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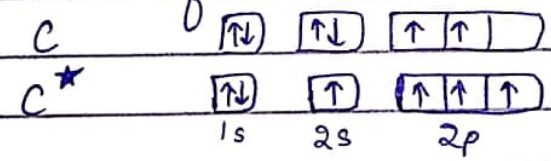
Organic Chemistry is the study of compds. containing carbon.

C
3 isotope

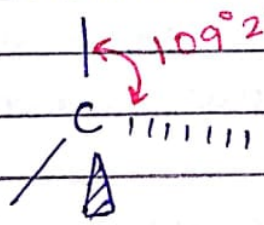
$^{12}_{6}C$	$^{13}_{6}C$	$^{14}_{6}C$
98.8 %	1.1 %	0.001 %
A = 12		half life = 5730 yrs
Z = 6		

Characterstic of C :-

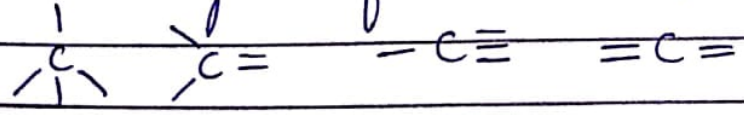
1. Tetravalent : C form 4 bond in excited state.



2. Tetrahedral : 4 bonds are directed towards corner of ~~of~~ tetrahr~~ed~~-on.



3. Tendency to form multiple bond :



4. Catenation : Self linking property of C to form long chain.

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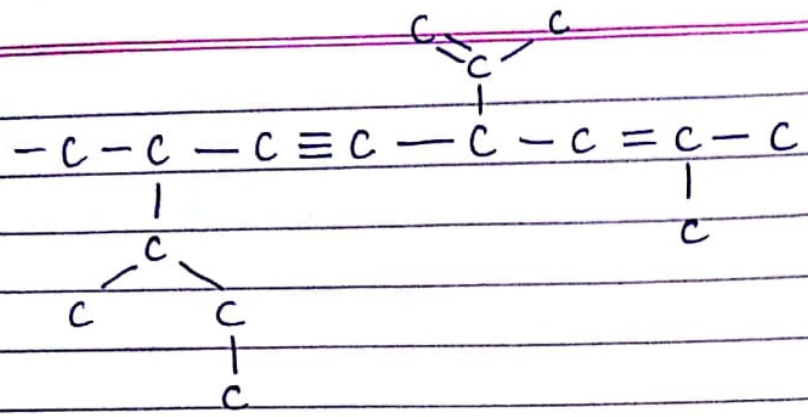
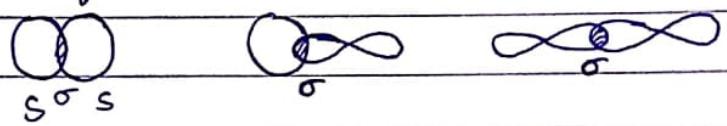
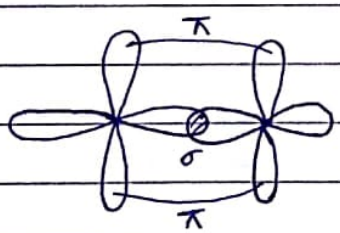


5. Hybridisation :-

σ bond : It is formed by coaxial overlapping of atomic orbitals.



π-bond : formed by colateral / sidewise overlapping of atomic orbitals.



Note :- ① σ bond is stronger than π-bond becoz extent of overlapping is more in σ bond.

② π-bond is more reactive than σ-bond.

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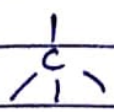
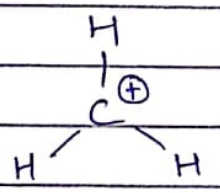
Str.	σ, π bond	hyb.	B.A.	Shape
	4, 0	sp^3	109° 28'	tetrahedral
$>C=$	3, 1	sp^2	120°	trigonal planar
$-C\equiv$	2, 2	sp	180°	linear
$=C=$	2, 2	sp	180°	linear

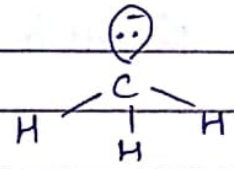
S.No. = no. of σ bond + no. of lp.

CH_3^+



sp^2

CH_3^-



sp^3

E.N. ∝ % S-Char

	sp	sp^2	sp^3
% s char	1/2 × 100 = 50%	1/3 × 100 = 33.3%	1/4 × 100 = 25%

E.N. → sp (3.25) > sp^2 (2.75) > sp^3 (2.5)

B.L. ∝ 1/E.N. $sp < sp^2 < sp^3$

B.S. ∝ E.N $sp > sp^2 > sp^3$

or

B.S. ∝ 1/B.L

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Ques Find hyb. of underlined C ?

1. $CH_3-\underset{\underset{OH}{|}}{\underline{C}H}-CH_2-\underset{\underset{sp^2}{|}}{\underline{C}H}=CH_2$ ($\underline{C}H$: sp^3)

2. $CH_3-CH_2-\underline{C}\equiv N$ ($\underline{C}$: sp)

3. $CH_3-CH=CH-\underset{\underset{sp^3}{|}}{\underline{C}H_2}-\underset{\underset{O}{||}}{\underline{C}}-CH_3$ ($\underline{C}H_2$: sp^3; $\underline{C}$: sp^2)

4. $CH_3-\underset{\underset{O}{||}}{\underline{C}}-CH_2-\underline{C}OOH$ ($\underline{C}$: sp^2; $\underline{C}OOH$: sp^2)

5. $CH_3-\underset{\underset{OH}{|}}{\underline{C}}=CH-\underline{C}H_2-Cl$ ($\underline{C}$: sp^2; $\underline{C}H_2$: sp^3)

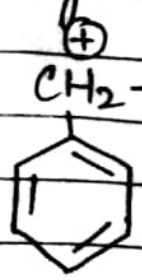
Ques Find hybridisation of C-C single bond

$HC\equiv\underset{\underset{sp}{|}}{\underline{C}}-\underset{\underset{sp^2}{|}}{\underline{C}H}=CH_2$

Ques Find hyb. of C_2 & C_3 in following

$HC^{6}\equiv C^{5}-CH_2^{4}-CH_2^{3}-HC^{2}=CH_2^{1}$ (C^3: sp^3; C^2: sp^2)

Ques Find hyb. of carbonium ion ?



$CH_2 \rightarrow sp^2$

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Ques find no. of σ & π-bond in following?

1. $CH_3-CH_2-CH_2-OH$ 11σ

2. $CH_3-CH_2-CH=CH_2-OH$ 13σ, 1π

3. CH_3-CH_2-CN 8σ, 2π

4. CH_3-CHO 6σ, 1π

5. CH_3-COOH 7σ, 1π

6. $CH_3-\underset{\underset{O}{\|}}{C}-CH_2-COOH$ 12σ, 2π

7. $CH_3-\underset{\underset{OH}{|}}{C}=CH-COOH$ 12σ, 2π

NT 8. $CH_2=CH-C\equiv CH$ 7σ, 3π

NT 9. $CH\equiv C-CH_2-C\equiv C-CH_3$ 11σ, 4π

ANIMS 10. $CH_2=CH-CH_2-CN$ 9σ, 3π
allyl cyanide

IIT 11. Toluene  15σ, 3π

DEC 12. Styrene  16σ, 4π

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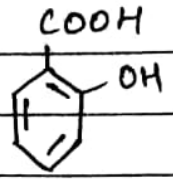
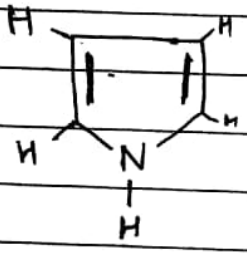
13.  16σ, 4π

14.  14σ, 1π

15.  23σ, 2π

16.  10π, 2π

Ques Arrange following in ↑ing order of B.L.?

① $\underset{x}{CH \equiv CH}$ $\underset{y}{CH_3 - CH_3}$ $\underset{z}{CH_2 = CH_2}$

$\underset{sp}{}$ $\underset{sp^3}{}$ $\underset{sp^2}{}$

B.L. $\propto \frac{1}{E.N}$

$y > z > x$

② $\underset{sp}{CH \equiv C \overset{a}{-} H}$ $\underset{sp^3}{CH_3 - CH_2 \overset{b}{-} H}$ $\underset{sp^2}{CH_2 = CH \overset{c}{-} H}$

$b > c > a$

③ $CH_3 \overset{\alpha}{-} CH = CH_2$ $CH_3 \overset{\beta}{-} C \equiv CH$ $CH_3 \overset{\gamma}{-} CH_2 - CH_2$

$\gamma > \alpha > \beta$

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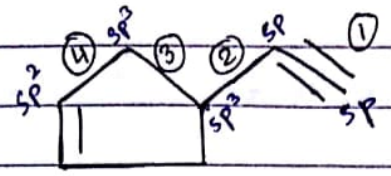
(4)



~~2 = 3 > 4 > 2 > 1~~

3 > 4 > 2 > 1

B.S. ① > ② > ④ > ③

Type of Carbon and Hydrogen :-

1. Primary Carbon & Primary Hydrogen :-

1°C → C which is attached to only 1° carbon.
1°H → H which is attached to only 1° C.

$$\underset{1^\circ}{CH_3}-\underset{1^\circ}{CH_2}-\underset{}{CH}(CH_2-Cl)-CH_2-\underset{}{CH}(\underset{1^\circ}{CH_2}-Cl)-CH_2-\underset{1^\circ}{C}\equiv N$$

1°C → 4
1°H → 6

2. Secondary Carbon & Secondary Hydrogen :-

2°C → C which is attached to 2° carbon
2°H → H which is attached to 2° C.

$$\underset{1^\circ}{CH_3}-\underset{2^\circ}{CH_2}-\underset{2^\circ}{CH}(Cl)-\underset{2^\circ}{CH}(\overset{2^\circ}{CH}=\underset{1^\circ}{CH_2})-\underset{2^\circ}{C}(=O)-\underset{1^\circ}{CH_3}$$

2°C → 4
2°H → 4

3. Tertiary Carbon & Tertiary Hydrogen :-

3°C → C which is attached to 3 carbon.
3°H → H which is attached to 3° C.

$$CH_3-\overset{CH_3}{\underset{Cl}{\overset{3^\circ}{C}}}-CH_2-\underset{CH_3}{\overset{3^\circ}{CH}}-CH_2-\underset{3^\circ C}{\overset{3^\circ C}{CH}}(CH_3)-CH_2OH$$

3°C → 4
3°H → 3

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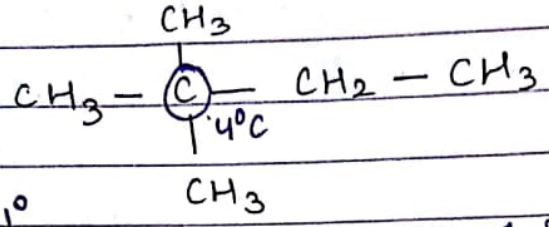
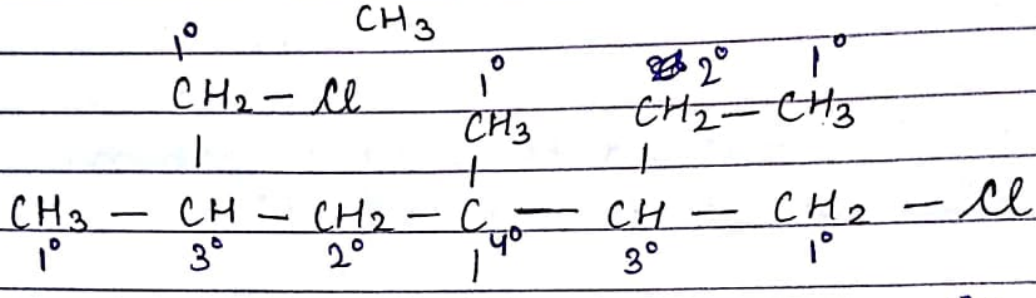
4. Quaternary Carbon :-

4°C → Carbon which is attached to 4 carbon atom



ex



1°C → 7C
1°H → 19H
2°C → 3C
2°H → 5H
3°C → 3
3°H → 3
4°C → 1

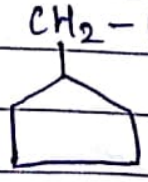
Type of Alcohol :-

1. Primary Alcohol :- (1° OH) The alcoholic compd. in which OH gp. is attached to 1°C.

CH_3-CH_2-OH

$CH_3-CH_2-CH_2-OH$

CH_3-OH



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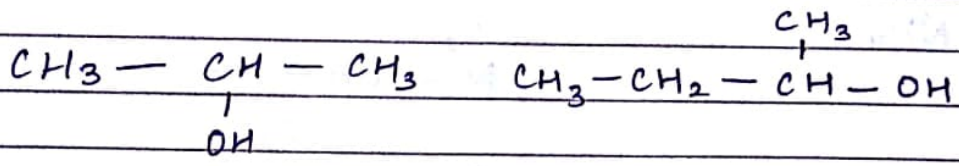
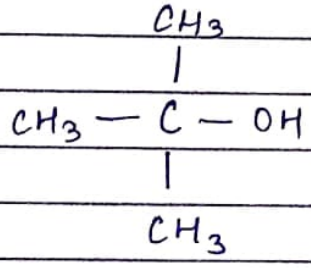
2. Secondary Alcohol : The compd in which OH gp. is attached to 2°C.

