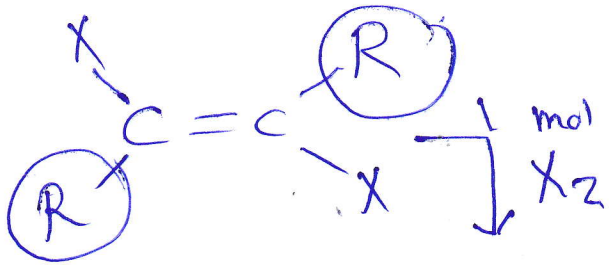
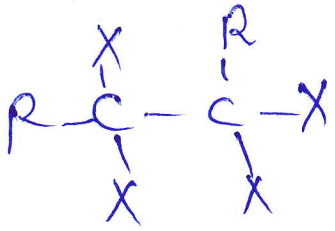
Reactions of Alkynes:

a) With X_2

$$R-C\equiv C-R \xrightarrow{1\ mol\ X_2}$$

$X = Cl, Br$

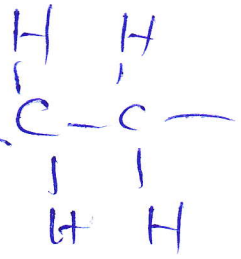




$$CH_3-C\equiv C-CH_3 \xrightarrow{excess\ Cl_2} ???$$

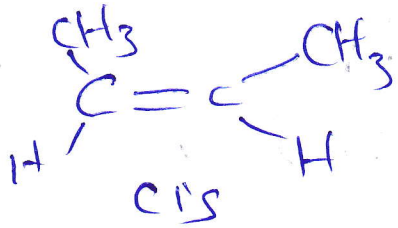
b) With $H_{2(g)}$, Cat. Pt or Ni

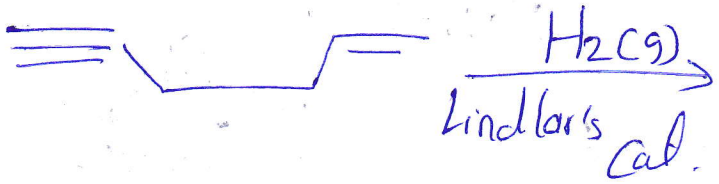
$$-C\equiv C- \xrightarrow[Pt]{H_{2(g)}}$$



But in the presence of Lindlar's Catalyst: alkene is not affected and just 1 π bond is broken in alkyne and cis-product is obtained.

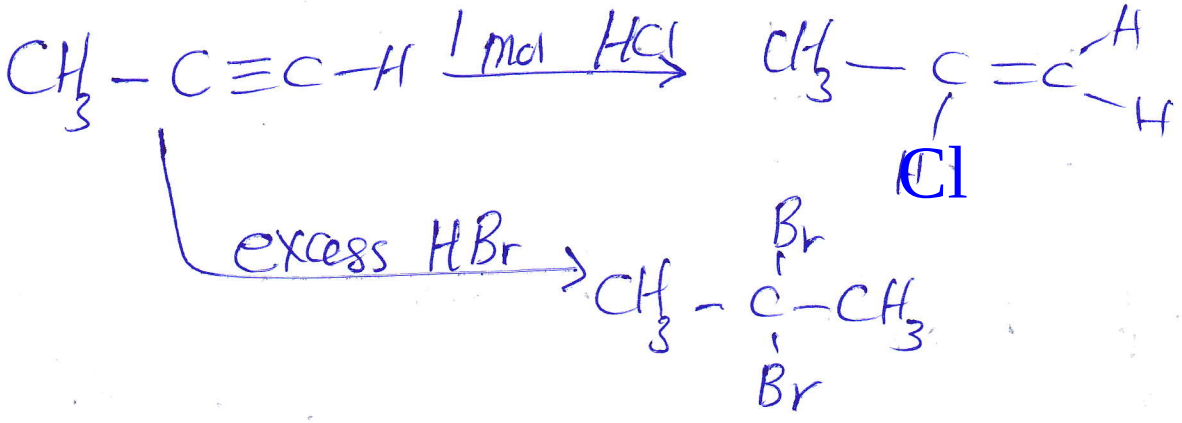
$$CH_3-C\equiv C-CH_3 \xrightarrow[Lindlar's\ cat.]{H_{2(g)}}$$



