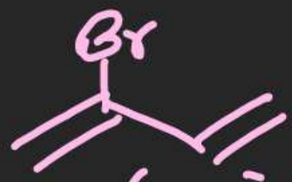
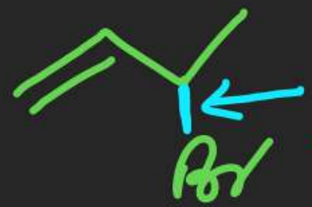
(43) $HC\equiv C-CH=CH_2$ $\xrightarrow[(1eq)]{HBr}$  (TCP)

(major)

(44) $H_2C=CH-CH=CH_2$ — HCl (1eq), −80°C; HCl (1eq), +35°C; HCl (1eq), +80°C



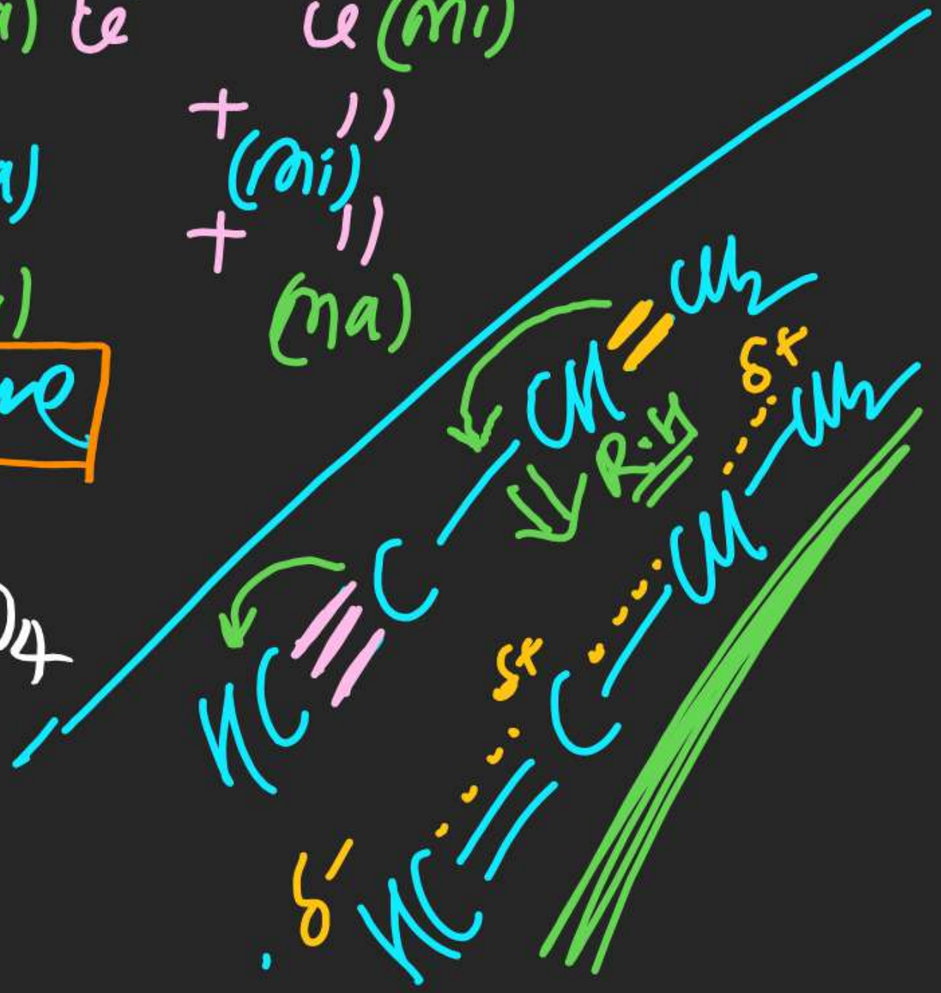
(ma) ‖ (mi)

(ma) + (mi) ‖ + (ma)

(#) **Addition of H_2O / Hydration of alkene**

Reaction of alkene with dil H_2SO_4

⇒ On Reaction of alkene with dil H_2SO_4 Alcohol is obtained as a Product.



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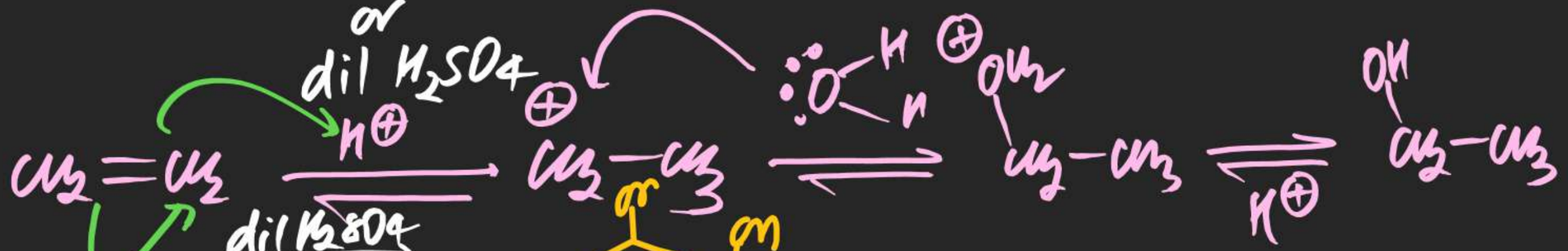
(45) $CH_2=CH_2 \xrightarrow[\text{or } H_3O^{\oplus} \text{ or dil } H_2SO_4]{H_2O/H^+} CH_3-CH_2-OH$

mechⁿ:



(i) $Hg(OAc)_2, H_2O$
(ii) $NaBH_4, OH^-$

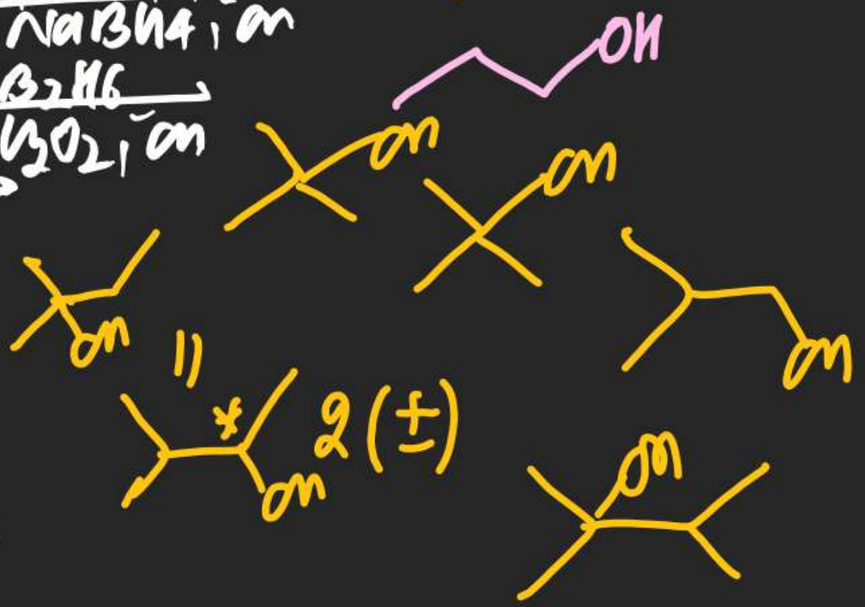
(i) B_2H_6
(ii) H_2O_2, OH^-

(46)

(47)

(48)

(49)