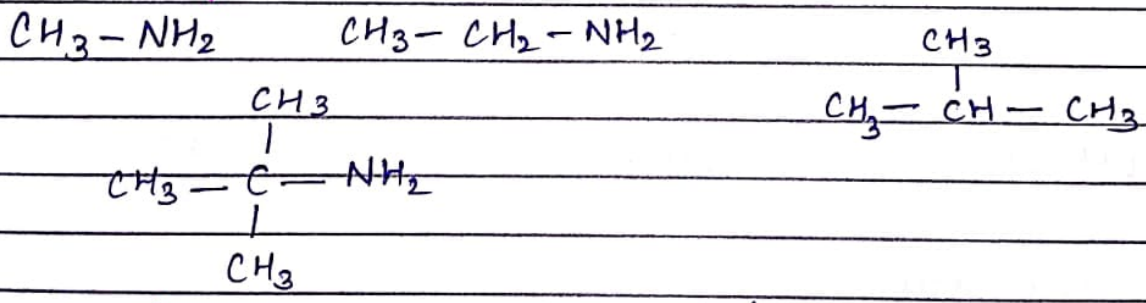


3. Tertiary Alcohol : The alcoholic compd. in which OH gp is attached to 3°C

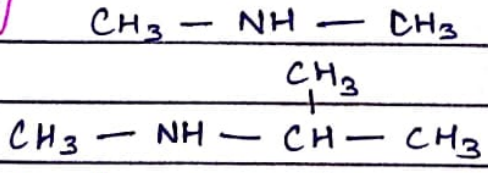


Type of Amine :-

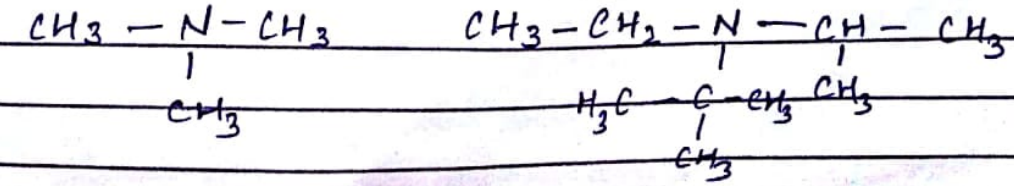
1. Primary Amine : N is attached to only 1 C atom.



2. Secondary Amine :- N is attached to 2 C atom.



3. Tertiary Amine : ~~In which~~ N is attached to 3 C atom.



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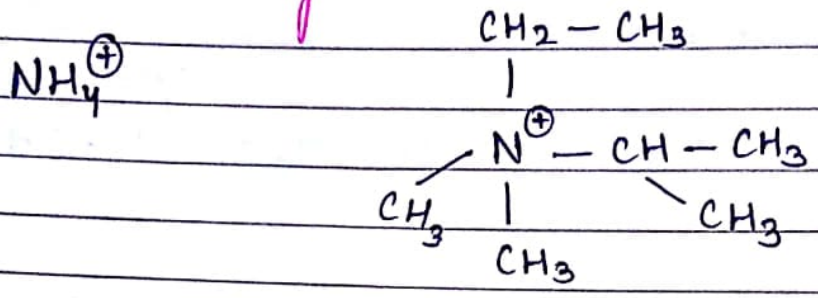
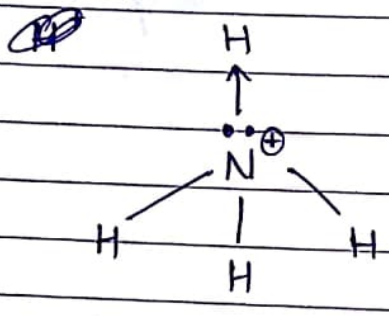
4. Quaternary amine : N is attached to 4C atom.





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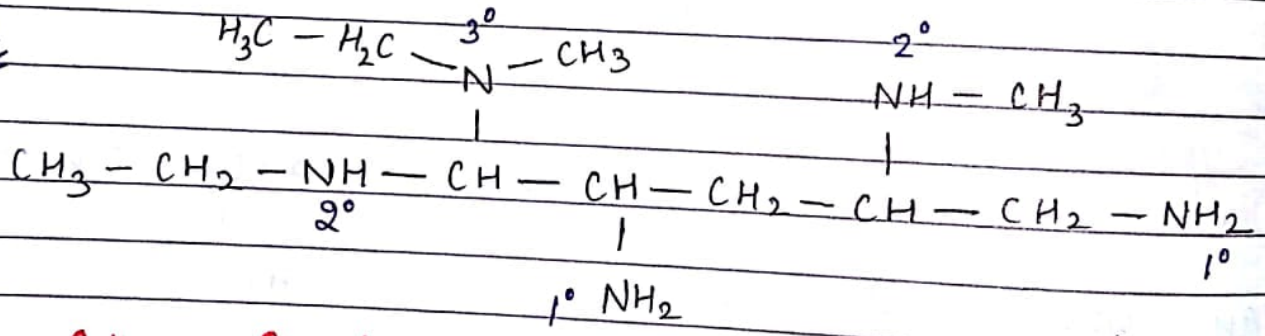

Classification and Nomenclature

Classification :-

1. Based on structure
2. Based on Group
3. Based on Homologous

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① Based on structure :-

- **Open chain / aliphatic / acyclic**
  - **Saturated** — C–C
    - + alkanes
    - C_nH_{2n+2}
    - Paraffins
    - $CH_3-CH_2-CH_3$
    - $CH_3-\overset{\overset{O}{\|}}{C}-OH$
    - $CH_3-CH=O$
  - **Unsaturated**
    - $C=C$ — Olifinic bond — alkene — C_nH_{2n}
    - $C\equiv C$ — acetylinic bond — alkyne — C_nH_{2n-2}
- **Closed chain / Cyclic**
  - **Homocyclic**
    - alicyclic
    - aromatic
  - **Heterocyclic**
    - **Alicyclic**
    - **Aromatic**
      - Pyridine
      - Pyrole

Ques Which of the following is unsaturated compo

1. C_3H_8 ×
2. CH_3-CHO ×
3. CH_3-COOH ×
4. C_3H_4
5. $CH_3-CH_2-CH_2-OH$

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6. $CH_3 - CH = CH - CH_3$

7. $CH_3 - \overset{\overset{O}{\|}}{C} - NH_2$

8. $CH_3 - \overset{\overset{O}{\|}}{C} - O - CH_3$

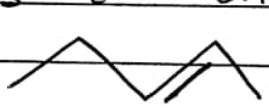
9. $CH_3 - C \equiv CH$

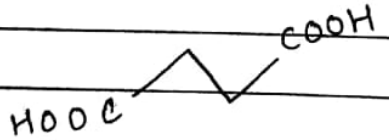
10. $CH_3 - CH_2 - \underset{\underset{\underset{O}{\|}}{C - O - CH_3}}{\overset{|}{CH}} - CH_3$

11. $CH_3 - CH_2 - CH = \underset{|}{C} - CH_3$ (Cl)

12. $CH_3 - CH_2 - CH_2 - NH_2$

13. $CH_3 - CH = CH - CH_2 - NH - CH_3$

14. 

15. 

16. $CH_2 \equiv CH$

Ques Which of the following is unsaturated?

1. Maleic acid $HOOC - CH = CH - COOH$

2. Succinic acid $CH_2 - COOH$ / $CH_2 - COOH$

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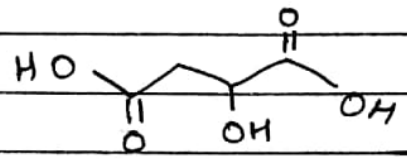
3. Malonic acid $CH_2(COOH)_2$

4. acetic acid CH_3-COOH

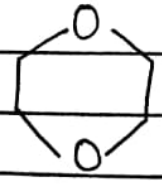
5. Malic acid 

A :- Acetic acid is not an unsaturated compd. ✓
R :- acetic acid do not have olefinic ~~comp~~ bond. (2)

A :- acetic acid is saturated compd. ✓
R : acetic acid have $-\overset{\overset{O}{\|}}{C}-$ bond. ✓ (2)

A : acetic acid have $-\overset{\overset{O}{\|}}{C}-$ bond.
R : acetic acid is saturated compd. (2)

Ques find no. of heteroatoms in following ?

(1)  2

2.  1

3.  1

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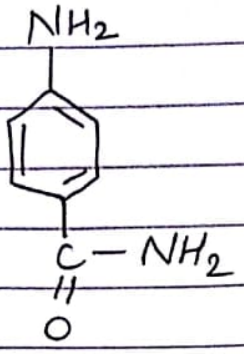
4. 

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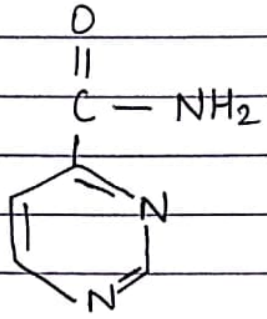
5. 

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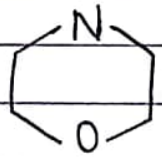
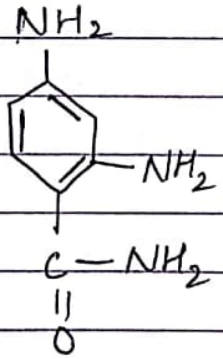
6. 

2

7. 

O

(2) Classification based on Group :-

$R-H \xrightarrow[-H]{+G_1} R-G_1$

Hydrocarbon → hyd.-radical → func^n gp.

phy. property → chemical property

B.P., M.P. & density etc

- $-OH$
- $-NH_2$
- $-X$
- $-COOH$
- $-CH=O$

Pentyl = amyl

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Hydrocarbon Radical (R–) :-

Saturated :

Monovalent :-

alkane $\xrightarrow{-H}$ alkyl

CH_4 $\xrightarrow{-H}$ CH_3-

Methane — Methyl

CH_3-CH_3 $\xrightarrow{-H}$ CH_3-CH_2-

ethane — ethyl

$CH_3-CH_2-CH_3$ (Propane) $\xrightarrow{-H}$ $CH_3-CH_2-CH_2-$ n-propyl

$CH_3-CH_2-CH_3$ (Propane) $\rightarrow$ $CH_3-\underset{|}{CH}-CH_3$ iso-propyl

Normal :- • Straight chain hydrocarbon
• no branching

eg

$CH_3-CH_2-CH_2-CH_3$

n-butane

$CH_3-CH_2-CH_2-CH_2-CH_2-CH_3$

n-hexane

$CH_3-CH_2-CH_3$

propane

n-pentane

$CH_3(CH_2)_5CH_3$

n-heptane

$CH_3-CH_2-CH_2-$ n-propyl

$CH_3-CH_2-CH_2-CH_2-$ n-butyl

Iso : When methyl gp. is attached at 2nd last C or 2nd C (in case of alkanes) is c/a iso-comp.

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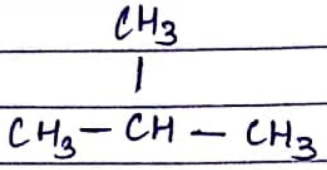
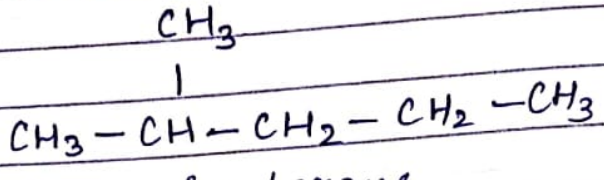
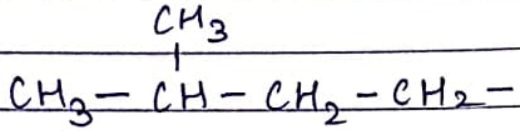
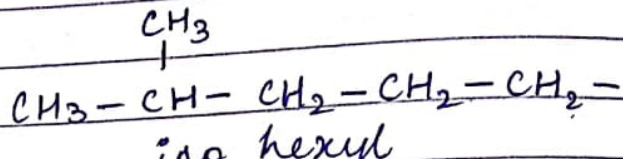


iso-butane

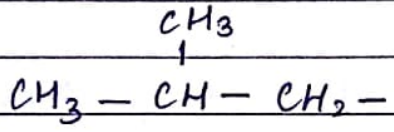


iso hexane

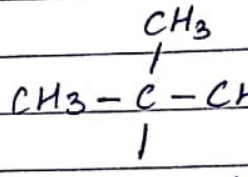




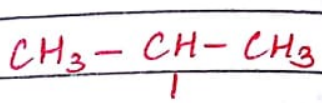
iso hexyl



iso-butyl

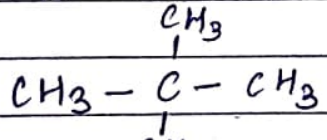


t-butyl

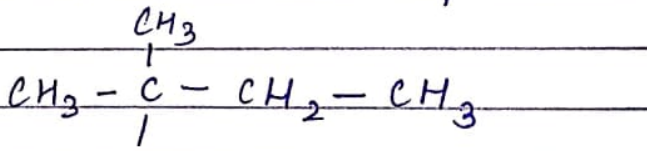


isopropyl

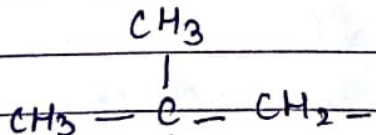
Neo :- When 2 methyl gp. is attached to 2nd last C or 2nd C (in case of alkane) c/a neo compd.