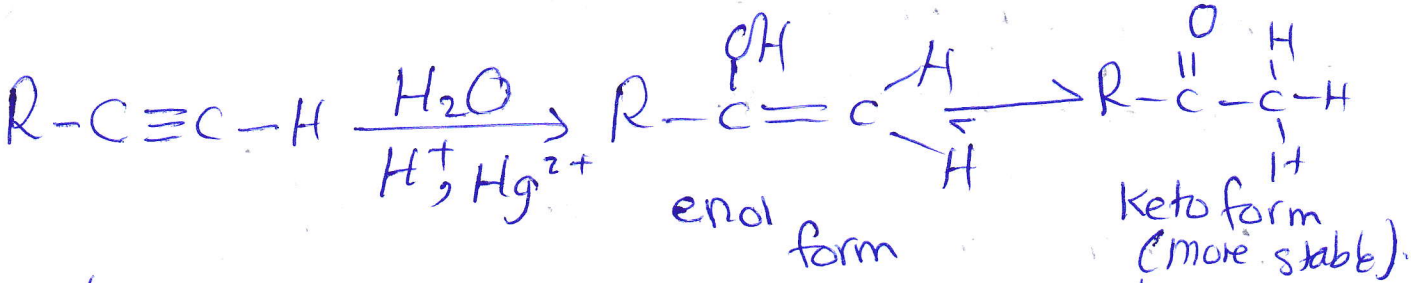


???

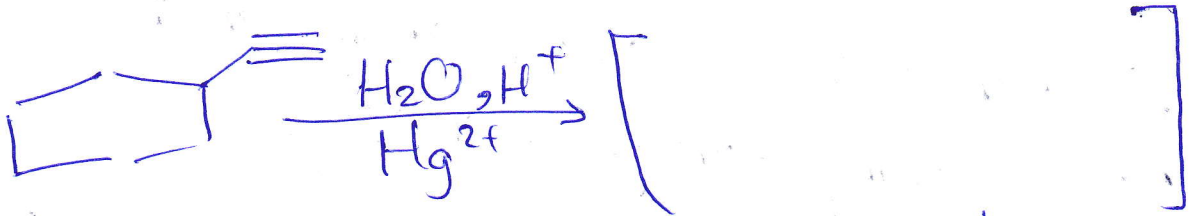
c) With HX: Markovnikov's rule is applied for R-C≡C-H.



d) With H_2O, H^+ and $HgSO_4$ (Hg^{2+})
1 π bond is only broken and Markovnikov's rule is applied.



This equilibrium is called: tautomerization.

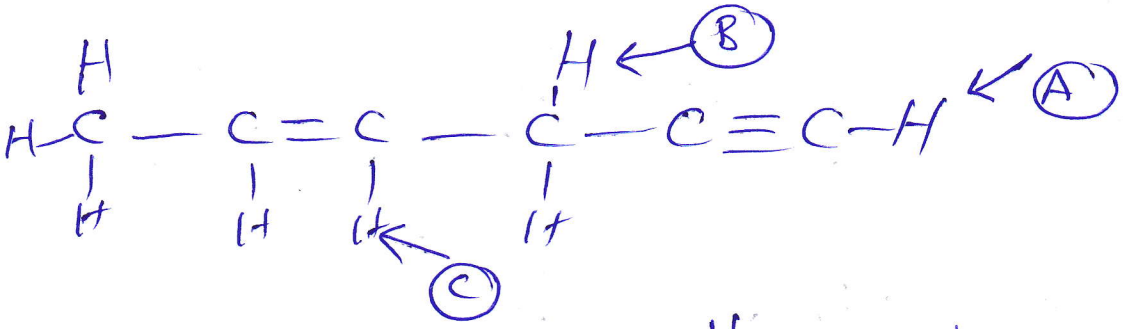


major product.

e) With strong base ($NaNH_2$):

Terminal alkyne ($R-C\equiv C-H$) $\xrightarrow[liq.\ NH_3]{\ominus NH_2}$

$R-C\equiv C^{\ominus}$ Nucleophile



Which hydrogen is the most acidic?

It based on the hybridization of the attacheed Carbon. For sp- Carbon ⟹ hydrogen is the most acidic, while for sp^3- hybridized carbon ⟹ the acidity is the weakest.

S-character: sp sp^2 sp^3

50% ~33% 25%

As S-character of carbon atom increases ⟹ the electronegativity increases.

End of cha. 3