

Hydrocarbon :-

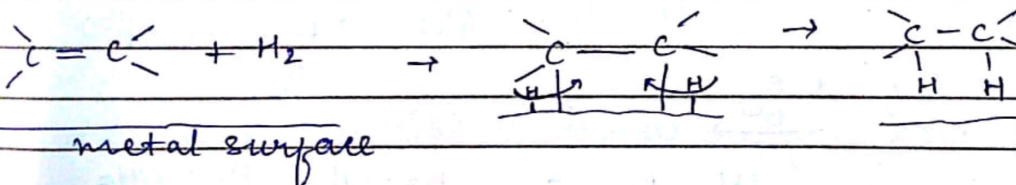
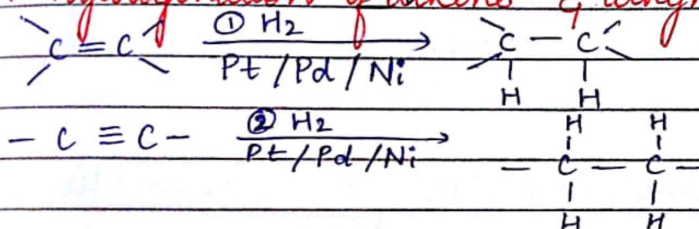
PAGE NO.: 1
DATE: / /

Alkanes : G.F. $\rightarrow C_nH_{2n+2}$ B.A. = $109^\circ 28'$

	B.L.	B.E.
C-H	1.12 Å	98 Kcal
C-C	1.54 Å	84 Kcal

General Method of Preparation :-

1. **Hydrogenation of alkene & alkyne :-**

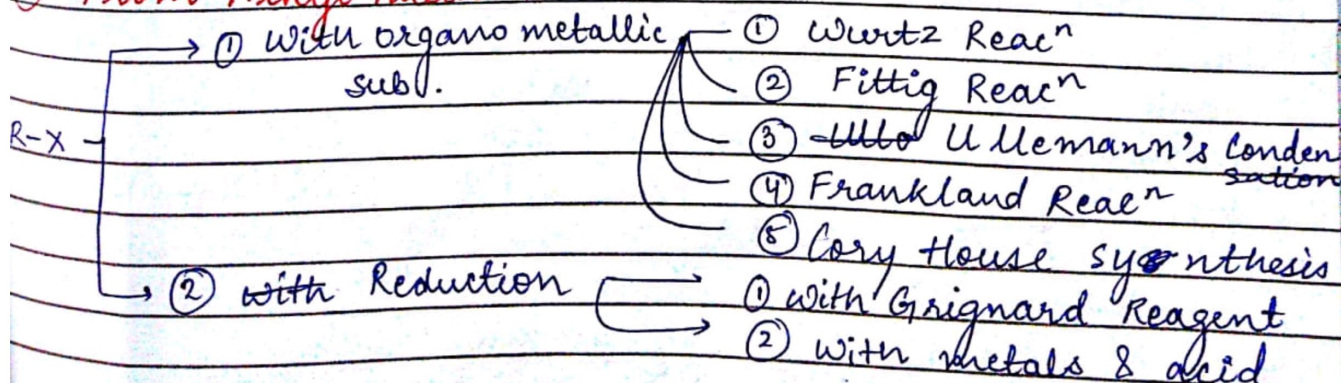


Pt / Pd $\rightarrow$ room Temp.

Ni $\rightarrow$ High Temp. $\rightarrow$ SABATIER - Senderson Reacⁿ

Raney Ni = (Ni-Al Alloy in Powder form) Surface Area of Catalyst $\uparrow$ ROR $\uparrow$ Room Temp $\uparrow$ हो जायेगा।

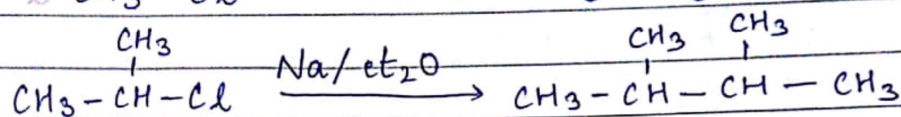
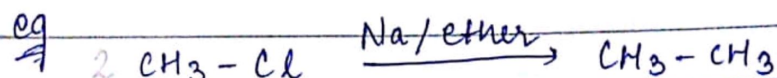
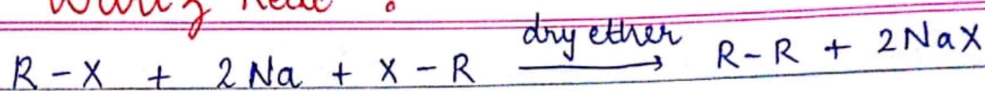
② **From Alkyl halide :-**



* Radical Wurtz Mech. is more stable than Ionic Mech.

Wurtz Reacⁿ :

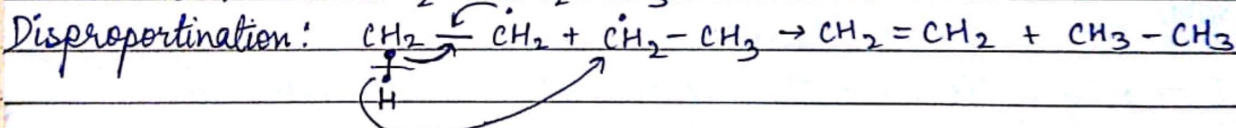
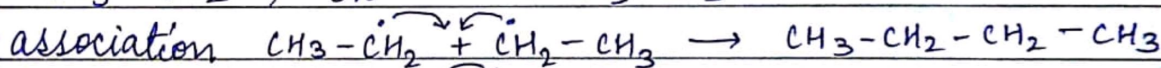
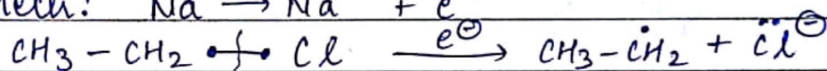
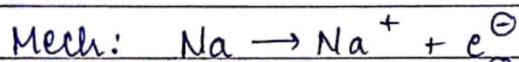
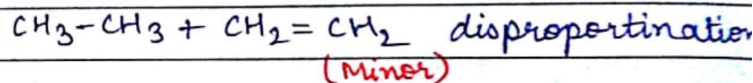
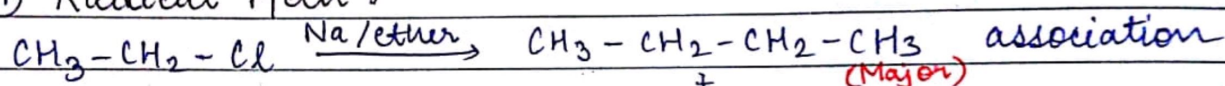
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* 2 same moles of alkyl halide are taken.

Wurtz Reacⁿ Mech $\begin{cases} \rightarrow \text{Radical Mech. (Best)} \\ \rightarrow \text{Ionic Mech.} \end{cases}$

① Radical Mech :-

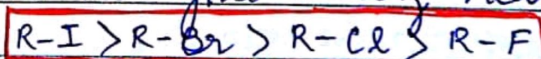


1°/2° R-X $\rightarrow$ association Prod. $\rightarrow$ higher alkanes.

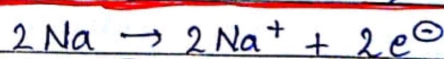
3° R-X $\rightarrow$ disproportionation Prod.

So 3° alkyl halide do not give Wurtz Reacⁿ

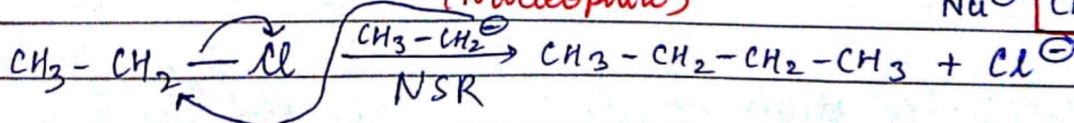
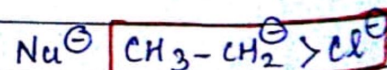
Reactivity of R-X



② Ionic Mech :-

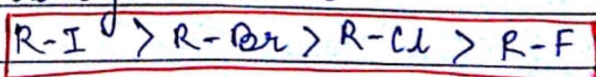


(Nucleophile)



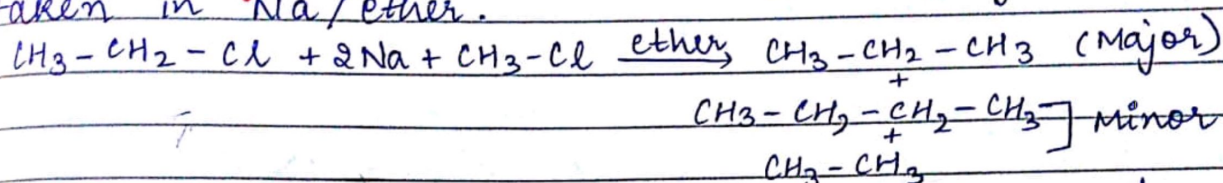
• Wurtz Reacⁿ give sym. alkane.

• Reactivity order



In Wurtz Reactⁿ breaking of R-X bond is slow step is RDS
 $R-I > R-Br > R-Cl > R-F$

Cross-Wurtz Reactⁿ : When 2 different alkyl halide are taken in Na/ether.



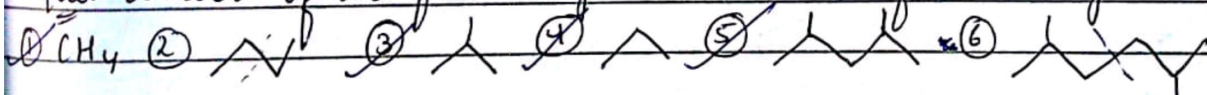
In cross Wurtz Reactⁿ, unsym. alkane are formed.

• Cross Wurtz reactⁿ is not good for preparation of alkane becoz separation of alkanes formed is difficult due to very small diff. in their B.P. However cross prod. are major product.

Drawback of Wurtz Reactⁿ:-

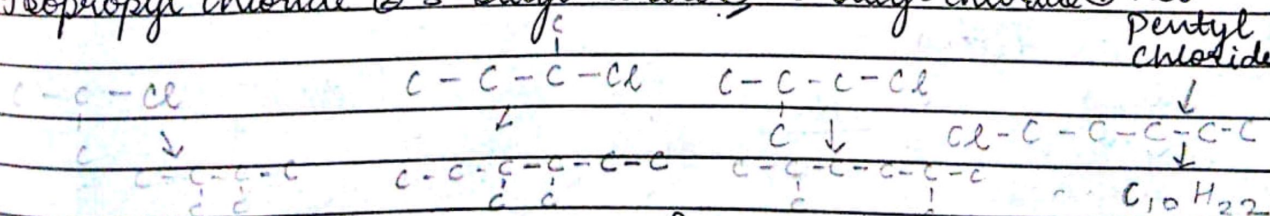
- ① CH_4 can not be formed.
- ② Odd no. C-containing alkane are not formed by Wurtz Reactⁿ.

Ques which of the following alkane is not formed by Wurtz Reactⁿ?

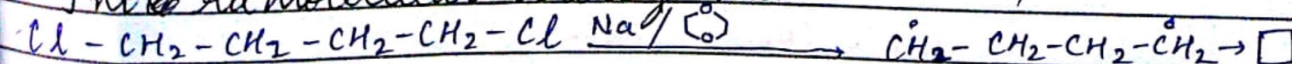


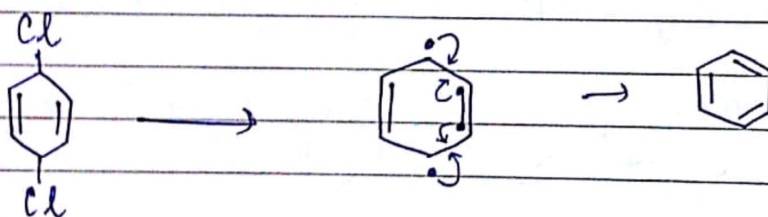
Ques In which of the following will give 2,5-dimethylhexane when treated with Sodium metal in dry ether?

- ① Isopropyl chloride ② n-butyl chloride ③ iso-butyl chloride ④ neo-pentyl chloride



Intramolecular Wurtz Reactⁿ:-





2 c1ccccc1Cl $\xrightarrow{\text{Na/ether}}$ c1ccccc1-c2ccccc2

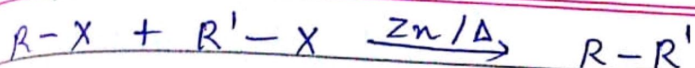
c1ccccc1Cl + CH3-Cl $\xrightarrow[\text{ether}]{\text{Na}}$ Cc1ccccc1 (Major) + CH3-CH3 + c1ccccc1-c2ccccc2 (Minor)

$$2 \text{ } \text{C}_6\text{H}_5\text{I} \xrightarrow{\text{Cu}/\Delta} \text{C}_6\text{H}_5\text{C}_6\text{H}_5$$

R-Li is good nucleophile but it does not act as nucleophile in Corey House Reacⁿ becoz it is fast & E² reacⁿ takes place

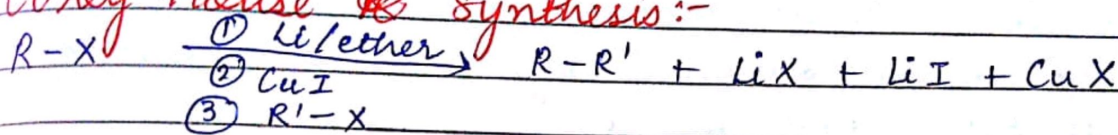
Frankland Reacⁿ :-

PAGE NO.: 5
DATE: / /

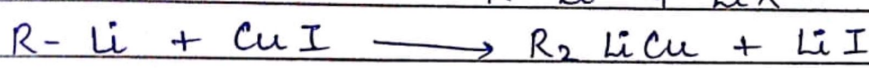
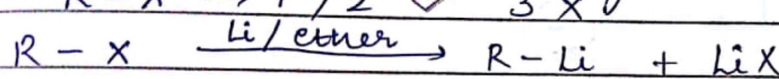


- Symm. as well as unsym. alkane are formed
- 1°/2°/3° ✓

Corey House Reacⁿ Synthesis :-



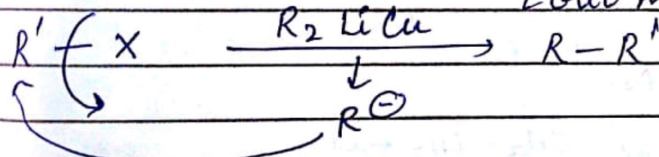
- Symm. as well as unsym. alkanes are formed.
- $R-X \rightarrow 1^\circ/2^\circ \checkmark \quad 3^\circ X$



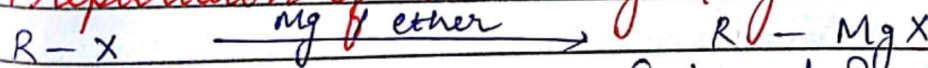
di-alkyl lithium cuprate

[Gilman's Reagent]

Nucleophile

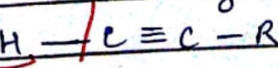
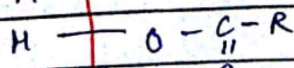
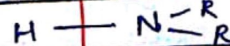
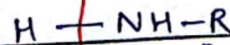
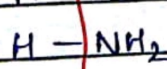


Preparation of alkane by Grignard Reagent :-

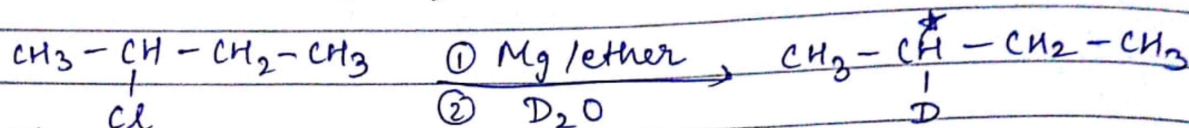
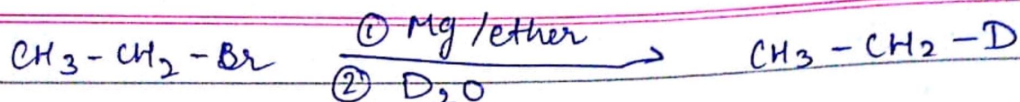


Grignard Reagent (Nucleophile)

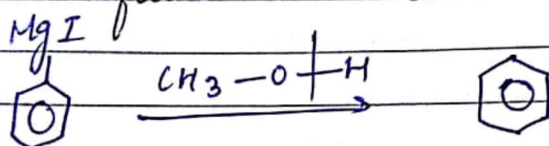
R-H Type Alkane :-



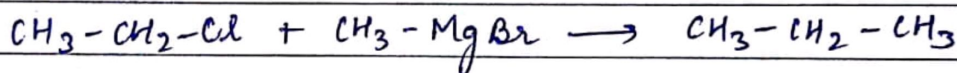
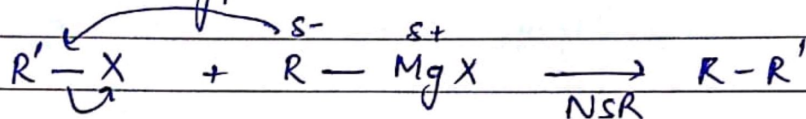
Acidic H



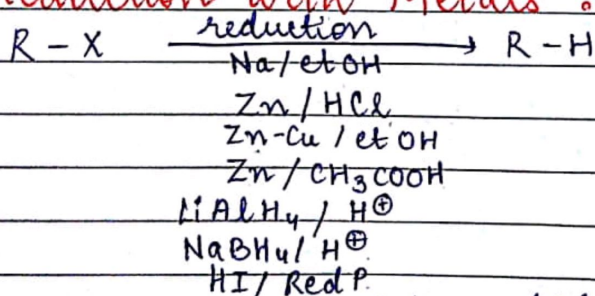
Que Find the Pdt obtained when Phenyl Magnesium Iodide reflux with methol?