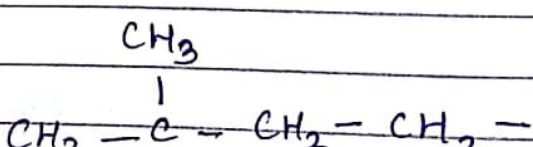
neo-Pentane



neo-hexane

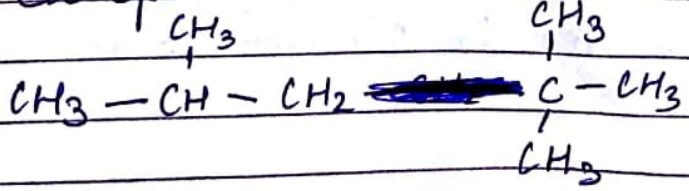


neopentyl

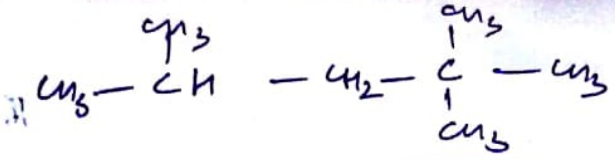


neo hexyl

Exception



Iso-octane



iso octane

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$CH_3 - CH_2 - CH_2 - CH_2 - CH_2 -$ n-pentyl

$CH_3 - CH_2 - CH_2 - \underset{\displaystyle CH_3}{\underset{|}{CH}} - CH_3$ Sec. pentyl

$CH_3 - \underset{\displaystyle CH_3}{\underset{|}{CH}} - CH_2 - CH_2 -$ iso · pentyl

$CH_3 - \underset{\displaystyle CH_3}{\underset{|}{\overset{\displaystyle CH_3}{\overset{|}{C}}}} - CH_2 -$ neo pentyl

Bivalent :- 2 valency free
from same C - atom → alkylidene
from vicinal C - atom → alkylene
terminal C - atom → polymethylene

$CH_4 \xrightarrow{-H} CH_3 - \xrightarrow{-H} CH_2 <$

Methylidene
or
Methylene

$CH_3 - CH_3 \longrightarrow CH_3 - CH_2 - \rightarrow CH_3 - CH <$ ethylidene

$CH_2 - CH_2$ ethylene

$CH_3 - CH_2 - CH_3 \rightarrow CH_3 - CH_2 - CH <$ propylidene

$CH_3 - CH_2 - CH_2 -$ propylene

$CH_3 - \underset{\displaystyle <}{C} - CH_3$ isopropylidene

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$-CH_2-CH_2-CH_2-CH_2-$

$CH_2=CH_2 \longrightarrow CH_2=CH- \longrightarrow CH_2=C\overset{\cdot}{}$

Vinyl or ethenyl — ethenylidene

$CH_3-CH=CH_2 \longrightarrow CH_3-CH=CH-$ propenyl

$\longrightarrow CH_3-\underset{|}{C}=CH_2$ isopropenyl

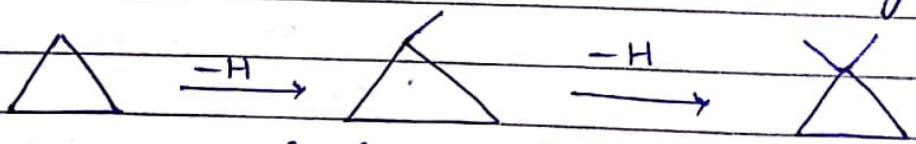
$\longrightarrow -CH_2-CH=CH_2$ Allyl

$CH\equiv CH \longrightarrow CH\equiv C-$ ethynyl

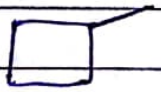
$CH_3-C\equiv CH \longrightarrow CH_3-C\equiv C-$ propynyl

$\longrightarrow -CH_2-C\equiv CH$ propargyl

$CH_3-CH=CH-CH_2-$ Crotyl



Cyclopropane — Cyclopropyl — cyclopropylidene



cyclobutyl

cyclopentyl

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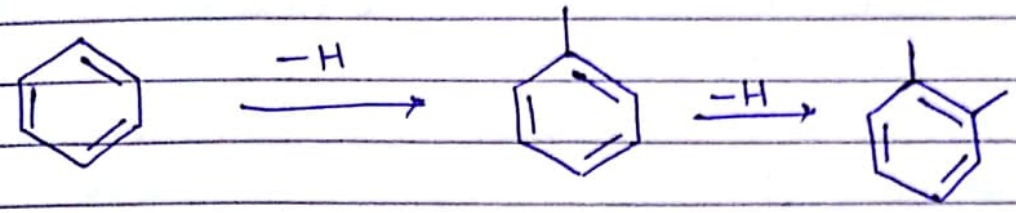
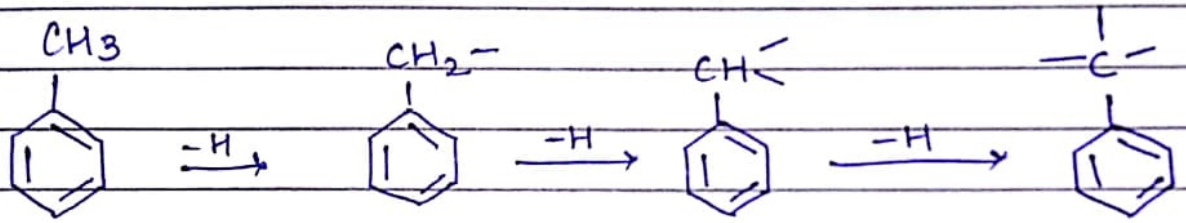
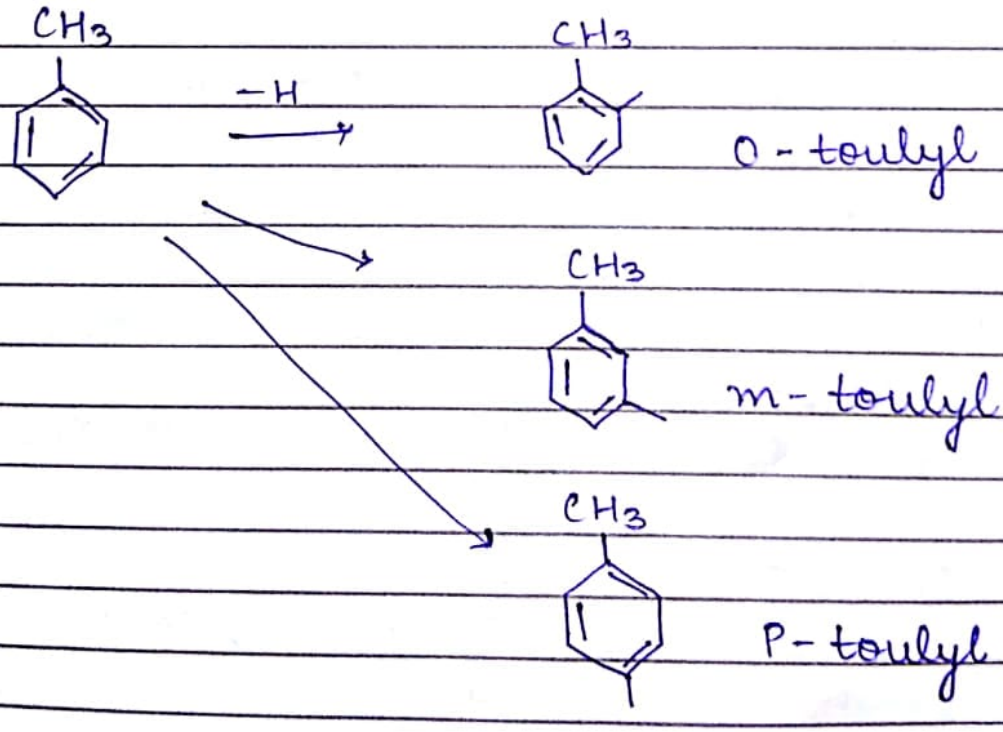
Aromatic :-



benzene or phene — phenyl — phenylene



toluene — benzyl — benzal — benzo



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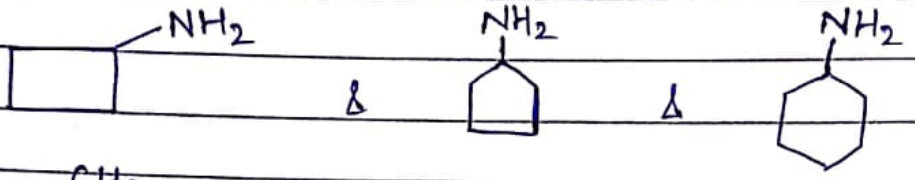
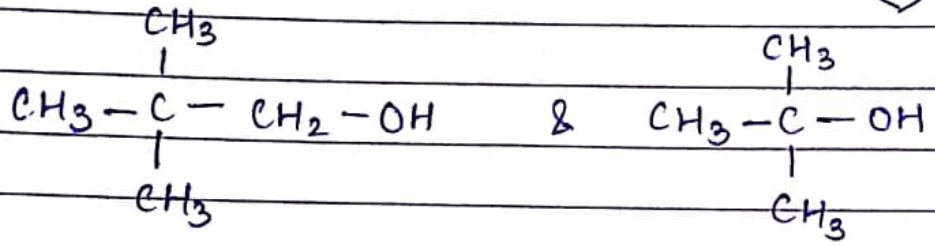
Concept of Homology :-

Those compd's which have same structural features as well as same general formula but differ by $-CH_2-$ group c/a homologs & series is c/a homologous series.

CH_3-CH_2-OH & $CH_3-CH_2-CH_2-OH$





	G.F.	
alkane	C_nH_{2n+2}	CH_4, CH_3-CH_3, $CH_3-CH_2-CH_3$
alkene	C_nH_{2n}	$CH_2=CH_2$, $CH_3-CH=CH_2$, $CH_3-CH_2-CH=CH$
alkyne	C_nH_{2n-2}	$CH\equiv CH$, $CH_3-C\equiv CH$
Alcohol	$C_nH_{2n+2}O$	CH_3-OH, CH_3-CH_2-OH, $CH_3-CH_2-CH_2-OH$
ether	$C_nH_{2n+}O$	CH_3-O-CH_3, $CH_3-O-CH_2-CH_3$
Halide	$C_nH_{2n+1}X$	
aldehyde or	$C_nH_{2n}O$	$H-\overset{\overset{O}{\|}}{C}-H$, $CH_3-CH=O$, CH_3-CH_2-CHO
Ketone	$C_nH_{2n}O$	$CH_3-\overset{\overset{O}{\|}}{C}-CH_3$
acid/ester	$C_nH_{2n}O_2$	$H-\overset{\overset{O}{\|}}{C}-OH$, CH_3-COOH

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Characterstics of Homologues :-

1. Have same general formula i.e. same method of preparation.
2. Have same type of atom.
3. have same functional gp. hence similiar chemical property.
4. Have different physical property.
5. 2 successive members differ by CH_2- gp i.e. a weight of 14 unit.

$R-CH_3$ $\xrightarrow{-CH_2}$ $R-H$ (Lower Homologue)

$R-CH_3$ $\xrightarrow{+CH_2}$ $R-CH_2-CH_3$ (Higher Homologue)

Ques Write lower & higher homologue of isopentyl alcohol.

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

Higher $CH_3-\underset{\underset{CH_3}{|}}{CH}-CH_2-CH_2-CH_2-OH$

Lower $CH_3-\underset{\underset{CH_3}{|}}{CH}-CH_2-OH$ isobutyl alcohol

Ques Which of the following is pair of Homologues?

1. $CH_3-CH_2-CH_2-NH_2$ & $CH_3-\underset{\underset{CH_3}{|}}{CH}-NH_2$ X

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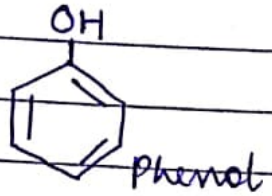
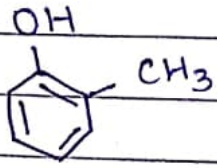
2. CH_3-CH_2-OH & $CH_3-CH_2-O-CH_3$ ✗

3. $H-\underset{\underset{O}{\|}}{C}-H$ & CH_3-CHO ✓

4. $CH_3-CH=CH_2$ & $CH_3-CH_2-\underset{\underset{H}{|}}{C}=CH_2$ ✓

5. CH_3-CH_2-Cl & CH_3-CH_2-Br ✗

6.  Phenol &  alcoholic ✗

7.  &  ✓

8. $CH_3-CH=CH_2$ &  ✗

9. $CH_3-CH_2-NH_2$ & $CH_3-CH_2-NH-CH_3$ ✗

10. $CH_3-\underset{\underset{O}{\|}}{C}-CH_3$ & $CH_3-CH_2-CH_2-CH=O$ ✗

11. $CH_3-CH_2-CH_2-OH$ & CH_3-O-CH_3 ✗

12.  &  ✓

13. $HCOOH$ & CH_3COOH ✓

14. $CH_3-\underset{\underset{O}{\|}}{C}-OH$ & $CH_3-O-\underset{\underset{O}{\|}}{C}-CH_3$ ✗

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15. $CH_3-\overset{\overset{O}{\|}}{C}-CH_2-CH_3$ & $CH_3-\overset{\overset{O}{\|}}{C}-CH_3$ ✓

16. $CH_3-\underset{\underset{CH_3}{|}}{CH}-CH_2-Cl$ & $CH_3-CH_2-CH_2-Cl$ ✗

Nomenclature :-

- Common Name
- Derived Name
- IUPAC system

1. Common Name OR TRIVAL NAMING :-

- based on source of origin.

Structure	Source	Common Name
CH_4	Marshy area	Marsh Gas
CH_3-OH	distillation of wood	wood spirit
$HCOOH$	formica (Red Ant)	formic acid
CH_3-COOH	acetum (Vinegar)	acetic acid
$CH_3-\underset{\underset{OH}{|}}{CH}-COOH$	Milk	Lactic acid
C_3H_7-COOH	Butter	butyric acid
$HOOC-CH_2-\underset{\underset{OH}{|}}{CH}-COOH$	Apple	Malic acid
$HOOC-\underset{\underset{OH}{|}}{CH}-\underset{\underset{OH}{|}}{CH}-COOH$	~~tar~~ tamarind	tataric acid

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$HOOC-CH_2-\underset{\underset{OH}{|}}{CH}-CH_2-COOH$ Citrus fruit Citric acid

(R) — (G) fun^c gp
hydrocarbon

Common Name
Functional Group

① Non-Terminating (without C containing func gp)
eg $-OH, -NH_2, -O-, -\underset{\underset{O}{\|}}{C}-$

② terminating (C containing func^c gp)
$-COOH$, $-CHO$

1. Non terminating

	Suffix
$-OH$	alcohol
$-SH$	thio alcohol
$-X$	Halide
$-NH_2$	amine
$-NH-$	amine
$-\underset{\underset{|}{}}{N}-$	amine
$-O-$	ether
$-S-$	thio ether
$-\underset{\underset{O}{\|}}{C}-$	Ketone

Polyvalent func^c gp:-
1. If same hydrocarbon gp is attached then di, tri, tetra etc used.
2. If diff. hydrocarbon are attached then write them in alphabatical order

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Note: di, tri, tetra, primary, secondary, etc. are not considered in alphabatical order while terms iso, neo are considered in alphabetical order

CH_3-O-CH_3 — dimethyl ether

$CH_3-O-\underset{\displaystyle CH_3}{\underset{|}{CH}}-CH_3$ — isopropyl methyl ether

$CH_3-\overset{\displaystyle O}{\overset{||}{C}}-CH_3$ — dimethyl ketone

$CH_3-\overset{\displaystyle O}{\overset{||}{C}}-CH_2-CH_3$ — ethyl methyl ketone

CH_3-CH_2-OH — ethyl alcohol

$CH_3-\underset{\displaystyle CH_3}{\underset{|}{CH}}-Cl$ — isopropyl chloride

$CH_3-\underset{\displaystyle CH_3}{\underset{|}{CH}}-CH_2-NH_2$ — isobutyl amine

