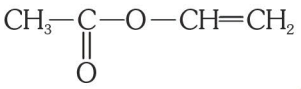
CLASSIFICATION & NOMENCLATURE

5. $CH_2=CH-C\equiv CH \xrightarrow{+2(CH_2)} C_6H_8$

First member of Alkenyne C_4H_4

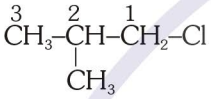
Third member of Alkenyne

18.



Vinyl acetate

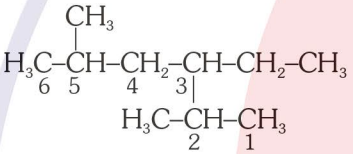
23.



Isobutyl chloride

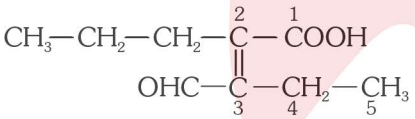
IUPAC Name 1-Chloro-2-methyl propane

25.

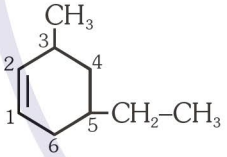


IUPAC : 3-Ethyl-2, 5-dimethylhexane

27.



34.



IUPAC : 5-Ehyl-3-methylcyclohex-1-ene

43. $(CH_3)_2CHCH(CH_3)_2 \leftrightarrow H_3C-\underset{CH_3}{\underset{|}{CH}}-\underset{CH_3}{\underset{|}{CH}}-CH_3$

IUPAC → 2, 3-Dimethyl butane

ISOMERISM

2. $CH_3-CH_2-CH_2-CH_3$ n-butane

$CH_3-\underset{CH_3}{\underset{|}{CH}}-CH_3$ isobutane

19. Each compound have three double bond and each double bond in second compound show geometrical isomerism and cis representation.

21. Option three have –OH group gauche (stabilised by H-bonding) and $-CH_3$ group anti (minimum repulsion). So, it is most stable.

22. (A) $CH_3-CH_2-CH_2-CH_2-CH_2-OH$ n-Pentyl alcohol

(B) $CH_3-\underset{CH_3}{\underset{|}{CH}}-CH_2-CH_2-OH$ isopentyl alcohol

(C) $CH_3-\underset{CH_3}{\underset{|}{\overset{CH_3}{\overset{|}{C}}}}-CH_2-OH$ Neopentyl alcohol

(D) $CH_3-CH_2-\underset{CH_3}{\underset{|}{CH}}-CH_2-OH$ active pentyl alcohol

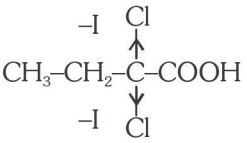
24.

* ⇒ Chiral carbon

S.I. = $2^3 = 8$ √ ⇒ G.I. center

GENERAL ORGANIC CHEMISTRY

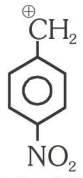
15. Carboxylic acid in water releases proton, so most acidic compound will be the most highly ionized in water i.e.,



21. (1)

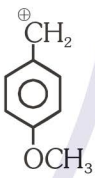
(–I, +M)
(–I > +M)

(2)



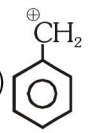
(–I, –M)

(3)



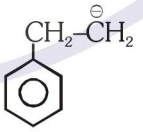
(–I, +M)
(+M > –I)
Most stable

(4)



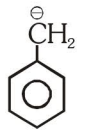
25. In vinyl chloride ($CH_2=CH-Cl$) C-Cl bond is having double bond character due to resonance, while in rest of the compound C-Cl bond is pure single bond.