R-R' type alkane :-

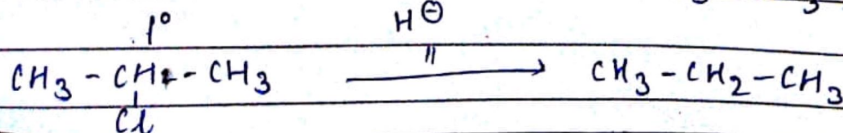
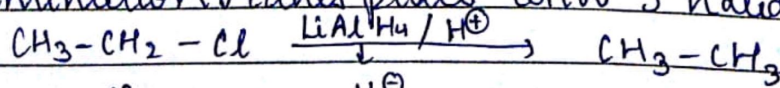


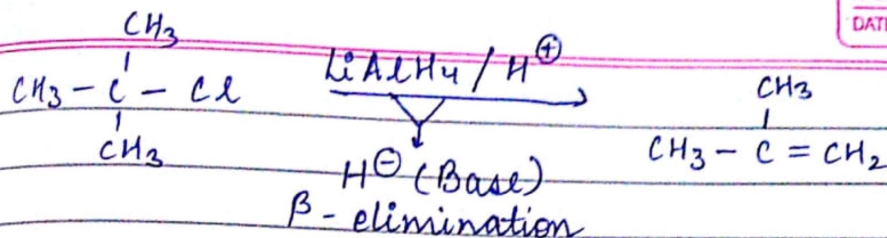
Reduction with Metals :-



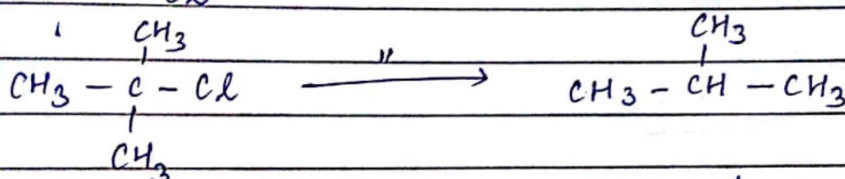
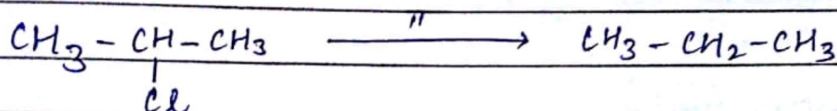
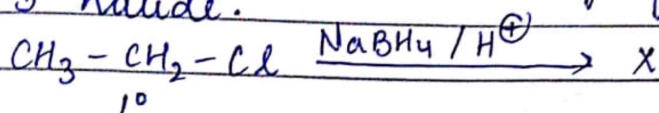
T.P.H. $\rightarrow$ Jsi Phenyl tin hydride $(\text{Ph})_3\text{SnH}$

① $\text{LiAlH}_4/\text{H}^+$: It is very strong reducing agent so reduce only Primary & secondary Halides. However B-elimination takes place with 3° Halide.

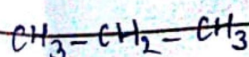
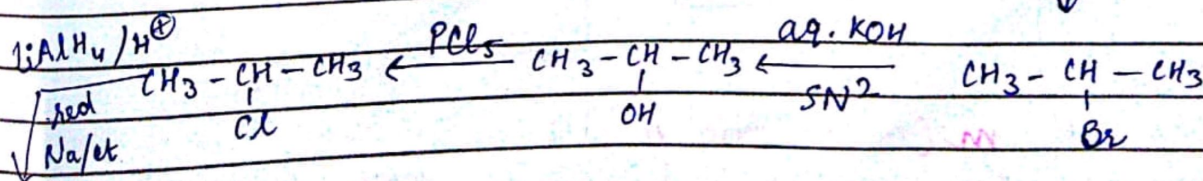
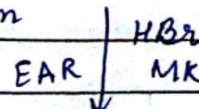
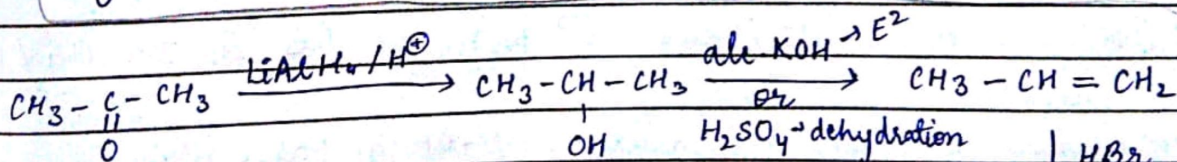
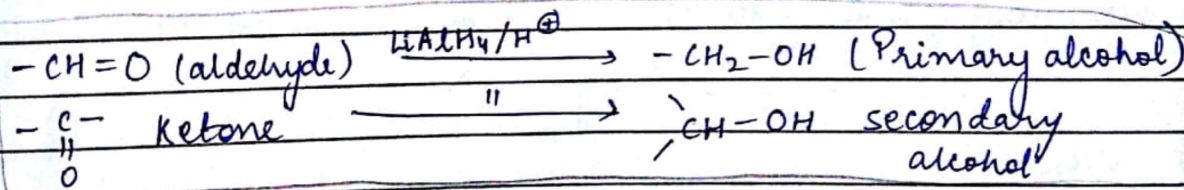
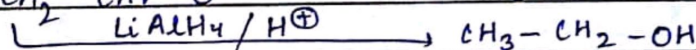
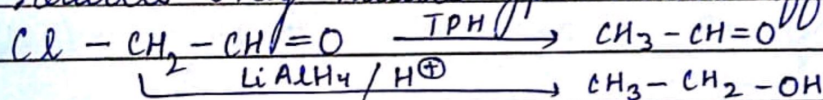




② $\text{NaBH}_4 / \text{H}^+$: Weak Reducing agent so reduce only 2° & 3° halide.

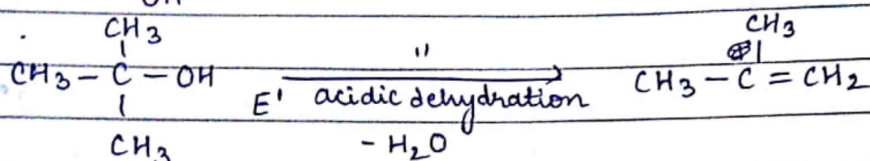
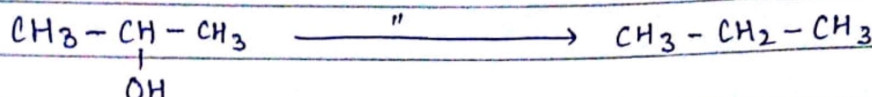
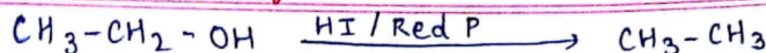


③ T.P.H. : It is very specific reducing agent which reduces only halide gp without affecting other gp.

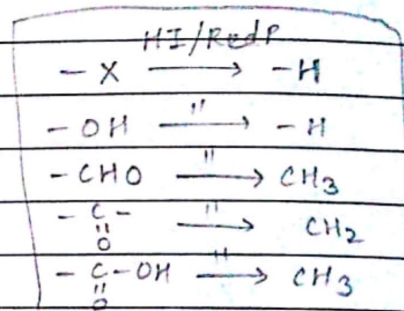
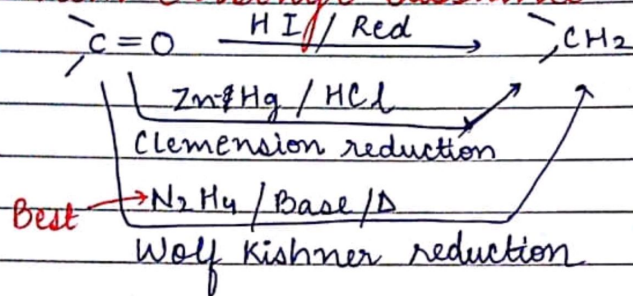


Preparation of alkane with alcohol :-

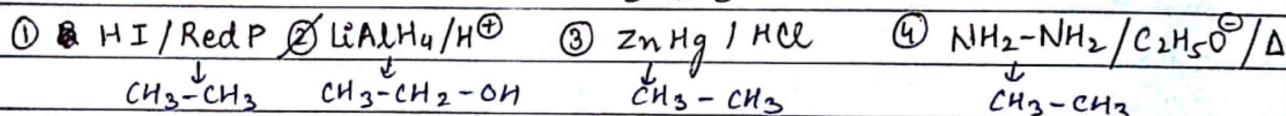
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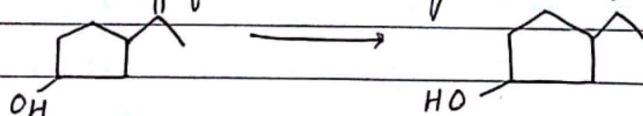
From Carbonyl substance :-



Ques which of the following can not be used for the given transformation

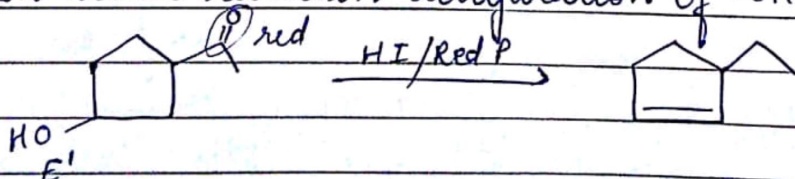


Ques which of the following is best for given reduction?



- ① $\text{LiAlH}_4/\text{H}^+$ ② HI/Red P ③ $\text{N}_2\text{H}_4/\text{OH}^-/\Delta$ ④ Zn-Hg/HCl
- $\downarrow$ $\downarrow$ $\downarrow$ $\downarrow$
 acidic acidic acidic

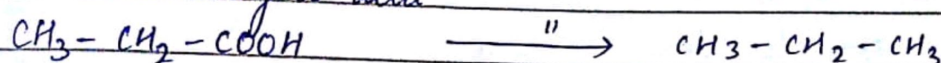
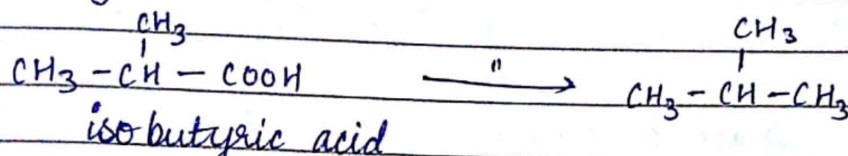
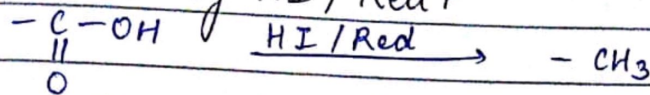
In acidic reduction dehydration of -OH gp takes place



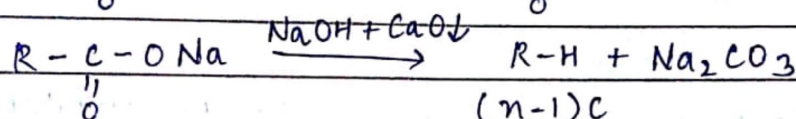
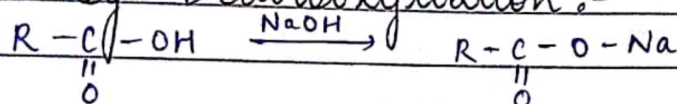
From Carboxylic Acid :-

- ① Reduction by HI/Red P ③ Kolbe Synthesis
② by decarboxylation

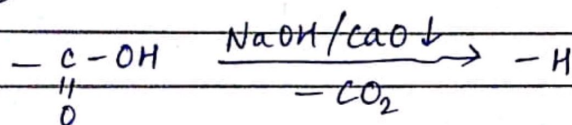
① Red. by HI/Red P



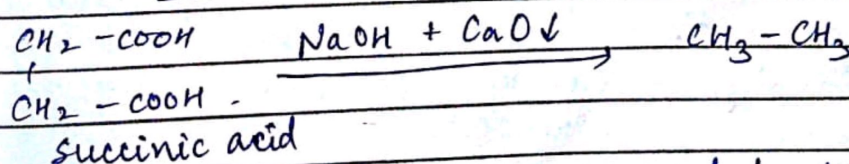
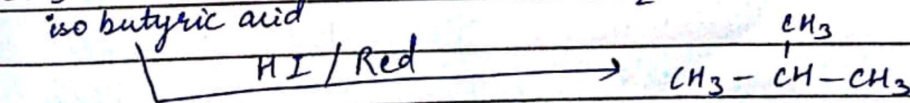
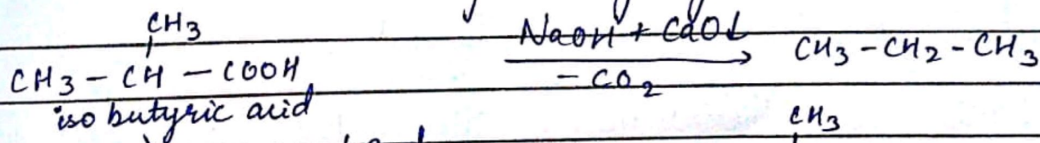
② By Decarboxylation:-



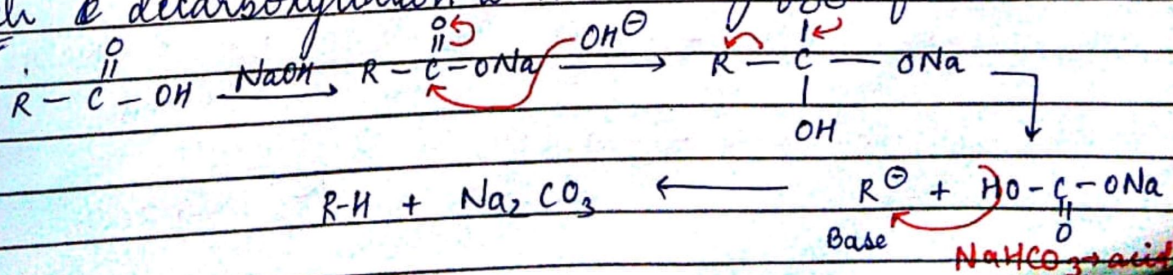
nC



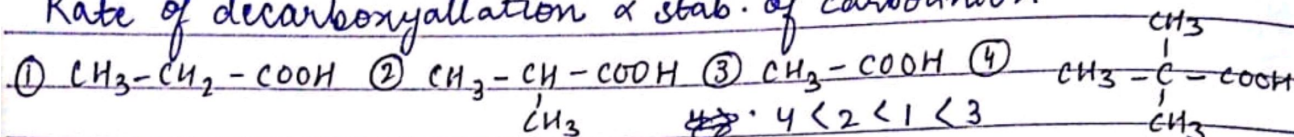
Ques Why CaO is used during decarboxylation of carboxylic acid?
Since NaOH is hygroscopic (absorb moisture from air) in nature
so CaO is used as dehydrating agent.



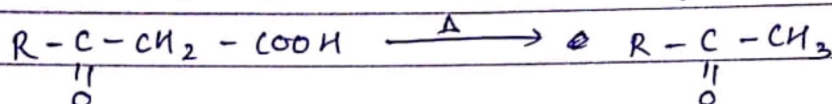
Mech of decarboxylation is proceed by form of $\text{C}^\ominus$.