$CH_3-\underset{\displaystyle CH_3}{\underset{|}{\overset{\displaystyle CH_3}{\overset{|}{C}}}}-CH_2-OH$ — neo pentyl alcohol

$CH_2=CH-Cl$ — Vinyl chloride

$CH_2=CH-CH_2-OH$ — Allyl chloride

$CH_3-NH-CH_3$ — dimethyl amine

$CH_3-\underset{\displaystyle CH-CH_3}{\underset{|}{\overset{\displaystyle CH_3}{\overset{|}{N}}}}-CH_2-CH_3$ — ethyl isopropyl methyl amine

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H

Terminating func^c gp :-

Prefix :-

Total no. of C	Prefix form
1C	
2C	acet
3C	propion
4C	butyr — n, iso
5C	Valer

① M
Cu
eg

3C + 1db	C-C=C	acryl
4C + 1db	C-C=C-C	croton

Suffix :-

P. fg	Suffix
$-COOH$	ic acid
$-\overset{O}{\overset{\|\|}{C}}-O-R$	alkyl --- ate
$-\overset{O}{\overset{\|\|}{C}}-X$	yl halide
$-CHO$	aldehyde
$-\overset{O}{\overset{\|\|}{C}}-O-\overset{O}{\overset{\|\|}{C}}-$	ic anhydride
$-CN$	o nitrile
$-NC$	o iso nitrile
$-\overset{O}{\overset{\|\|}{C}}-NH_2$	amide

$$H-\overset{O}{\overset{\|\|}{C}}-O-H$$ formic acid

$$CH_3-COOH$$ acetic acid

$$CH_3-\underset{CH_3}{\underset{|}{CH}}-COOH$$ isobutyric acid

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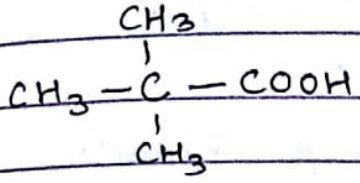
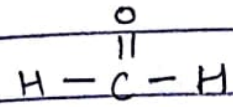
$CH_3-CH_2-CH_2-COOH$ — n-butyric acid

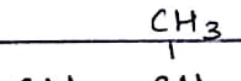

neo valeric acid


formaldehyde

$CH_3-CH=O$ — acetaldehyde

$CH_3-CH_2-CH=O$ — propionaldehyde


isobutyraldehyde

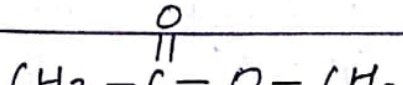

isovaler aldehyde

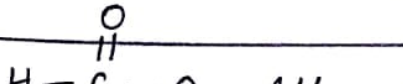
$CH_2=CH-CH=O$ — acryl aldehyde

$CH_2=CH-COOH$ — acrylic acid

$CH_3-CH=CH-CHO$ — Croton aldehyde

$CH_3-CH=CH-COOH$ — crotonic acid


methyl acetate


ethyl formate


isopropyl ethyl acetate

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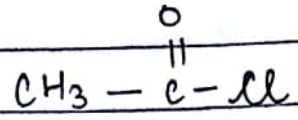
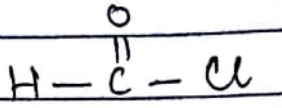
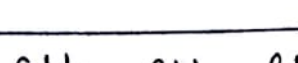
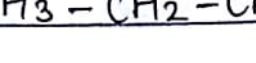
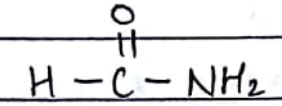
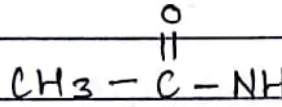

acetyl chloride

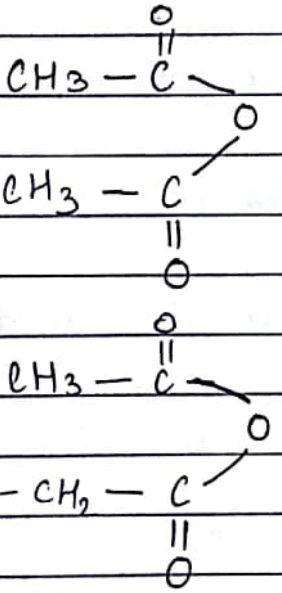

formyl chloride


propionitrile


aceto isonitrile


formamide


acetamide


acetic anhydride

acetic propionic anhydride

DERIVED NAME :

(3) Based on famous Homolog

selection of parent chain
4°C > 3°C > 2°C > 1°C

alkane :- CH_4 methane

$CH_3-\boxed{CH_3}$ methyl methane

$CH_3-\underset{CH_3}{CH_2}-\boxed{CH_2}-CH_3$ ethyl methyl methane

$CH_3-\underset{CH_3}{\boxed{CH}}-CH_2-CH_3$ ethyl dimethyl methane

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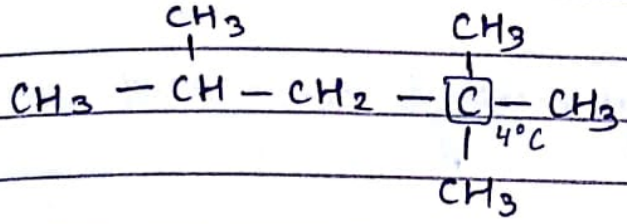
Ques Write derived name of iso-octane?



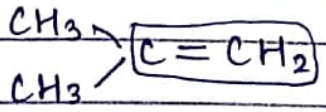
isobutyl trimethyl methane

alkene : $CH_2=CH_2$ ethylene

Fg > multiple bond
=> =

$CH_2=CH-CH_3$ methyl ethylene

$CH_3-CH=CH-CH_3$ sym. dimethyl ethylene



unsym. dimethyl ethylene

alkyne : $CH\equiv CH$ acetylene

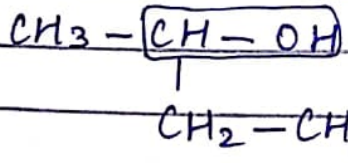
$CH_3-C\equiv CH$ methyl acetylene

$CH_3-C\equiv C-CH_2-CH_3$ ethyl methyl acetylene

$CH_2=CH-C\equiv CH$ Vinyl acetylene

alcohol : CH_3-OH Carbinol

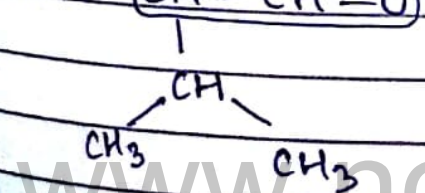
$CH_3-CH_2-CH_2-OH$ ethyl carbinol



ethyl methyl carbinol

Aldehyde : $CH_3-CH=O$ acetaldehyde

$CH_3-CH_2-CH=O$ methyl acetaldehyde



isopropyl methyl acetaldehyde

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acid : CH_3-COOH acetic acid

$CH_3-\underset{\displaystyle CH_2-CH_3}{\underset{|}{CH}}-COOH$ ethyl methyl acetic acid

Cl_3CCOOH

$Cl-C-COOH$ trichloro acetic acid

Ketone : $CH_3-\overset{\displaystyle O}{\overset{||}{C}}-CH_3$ acetone

$CH_3-CH_2-\overset{\displaystyle O}{\overset{||}{C}}-CH_2-CH_2-CH_3$

ethyl methyl acetone

IUPAC Naming

International Union of Pure & Applied Chemistry

Parts of IUPAC

1. Word — Root
2. Prefix — Pri / Sec.
3. Suffix — Pri. / Sec.

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Secondary Prefix	Primary Prefix	Word Root	Primary Suffix	Secondary Suffix
2°	1°	WR	1°	2°
substituent is written in alphabetical order - Cl chloro - NO_2 Nitro	used when compd is cyclic "cyclo"	represent total no. of C in Principal C chain 1C - meth 2C - eth 3C - Prop ⋮ 10C - dec 11C - undec 12 - dodec ⋮ 20 Eicos	tells whether compd. is saturated or unsaturated C - C ane 1C = C ene 1C ≡ C yne 2C = C diene 2C ≡ C diyne C=C & C≡C enyne	tells about Principal func gp. - COOH - CHO - OH - NH_2

PRIORITY ORDER of FUNCTIONAL GROUP :-

Functional Gp.	Prefix	Suffix
-(C)OOH (carboxylic acid)	x	oic acid
-COOH	carboxy	carboxylic acid
$-SO_3H$ (Sulphonic acid)	sulpho	sulphonic acid
$-(C)(=O)-O-(C)(=O)-$ (anhydride)	x	oic anhydride

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Functional Group	Prefix	Suffix
-(C)OOR (ester)	x	alkyl --- oate
-COOR	alkoxycarbonyl or carbalkoxy	alkyl --- carboxylate
-(C)OX (acidhalide)	x	oyl halide
-COX	halo formyl	carbonyl halide
-(C)ONH$_2$ (amide)	x	amide
-CONH$_2$	carbamoyl	carboxamide
-(C)N (cyanide)	x	Nitrile
-CN	cyano	carbonitrile
-N$\rightleftarrows$(C) (isocyanide)	x	isonitrile
-NC	isocyano/ carbyl amino	carbyl amine
-(C)HO (aldehyde)	oxo	al
-CHO	formyl	carbaldehyde
-(C)- (Ketone) ‖ O	Keto/oxo	one
-OH (alcohol)	hydroxy	ol
-SH (thio alcohol)	mercapto	thiol
-NH$_2$ (amine)	amino	amine

Substituents	Prefix
-R	alkyl
-X	halo
-NH$_2$	amino
$-N^{=O}_{\rightarrow O}$	nitro
-O-N=O	nitrite
-N=O	nitroso

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Substituents	Prefix
$-OCH_2CH_3$	ethoxy
$-CH_2-OH$	hydroxy methyl
$-CH_2-Cl$	Chloro methyl
$-NH-CH_3$	methyl amino
$-S-$	thio
$-S-R$	alkyl thio
$CH_3-\overset{\overset{O}{\|\|}}{C}-O-$	acetoxy/ethanoyloxy
$CH_3CH_2-\overset{\overset{O}{\|\|}}{C}-O-$	propanoyloxy
$C_6H_5-\overset{\overset{O}{\|\|}}{C}-O-$	benzoyloxy
$-OR$	alkoxy

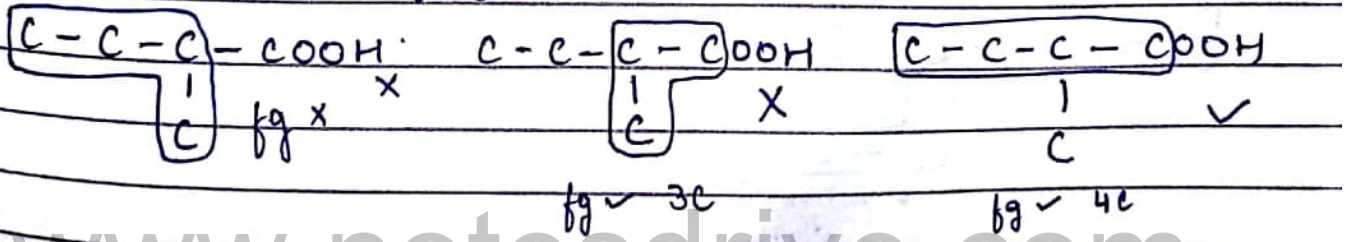
Rules of IUPAC :-

1. Selection of Principal Carbon chain
2. Numbering of P.C.C.

1. Selection of Principal Carbon Chain (PCC)

P.C.C. will be that ~~largest~~ longest continuous chain of carbon which have

Pfg > Max^m no. of multiple bond > max. no. of C-atom



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C-C-C-C
|
CH_2-OH

C-C-C-C
|
CH_2OH

C-C-C-C
|
C
|
CH_2OH

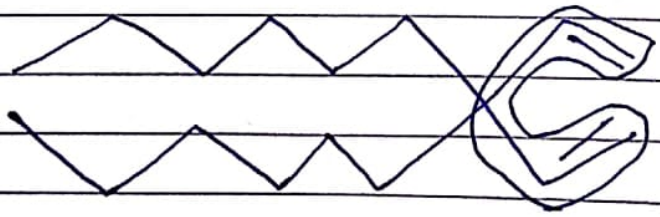
C
|
C-C-C-C-C-C
|
CH=O

C-C=C-C-C-C
|
C

C=C-C-C-C-C-C
|
C-C-C

C=C-C-C-C-C-C
|
C=C
6C
1 mb
X

C=C-C-C-C-C
|
C=C
6C, 2mb
✓



If symmetric molecule is tnt then priority is given to double & bond over triple bond

C=C-C-C-C≡C
|
C=C

2mb, 6C
↓
1db, 1tb

~~2mb, 6C~~
↓
2db

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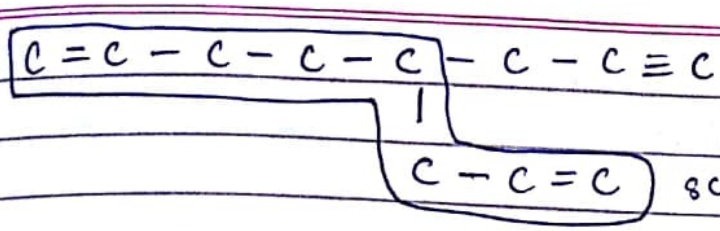
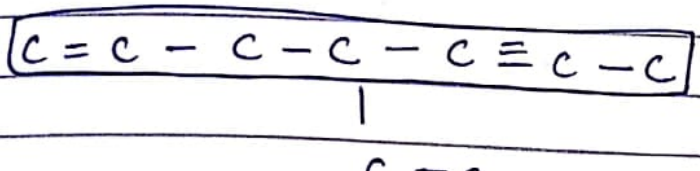
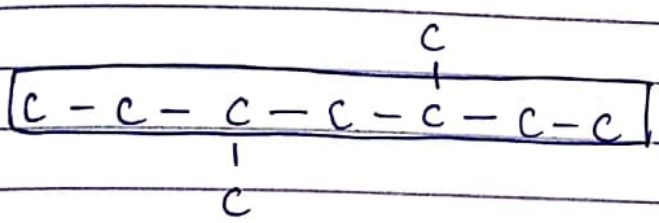