28. (1)



No resonance

(2)



Resonance

(3)

+M

(4)

–M
(Most stable)

Stability of carbonion ∝ –M, –I

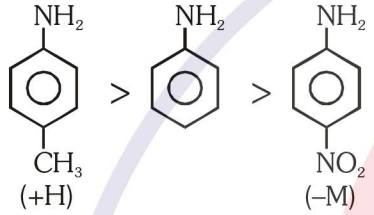
29. Most stable carbocation is tropylium ion i.e.,


(stabilised by aromaticity)

31. $CH_3-\ddot{O}-\overset{\oplus}{C}H_2$ is stabilised by resonance so it is more stable than $CH_3-\overset{\oplus}{C}H_2$

49. Basic strength $\propto$ + M, + H, + I

$$\propto \frac{1}{-M,-I,-H}$$


(+H) (–M)

55. Stability of Alkene $\propto$ H-effect $\propto$ Number of αH

HYDROCARBON

2. $CH_3-CH_2-COO^-K^+ + CH_3-\underset{CH_3}{\underset{|}{CH}}-CH_2-COO^-K^+ \xrightarrow[\text{Reaction}]{\text{Mixed kolbe electrolysis}}$

$CH_3-CH_2-CH_2-CH_3$ + $CH_3-CH_2-CH_2-\underset{CH_3}{\underset{|}{CH}}-CH_3$

n-Butane Isohexane

+ $CH_3-\underset{CH_3}{\underset{|}{CH}}-CH_2-CH_2-\underset{CH_3}{\underset{|}{CH}}-CH_3$

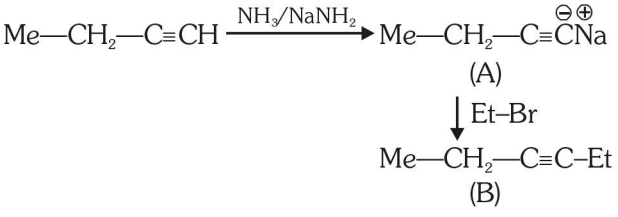
2,5-Dimethylhexane

4. Isobutane is unsymmetrical alkane, so it not prepared by wurtz reaction.

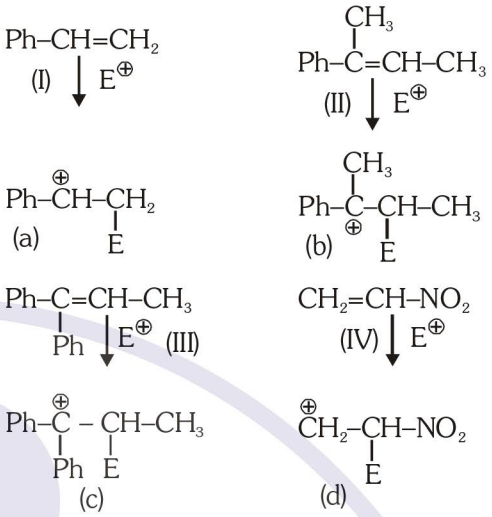
15. $CH_3-\underset{CH_3}{\underset{|}{C}}=CH_2 \xrightarrow{KMnO_4} CH_3-\underset{CH_3}{\underset{|}{C}}=O + [HCOOH] \xrightarrow{[O]} CO_2$

Acetone

27.

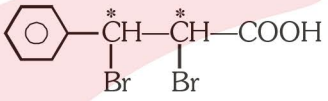


36. Reactivity $\propto$ stability of intermediate carbocation



Stability order c > b > a > d

Reactivity order III > II > I > IV

38. A is 

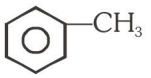
39. $CH_3-CH=CH_2 \xrightarrow[H_2SO_4]{dil} CH_3-\underset{OH}{\underset{|}{CH}}-CH_3$ (A)

$CH_3-CH=CH_2 \xrightarrow[H_2SO_4]{B_2H_6} \xrightarrow[^-OH]{H_2O_2} CH_3-CH_2-\underset{OH}{\underset{|}{CH_2}}$ (B)

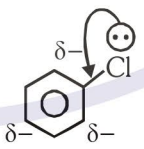
A and B are not chain isomers. A and B are isomers of $CH_3-CH_2-O-CH_3$ (i.e. mixed ether)

54. $CH_3-CH_2-CH_2-CH_3 + Br_2 \xrightarrow{Light} CH_3-CH_2-\underset{CH_3}{\underset{|}{CH}}-Br$

56. Reactivity (ESR) $\propto$ e^- density in the ring


3 α–H (Maximum hyperconjugation)

63.