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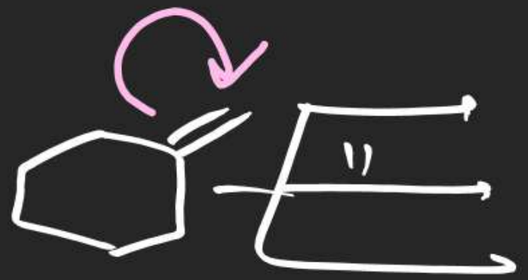
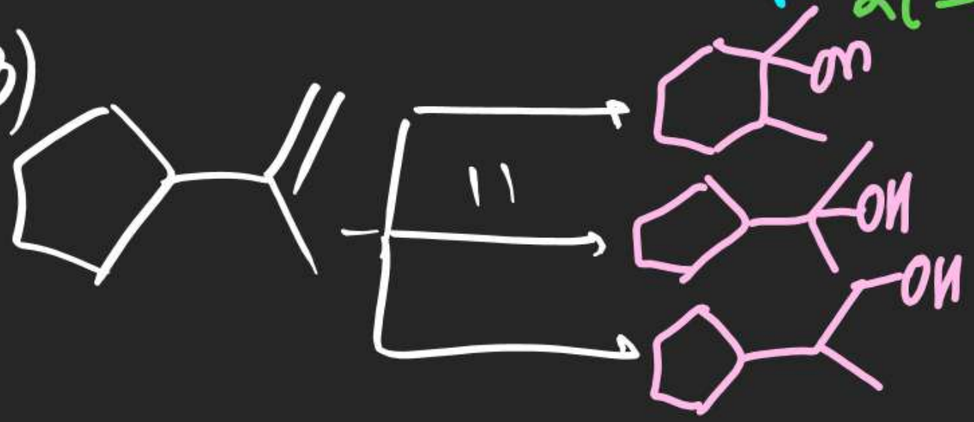
(50)

(51)

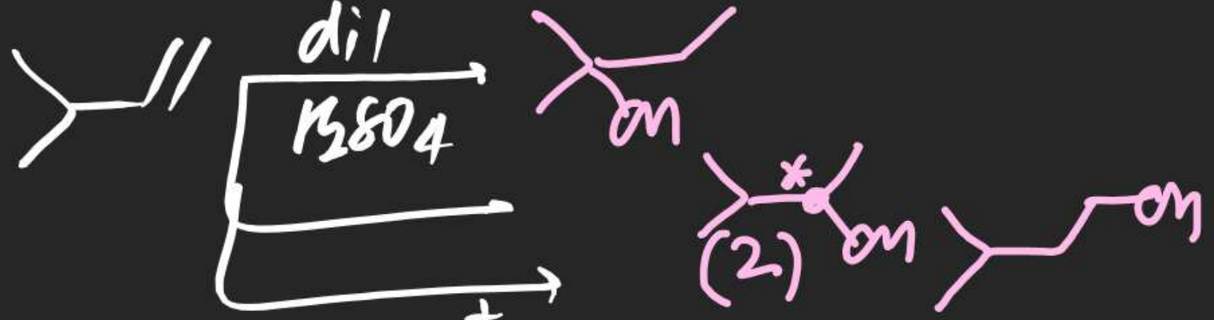


(52)

(53)

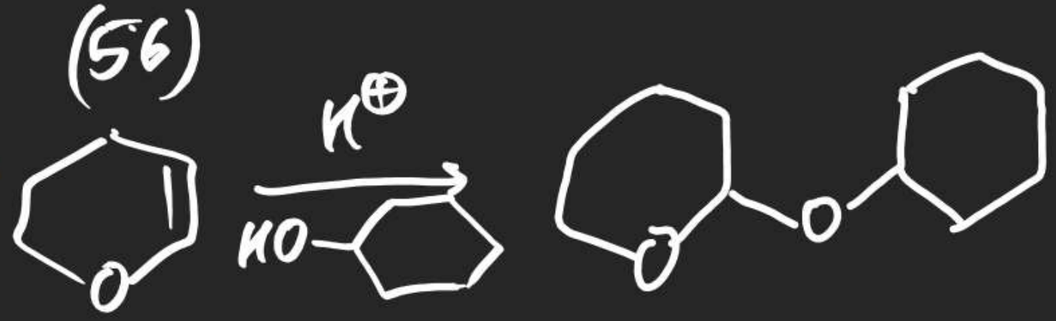


(54)

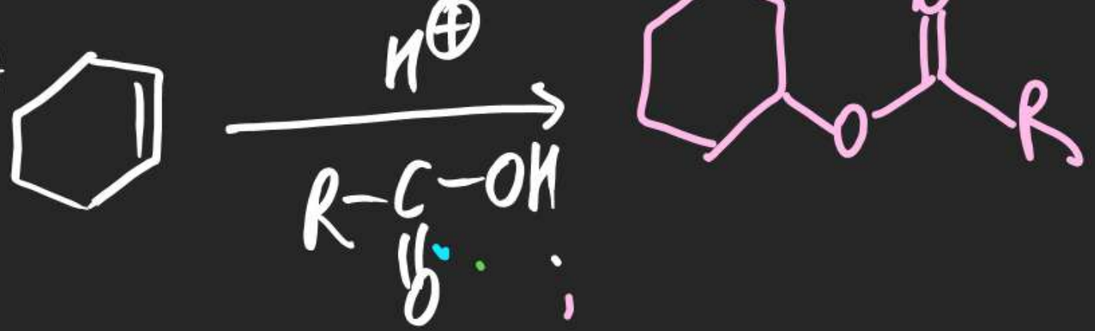


(55)

(56)



(57)



(#12) Kuchrov's Reaction :-

(58) $H-C\equiv C-H \xrightarrow[H_2SO_4]{HgSO_4} CH_3-\overset{O}{\overset{\|}{C}}-H$

H_2O → $\left[HC=CH \right]$ (Enol) ⇌ $CH_3-\overset{O}{\overset{\|}{C}}-H$

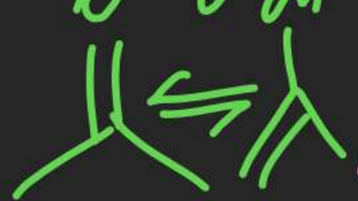
$CH_3-\overset{O}{\overset{\|}{C}}-H \rightleftharpoons CH_2=CH-OH$

mechⁿ: $HC\equiv CH \xrightarrow{HgSO_4}$ $\left[HC=CH \right]^{+2}$ (vacant) SO_4^{2-} $\xrightarrow{O(H)H}$ $\left[CH_2=CH \right]^{\oplus}$ SO_4^{2-} $\xrightarrow{-HgSO_4}$

(59) $R-C\equiv CH \xrightarrow[H_2SO_4]{HgSO_4}$ $R-\overset{O}{\overset{\|}{C}}-CH_3$

(60) $R-C\equiv C-R \xrightarrow{H_2O} R-\underset{\underset{O}{\|}}{C}-CH_2-R$

(61) 

(62) $CH_2=C=CH_2 \xrightarrow[H_2SO_4]{dil}$  on mechⁿ :

(63) $CH_2=CH_2 \xrightarrow{H_2SO_4} CH_2-CH_2$ (H, OSO_3H)

(64) $R-CH=CH_2 \xrightarrow{H_2O} R-\underset{*}{CH}-CH_3$ (OSO_3H)

$R-CH=CH_2 \xrightarrow{H^{\oplus}} R-\overset{\oplus}{C}H-CH_3 \xrightarrow{\ominus OSO_3H} R-CH-CH_3$ (OSO_3H)

(#) Addition of Conc. H_2SO_4 :-

$\Rightarrow$ On addⁿ of H_2SO_4, alkyl hydrogen sulphate is obtained, if alkene type is $CH_2=CH_2$, $R-CH=CH_2$ . . . . .