8C, 2 mb → 2 db

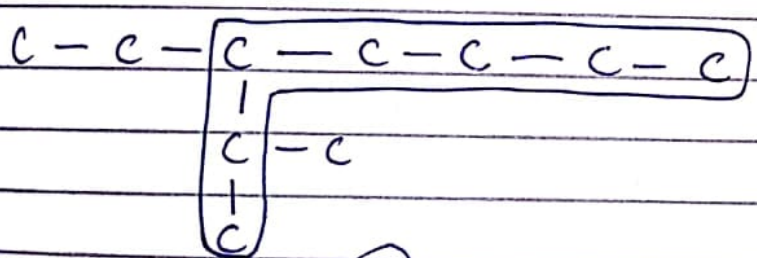


7C, 2 mb

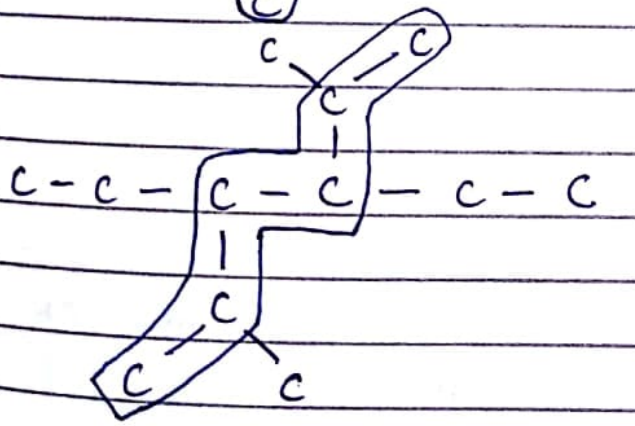


7C

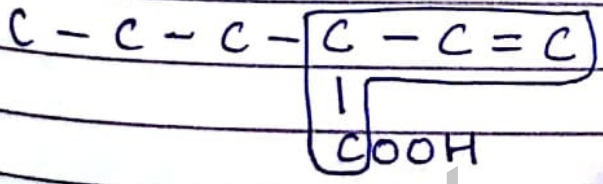
If 2 diff. P.C.C. have same no. of C in a molecule tho then that P.C.C. will be selected as P.C.C. which have max^m no. of sb (/ more branching)



2 sub, 7C



6C, 4 sub



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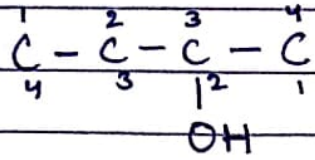
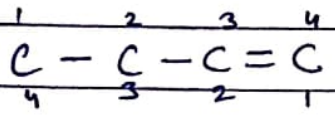
Numbering of P.C.C.:-

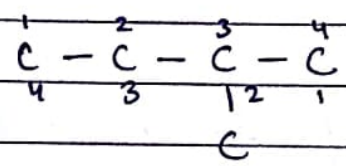
① Lowest no. will given to Pfg > Mb > Sb



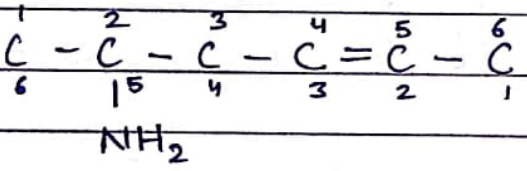
	fg
LHS	3
RHS	2



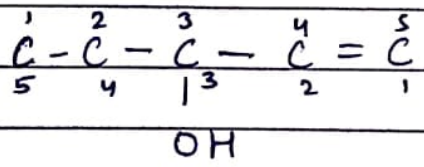
	mb
LHS	3
RHS	1



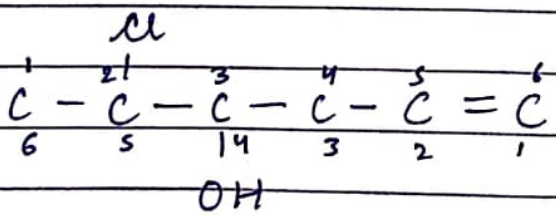
	Sb
L.H.S	3
RHS	2



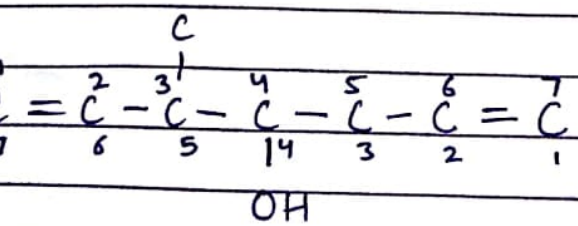
	fg
LHS	2
RHS	5



	fg	mb
LHS	3	4
RHS	3	1



	fg
LHS	3
RHS	4



	fg	mb	sb
LHS	4	1, 6	3
RHS	4	1, 6	5

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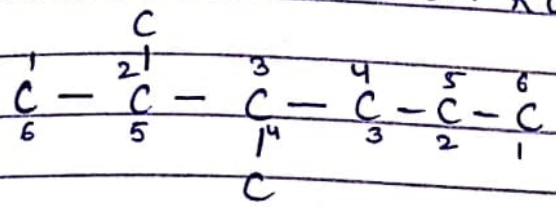
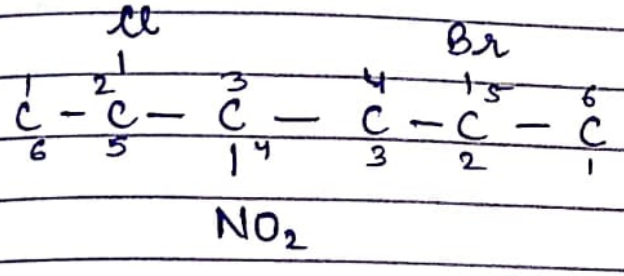
(2) If more than one substituent are +nt then least ~~low~~ locant no. Rule is followed.

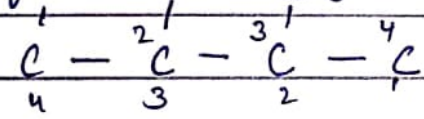


Sb
LHS 2,3 ✓
RHS 4,5

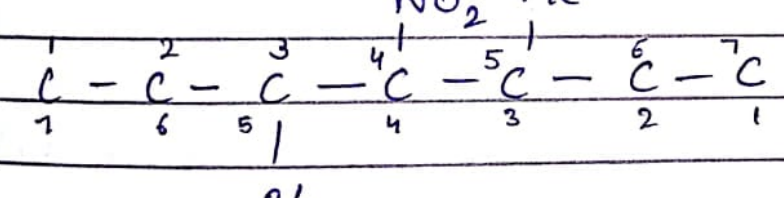


Sb
LHS 2, 3, 5 ✓
RHS 2, 4, 5

3. If 2 or more substituent are +nt at same posⁿ from either side then no. ~~of~~ starts from the side where alphabetically prefered substituent get lowest no.

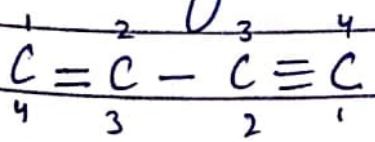


LHS 2, 3
RHS ~~or~~ 2, 3 ✓



ethyl
LHS 3 4 5 ✓
RHS 3 4 5

4. If db & tb are at similiar posⁿ from either side of PCC then priority is given to db ~~r~~



db mb
L·HS 1, 3 ✓
RHS 1, 3

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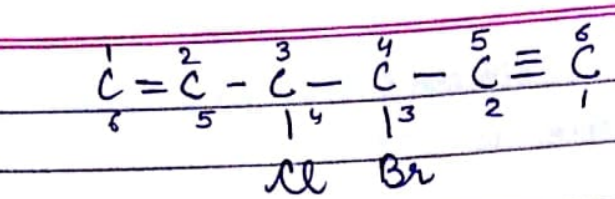
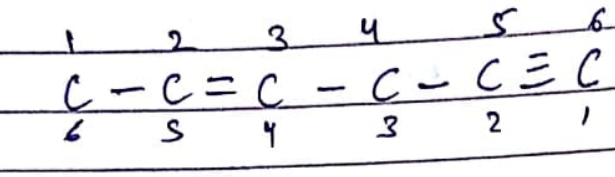
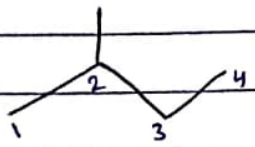
mb
db ← 1,5 3,4 ✓
LHS
RHS 1,5 3,4
tb



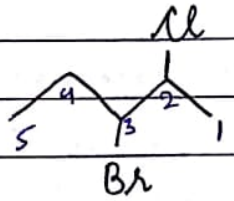
mb
LHS 2,5
RHS 1,4 ✓



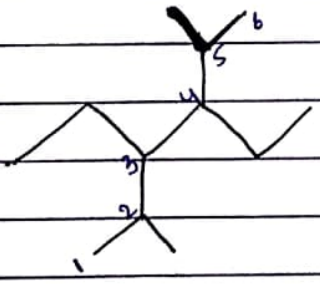
Ques



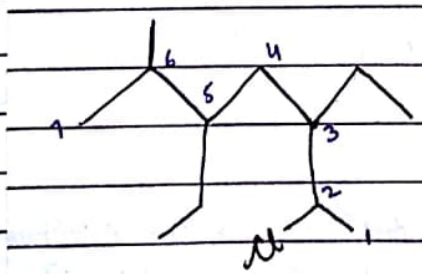
2-Methyl Butane



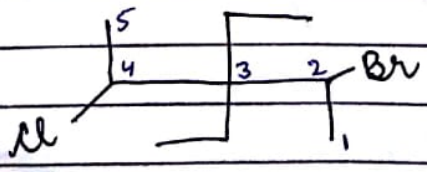
3-Bromo-2 Chloro Pentane



3,4 diethyl - 2,5 dimethyl Hexane



2-Chloro - 3,5 - diethyl - 6-methyl heptane



2-Bromo - 4 - Chloro - 3,3-diethyl Pentane

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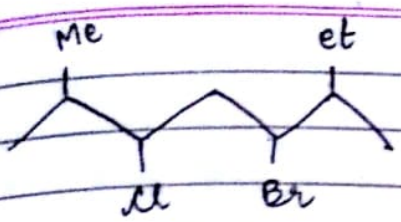
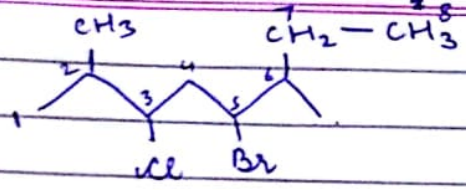
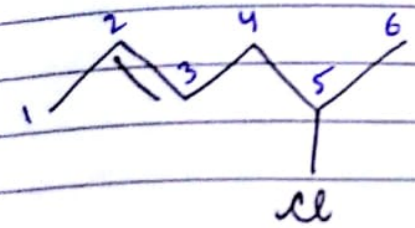
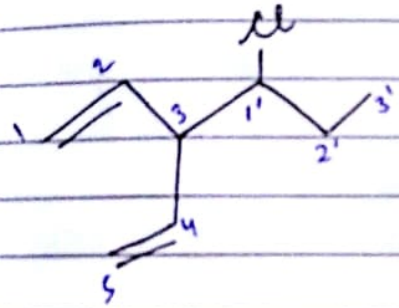




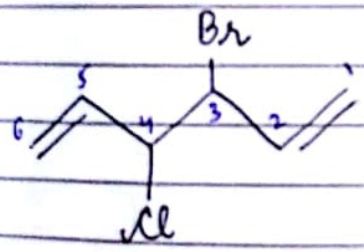
5-Bromo-3-Chloro, 2,6-dimethyl Octane



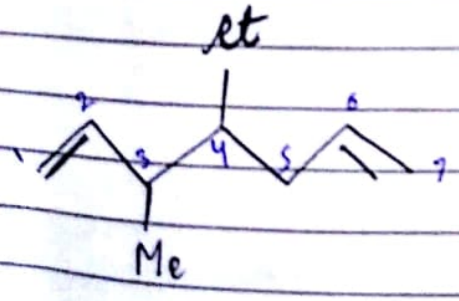
5-Chloro-~~Hex~~ Hex-2-ene



3(1'-Chloro Propyl) ~~Hex~~ Pent-1,4-diene



3-Bromo-4-Chloro hex-1,5 diene



4-ethyl-3-methyl-hept-1,6-di ene

$\overset{1}{CH_2}=\overset{2}{CH}-\overset{3}{CH_2}-\overset{4}{C}\equiv\overset{5}{CH}$ Pent-1-ene-4-yne

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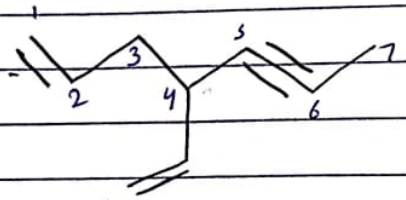
AIPMT-10

$CH_3 - CH = CH - CH_2 - C \equiv CH$

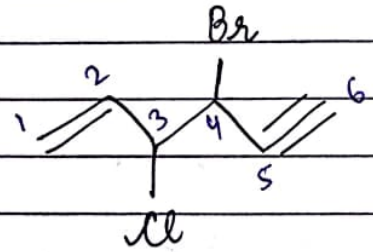
Hex - 4 - ene - 1 - yne

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

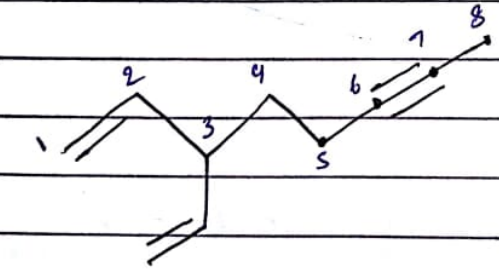
2 - Ethyl - 3 - Methyl But~~a~~ - 1, 3 - diene



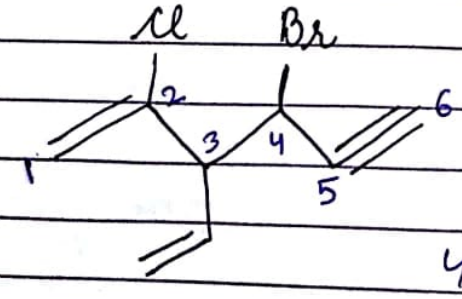
4 - ~~Eth~~ Vinyl hept - 1 ene - 5 - yne
or
4 - ethenyl hept - 1 - en - 5 - yne