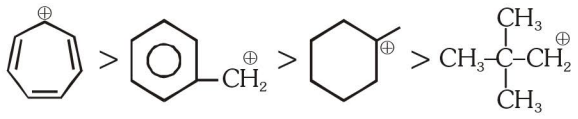


(Due to +M/+R of –Cl)

HALOGEN DERIVATIVES

1. Cl^- can not substitute ^-OH because here ^-OH is not a good leaving group.

4. $CH_3-\underset{OH}{\underset{|}{CH}}-Z$ or $CH_3-\underset{O}{\underset{||}{C}}-Z$ group give yellow ppt but Z should not have L.P.

7. 

Aromatic carbocation

14. $\overset{-\delta}{R}-\overset{+\delta}{Mgx}$ + $R'-NH_2$

(Base) ↓ (active hydrogen compound)

Acid base Rx

R–H (Alkane)

21. $-CCl_3$ gp is meta-directing

23. SN^1 reaction

32. Rate of $SN^1 \propto$ stability of carbocation

36. 

s-butyl bromide

ALCOHOL, ETHER AND PHENOL

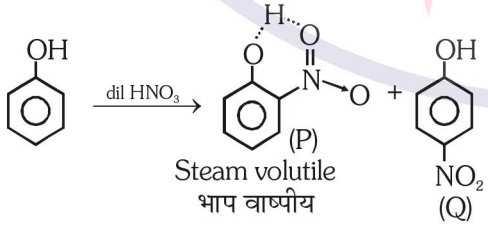
1. $CH_3-CH_2-OH \xrightarrow[\text{Nucleophilic substitution}]{PBr_3} CH_3-CH_2-Br \xrightarrow[\text{Elimination}]{\text{Alc. KOH}}$

$CH_2=CH_2 \xrightarrow[\text{Electrophilic addition}]{Br_2} CH_2(Br)-CH_2(Br)$

6. $CH_3-CH=CH_2 + H_2O \xrightarrow{H^\oplus} CH_3-\overset{OH}{\underset{|}{C}}H-CH_3$

RDS: $\xrightarrow[\text{Electrophile attack}]{H^\oplus} CH_3-\overset{\oplus}{C}H-CH_3 \xrightarrow[-H^\oplus]{H_2O}$ Nucleophilic attack

This is example of electrophilic addition reaction.

20. 

Steam volutile
भाप वाष्पीय

23. $CH_2=CH_2 \xrightarrow{HBr} CH_3-CH_2-Br \xrightarrow{C_2H_5Na}$

$CH_3-CH_2-O-C_2H_5$

Ethoxyethane

31. Nature of Alcohol — Time with Lucas reagent to develope turbidity

1) 1° Alcohol (isobutyl alcohol) → after 30 minute
2) 2° Alcohol (2-Butanol) → after 5 minute
3) 3° Alcohol t-Butyl alcohol, → Instant (तुरन्त)
4) Diphenyl carbinol → Instant (तुरन्त)

CARBONYL COMPOUNDS, ACID AND IT'S DERIVATIVES

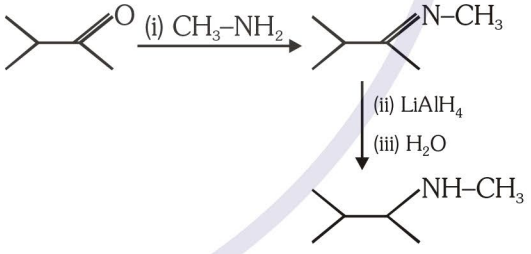
4. $CH_3-C\equiv N + CH_3-Mg-I \xrightarrow{H_2O} CH_3-\overset{O}{\overset{\|}{C}}-CH_3$