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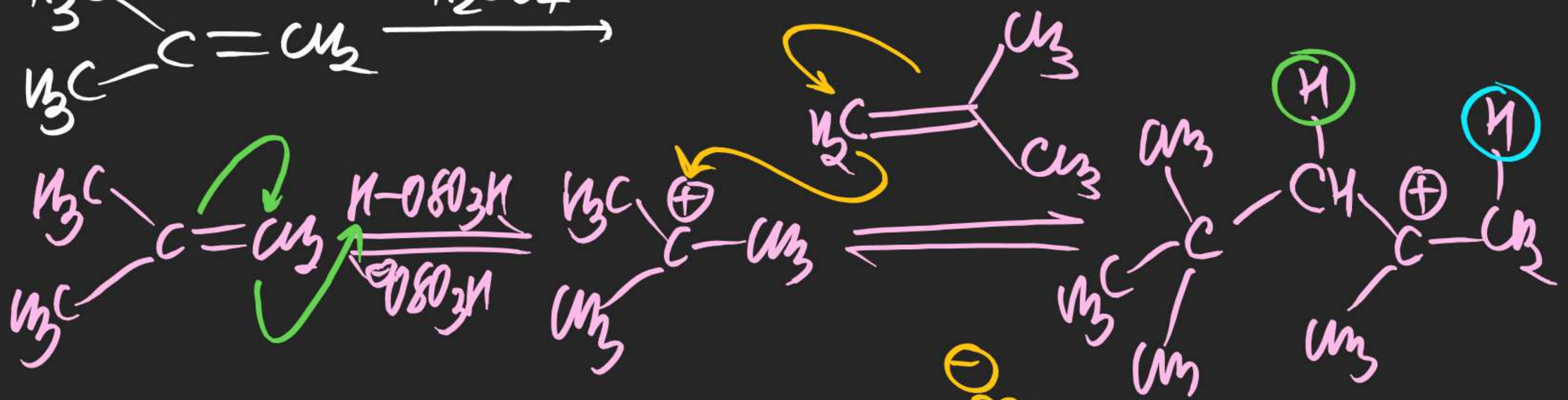
$\Rightarrow$ Alkene gets **dimerised** with conc. H_2SO_4

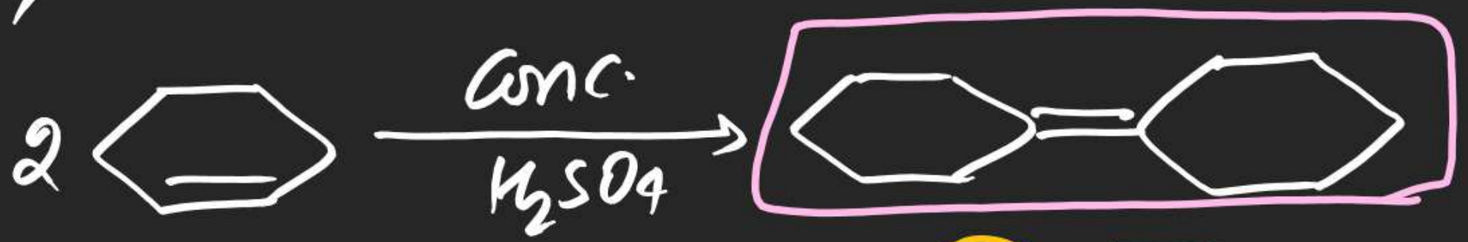
if alkene type is $\left[R_2C=CH_2,\ R_2C=CHR,\ \ldots \right]$