4 - Bromo - 3 - Chloro - Hex - 1 - ene 5 - yne



3 ethenyl - Oct - 1 ene - 6 - yne



4 - Bromo - 2 - Chloro - 3 Ethenyl - Hex - 1 ene - 5 yne

4 - Bromo - 2 - Chloro - 3 - Vinyl Hex - 1 ene - 5 - yne

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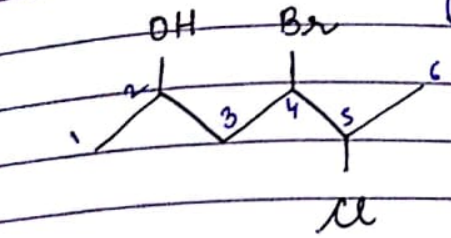
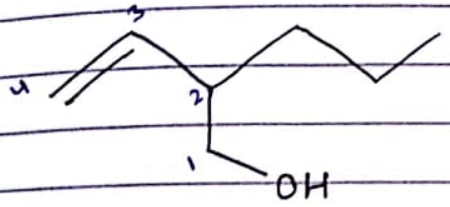
Prefix — Suffix

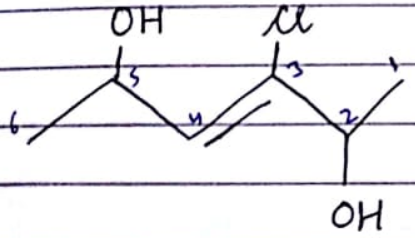
−OH — Hydroxy — ol



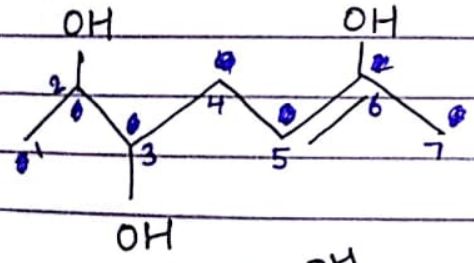
4 - Bromo - 5 - Chloro - 2 - Hexanol



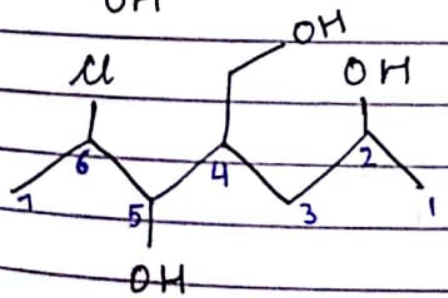
2 - Propyl - But - 3 - ene - 1 - ol



3 - Chloro - Hex - 3 - ene - 2, 5 - diol



hept - 5 - ene - 2, 3, 6 - triol



6 Chloro - 4 hydroxy Methyl hept - 2, 5 - diol

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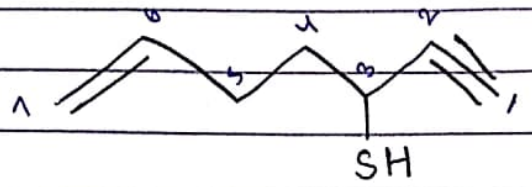
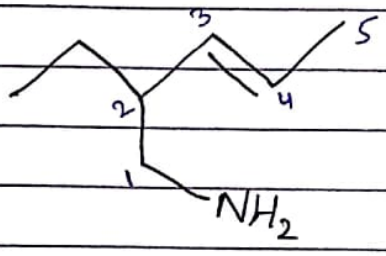
	Prefix	Suffix
$-SH$	mercapto	thiol

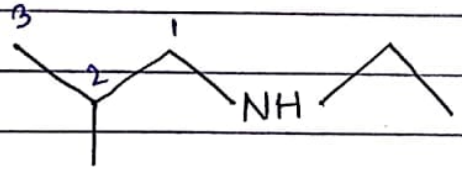


Hept - 6 - ene - 1 - yne - 3 - thiol

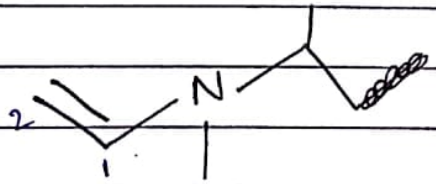
	Prefix	suffix
$-NH_2$	amino	amine



2 - Ethyl - Pent - 3 - ene - 1 - amine

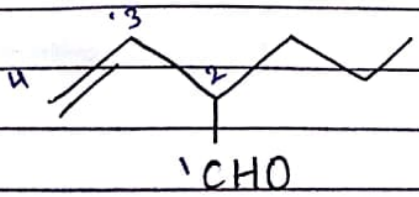


N - ethyl - 2 - methyl Propan amine

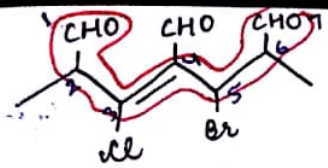


N - isopropyl - N - methyl ethene amine

	Prefix	Suffix
$-CHO$	oxo / formyl	al / carbaldehyde



2 - Propyl But - 3 - en al



5-Bromo - 3 Chloro . 4 - formyl - 2,6 - dimethyl hept an - 1, 7 - dial

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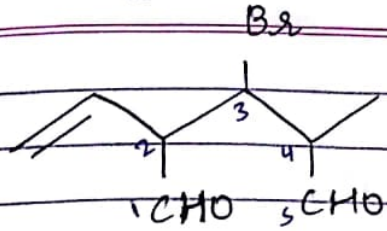
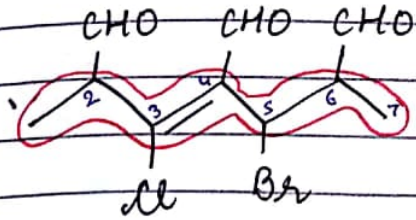
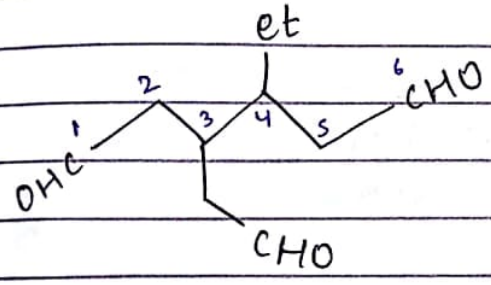


3-Bromo - 2- ethenyl - 4 - methyl Pentan - 1, 5 - dial

Note : When more than 2 carbon containing same func gp are attached to main ring chain then exclude all of them.

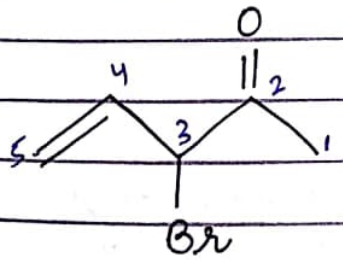


5-Bromo - 3 -Chloro hept - 3-ene -2,4,6 - tricarbaldehyde

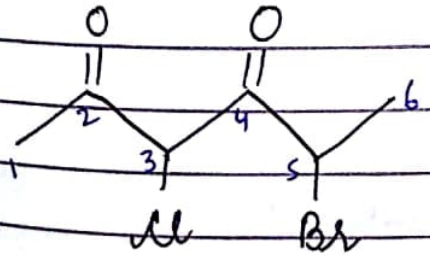


4- ethyl - 3- formyl methyl - hexan - 1, 6 - dial

	Prefix	Suffix
$-\overset{\overset{O}{\|\|}}{C}-$	oxo / keto	one



3 - Bromo - Pent - 4 - en - 2 - one



5 Bromo - 3 - Chloro hexan - 2, 4 - dione

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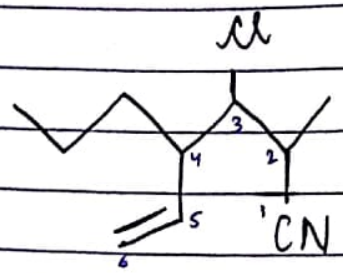
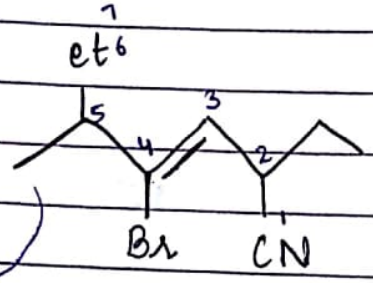
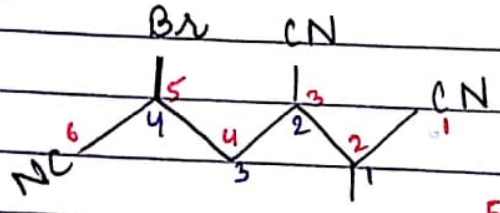
$-CN$ $-(C)N$ $-CN$ x cyano nitrile carbonitrile



3-Chloro-2-Methyl-4-Propyl-hex-5-ene nitrile



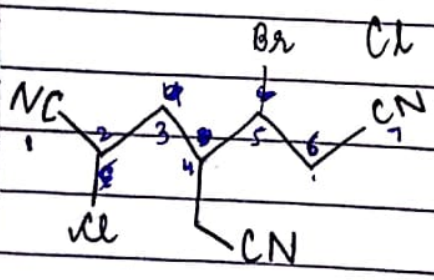
4-Bromo-2-ethyl-5-Methyl hept-3-ene nitrile



Pfg
CHS 1,3,4
RHS 1,2,4

4-Bromo-1-Chloro butane-1,2,4-carbo nitrile

5-Bromo-2-Chloro-3-cyano hexane-1,6-dinitrile



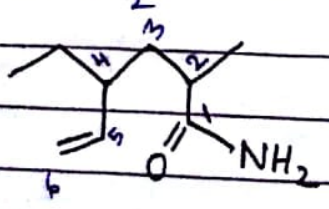
5-bromo-2-Chloro-4-cyano methyl heptane-1,7-dinitrile

$-\overset{O}{\overset{\|}{C}}-NH_2$

$-(\overset{O}{\overset{\|}{C}})-NH_2$

$-\overset{O}{\overset{\|}{C}}-NH_2$

x carbamoyl amide carboxamide



4-Ethyl-2-Methyl-hex-5-ene amide

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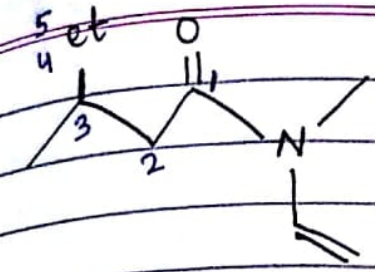
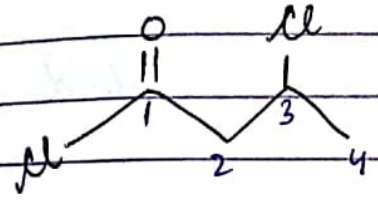
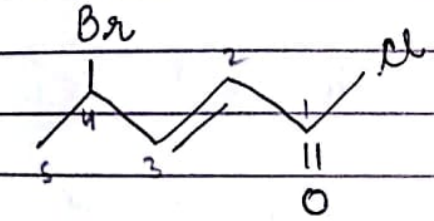


N-ethenyl-3,N-dimethyl Pent-anamide

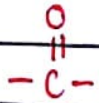
	X	oyl halide
	halo formyl	carbonyl halide

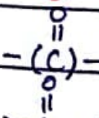


3-Chloro-Butanoyl Chloride

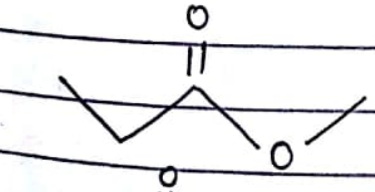


4-Bromo-Pent-2-eneoyl Chloride

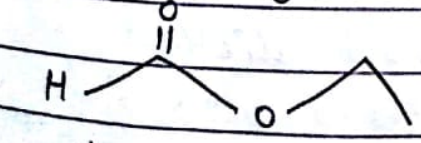




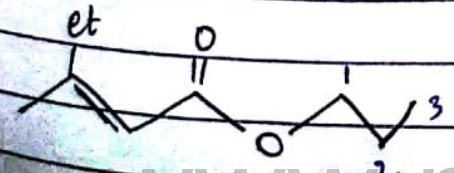
	X	alkyl --- oate
	alkoxy carbonyl	alkyl --- carboxylate



methyl-Propanoate



Ethyl-Methanoate



Propyl Ethyl-3-Methyl-Pent 2-ene oate

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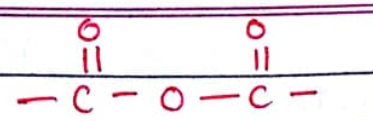
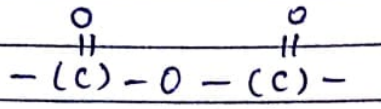
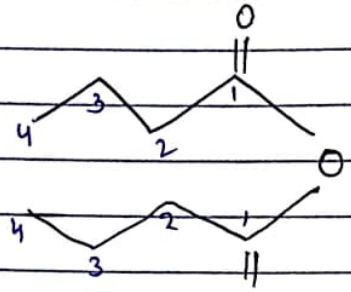
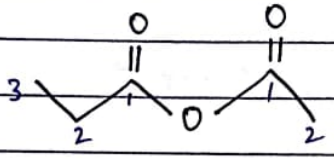




× oic anhydride

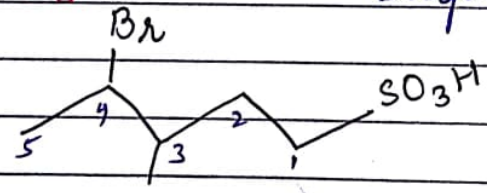


Butanoic anhydride



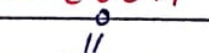
Ethanoic - Propanoic anhydride

$-SO_3H$ Sulpho sulphonic acid



4-Bromo-3-Methyl Pentane sulphonic acid.