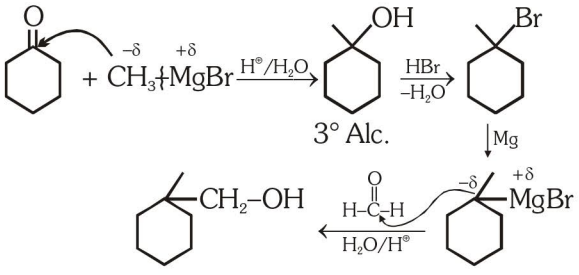
12. $CH_3-CH=CH-CH_2-\overset{O}{\overset{\|}{C}}-CH_3 \xrightarrow[+NaOH]{(i)\ I_2}$

$CH_3-CH=CH-CH_2-\overset{O}{\overset{\|}{C}}-OH \xleftarrow{(ii)\ H^\oplus} CH_3-CH=CH-CH_2-\overset{O}{\overset{\|}{C}}-\overset{\ominus}{O}Na^\oplus + CHI_3$

17. $R-CH=O + H_2N-R' \longrightarrow R-CH=N-R'$

Imine

25. 

26. 

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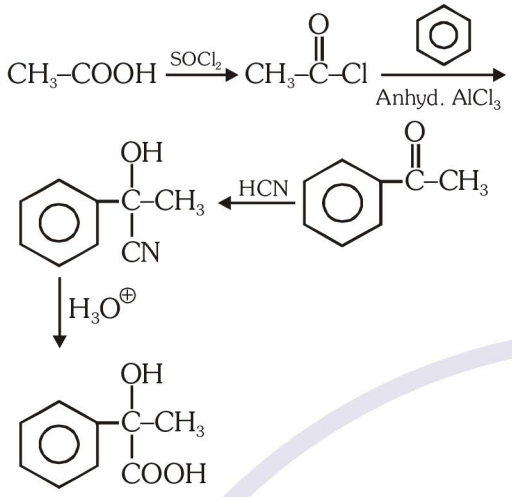

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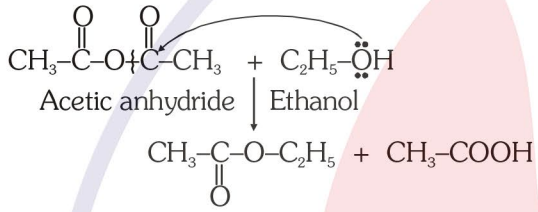
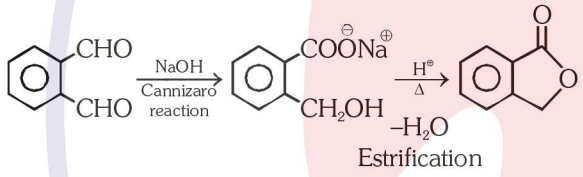


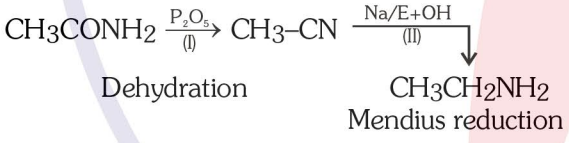
47. $P_2O_5 \Rightarrow$ Dehydratioin agent

48.



NITROGEN CONTAINING COMPOUNDS

4.



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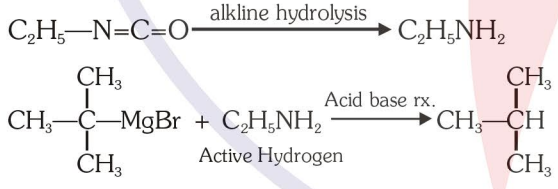
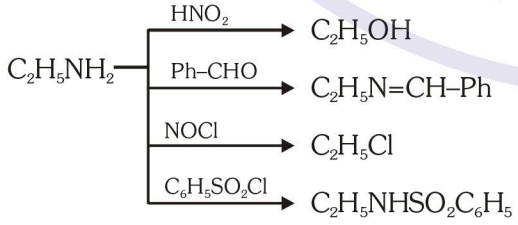


14.