(65) $H_3C-\underset{H_3C}{\overset{}{C}}=CH_2 \xrightarrow{H_2SO_4}$

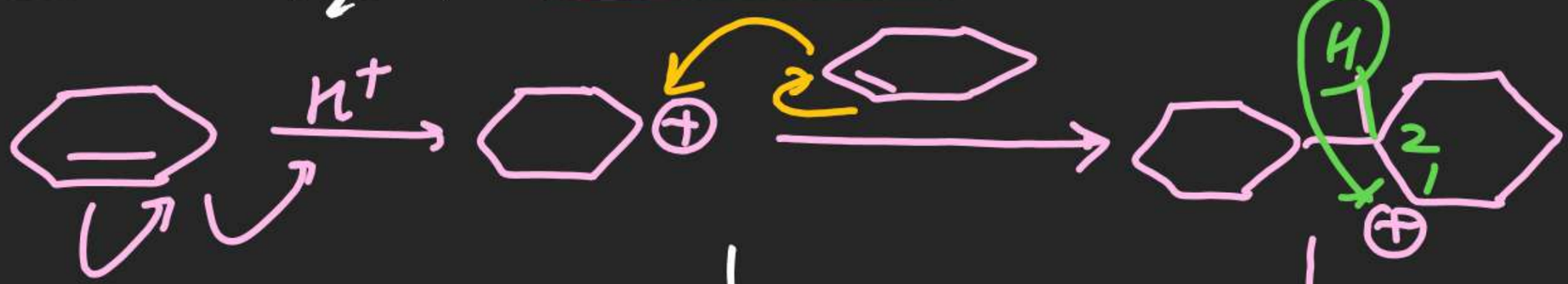
Mechⁿ :-

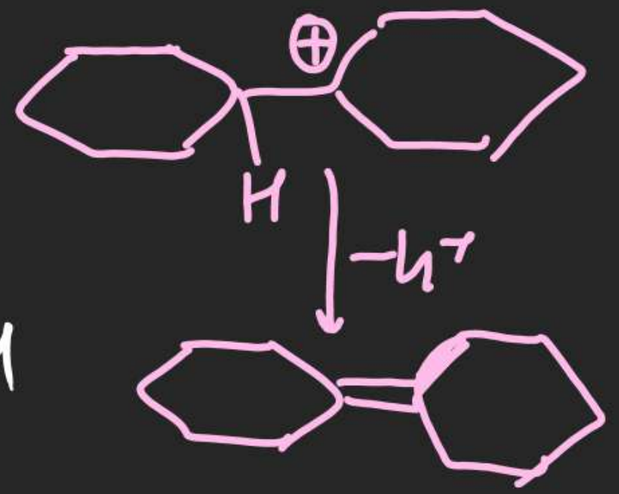


(66) Propose mechanism

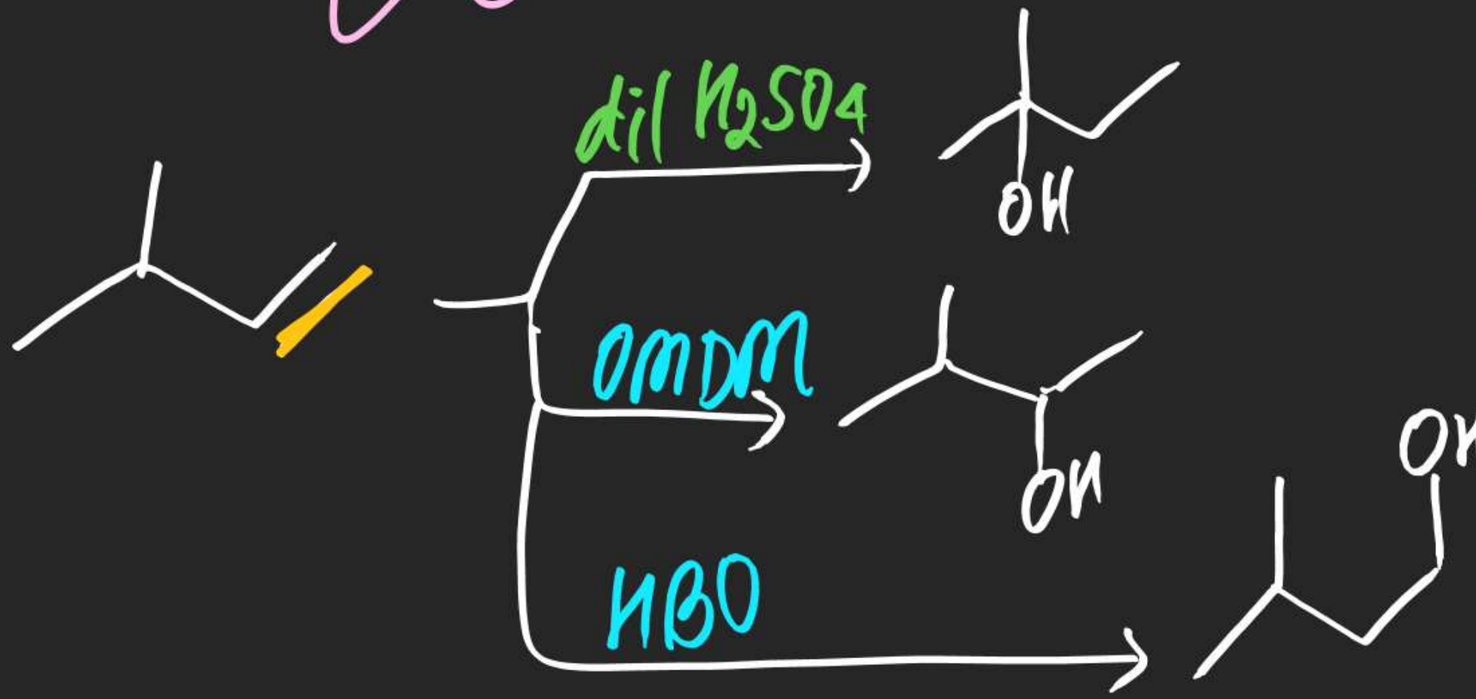


Mechanism:-





(67)



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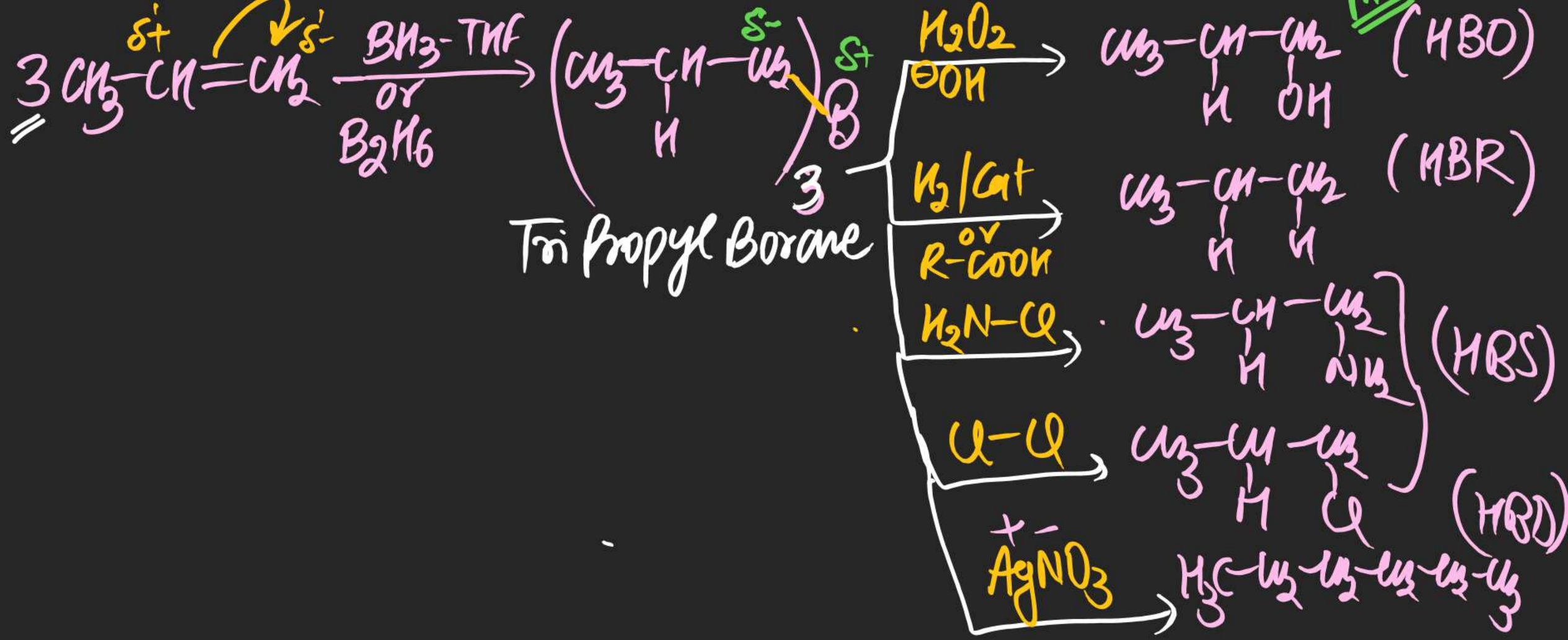
(#) Hydro-Boration (HB)

⇒ Reaction of alkene with Borane / Di Borane is known as HydroBoration



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Or given alkene in Anti markonikoff's method.

(v) $CH_3-CH=CH_2 \xrightarrow[(ii)\ H_2O_2,\ \ominus OH]{(i)\ BH_3-THF} CH_3-\underset{H}{CH}-\underset{OH}{CH_2}$

(vi) When Crowded alkene is used, mono or Di alkyl Borane is obtained as a Product.

(1) 

(2) 

Di-Simyl Borane $[Sia_2BH]$

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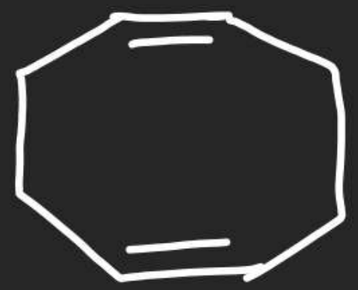
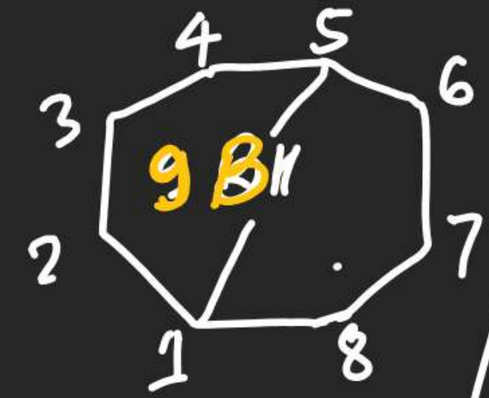
(3)  $\xrightarrow[THF]{BH_3}$ 

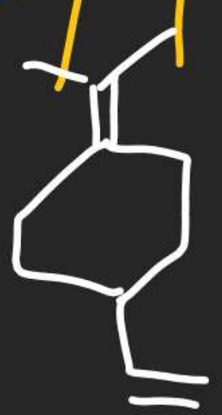
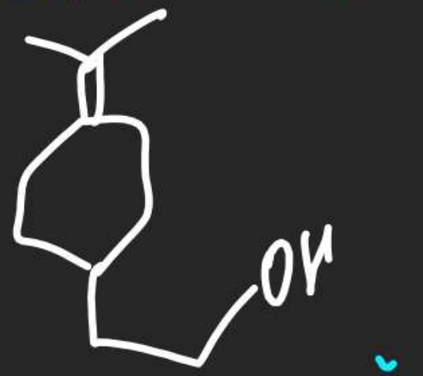
/ 

/ 

(9-BBN)

(9-Bora Bicyclo Nonane)

Note! 9BBN & Sia_2BH Both are selective Reducing agent & reduces less Crowded alkenes.