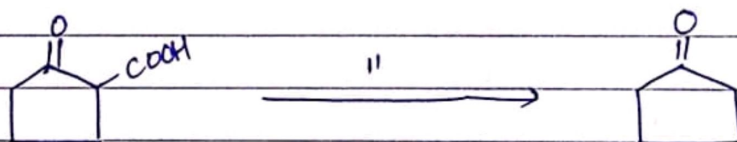
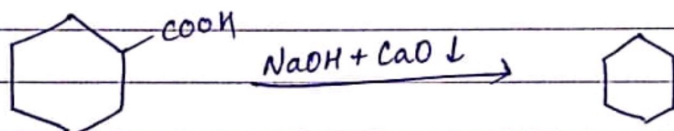
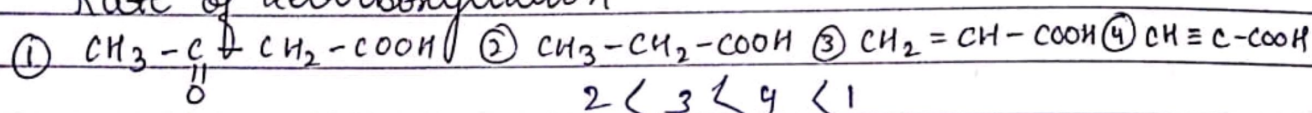
Rate of decarboxylation $\propto$ stab. of carboanion



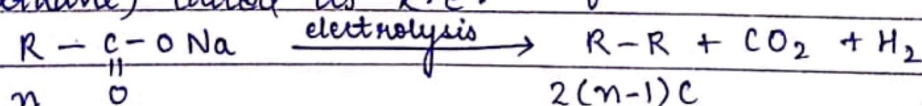
β -keto Acid : Rate of decarboxylation of β keto acid is always greater than any other acid



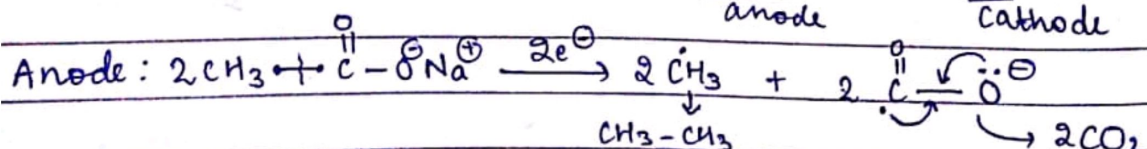
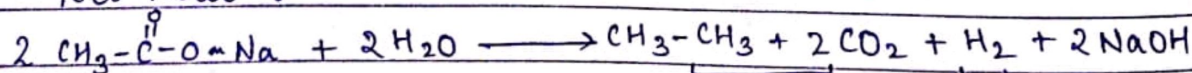
Rate of decarboxylation

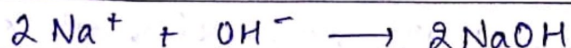
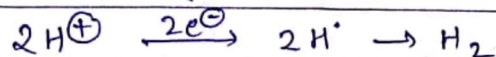
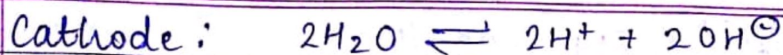


By Kolbe & Electrolysis^(K.E.) :- When Na and K salt of fatty acid is electrolysed then form of higher alkanes take place (except methane) called as K.E.



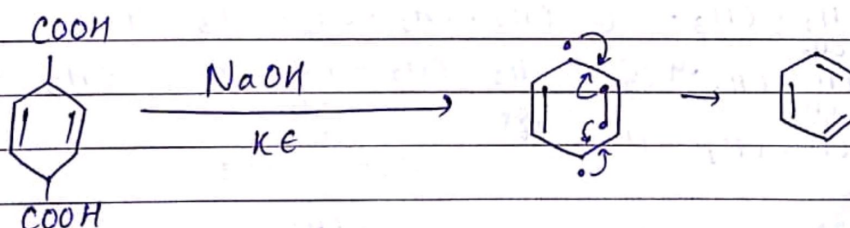
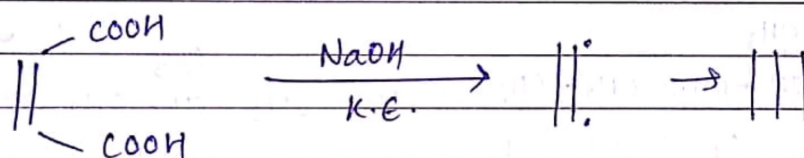
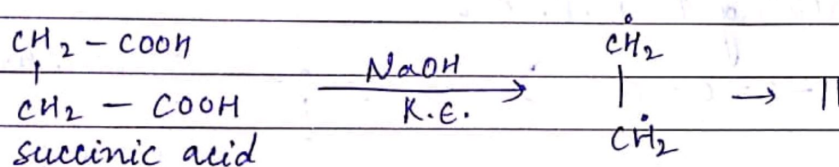
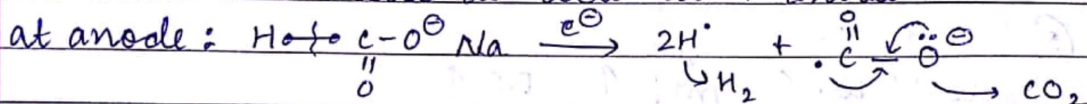
Net Reacⁿ :-



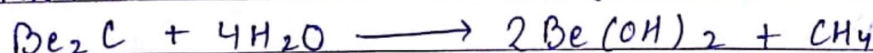
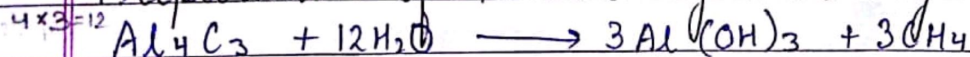


- In K.E. CO_2 is obtained at anode
- In K.E. H_2 is obtained at cathode
- Since form of $NaOH$ ↑ so pH ↑
- CH_4 can not be obtained K.E.

If Sodium or K salt of fatty acid is taken then H_2 is obtained at cathode as well as + anode.



Preparation of Methane by Laboratory Method :-



Physical Properties :-

- State : $C_1 - C_4$ & neo Pentane → gas
 $C_5 - C_{17}$ → liq
 C_{18} & higher alkane → solid

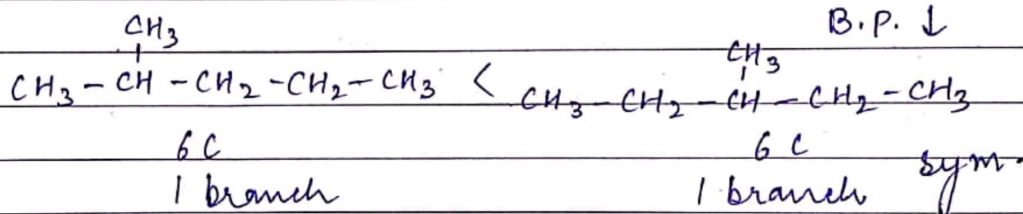
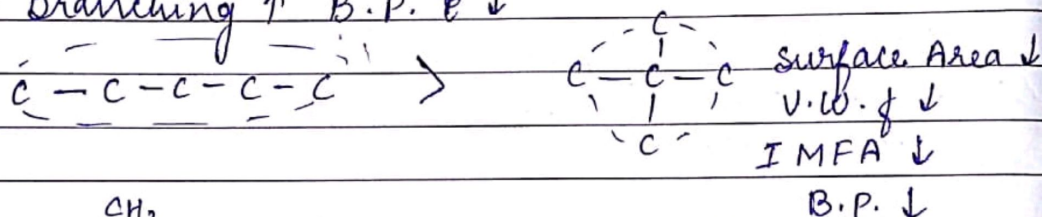
(2) Alkane exist in zig-zag form



(3) Solubility : Alkanes are non-polar ~~so~~ so non polar solvent as M.w. $\uparrow$ solubility $\downarrow$
 $C-C-C-C < C-C-C$

(4) Density : as M.w. $\uparrow$ density $\uparrow$ max density of alkanes is 0.8 g/cc becoz alkanes have lower density ^{than} ~~than~~ water so petroleum products (higher alkanes) float on water surface.

(5) B.P. :-
 • as M.w. $\uparrow$ ^{vwb} $\uparrow$ BP $\uparrow$
 • as Branching $\uparrow$ B.P. $\downarrow$



(1) $CH_3-CH_2-CH_3 \rightarrow 3$ (2) $CH_3-CH_2-CH_2-CH_3 \rightarrow 4$

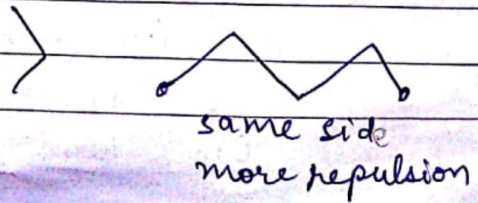
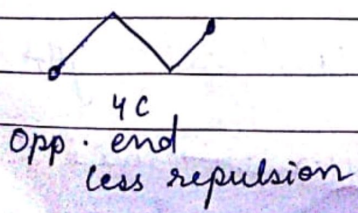
(3) $CH_3-\overset{\overset{CH_3}{|}}{CH}-CH_3 \rightarrow 4$ (4) $CH_3-CH_2-CH_2-CH_2-CH_3 \rightarrow 5$

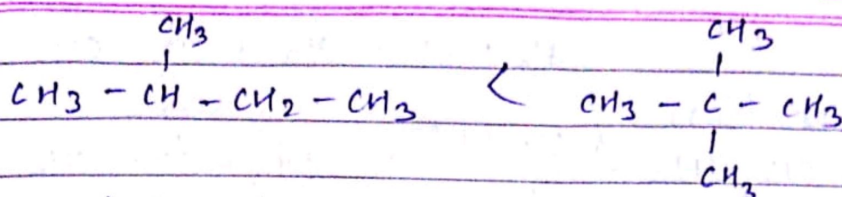
(5) $CH_3-\overset{\overset{CH_3}{|}}{CH}-CH_2-CH_3 \rightarrow 5$ (6) $CH_3-\overset{\overset{CH_3}{|}}{C}-CH_3$

$1 < 3 < 2 < 6 < 5 < 4$

(6) M.P.

Even no. C-containing alkane $>$ odd no. C-containing alkanes



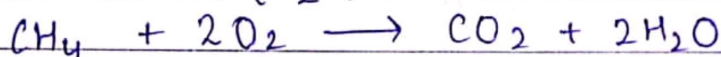
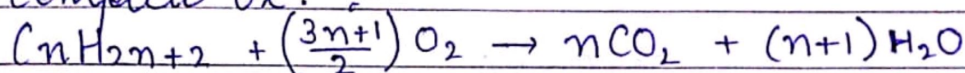


more sym. alkane
have high M.P.

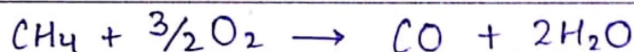
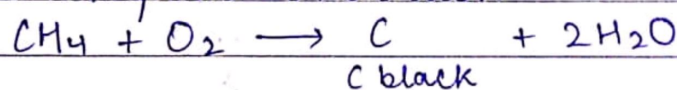
Chemical Properties of

1. FRSR $\rightarrow$ CHⁿ Reacⁿ of alkane $\rightarrow$ GOC II से Revise करें ।
2. Oxidation

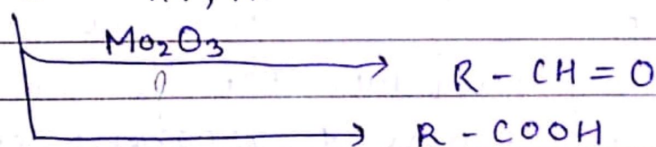
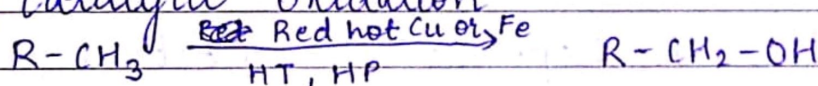
(a) Complete Ox. :-



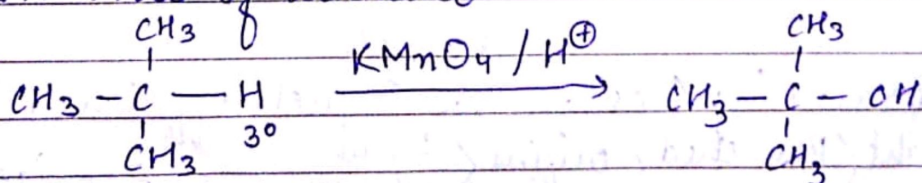
(b) Incomplete oxidation :-



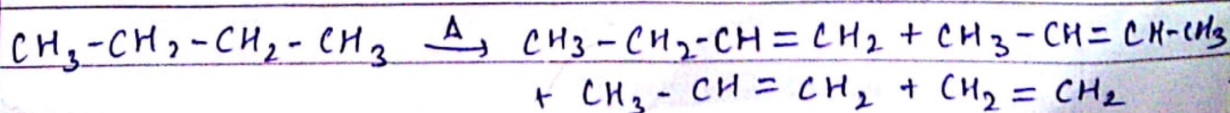
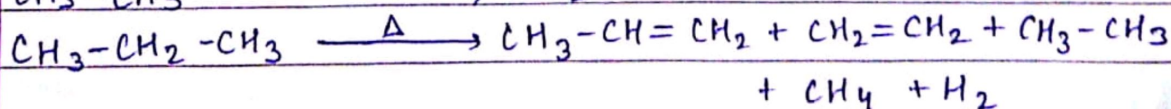
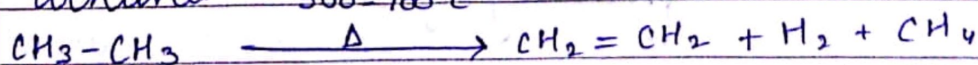
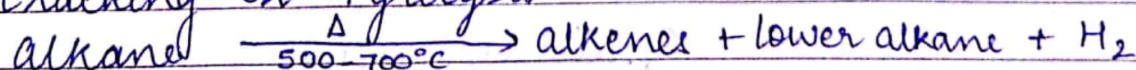
(c) Catalytic oxidation

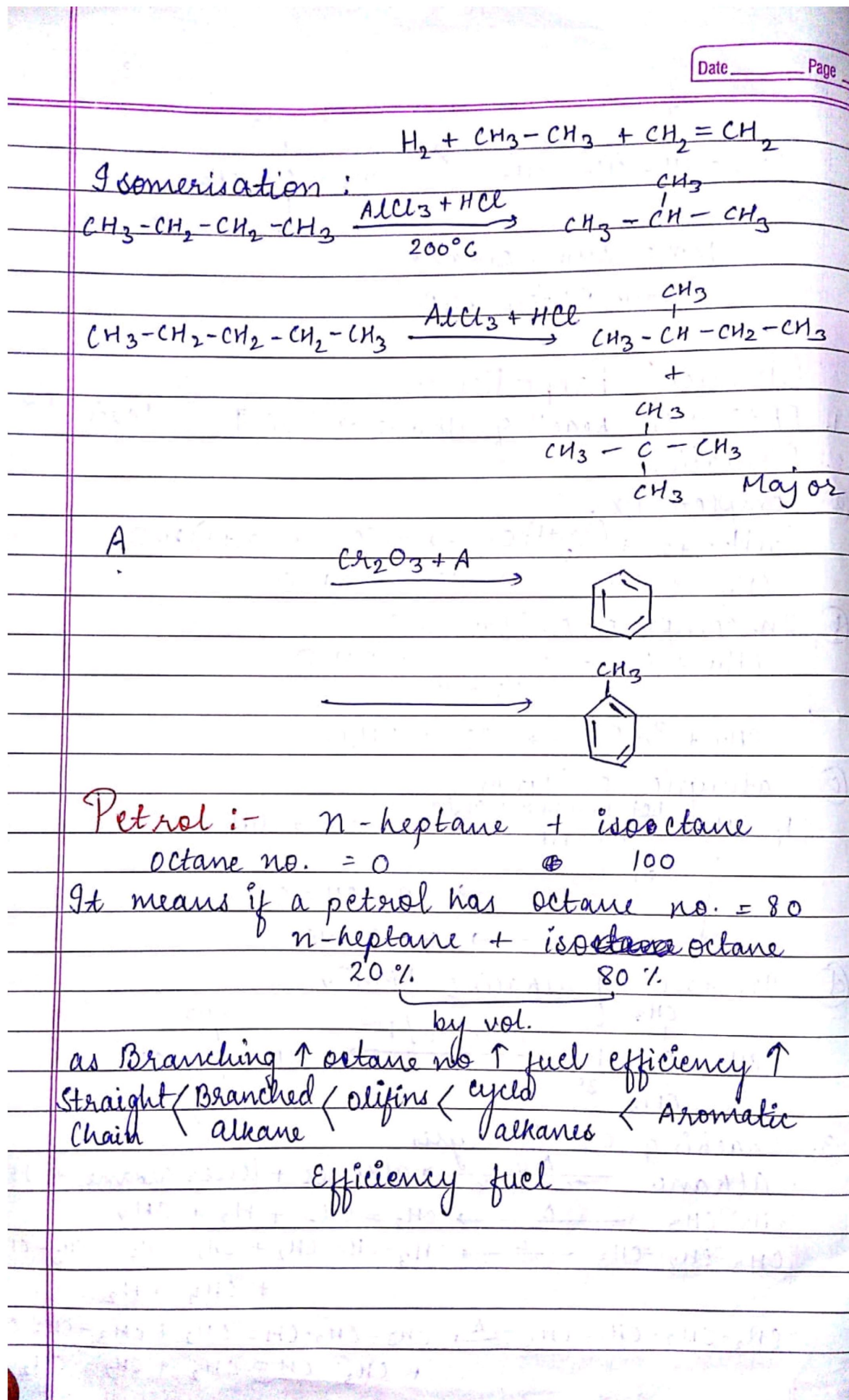


(d) In +ve of alkaline KMnO_4



(3) Cracking or Pyrolysis



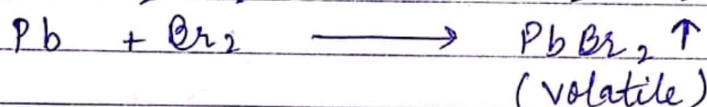
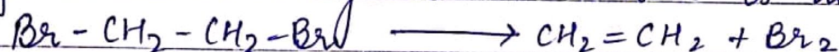


Date 15 Page

Knocking :- Pre-ignition of fuel air mixture in cylinder ahead of flame causes knocking.
→ Knocking reduce efficiency of Engine
→ Damage Piston of Engine.