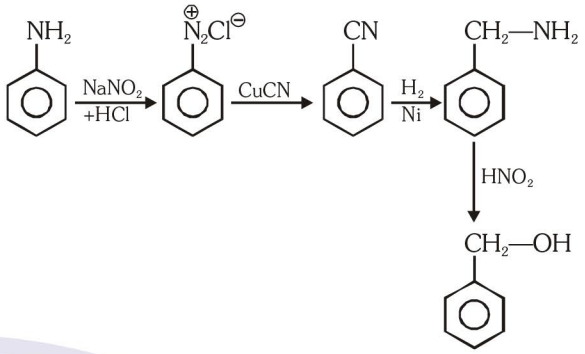


32. $C_6H_5NH_2 \xrightarrow[0.5°C]{NaNO_2/HCl} C_6H_5\overset{\oplus}{N}_2\overset{\ominus}{Cl}$

$[C_6H_5 - N \equiv \overset{\oplus}{N}]\overset{\ominus}{Cl}$

Trivalent nitrogen with positive charge is incorrect.

36.



BIOMOLECULES, POLYMERS AND CHEMISTRY IN EVERYDAY LIFE
(Refer to NCERT Book)

QUALITATIVE AND QUANTITATIVE ANALYSIS OF ORGANIC COMPOUND

1. $PV = \frac{WN_2}{28}RT$ $\quad P = 720 - 20 = \frac{700}{760}$ Atm

$V = 60$ ml $= 0.060$ L

$T = 300$ K

$W_{N_2} = \frac{700}{760} \times \frac{0.060 \times 28}{0.0821 \times 300}$ $\quad W_{compound} = 0.4$ gm

$W_{N_2} = 0.062$ gm

$\%N = \frac{0.062}{0.4} \times 100 = 15.72\%$

12. Total number of eq of base in acid base titration = Total number of eq of acid

So $Meq_{NH_3} + Meq_{NaOH} = Meq_{H_2SO_4}$

$Meq_{NH_3} + 0.5 \times 80 = 0.5 \times 2 \times 50$

$Meq_{NH_3} = 50 - 40$

$Meq_{NH_3} = 10$ (x factor = 1)

$W_N = 10 \times 10^{-3} \times 14$

$\%N = \frac{0.14}{0.50} \times 100 = 28\%$

13. $Meq_{NH_3} = Meq_{H_2SO_4}$

$Meq_{NH_3} = 20 \times 1 = 20$ Meq

$Mmol_{NH_3} = Meq_{NH_3} = Mmol_N = 20$

$W_N = 20 \times 10^{-3} \times 14$

$\%N = \frac{0.28}{0.6} \times 100 = 46.67\%$

14. Mole of $BaSO_4$ = Mole of S = $\frac{0.699}{233}$

= 0.003 moles

$W_S = 0.003 \times 32 = 0.096$ gm

$\%S = \frac{0.48}{0.096} \times 100 = 20\%$

15. $Meq_{NH_3} + Meq_{NaOH} = Meq_{H_2SO_4}$

$Meq_{NH_3} + \frac{1}{10} \times 1 \times 20 = \frac{1}{10} \times 2 \times 60$

$Meq_{NH_3} = 12 - 2 = 10$ Meq

$Meq_{NH_3} = Mmol_{NH_3} = Mmol_N = 10$

$W_N = 10 \times 10^{-3} \times 14$ gm

$\%N = \frac{0.14}{1.4} \times 100 = 10\%$

16. $P = 715 - 15 = \frac{700}{760}$ Atm

V = 55 ml = 0.0552

T = 300 K

$W_{Compound} = 0.35$ gm

$PV = \frac{W_{N_2}}{28} \times RT$

$W_{N_2} = \frac{700}{760} \times \frac{0.055 \times 28}{0.0821 \times 300}$

$W_{N_2} = 0.057$ gm

$\%N = \frac{0.057}{0.35} \times 100 = 16.45\%$