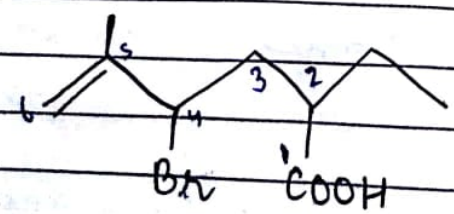
$-COOH$



× oic acid

$-C(=O)-OH$ Carboxy carboxylic acid

et



4-Bromo-2,5-diethyl hex-5-ene-oic acid

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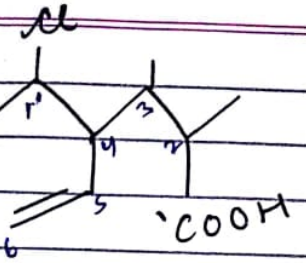
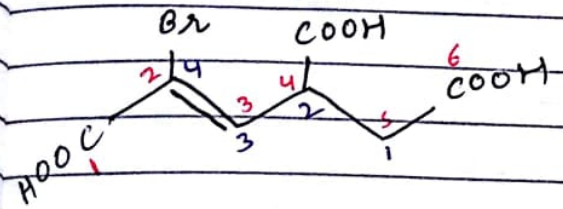


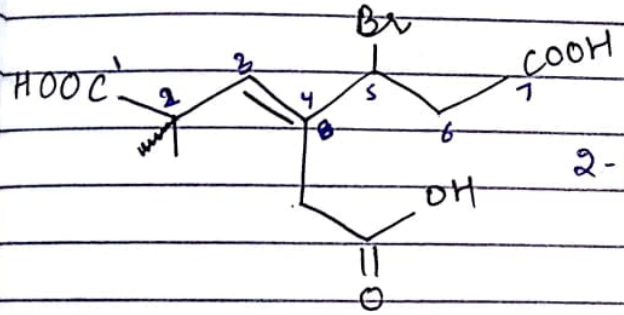
4 (1'-Chloro Ethyl) - 2, 3 - dimethyl hex - 5-ene - oic acid



2-bromo - 4-carboxy hex - 2 - ene - 1, 6 - dioic acid

But-3-ene -

4 - Bromo - 1, 2, 4 - ~~dicarboxy~~ dicarboxylic acid ~~But-3-ene~~

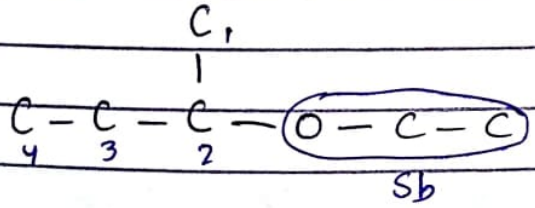


5 - Bromo - 4 - carboxy ~~ethyl~~ methyl 2 - Methyl-Hept - 3 - ene - 1, 7 - dioic acid

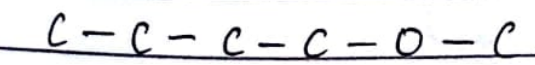
IUPAC Naming

$CH_3 - O - CH_3$ methoxy methane

$CH_3 - CH_2 - O - CH_3$ methoxy ethane



2 - ethoxy butane



butoxy ethene

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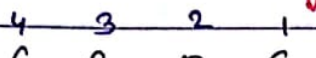
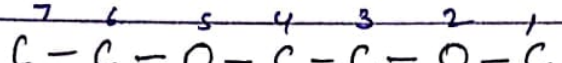
Oxa - System →

O को C atom से जोड़कर Least locant no. देनी है

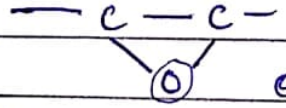


2-oxa-butane

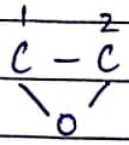


2,5-dioxa heptane

Cyclic ether

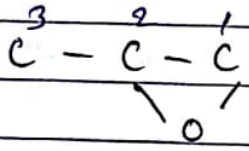


epoxy

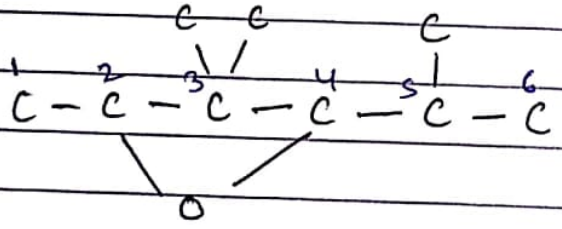


epoxy ethane

Or oxirane (trivial name)

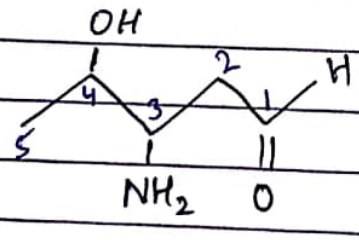


1,2-epoxy propane

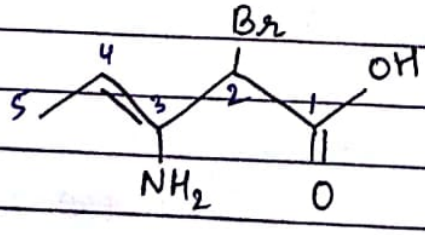


2,4-epoxy-3,3,5-trimethyl hexane

IUPAC Naming of Polyfunctional group :-



3-amino-4-hydroxy Pentanal



3-amino-2-Bromo-Pent-3-enoic acid

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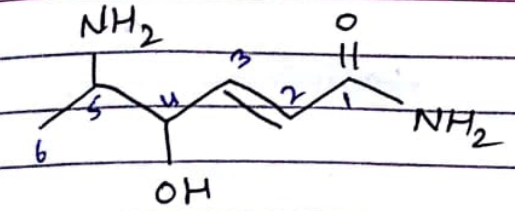
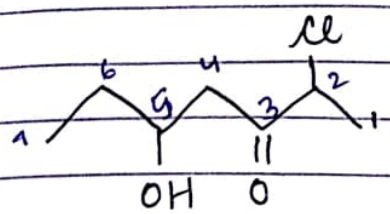
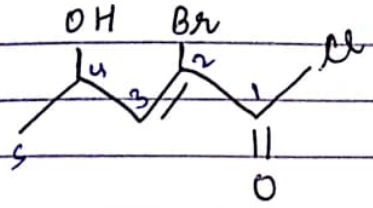


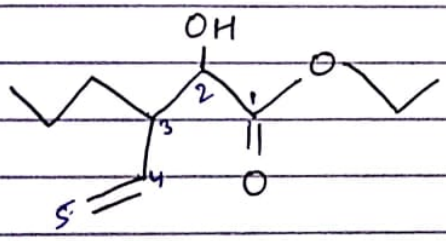
5 - amino - 4 - hydroxy hex - 2 - ene amide



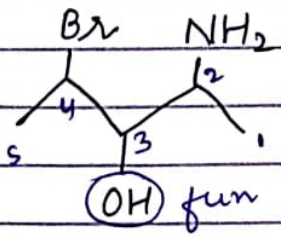
2 - Chloro - 5 - hydroxy heptan - 3 - one



2 - Bromo - 4 - hydroxy Pent - 2 - eneoyl Chloride

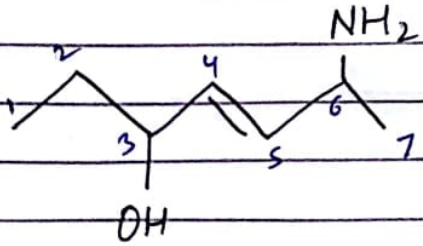


ethyl - 2 - hydroxy - 3 - Propyl Pent - 4 - eneoate

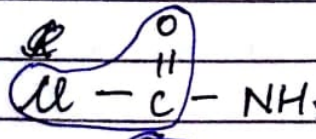


2 - amino - 4 - Bromo ~~- 3 - hydroxy~~ Pentan 3-ol ~~amine~~

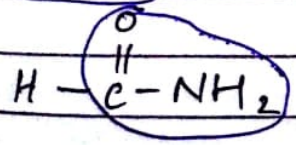
(OH) fun



6 - amino hept - 4 - ene - 3 - ol



amino · methanoyl chloride



methanamide

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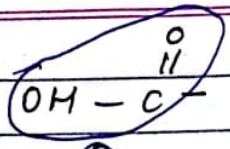
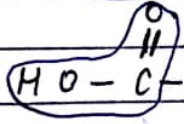
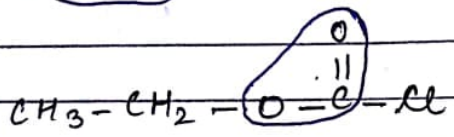


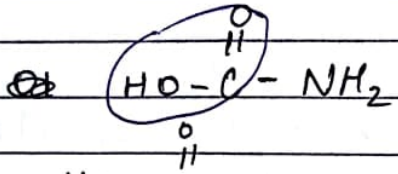
methoxy methanoic acid



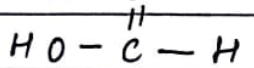
Chloro methanoic acid



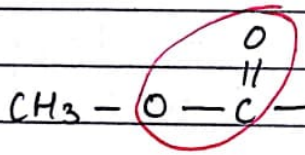
ethyl chloro methanoate



amino methanoic acid

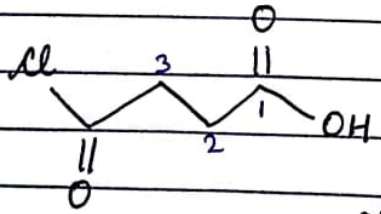


methanoic acid

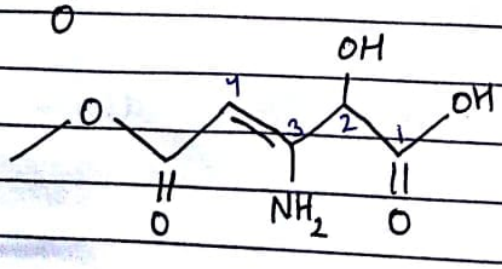


methyl amino methanoate

Note: In polyfunctional gp containing substance if C-containing func gp is +nt as substituents then its C is not considered in P.C.C. but in case of -CHO & $-\overset{\overset{O}{\|}}{C}-$ its C ~~is~~ can be included in chain.



Chloro formyl
3-~~methyl chloride~~ - Propanoic acid



3-amino-2-hydroxy-4-methyl carbonyl-3-butenoic acid

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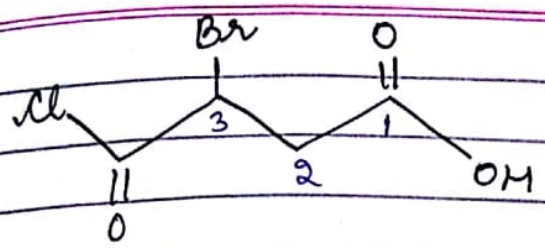
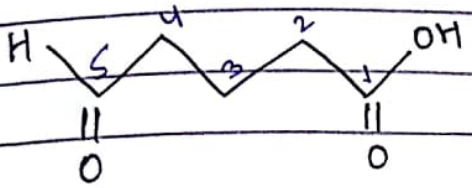
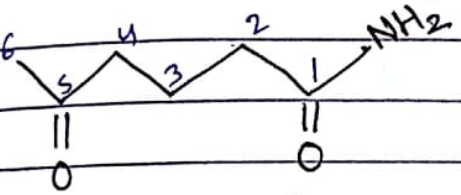


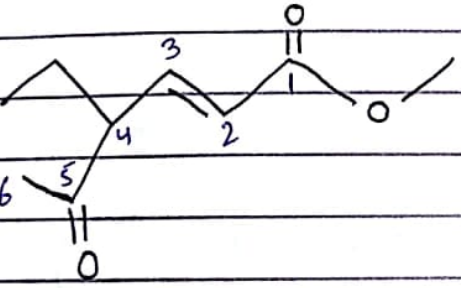
3 - Bromo - 3 - Chloroformyl Propanoic acid



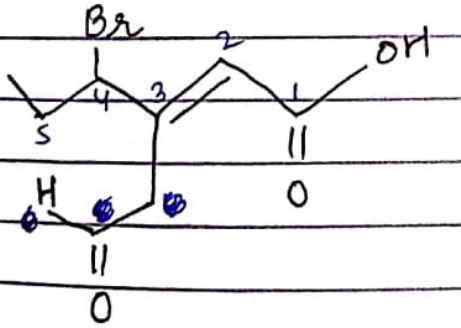
5 - Oxo - Pentanoic acid



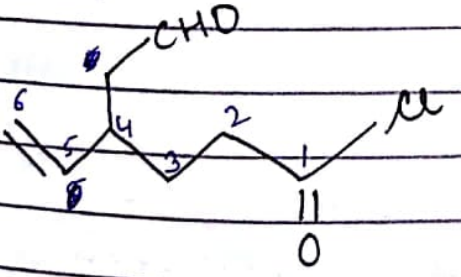
5 - Keto - Hexanamide



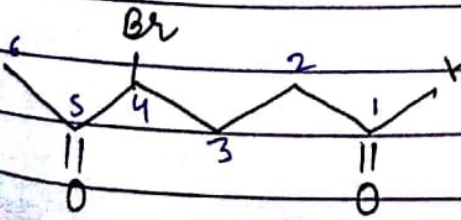
4 - ethyl - ~~methoxycarbonyl~~
5 - keto ~~Hexo - 2 - ene~~ methyl
Hex - 2 - ene oate



~~5 - Keto - 3 - Bromo Propyl~~
~~Hex - 2 - ene oic acid~~
4 - Bromo - 3 - methyl formyl hex - 2 - enoic acid



formyl methyl
4 - ~~Methyl formyl~~ - 5 - hexenoyl Chloride



4 - Bromo - 5 - keto Hexanal

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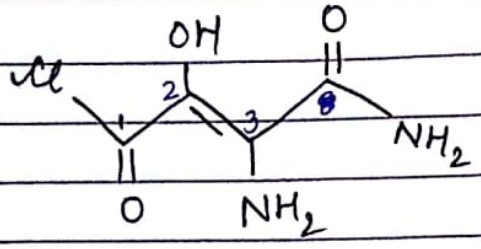
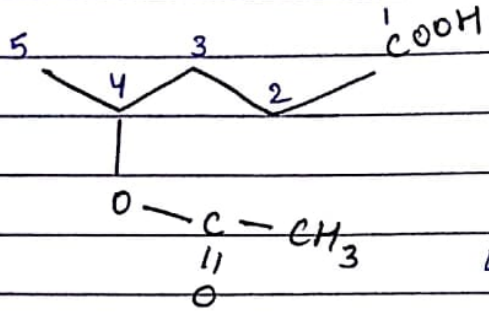
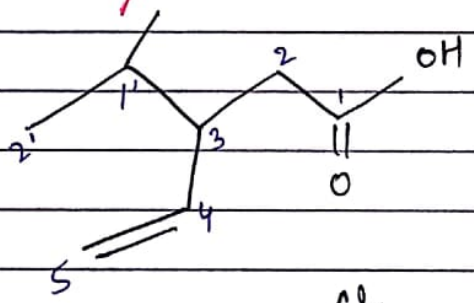