Anti knocking agent: Tetra ethyl lead (TEL)
 $\text{Pb}(\text{C}_2\text{H}_5)_4$

Combustion of TEL with Petrol gives litharge (PbO) which deposits cylinder walls & piston can jamm. So ethylene dibromide is added to TEL

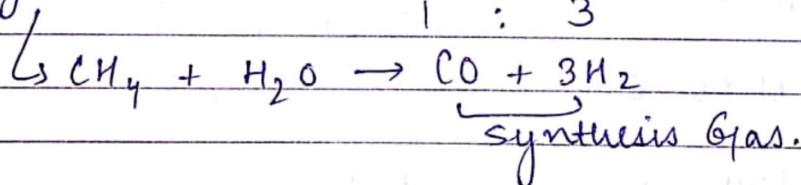


LPG (Liquid Petroleum Gas) : Propane + isobutane

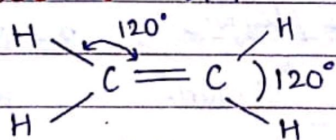
Natural Gas - 80% CH_4 + 10% C_2H_6 + 10% Propane + very small amt. of H_2 , N_2 , CO_2

Water Gas - $\text{CO} + \text{H}_2$
1 : 1

~~Syn~~ Synthesis Gas - $\text{CO} + 3\text{H}_2$
1 : 3



Alkenes :- G.F. C_nH_{2n}



sp^2
B.A. = 120°

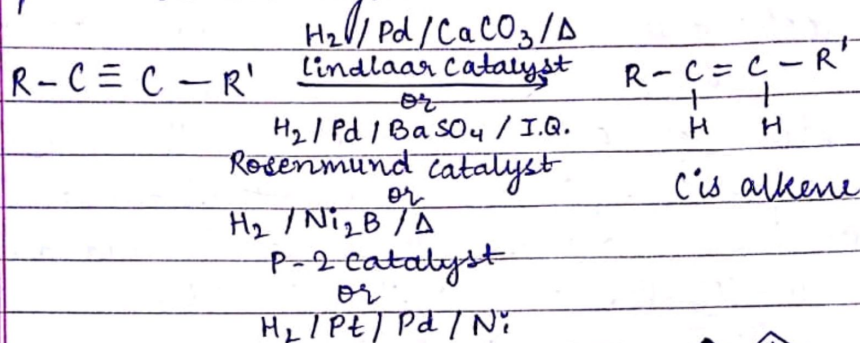
$\text{C}=\text{C}$	BL 1.34 Å	BE 146 Kcal
$=\text{C}-\text{C}$	1.12 Å	106 Kcal
sp^2		

General Method of Preparation :-

(I) Hydrogenation of Alkynes :-

(A) Cis - Hydrogenation :-

Catalytic hydrogenation of alkyne in +nce of poisoned catalyst.

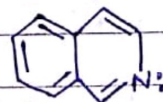


PbOAc

S₈

lead Acetate

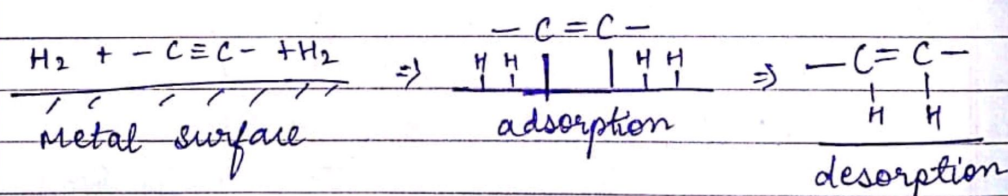
Rhombic Sulphur



1,2,3,4-tetrahydroquinoline I.Q.

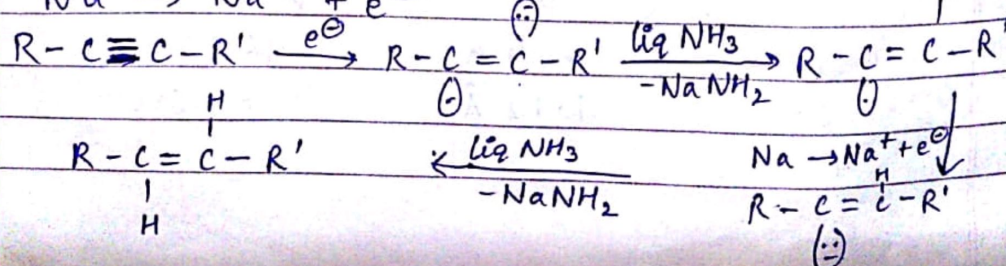
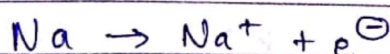
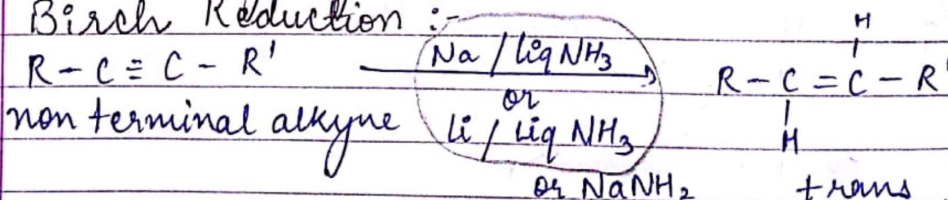
Poisonous Catalyst

To ↓ se rate of hydr



(B) Trans - Hydrogenation :-

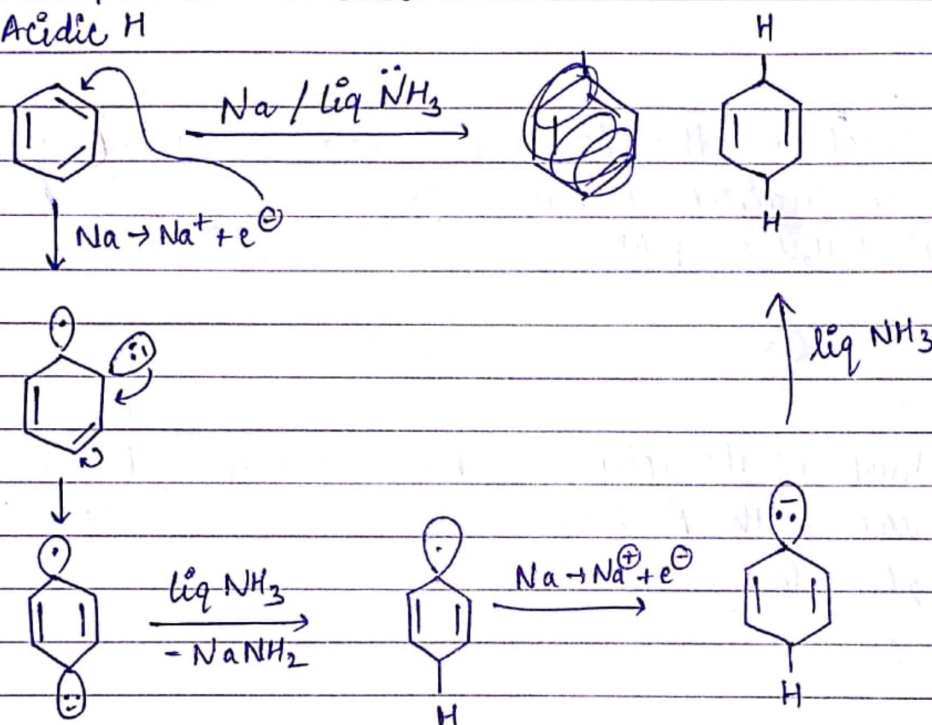
(1) Birch Reduction :-



$$\text{R}-\text{C}\equiv\text{C}-\text{H} \xrightarrow[\text{Base}]{\text{Na/liq } \ddot{\text{N}}\text{H}_3} \text{R}-\text{C}\equiv\text{C}^{\ominus}\text{Na}^{\oplus}$$

C_{sp}

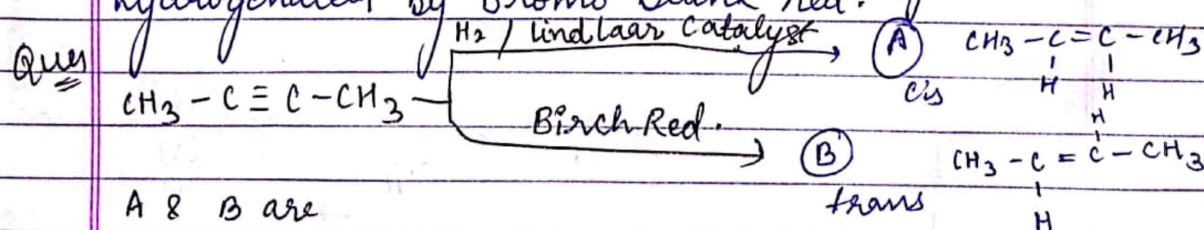
Acidic H



Bromo Blank Reduction:

$$\text{--C}\equiv\text{C--} \xrightarrow{\text{Na/etOH}} \text{--C}=\underset{\text{H}}{\text{C--}}$$

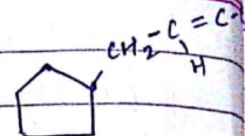
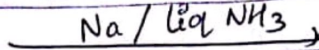
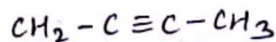
non-terminal as well as terminal alkyne can be hydrogenated by Bromo Blank red.



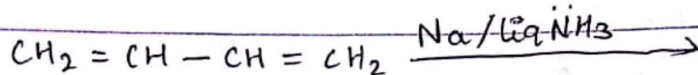
A & B are

- ① O.I. ② G.I. ③ Identical ④ Not Isomers

Ques



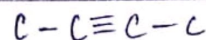
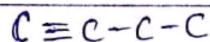
Ques



AI PMT
Ques

which of the following reagent is used to distinguish 1-butyne & 2-butyne?

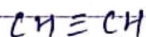
- ① NaNH_2 ② HCl ③ O_2 ④ Br_2



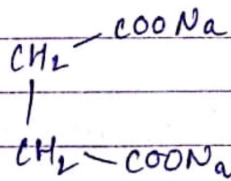
Ques

which of the following hydrocarbon will give neutralisation reaction with NaNH_2

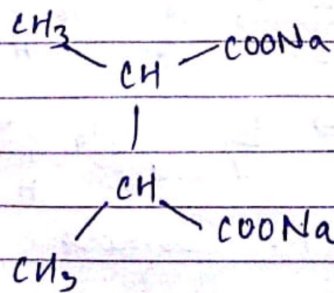
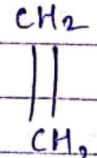
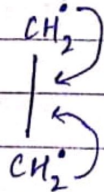
- ① C_2H_2 ② C_2H_4 ③ C_2H_6 ④ C_6H_6



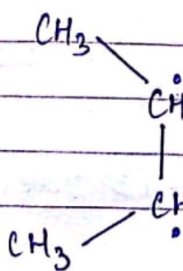
② Kolbe Electrolysis :-



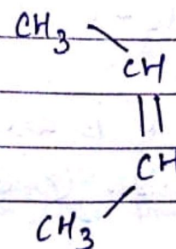
Electrolysis



"



→



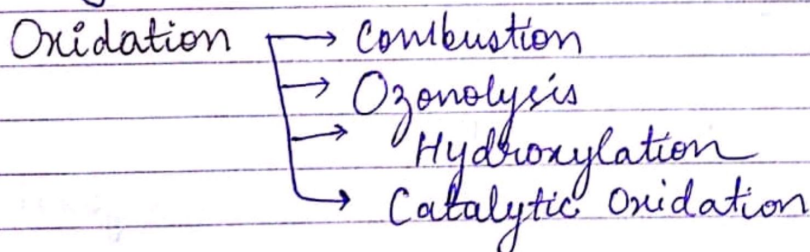
Elimination Reacⁿ : Revise from Groc II

Physical Properties :-

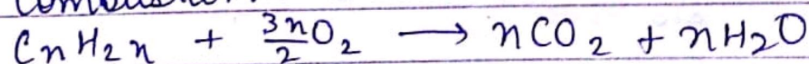
1. Alkenes colourless & odourless
2. less soluble in water but highly soluble in non-polar solvents like CCl_4 , benzene
3. B.P. & M.P. $\propto$ M.W.
Branching
4. M.P. of alkenes is slightly higher than alkanes becoz they have polarisable π bond.

Chemical Properties :-

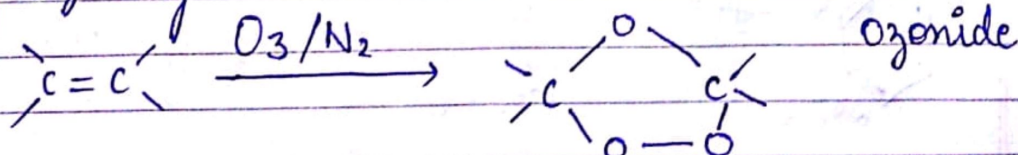
1. EAR
2. Φ FRAR
3. Substitution (allylic substitution)
4. Oxidation
5. Isomerisation
6. Polymerisation

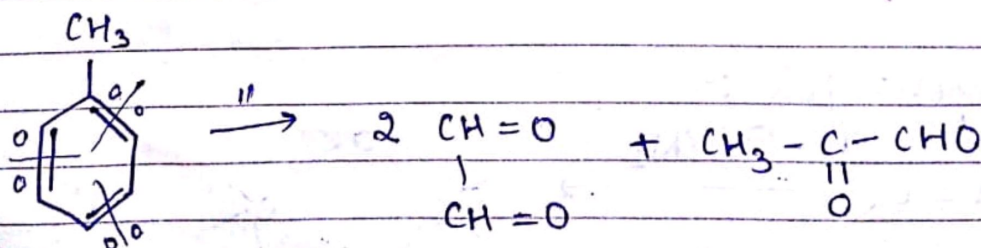
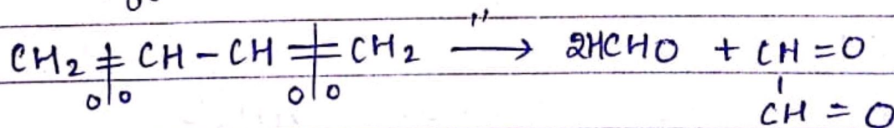
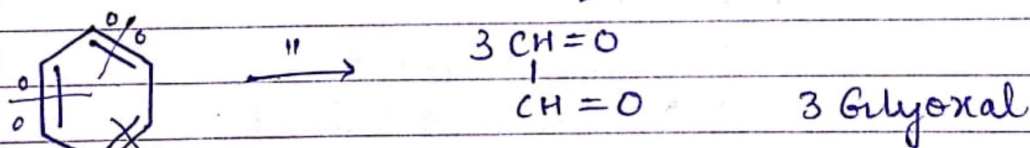
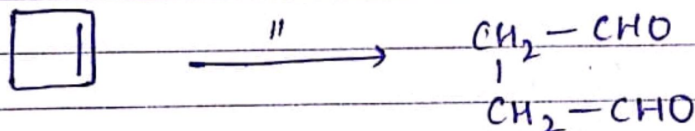
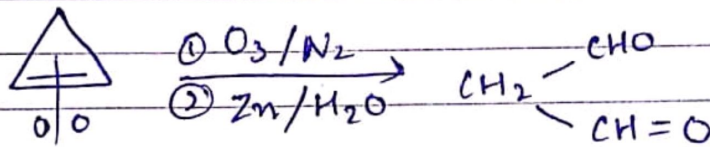
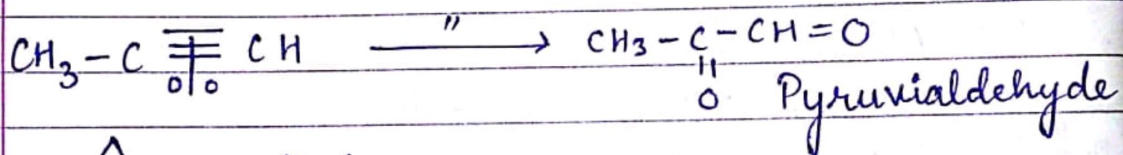
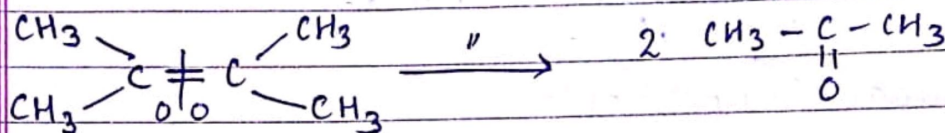
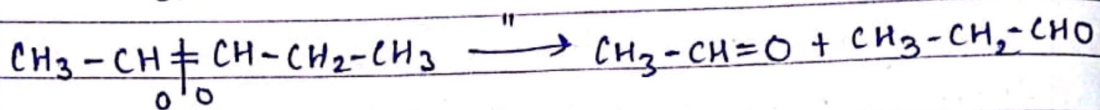
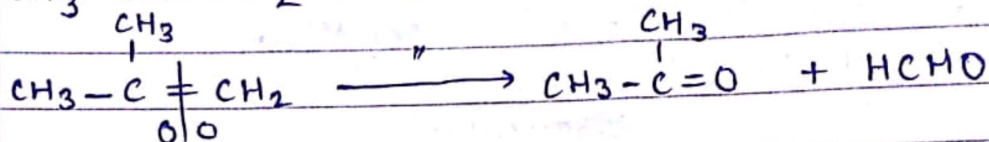
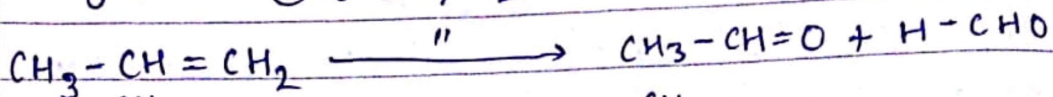
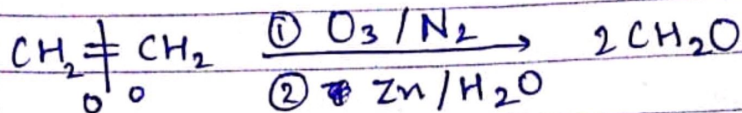
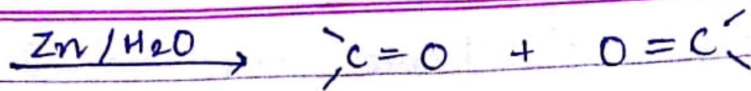


