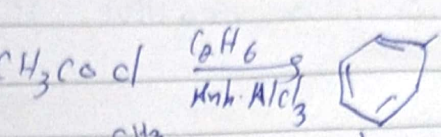
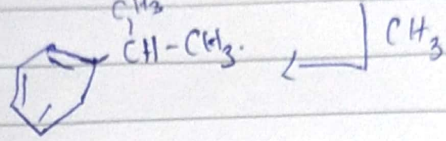
1. Identify A, B, C

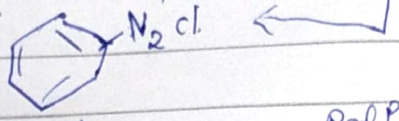
1. $CH \equiv CH \xrightarrow[HgSO_4]{H_2SO_4} CH_3-\overset{\overset{O}{\|}}{C}-CH_3 \xrightarrow[OH]{HCN} NC-\underset{OH}{\underset{|}{CH}}-CH_3$

$\xrightarrow{} OH-\underset{CH_3}{\underset{|}{CH}}-COOH$

2) $CH_3COOH \xrightarrow{SOCl_2} CH_3COCl \xrightarrow[Anh.AlCl_3]{C_6H_6}$ 

$\xrightarrow{CH_3MgBr}_{H_2O}$ 

3) $C_6H_5COOH \xrightarrow[\Delta]{NH_3} C_6H_5CONH_2 \xrightarrow{NaOBr} C_6H_5NH_2$

$\xrightarrow[HCl]{NaNO_2}$ 

4) $CH_3Br \xrightarrow{KCN} CH_3CN \xrightarrow{H_3O^+} CH_3COOH \xrightarrow[H_2O]{Red\ P,Cl_2} CH_3COCl$

5) $C_6H_5CH_2Br \xrightarrow{NaCN} C_6H_5CH_2CN \xrightarrow{H_3O^+} C_6H_5CH_2COOH$ (A)

$\xrightarrow[Ether]{Mg} C_6H_5CH_2MgBr \xrightarrow[CO_2]{H_2O} C_6H_5CH_2COOH$ (B)

6

II Conversions

i) $CH_3CHO \longrightarrow H_3C-\underset{OH}{\underset{|}{HC}}-H_2C-H_2C-OH$

$CH_3CHO \xrightarrow[dil.]{NaOH} CH_3CHOH-CH_2CHO$

$\xrightarrow{NaBH_4}$ $CH_3-\underset{OH}{\underset{|}{CH}}-CH_2-CH_2OH$

(ii) $CH_3-\overset{\overset{O}{\|}}{C}-CH_3 \longrightarrow CH_3CH=CH_2$

$CH_3-\overset{\overset{O}{\|}}{C}-CH_3 \xrightarrow{LiAlH_4} CH_3-\underset{\underset{OH}{|}}{CH}-CH_3 \xrightarrow[KOH]{\Delta} CH_3-CH=CH_2$

(iii) $C_6H_5CHO \longrightarrow C_6H_5-CO-C_6H_5$

$C_6H_5CHO \xrightarrow{KMnO_4} C_6H_5C=O \xrightarrow{Zn\,dust} C_6H_6 \xrightarrow[H_2O]{C_6H_5COMgBr}$

$C_6H_5-CO-C_6H_5$

(iv) $CH_3CH_2OH \longrightarrow CH_3\underset{\underset{O}{\|}}{C}H_2-\underset{\underset{OH}{|}}{CH}-CH_3$

$CH_3CH_2OH \xrightarrow[PCC]{O} CH_3CHO \xrightarrow[dil.\,NaOH]{} CH_3\underset{\underset{OH}{|}}{CH}-CH_2CHO$