(4)  $\xrightarrow[(ii)\ H_2O_2/\bar{O}H]{(i)\ 9\text{-BBN}}$ 

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(5)  $\xrightarrow[(ii)\ D_2O_2/\overset{\ominus}{O}D]{(i)\ BH_3\text{-}THF}$

(6)  $\xrightarrow[(ii)\ H_2O_2/\bar{O}H]{(i)\ BD_3/THF}$

(7)  $\xrightarrow[(ii)\ D_2O_2/\bar{O}H]{(i)\ BD_3\text{-}THF}$

(8) $H\text{-}C\equiv C\text{-}H \xrightarrow[(ii)\ H_2O_2/\bar{O}H]{(i)\ BH_3\text{-}THF} CH_3\text{-}\overset{\overset{O}{\|}}{C}\text{-}H$

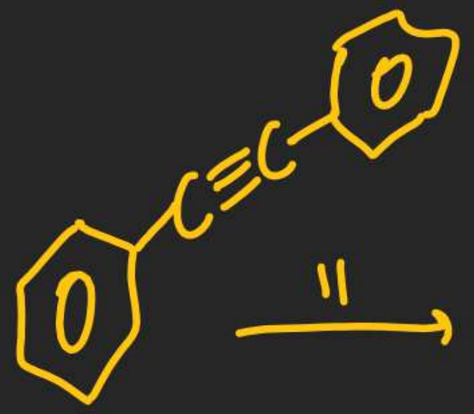
Soln: $H\text{-}C\equiv C\text{-}H \xrightarrow{\text{II}} \left[CH_2=\overset{\overset{OH}{|}}{CH}\right] \rightleftharpoons CH_3\text{-}\overset{\overset{O}{\|}}{C}\text{-}H$

(9) $R\text{-}C\equiv C\text{-}H \xrightarrow{\text{II}}$

Soln: $R\text{-}C\equiv CH \xrightarrow{\text{II}} \left[R\text{-}CH=\overset{\overset{OH}{|}}{CH}\right] \xrightarrow{\text{IL}} R\text{-}CH_2\text{-}\overset{\overset{O}{\|}}{C}\text{-}H$

(10) $R\text{-}C\equiv C\text{-}R \xrightarrow{\text{II}}$

(11)  $\xrightarrow{\text{II}}$

(12)  $\xrightarrow{\text{II}}$

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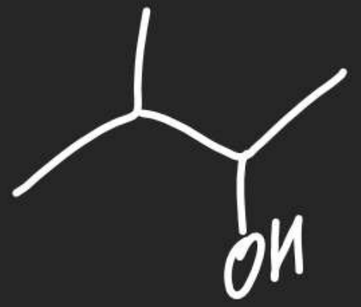
(13)  (i) $Hg(OAc)_2$ / ROH (ii) $NaBH_4$ – ⊖n  2(±)

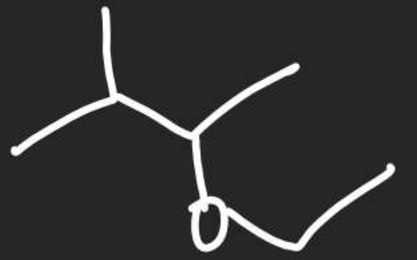
(14)  (i) $Hg(OAc)_2$, CH_3–SH (ii) $NaBH_4$, ⊖n

(15) Total possible Alkene (i) $Hg(OAc)_2$, H_2O (ii) $NaBH_4$, ⊖n 

(16) ? 〃 

(17) ? (i) 〃, R–⊖n (ii) 〃 

(18) 〃 〃 

(19) 〃 〃 

(20) 〃 〃 

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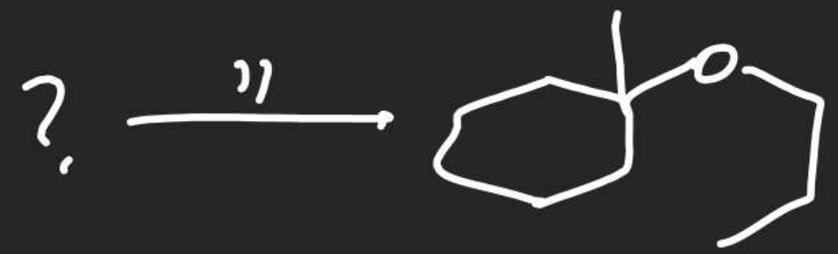
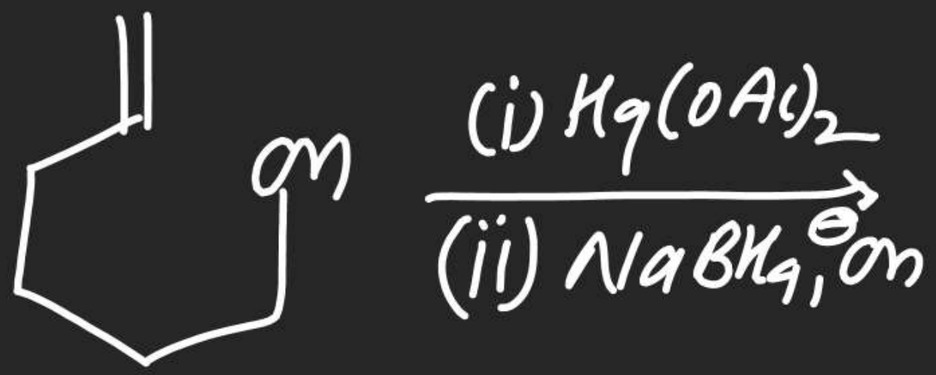
(21) 

(22) 

(#) Addition of X_2 :-

$\Rightarrow$ On Rxn of X_2 with alkene vicinal dihalide is obtained as a product.

Note (i) order of rate of rxn for X_2

$F_2 >> Cl_2 > Br_2 > I_2$

Reddish Brown

(ii) Rxn of Br_2 (Reddish Brown) with compound having π Bond, it

Reddish Brown colour disappear.

Colour disappear

$\Rightarrow$ This Rxn is used as **Test of unsaturation** in POC.