① Combustion



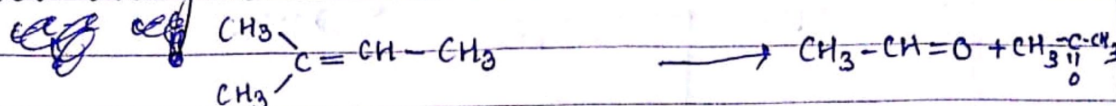
② Ozonolysis :-



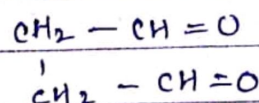


Write the name of compd. which gives following compd on ozonolysis.

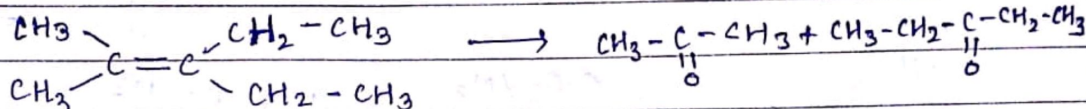
- ① acetaldehyde & acetone



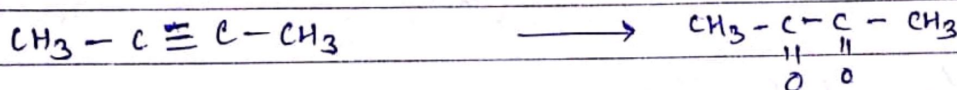
- ② only succinaldehyde



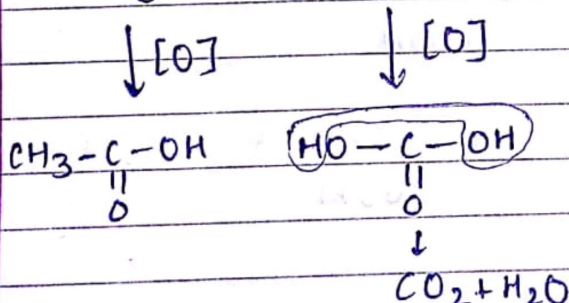
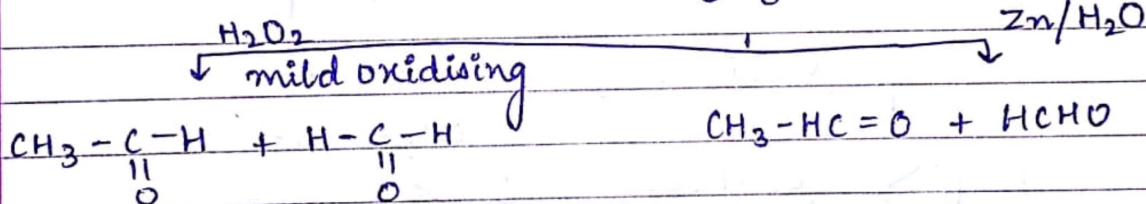
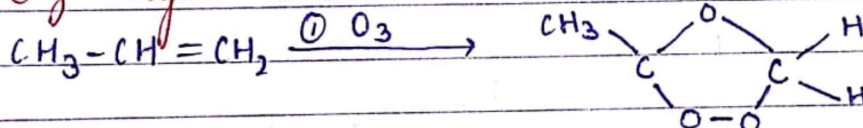
- ③ D.M.K. & D.E.K.



- ④ only dimethyl Glyoxal



Ozonolysis without zinc :-

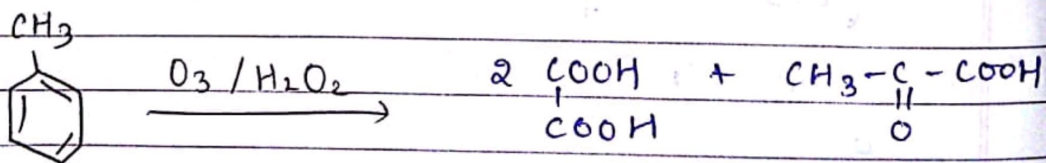
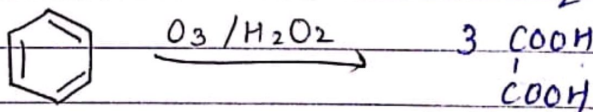
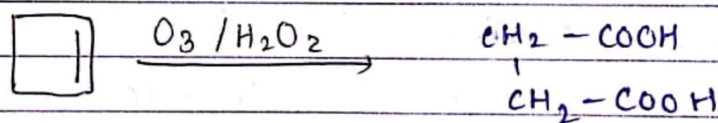
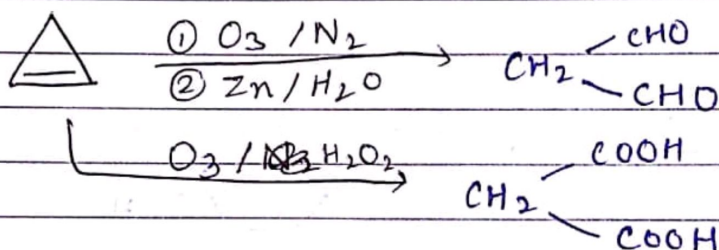
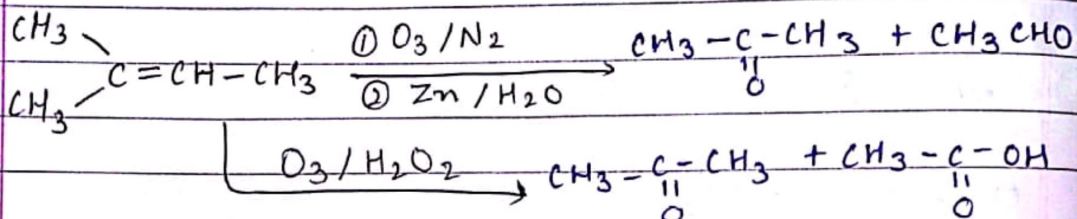
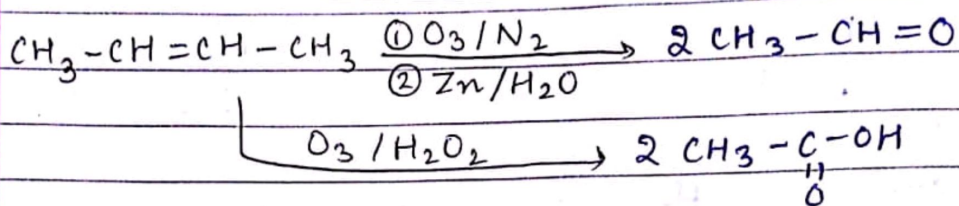
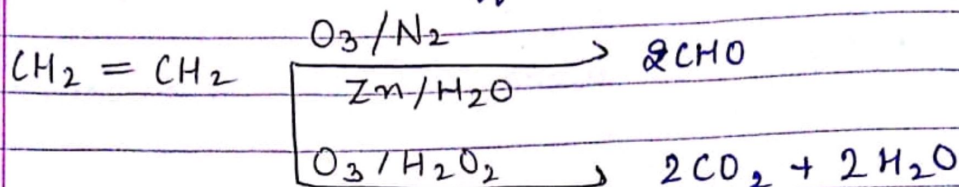


* Zn remove extra oxygen & stop further oxidation

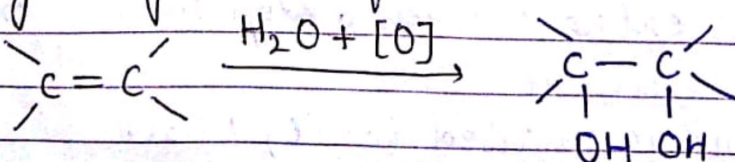
Ozonolysis without Zn

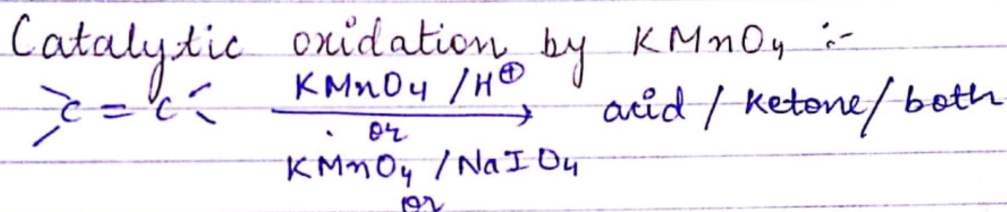
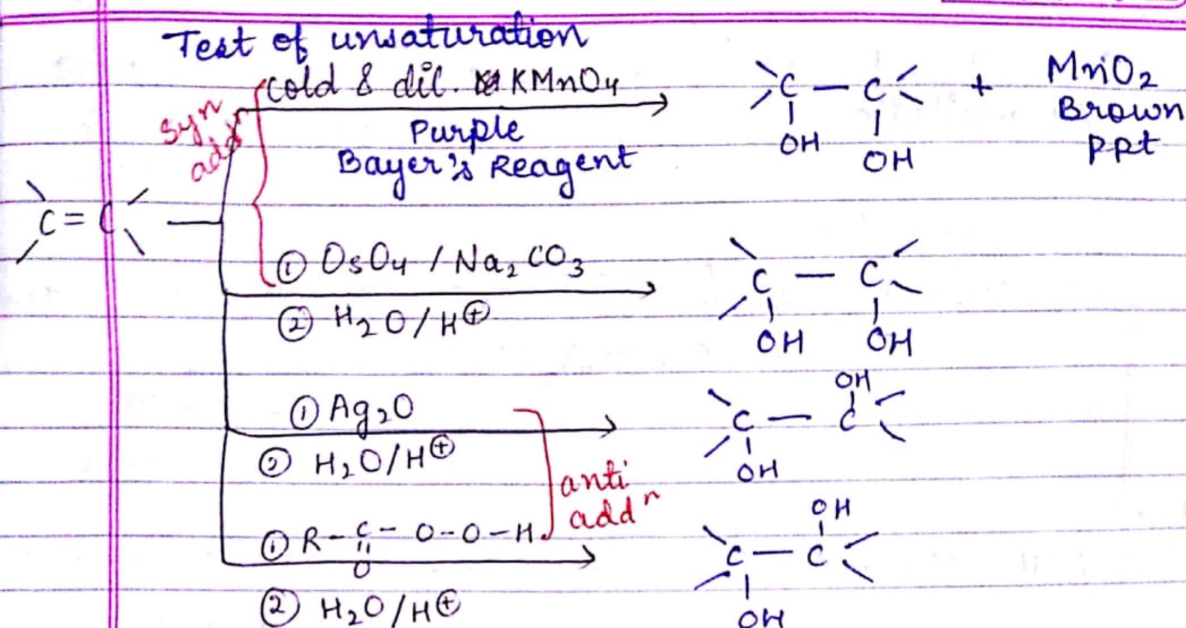
- ① Formaldehyde is oxidised to $\text{CO}_2 + \text{H}_2\text{O}$

- ② Aldehyde is oxidised to acid
③ Ketone is not affect.

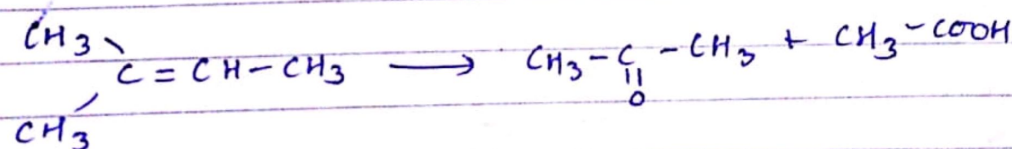
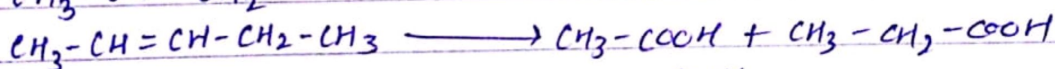
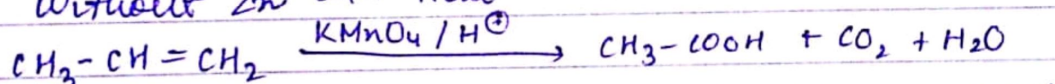


Hydroxylation of Alkene :-

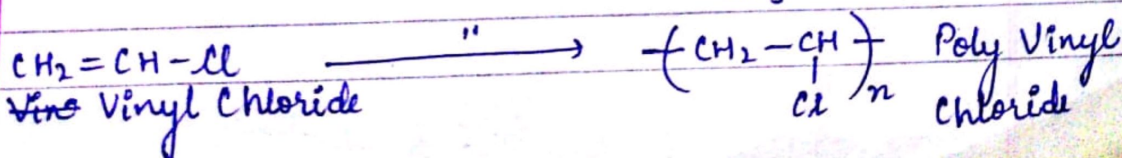
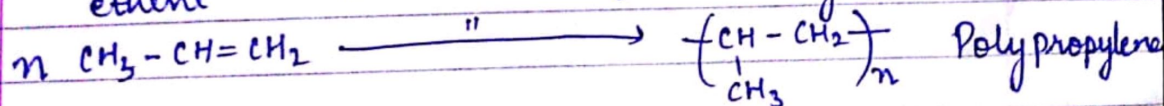
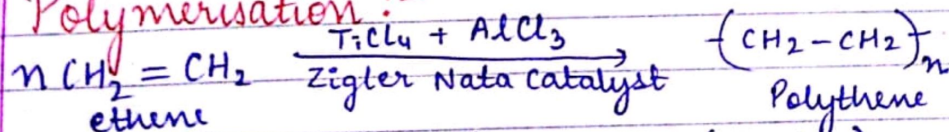




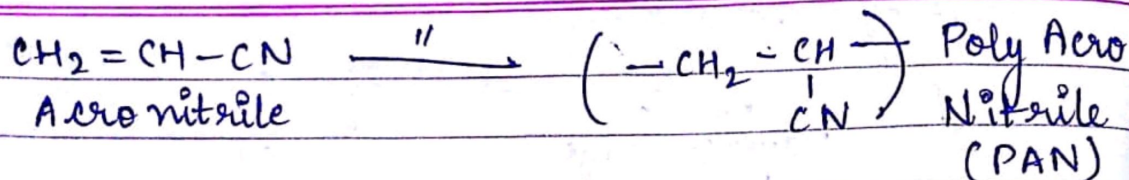
Hint - इस Reacⁿ में Product same होगा जैसे ozonolysis
Without Zn अलग Reacⁿ में लेने।