(v) $C_6H_5COOH \longrightarrow C_6H_5CHO$

$C_6H_5COOH \xrightarrow{SOCl_2} C_6H_5COCl \xrightarrow{H_2}$

(vi) $CH\equiv CH \longrightarrow CH_2=CH_2$

$CH\equiv CH \xrightarrow[H_2SO_4]{HgSO_4} CH_3-CHO$

(vii) $CH_3CH=CH_2 \longrightarrow CH_3\underset{\underset{O}{\|}}{C}H-CH_3$

$CH_3CH=CH_2 \xrightarrow{HBr} CH_3\underset{\underset{Br}{|}}{C}H-CH_3 \xrightarrow[aq.]{KOH} CH_3\underset{\underset{OH}{|}}{C}H-CH_3 \xrightarrow{\Delta} CH_3CH=CH_2$

(viii) $CH_3\underset{\underset{Br}{|}}{C}H-CH_3 \longrightarrow CH_3\underset{\underset{O}{\|}}{C}H-CH_3$

$CH_3\underset{\underset{Br}{|}}{C}H-CH_2 \xrightarrow[aq.]{KOH} CH_3-\underset{\underset{OH}{|}}{CH}-CH_3 \xrightarrow[alk.]{KMnO_4} CH_3-\underset{\underset{O}{\|}}{C}H-CH_3$

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(ix) $CH_3CH=CH-CH_3 \longrightarrow CH_3CHO$

$CH_3CH=CH-CH_3 \xrightarrow[Zn, H_2O]{O_3} 2CH_3CHO$

x) $C_6H_5OH \longrightarrow C_6H_5COCH_3$

$C_6H_5OH \xrightarrow{Zn\ dust} C_6H_6 \xrightarrow[Anh.\ AlCl_3]{CH_3COCl} C_6H_5COCH_3$

xi) $CH_3CHO \longrightarrow CH_3-\underset{\underset{OH}{|}}{CH}-COOH$

$\Rightarrow CH_3CHO \xrightarrow{HCN} CH_3-\underset{\underset{OH}{|}}{CH}-CN \xrightarrow{H_3O^+}$

(xii) $CH_3CHO \longrightarrow CH_4$

$CH_3CHO \xrightarrow[alk.]{KMnO_4} CH_3COOH \xrightarrow[Kolbe's\ Electrolysis]{Sodalime} CH_4 + CO_2$

(xiii) $HCHO \longrightarrow CH_3CHO$

$HCHO \xrightarrow{CH_3MgBr} CH_3CH_2OMgBr \xrightarrow{H_2O} CH_3CH_2OH$

$CH_3-CHO \xleftarrow{PCC} CH_3CH_2OH$

(xiv) $C_6H_5CHO \longrightarrow C_6H_5CH=CH-CHO$

$C_6H_5CHO \xrightarrow[i)\ dil.\ NaOH]{CH_3CHO} C_6H_5-C=CH-CHO$

$ii)\ \Delta$

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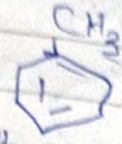
1) $C_9H_{10}O$

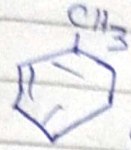
does not reduce Tollen's — Not an aldehyde

$A \xrightarrow{O} C$ [methyl ketone - A]

