 3 – Dimethyl – 6 – (2 – methylpropyl) decane

Question 48.

$CH_3 - CH(CH_3) - CH(OH) - CH_3$

$\downarrow$ H^+/heat

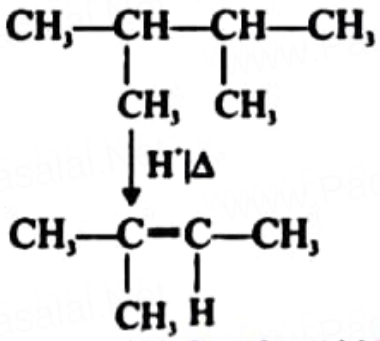
(A) major product $\xrightarrow{HBr}$ (B) major product. Identify A and B.

Answer:

$CH_3 - CH(CH_3) - CH(OH) - CH_3$

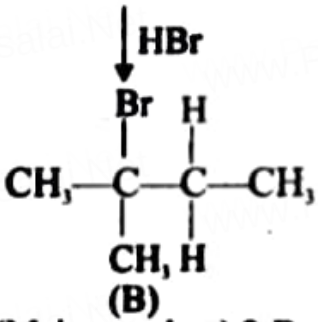
$\downarrow$ H^+/heat

(A) major product $\xrightarrow{HBr}$ (B) major product. Identify A and B.



(A)

(Major product) 2-methyl-2-butene)



(B)

(Major product) 2-Bromo-2-methyl-butane)

Question 49.

How will you distinguish 1 – butyne and 2 – butyne?

Answer:

(*i*) 2 – butyne $\xrightarrow{\text{Lindlar Catalyst}}$ (*ii*) $CH_2 = CH_2 \xrightarrow{I_2}$

(*iii*) $CH_2 = CH_2 \xrightarrow{Zn/C_2H_5OH}$ (*iv*) $CaC_2 \xrightarrow{H_2O}$

Answer:

(i) $CH_3-C\equiv C-CH_3$ (2-butyne) $\xrightarrow[\text{Linalar's catalyst}]{H_2,\ pd\text{-}CaCO_3}$ cis-2-butene

(ii) $CH_2=CH_2$ (Ethylene) $\xrightarrow{I_2}$ 1, 2-di-iodo ethene (unstable) $\xrightarrow{\Delta}$ $CH_2\equiv CH_2 + I_2$ (Ethylene)

(iii) $CH_2(Br)-CH_2(Br)$ (1, 2-di-bromoethane) $\xrightarrow[\Delta]{Zn|C_2H_5OH}$ $CH_2=CH_2$ (Ethene) $+ ZnBr_2$

(iv) CaC_2 (Calcium Carbide) $\xrightarrow{H_2O}$ $CH\equiv CH$ (Acetylene) $+ Ca(OH)_2$

Question 50.

How will you distinguish 1 – butyene and 2 – butyne?

Answer:

$CH_3-CH_2-C\equiv CH$ (1-butyne) $\qquad$ $CH_3-C\equiv C-CH_3$ (2-butyne)

In 1-butyne, terminal carbon atom contains atom one acidic hydrogen, therefore it will react with silver nitrate in the presence of ammonium hydroxide to give silver butynide. Whereas 2-butyne does not undergo such type of the reaction, because of the absence of acidic hydrogen.

(i) $CH_3-CH_2-C\equiv CH + 2AgNO_3 + 2NH_4OH \longrightarrow CH_3-CH_2-C\equiv C-Ag\downarrow$ (Silver butynide) $+ 2NH_4NO_3 + 2H_2O$

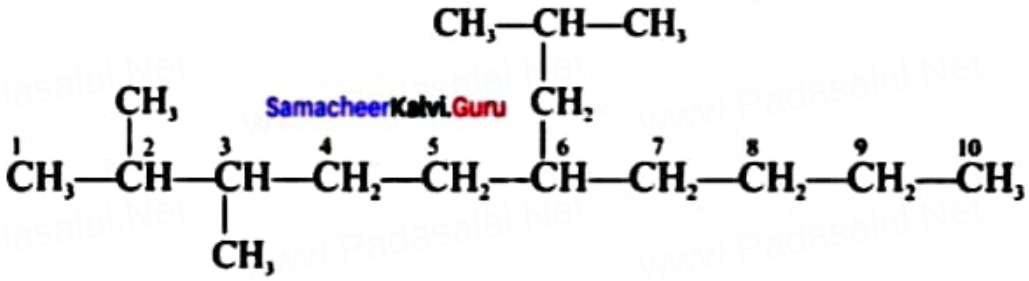
(ii) $CH_3-C\equiv C-CH_3$ (2-butyne) $+ 2AgNO_3 + 2NH_4OH \longrightarrow$ No reaction

2. 5 – (2 – Ethylbutyl) – 3, 3 – dimethyldecane

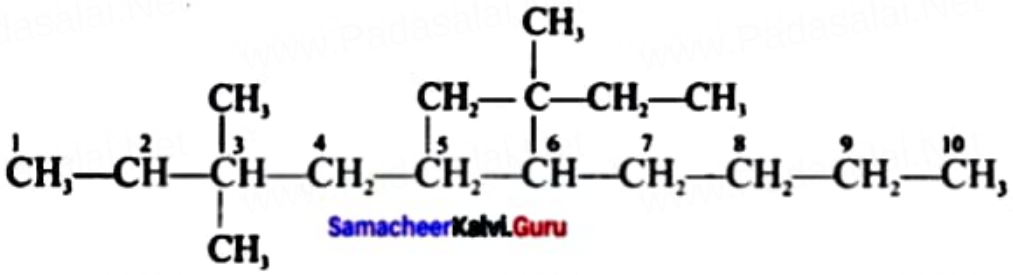
3. 5 (1,2 – Dimethyipropyl) – 2 – methylnonane

Answer:

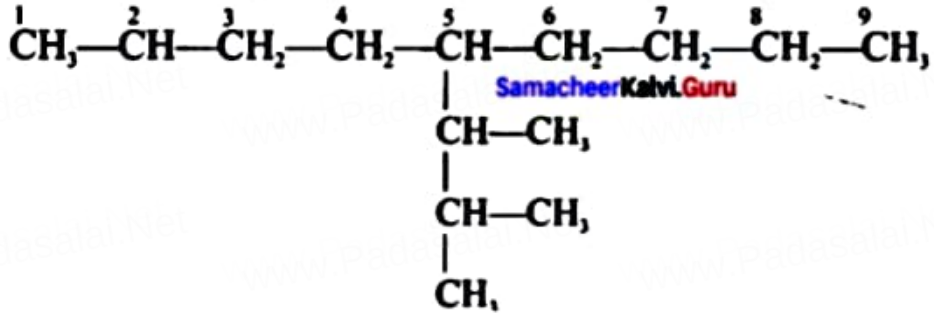
1. 2, 3 – Dimethyl – 6 – (2 – rnethylpropyl) decane



2. 5 – (2 – Ethylbutyl) – 3, 3- dimethyldecane



3. 5 – (1,2 – Dimethylpropyl) – 2- methylnonane



Question 47.

How will you prepare propane from a sodium salt of fatty acid?

Answer:

$$\underset{\text{(Sodium salt of butyric acid)}}{CH_3-CH_2-CH_2-COONa} \xrightarrow[\Delta]{NaOH,CaO} \underset{\text{(Propane)}}{CH_3-CH_2-CH_3} + Na_2CO_3$$

Sodium salt of butyric acid on heating with sodalime gives propane.