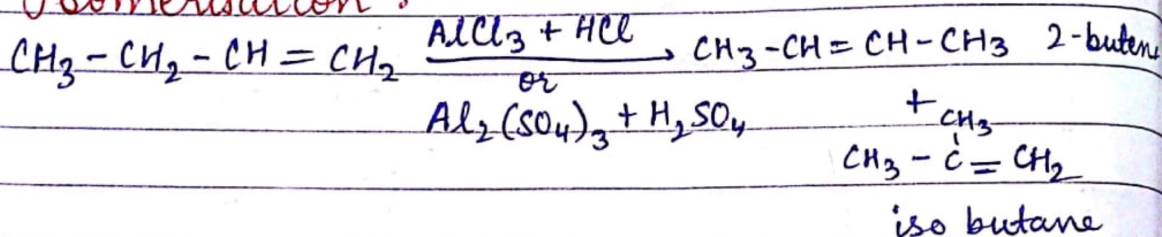
Polymerisation :-



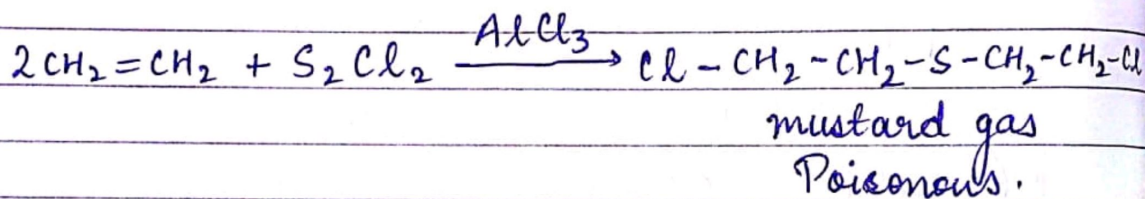
Date 24 Page

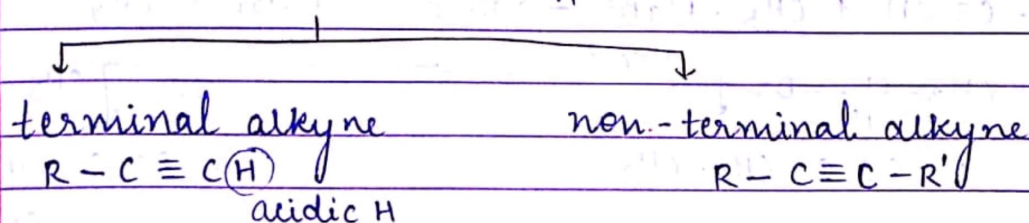


Isomerisation :-



Extra



$$G_n.F. \rightarrow C_nH_{2n-2}$$


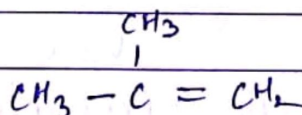
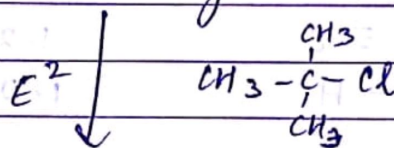
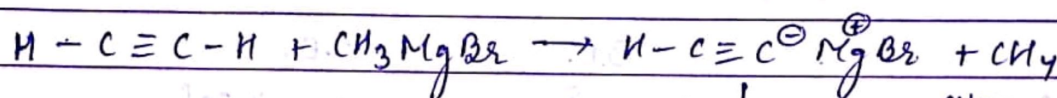
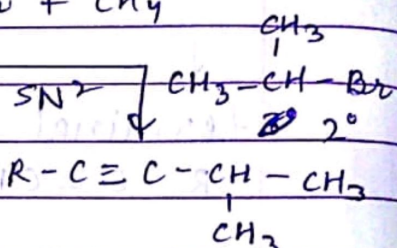
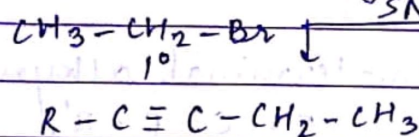
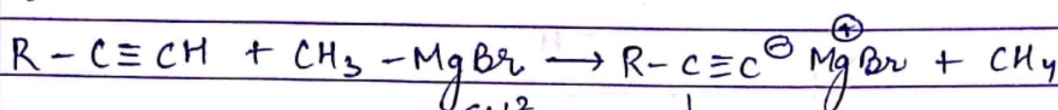
General Method of Preparation :-

(2) Preparation from dihalide & trihalide GOC II ^{2nd} Revision

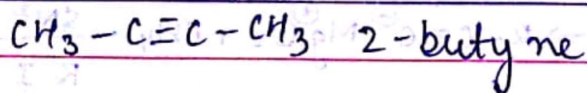
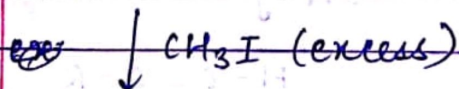
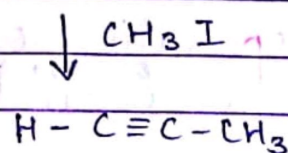
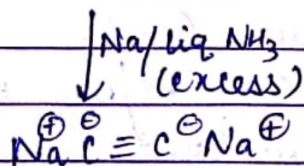
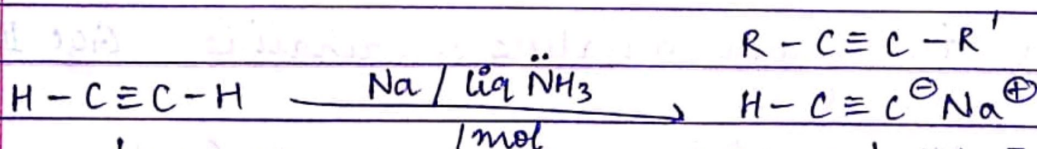
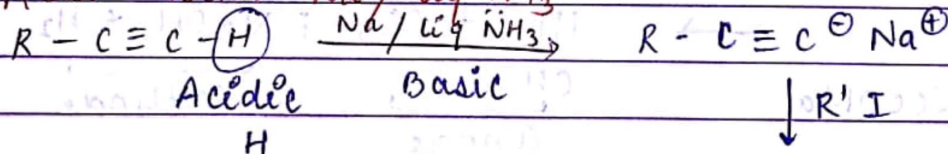
$$R-C \equiv C-H + CH_3-MgBr \rightarrow R-C \equiv C^{\ominus} Mg^{\oplus}Br + CH_4 \xrightarrow[R'I]{SN^2} R-C \equiv C-R$$

$1^\circ/2^\circ$ halide with alkynide gives S_N2 reacⁿ & form higher alkynes.

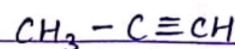
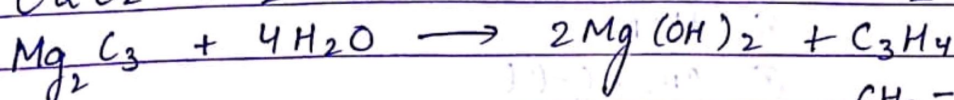
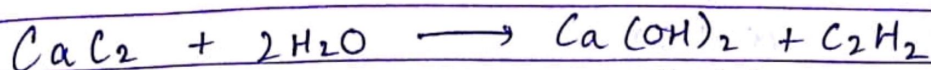
3° halide with alkynide gives $E2$ reacⁿ & alkene is formed.



Reacⁿ with $Na / liq \ddot{N}H_3$



Laboratory Method

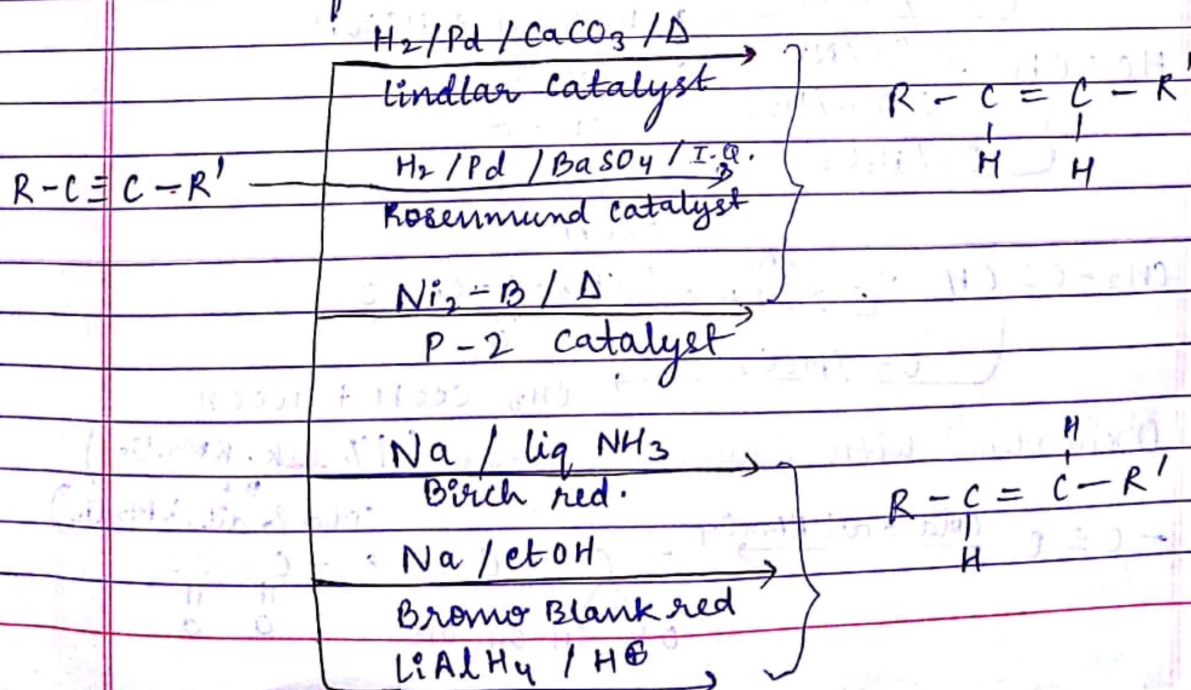


Physical Properties :-

1. State - $\text{C}_2 - \text{C}_4 \rightarrow$ gas
 $\text{C}_4 - \text{C}_{11} \rightarrow$ liq
higher $\rightarrow$ solid
2. Solubility $\rightarrow$ less soluble in water but soluble in non polar solvent like CCl_4 , benzene.
3. B.P. $\rightarrow$ Alkyne is more polar π bond than alkene so it has more bp than alkene & alkane.

Chemical Properties :-

Addⁿ of H_2

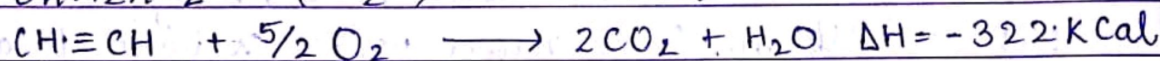


(Review from GOC II)

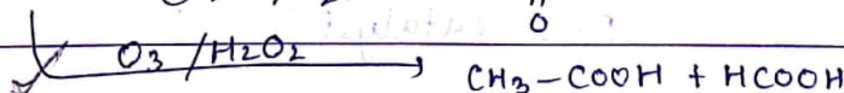
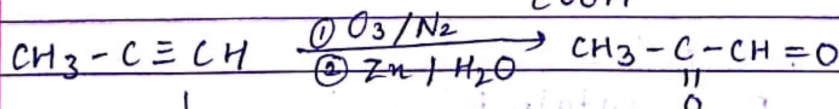
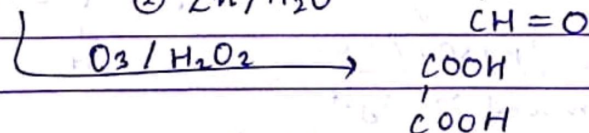
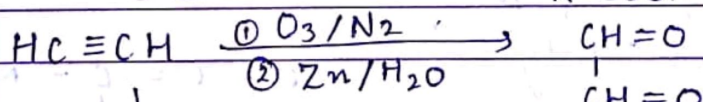
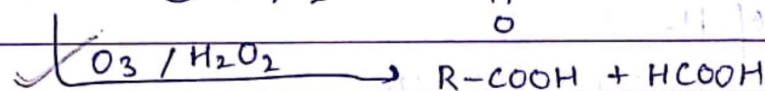
⑤ $\text{CH}_3 - \underset{\text{O}}{\underset{\text{||}}{\text{C}}} - \text{Cl}$

⑥ $\text{CH}_3 - \underset{\text{O}}{\underset{|}{\text{C}}} - \text{O} - \underset{\text{O}}{\underset{|}{\text{C}}} - \text{CH}_3$

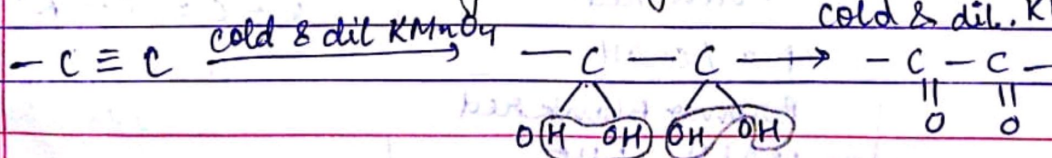
Oxidation :-

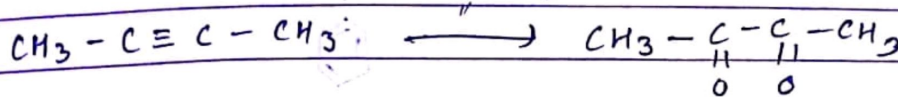
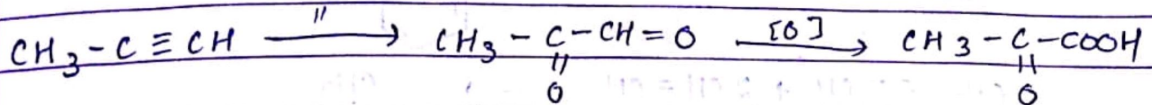
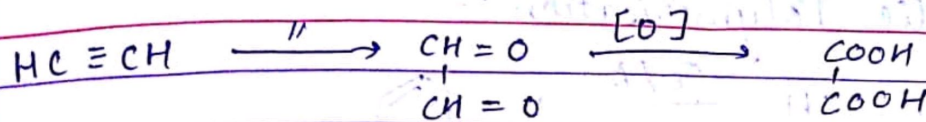
$$C_nH_{2n-2} + \left(\frac{3n-1}{2}\right) O_2 \rightarrow nCO_2 + (n-1)H_2O$$


↳ used for welding

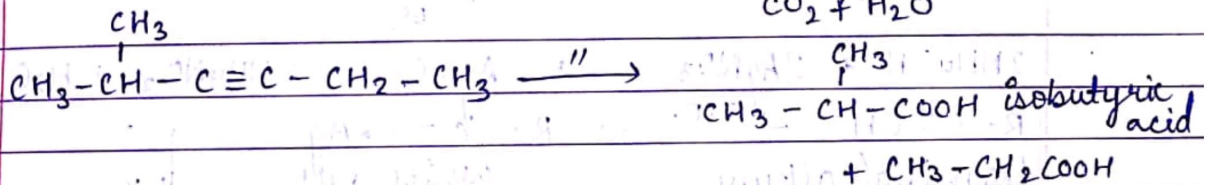
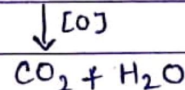
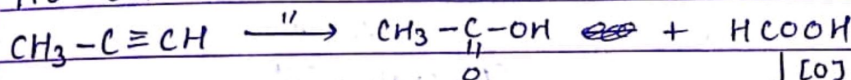
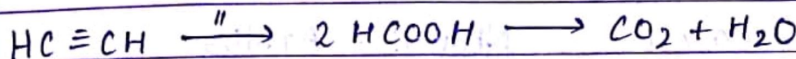
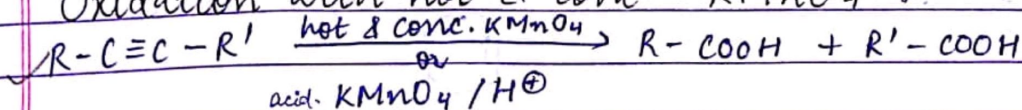
$$R-C \equiv CH \xrightarrow[\text{② } Zn/H_2O]{\text{① } O_3/N_2} R-\underset{\substack{| \\ H \\ | \\ O}}{C}-CHO$$


or
cold & dil. KMnO_4)