Practical Organic Chemistry

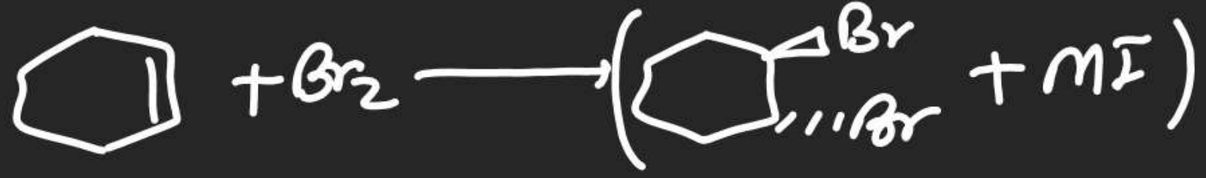
Ex: which of the following can be distinguished By Br_2/water

(A) $CH_2=CH_2$ $HC\equiv CH$

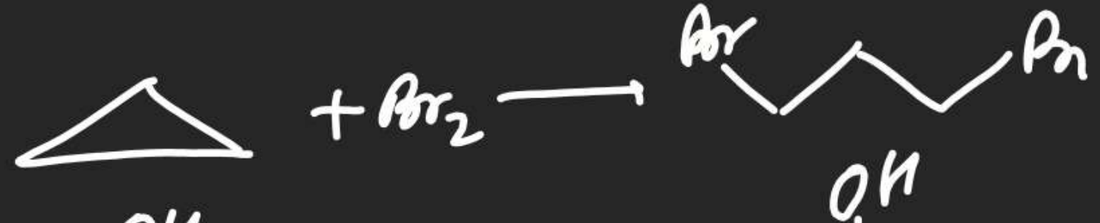
(B) $CH_2=CH-CH_3$ $CH_2=CH_2$

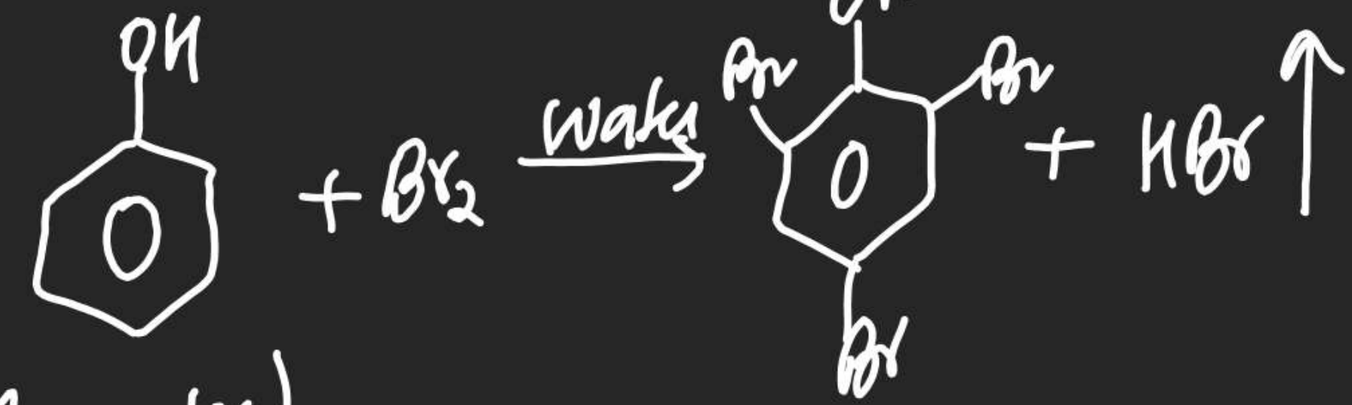
(C) CH_3-CH_3 $CH_3-CH_2-CH_3$

Ans (D) $CH_2=CH_2$ CH_3-CH_3

(*) 

(X) 

(X) 

(*) 

(Aromatic)

Colour decolourise

(1) $CH_2=CH_2 \xrightarrow[CCl_4]{Br_2}$

(2)  ⟶

(3)  ⟶

(4)  ⟶

(5)  ⟶

(6)  ⟶

(7)  ⟶

(8)  ⟶

(9)  ⟶

(10)  ⟶

(11)  $\xrightarrow{H^+}$

(12)  $\xrightarrow{H^+}$

(13)  $\xrightarrow{H^+}$

(14)  $\xrightarrow{H^+}$

(15) $HC\equiv CH \xrightarrow[\text{Excess}]{Br_2}$

(16) $R-C\equiv CH \xrightarrow{H^+}$

(17) $R-C\equiv C-R \xrightarrow{H^+}$

(18) $CH_2=CH-CH=CH_2 \xrightarrow{Br_2\,(1\,eq)}$

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(19) 

$\xrightarrow{Br_2}$

(20) 
$\xrightarrow[H_2O]{Br_2}$

(21) 
$\xrightarrow{ICl}$

Iodolactonization:

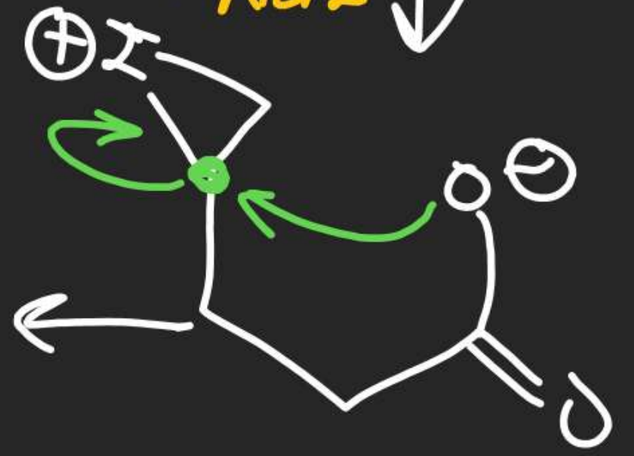
(22) 

$\xrightarrow[(ii)\ NaHCO_3]{(i)\ I_2}$

Soln:

$-H_2CO_3$
$-NaI$

$\overset{+}{Na}\overset{-}{HCO_3}$



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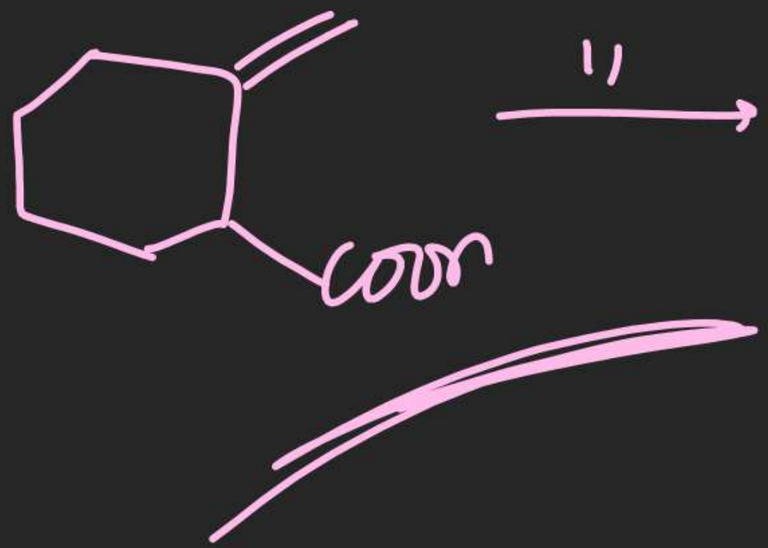
(23) 

(24) 