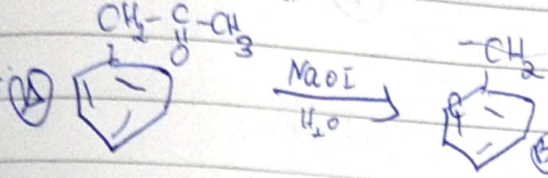
C_8H_6O

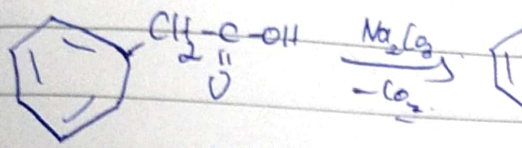
$A \xrightarrow{NaOI} B$

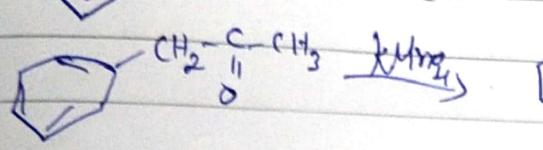
$B \xrightarrow{Soda\ lime}$ 

$\Rightarrow B =$ 

$\Rightarrow A \Rightarrow$







2) i) $CH_3CH=C(CH_3)CH_3 \xrightarrow[Zn/H_2O]{O_3} CH_3CHO + O=C(CH_3)CH_3$

(A) 2-methyl but-2-ene — ethanal + acetone

(ii) $CH_3CHO + 3NaOI \xrightarrow{H_2O} CHI_3 + 3HI + HCOONa$

(iii) $CH_3-C(=O)-CH_3 + 3NaOI \longrightarrow CH_3-C(=O)-OH + 3NaOH$

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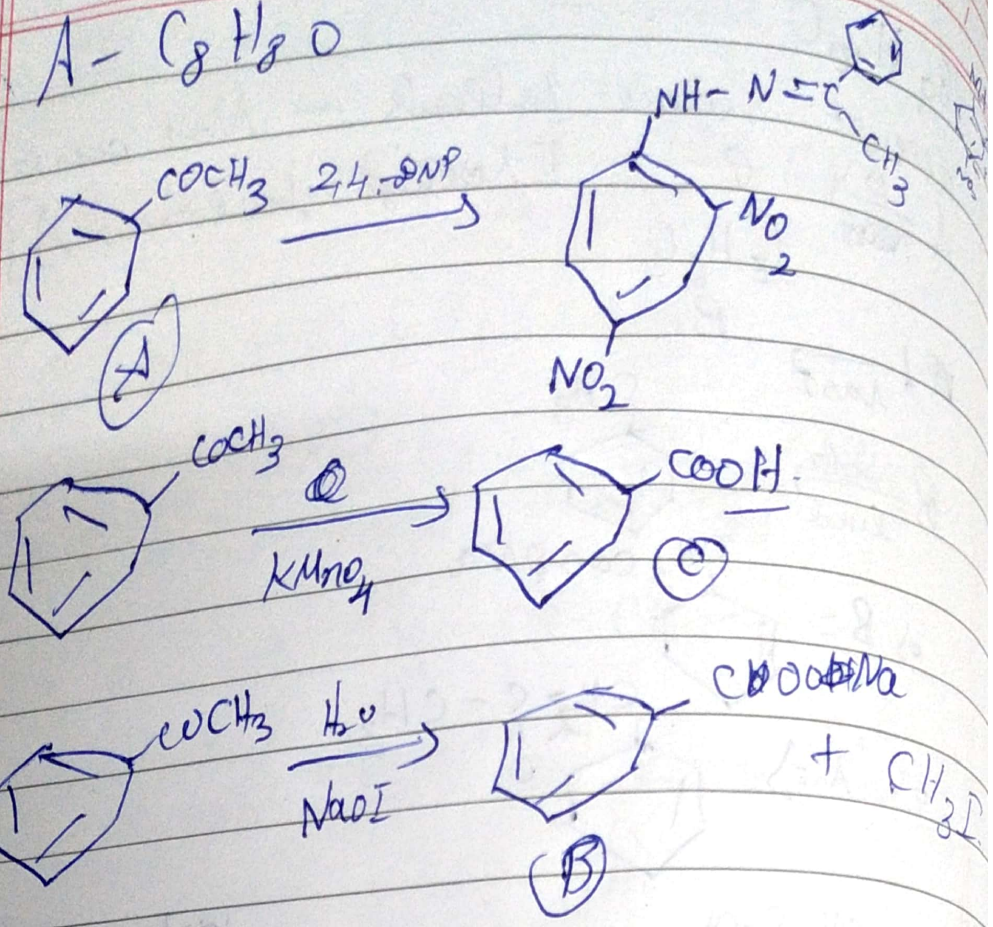
3) A - C_8H_8O


COCH3
2,4-DNP
NH-N=C
CH3
NO2
NO2
A

COCH3
KMnO4
COOH
C

COCH3
H2O
NaOI
COONa
+ CH3I
B