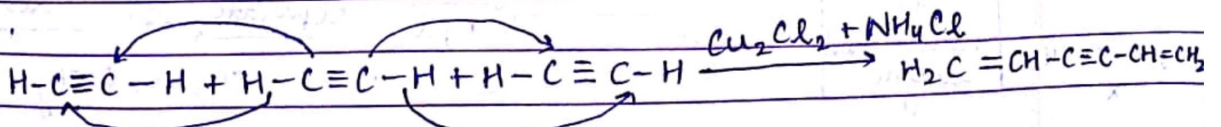
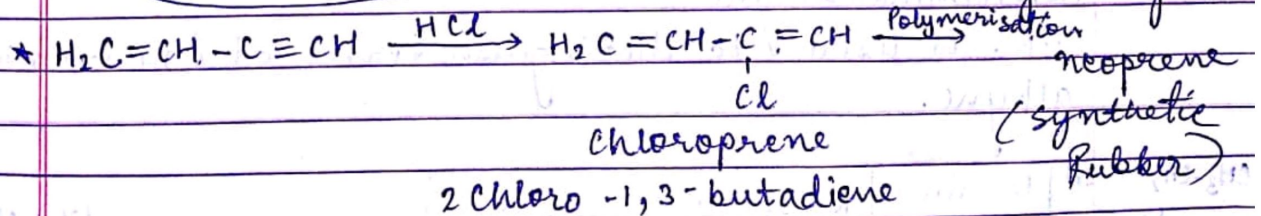
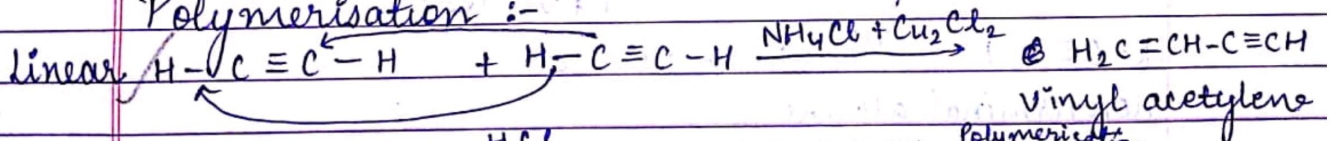




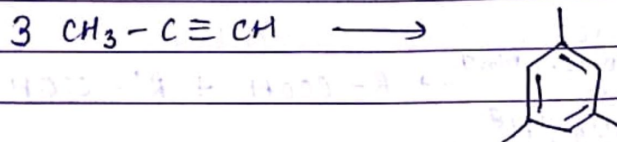
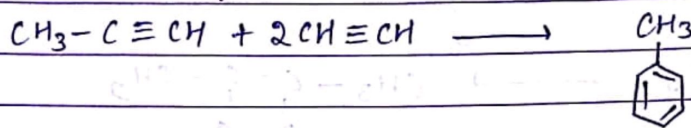
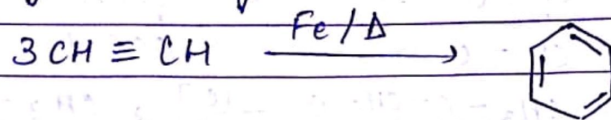
Oxidation with hot Δ concⁿ KMnO_4 :-



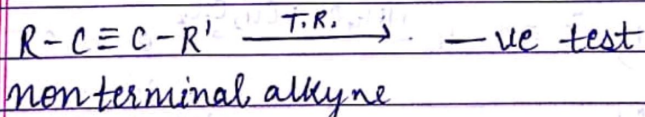
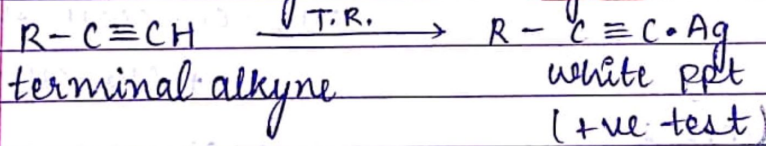
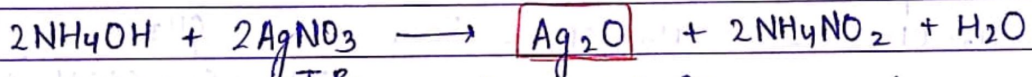
Polymerisation :-



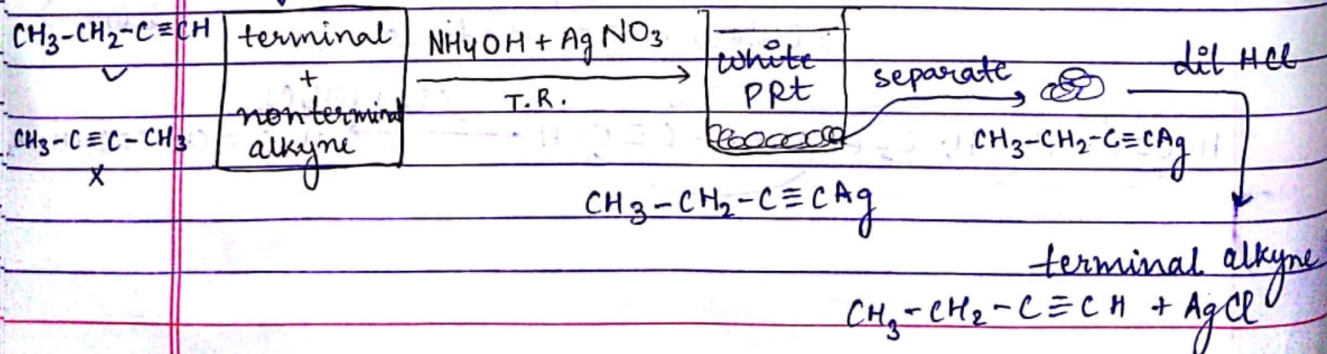
Cyclic Polymerisation :-

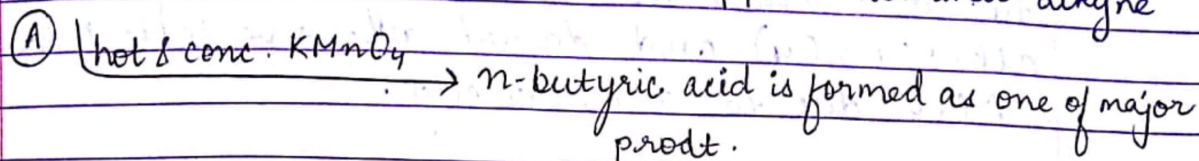
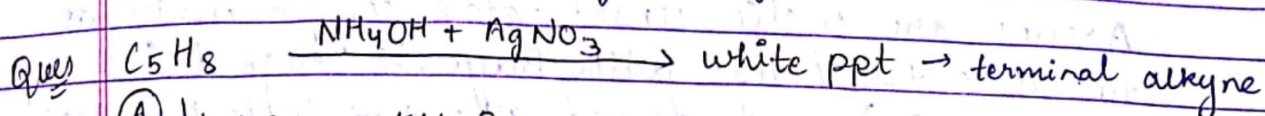
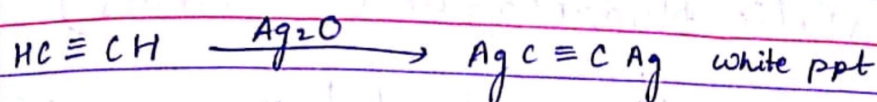


Tollen's Reagent :- $\text{NH}_4\text{OH} + \text{AgNO}_3$ or $[\text{Ag}(\text{NH}_3)_2]^+$ or

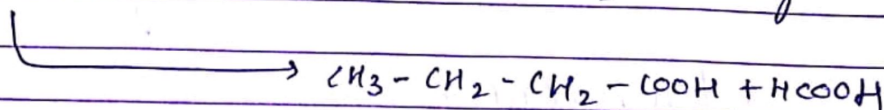
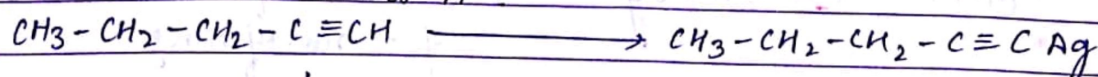


T.R. is used to distinguish terminal & non-terminal alkyne.





What is A?



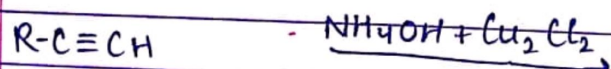
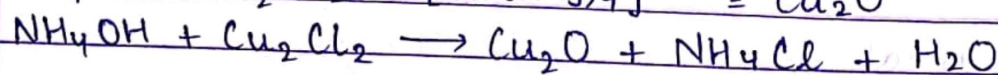
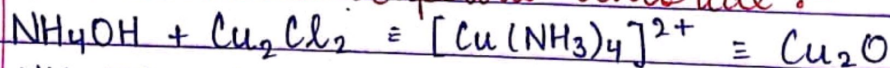
Ques Which following can not distinguish 1-butyne & 2-butyne?

- ① Tollen's Reagent ② Bayer's Reagent ③ $\text{Br}_2 / \text{CCl}_4$
④ both ② & ③

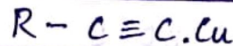
Ques Which of the following do not give test with Tollen's Reagent

- ① ethyne ② Propyne ③ 1-butyne ④ 2-butyne.

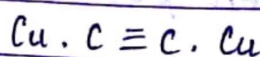
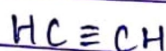
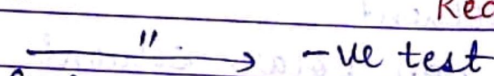
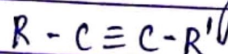
Ammoniacal Cuprous Chloride :-



terminal alkyne



Red ppt. (+ve test)



Red ppt.

Aromatic Hydrocarbon (Arenes)

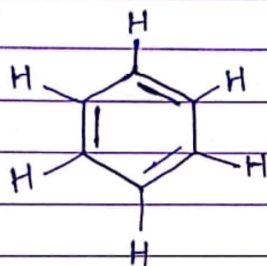
Arenes are cyclic unsaturated compd which do not give +ve test with Bayer's Reagent (1% alk. KMnO_4) and do not give +ve test Br_2 and CCl_4 due to aromaticity.

G.F. $\text{C}_n\text{H}_{2n-6y}$

$n \rightarrow$ no. of C
 $y \rightarrow$ no. of ring

Benzene :-

R.E. = 36.6 kcal
H.O.H. = 49.2 kcal

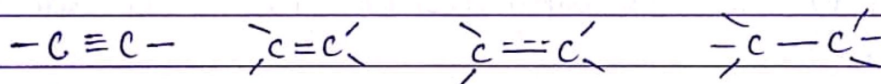


Csp^2

Planar

BA = $120^\circ \rightarrow 18$

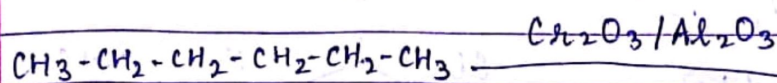
B.O. = 1.5 $\text{C} \equiv \text{C}$ 1.39 Å
 $\text{C} - \text{H}$ 1.10 Å



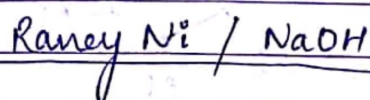
B.O.	3	2	1.5	1
	1.20	1.34 Å	1.39 Å	1.54 Å

Physical Properties of Benzene :-

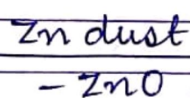
1. Colourless
2. B.P. $\rightarrow 80^\circ\text{C}$
3. non polar solvent
4. Soluble in non polar solvent



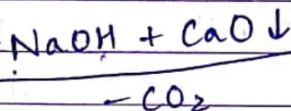
Cl



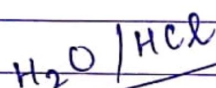
OH



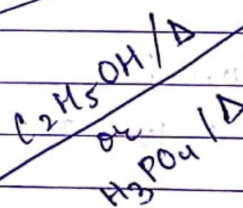
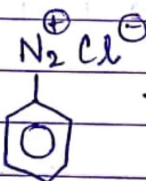
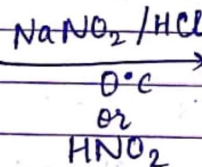
COOH



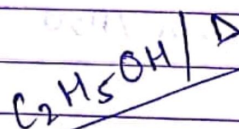
SO₃H



NH₂



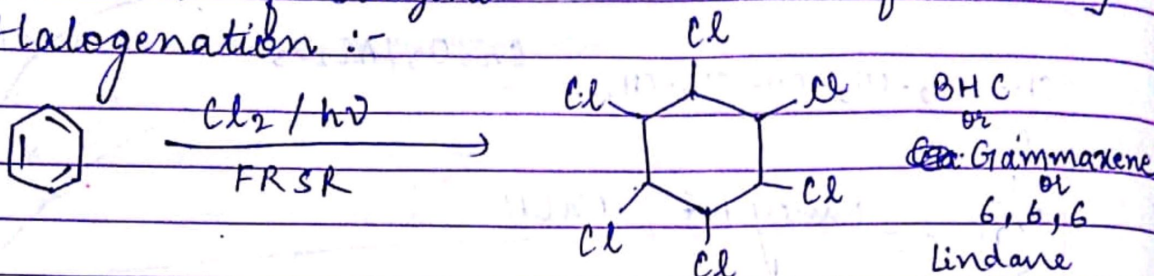
MgBr



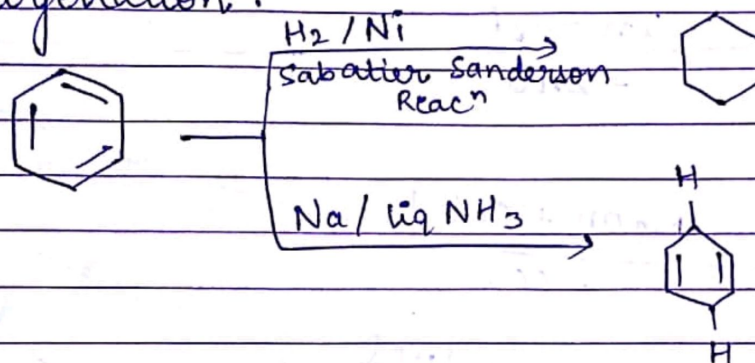
Chemical Properties :-

1. Ch¹ Reacⁿ of Benzene are ESR [Revise from GOC II]

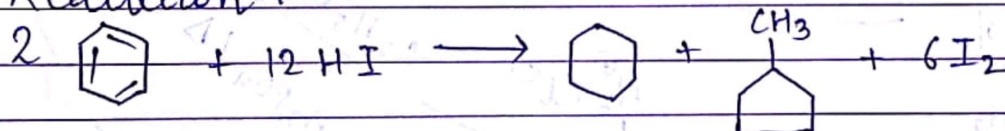
2. Halogenation :-



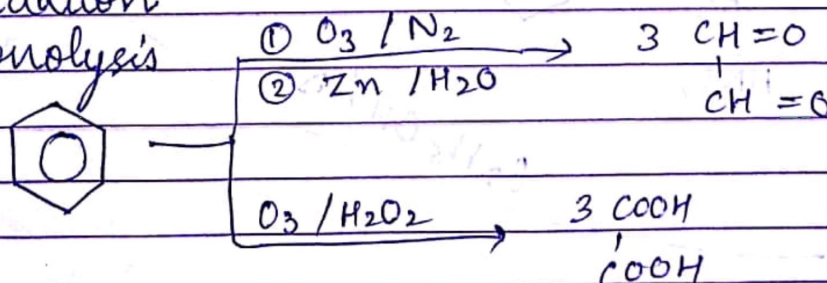
3. Hydrogenation :



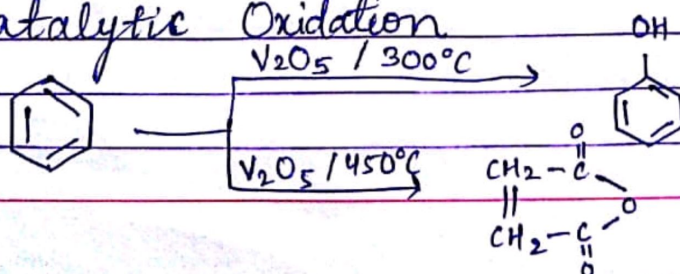
Reduction :-

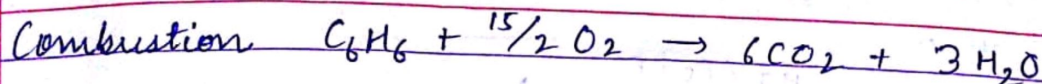


Oxidation Ozonolysis

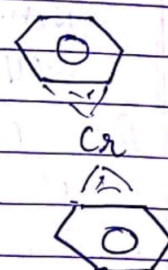
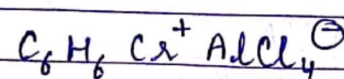
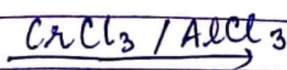
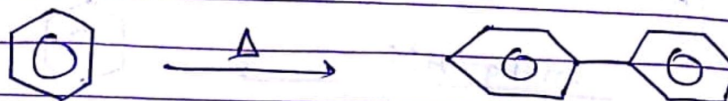