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∴ Carbon Free Radical :-

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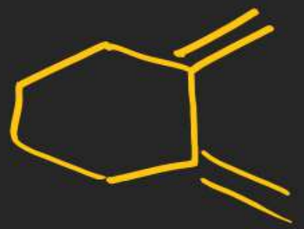
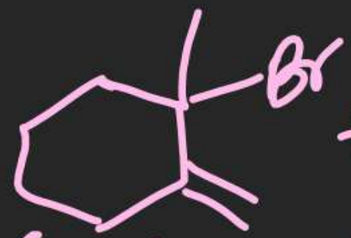
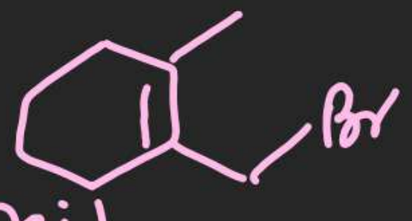
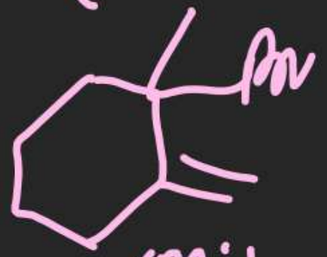
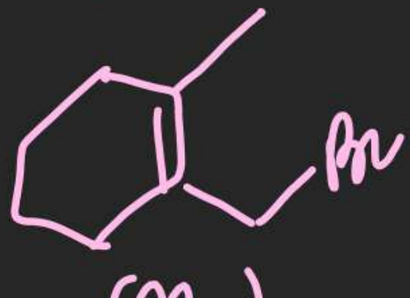
(31)  + HBr (1eq) $\xrightarrow{-80^\circ C}$  (major) +  (minor)

(32)  + HBr (1eq) $\xrightarrow{35^\circ C}$  (minor) +  (major)

(33)  + HBr (1eq) $\xrightarrow{-80^\circ C}$  (Ma) +  (Mi)

(34))) +)) $\xrightarrow{+80^\circ C}$  (Mi) +  (Ma)

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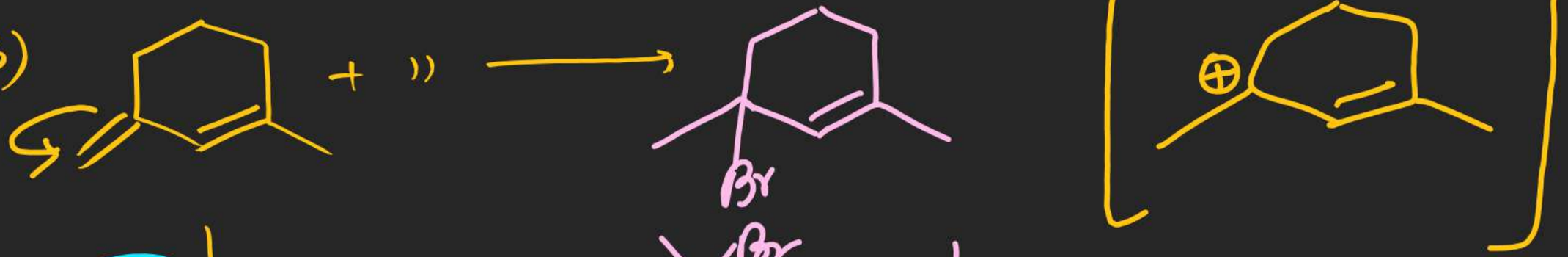
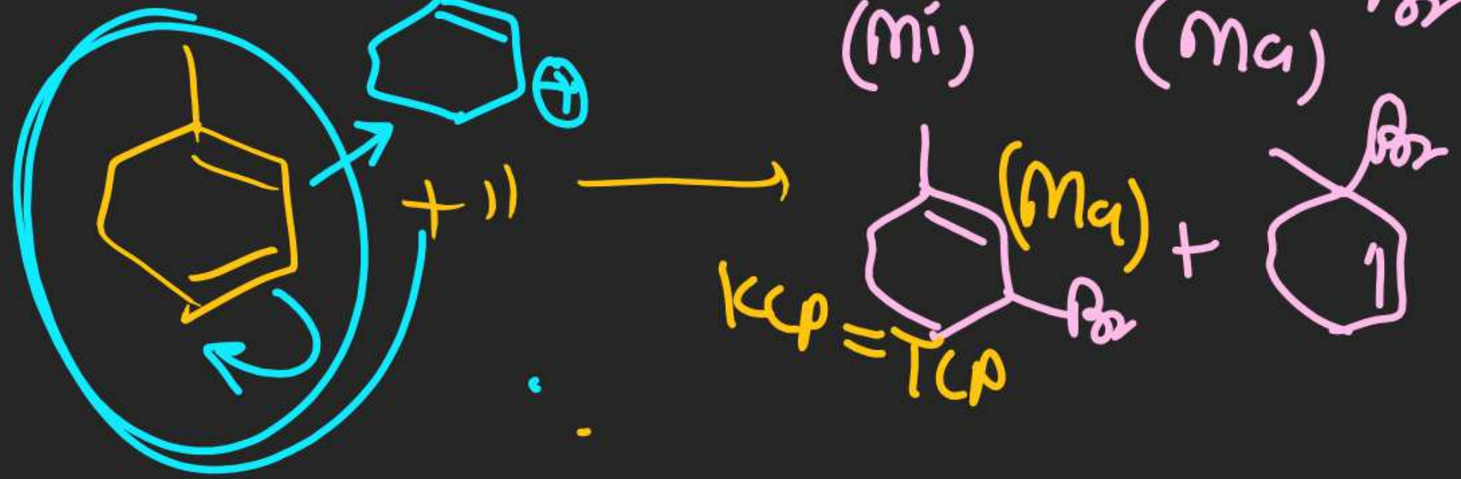
(35) 

(36) 

(37) 

(38) 

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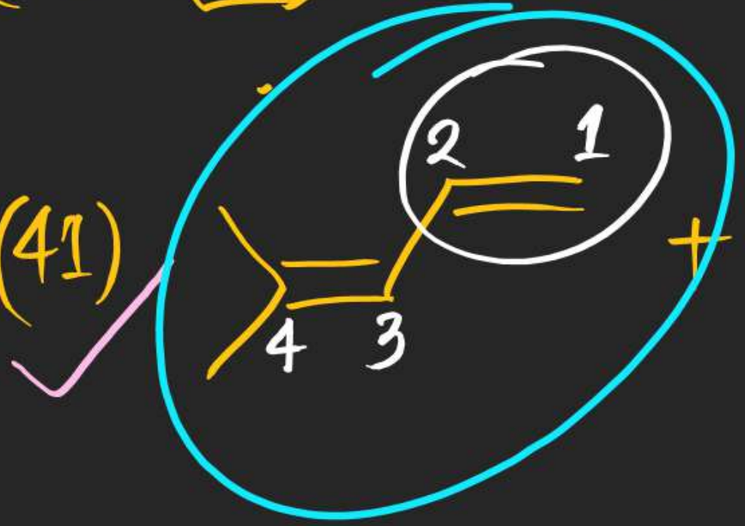
(39) 

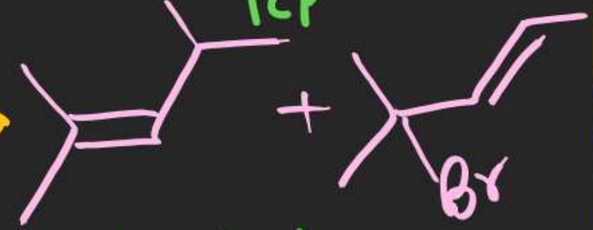
+ HBr (1eq) ⟶ 

KCP (1,2)