Catalytic Oxidation



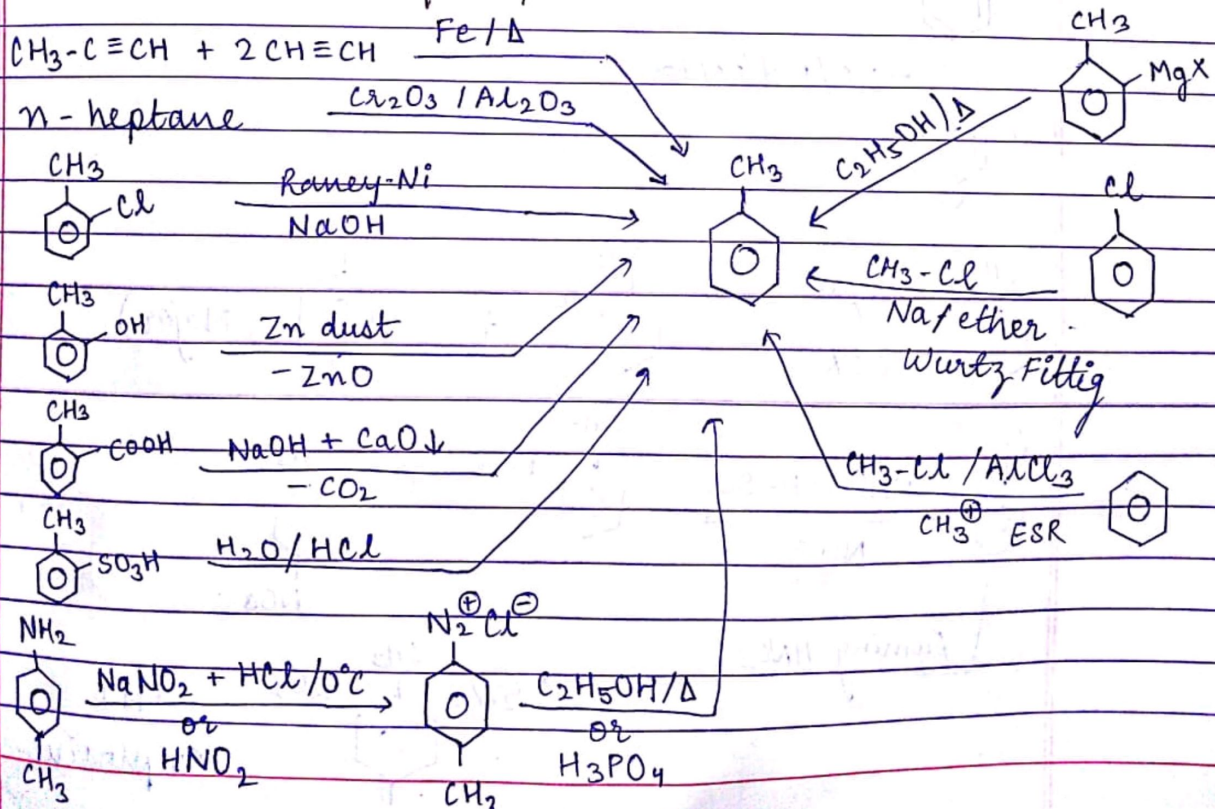


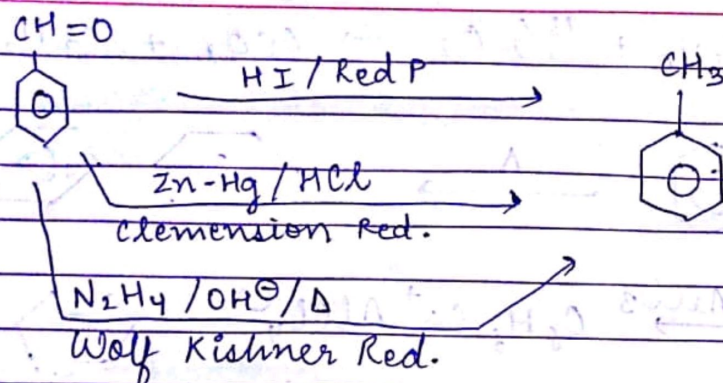
Pyrolysis



Toluene :-

General Method of Preparation :-

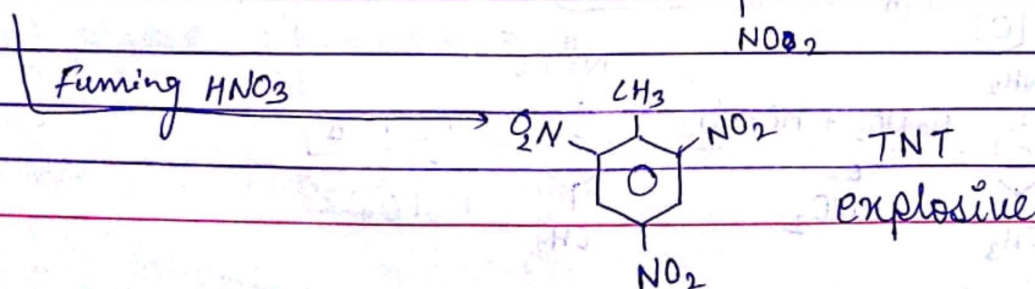
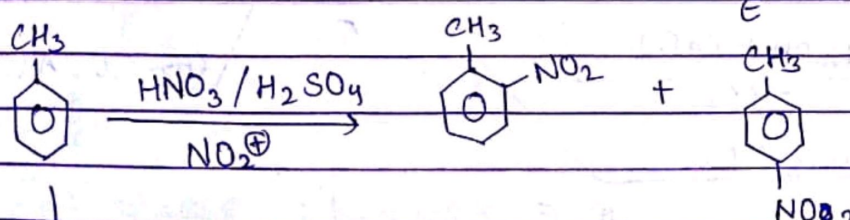
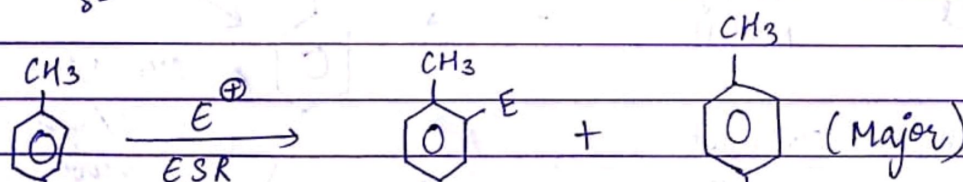
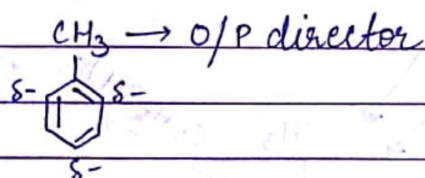
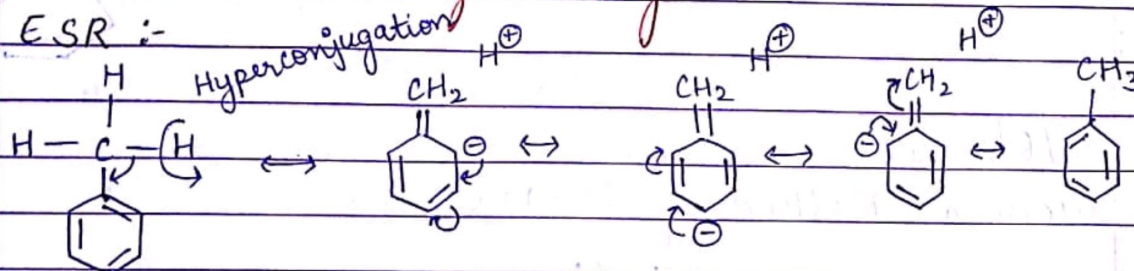


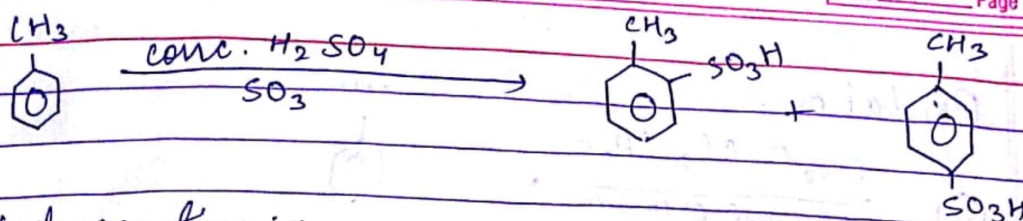


~~Re~~ chemical Properties :-

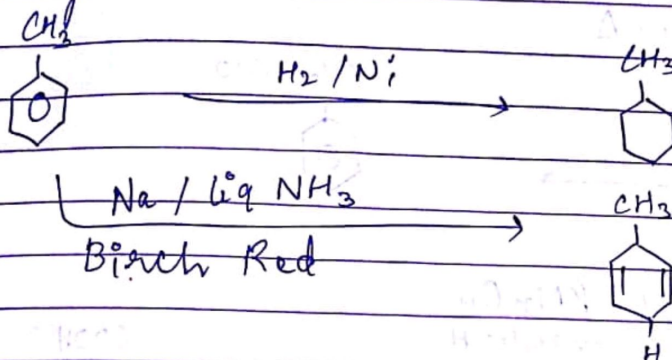
Reactⁿ due to benzene ring :-

① ESR :-

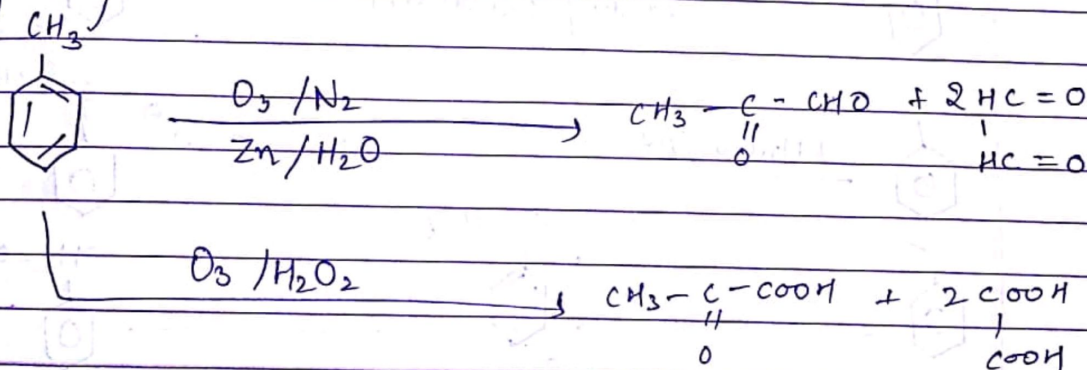




Hydrogenation :-

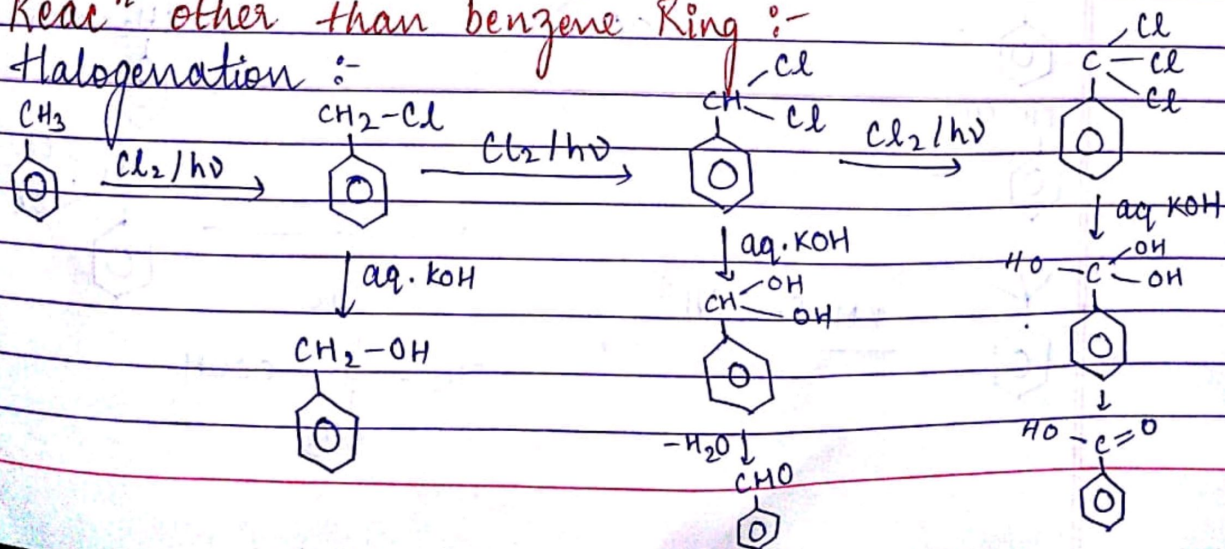


Ozonolysis :-

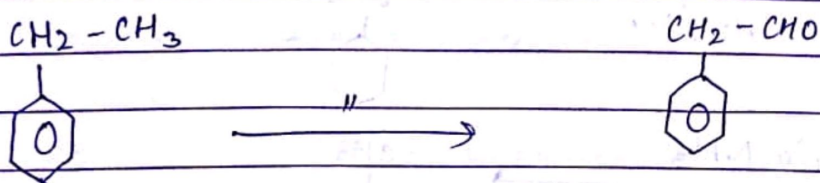
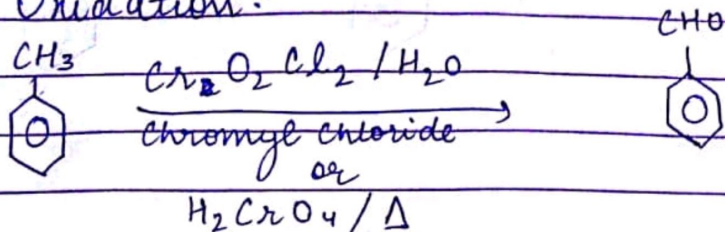


Reacⁿ other than benzene Ring :-

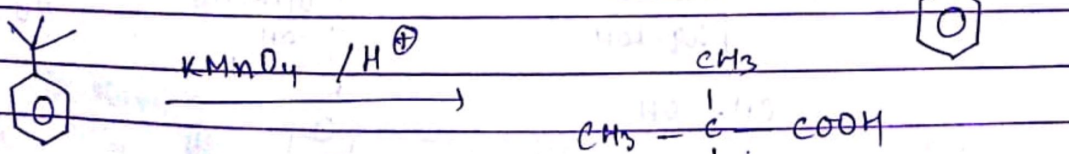
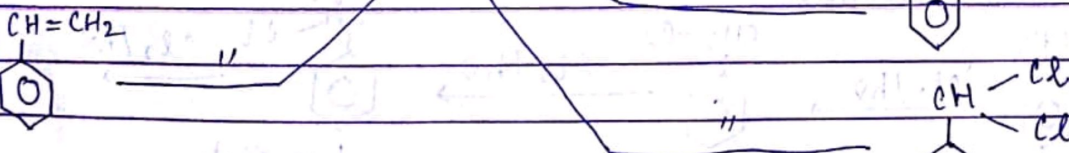
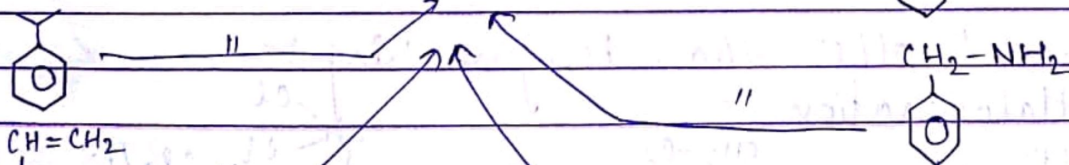
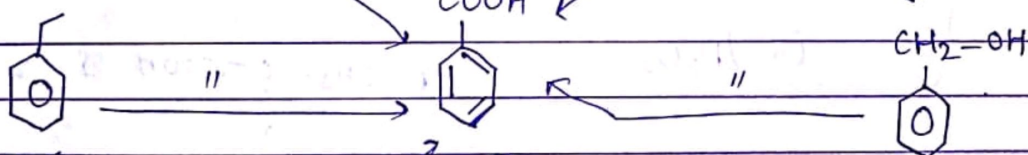
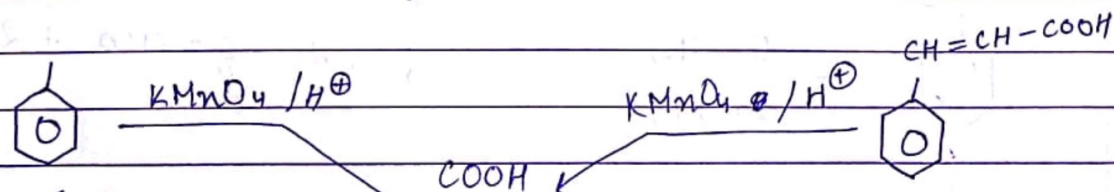
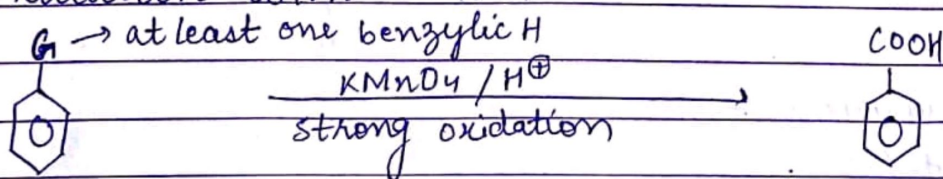
① Halogenation :-



Oxidation:-



Oxidation with $KMnO_4$



CCl_3



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$\text{CH}_3\text{C}-\text{COOH}$

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