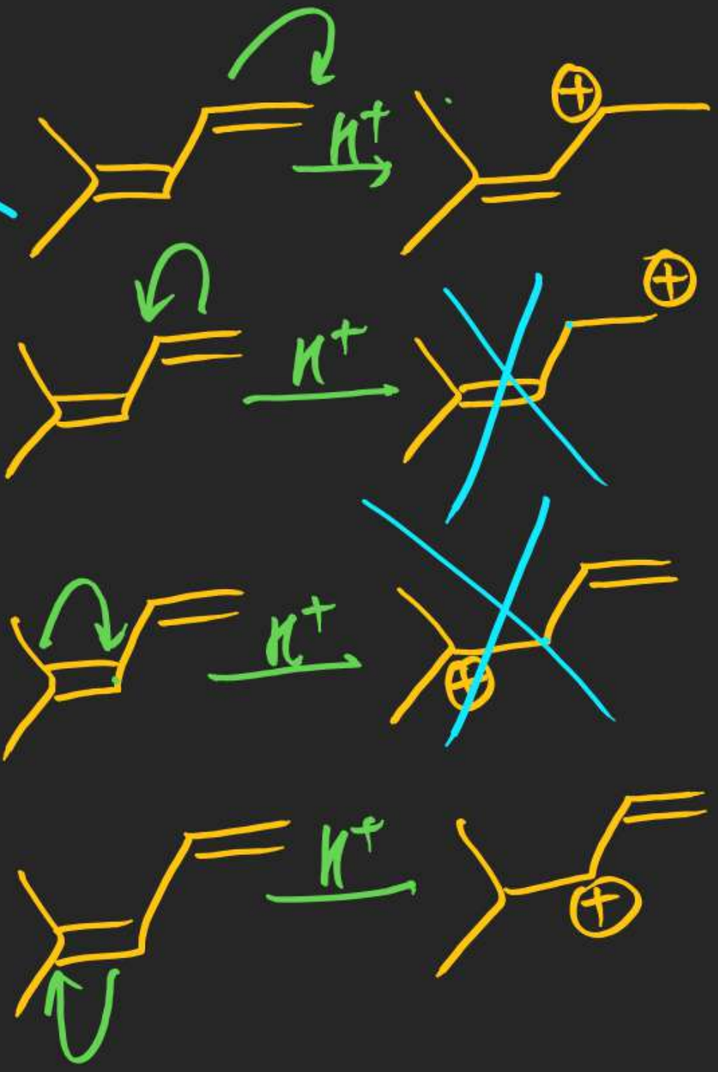
(40) 
+ HBr (1eq) ⟶ 

KCP (1,2)

(41) 

+ HBr (1eq) ⟶ 

(✗) 1,2 Product
(✓) KCP
(✗) TCP (more stable) (Major)



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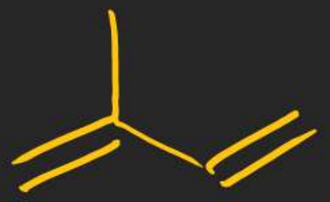
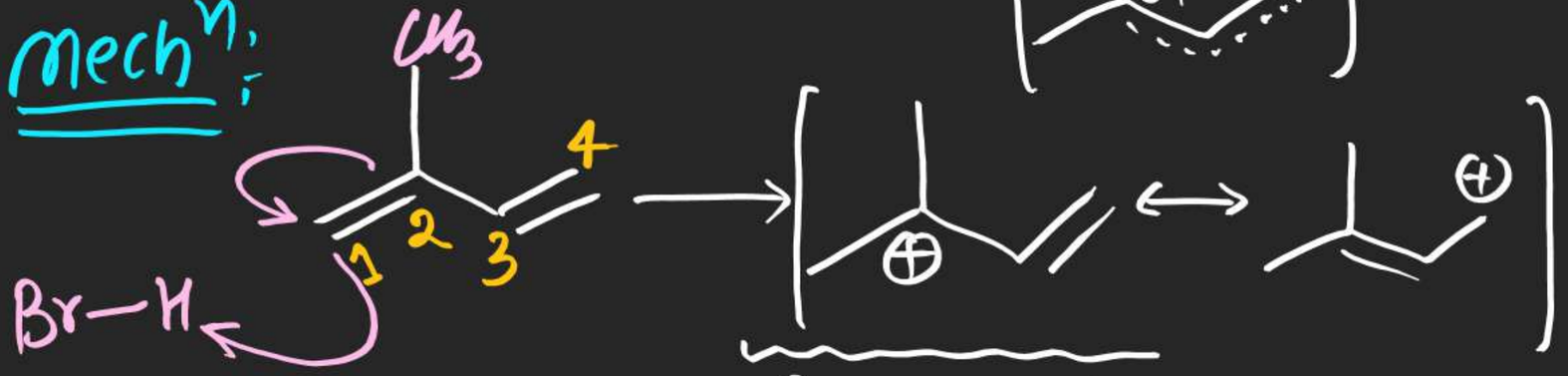
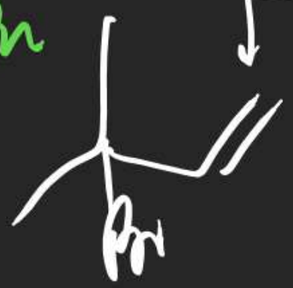
(42)  + HBr (1eq) ⟶

Mechⁿ:

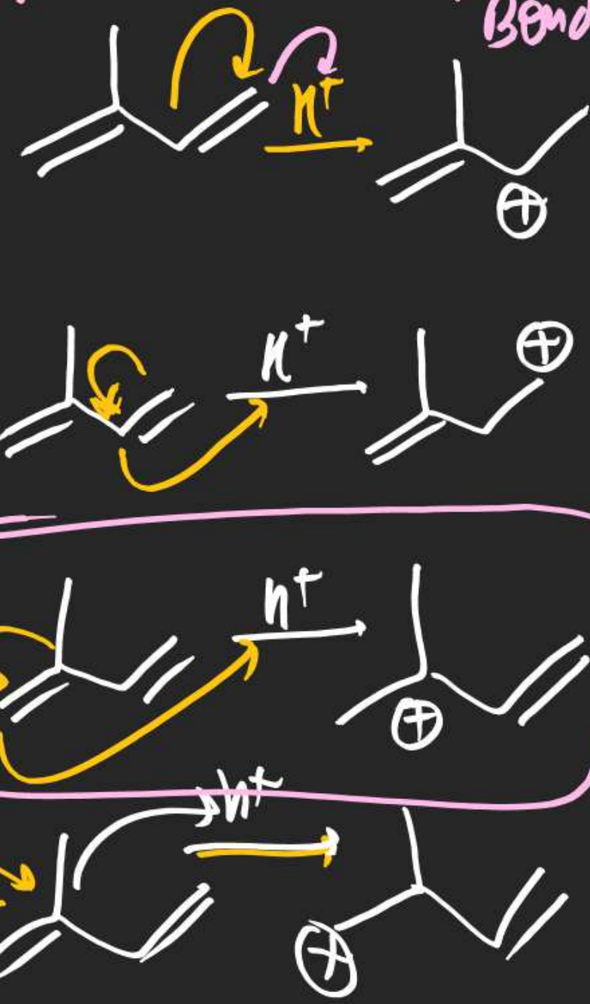


(i) 1,2 Pdt
(ii) KCP



(major)
(x) 1,4 Product
(y) TCP

Rough work To find out highly polarised Bond.



HW

Theory copy

isomerism

ex-Jee main