3 - amino - 3 - carbo amoyl
2 - hydroxy Prop
- 2 ene - chloro
oyl chloride

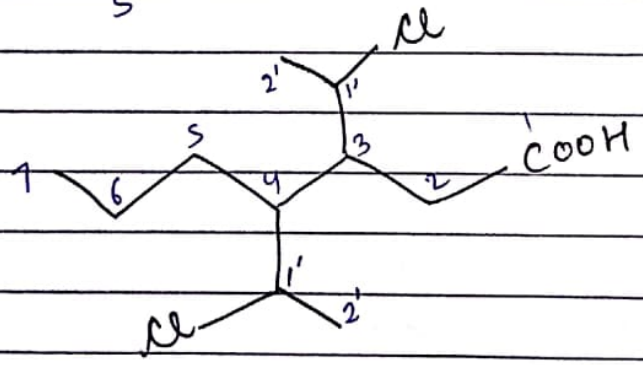


4 - ethanoyloxy pentanoic acid
or
4 - acetoxy Pentanoic acid

Complex Substitutent :-



3 isopropyl Pent - 4 - eneoic acid
or
3 (1'-methyl ethyl) pent - 4 - enoic acid



bis - 3,4 - (1'- Chloroethyl) heptanoic acid

IUPAC name of Cyclic compounds :-

Rule ① If an org. comp. is consist of open chains & closed chain then that chain will be PCC which have -

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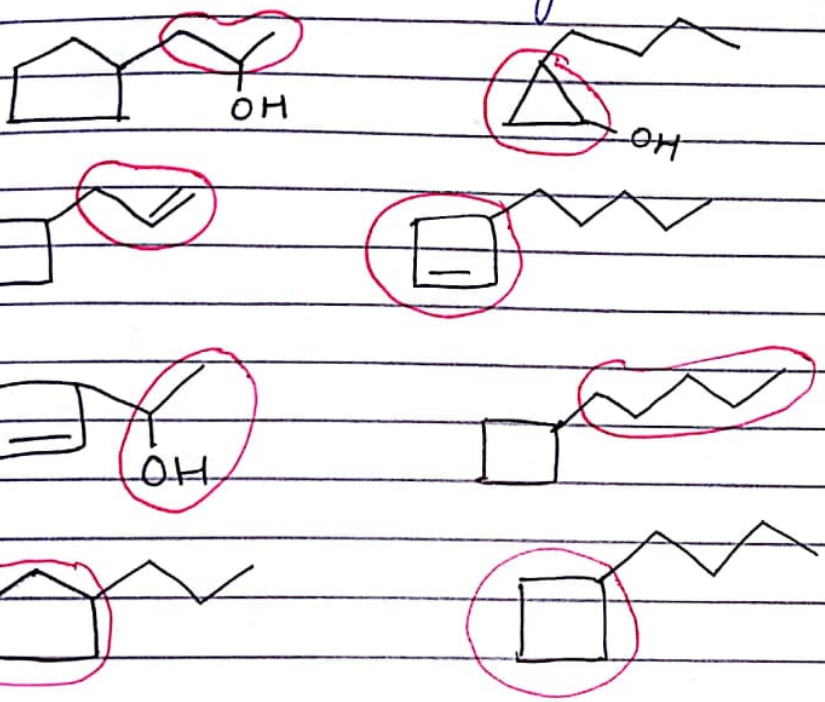
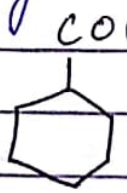
Pfg > max^m no. of m.b. > max^m no. of C-atom or longest chain > ring if open & closed chain have same no. of C-atom



Rule-2 If C-containing Pfg is directly attached to ring then it is consider as part of ring but its C is not included in P.C.C.



cyclo hexane carboxylic acid

cyclo hexane carbonitrile

Numbering as usual

Note:- ① ring prefix → cyclo
② Word cyclo is considered in alphabetical order

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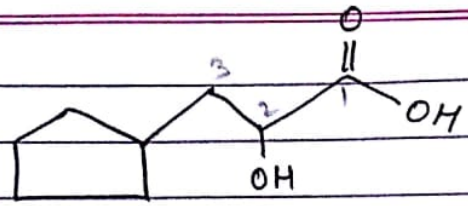
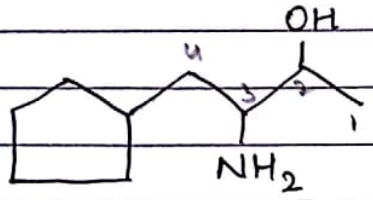
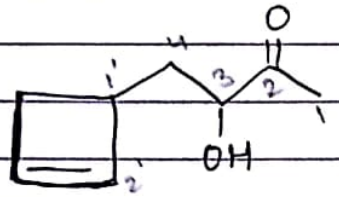


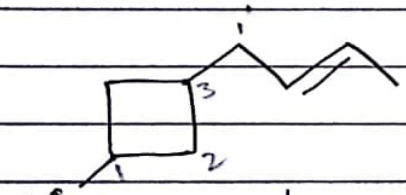
3-cyclo Pentyl-2-hydroxy Propanoic acid



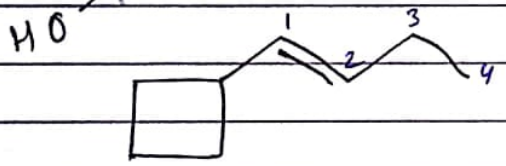
3-amino-4-cyclo Pentyl -Butan-2-ol



4 (2'-cyclobutenyl) -3-hydroxy -2-butanone

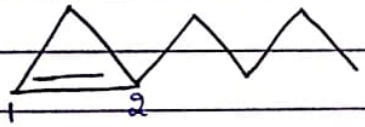


3 (2'-butenyl) butanol

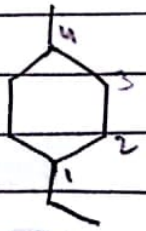


1-cyclo Butyl Buto-1-ene

2-Butyl-cyclo Propene



1-Butyl-2-Chloro-cyclo Butane



1-Ethyl-4-Methyl cyclo hexane

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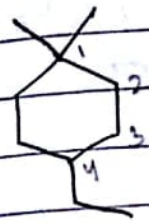
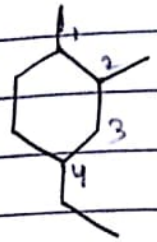
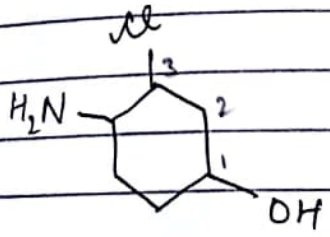


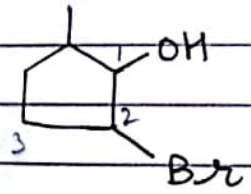
4-Ethyl-1,1-dimethyl cyclohexane.



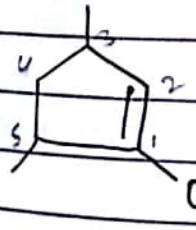
4-ethyl-1,2-dimethyl cyclohexane



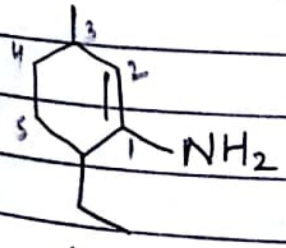
4-amino-3-chloro cyclohexanol



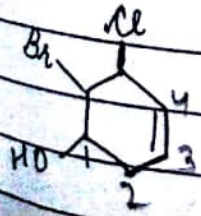
2-Bromo-5-methyl cyclo Pentanol



3,5-dimethyl cyclo Penteneol



6-Ethyl-3-Methyl cyclo Hexeneamine



6-Bromo-5-Chloro-cyclohex-3-eneol

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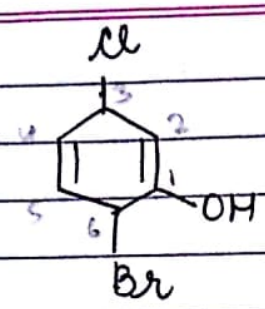
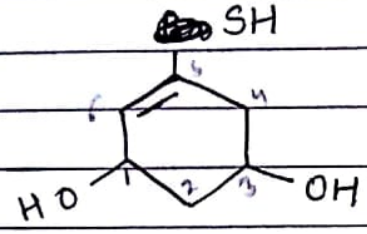
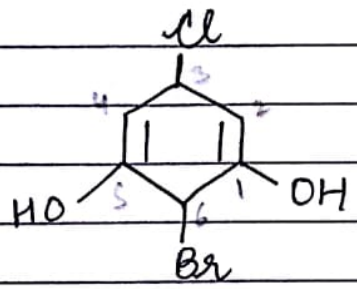
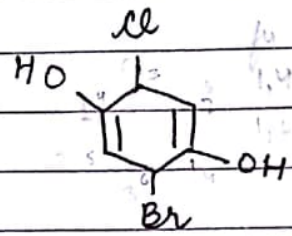


6 - Bromo - 3 - Chloro - cyclohex-1,4 -dienol



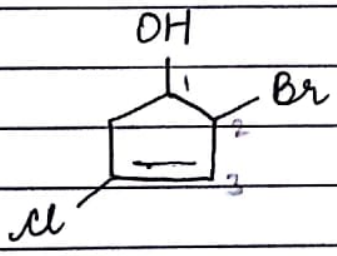
5- mercapto - cyclo - hex - 5-ene - 1, 3 - diol



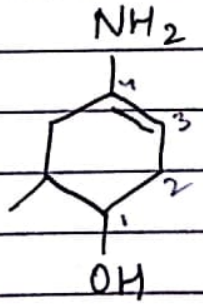


3- Bromo - 6 - Chloro cyclohex-1,4-diene -1,4-diol

6-Bromo - 3- Chloro cyclohiex - 1,4-di-ene-1,5-diol

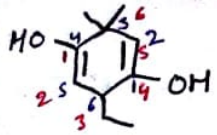


2- Bromo - 4 - Chloro - cyclo Pent-3-enol



4- amino - 6 - methyl - cyclo hex-3-enol

1 - carbonyl chloride - cyclohexane



Pf	mb	sb
1,4	1,4	3,3,6 ✓
1,4	1,4	3,6,6

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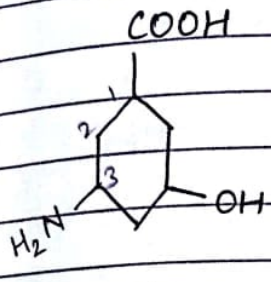
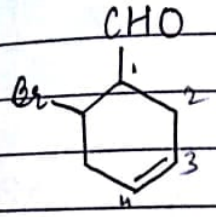
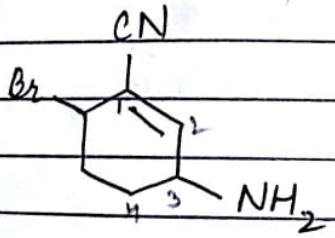
2- cyclo hexyl ethanal



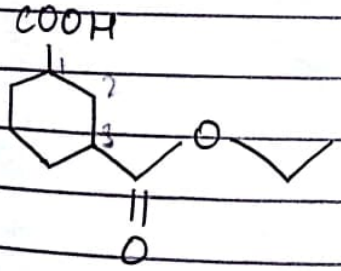
3 - amino - 5 - hydroxy - cyclohexane carboxylic acid



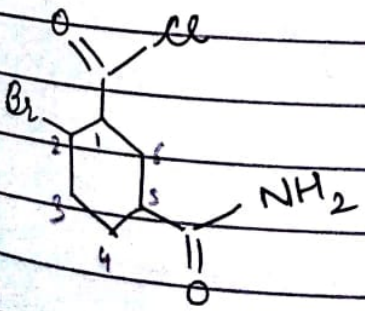
6 - Bromo - cyclohex - 3 - ene - carbaldehyde



3 - amino - 6 - Bromo - cyclohexene carbonitrile



3 - ethoxy carbonyl - cyclo hexane carboxylic acid



2 - Bromo - 5 - carbamoyl cyclo - hexane carbonyl halide

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IUPAC Name of Aromatic


Benzene


toulene


Phenol

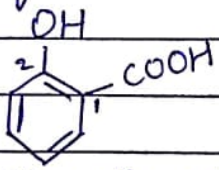

aniline

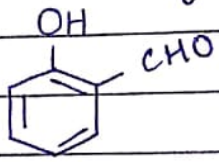

Benzoic acid

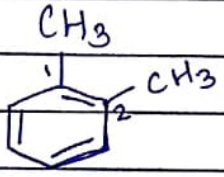

Benzaldehyde

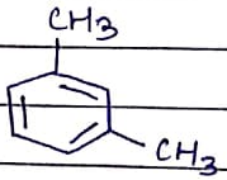

Benzonitrile


anisole

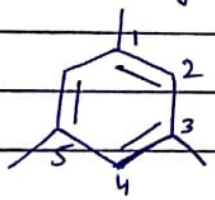

Salicyclic acid
2-hydroxy benzoic acid


Salicyaldehyde
2-hydroxy benzaldehyde


1, 2- dimethyl benzene
O- Xylene


m-Xylene


P-Xylene


1, 3, 5- trimethyl benzene
or
mesitylene

Rule: ~~Its~~ If aromatic compd is consist of open and closed chain then PCC will be
① which have P func gp.
② Open chain if it have more than 2 carbon

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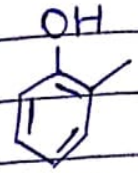
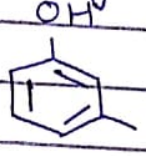
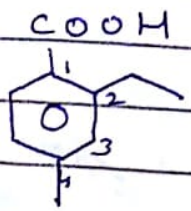
(in case when fun^{c} gp not +nt)



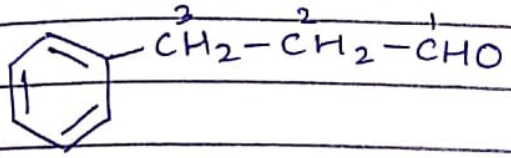
2-methyl Phenol
O-Cresol



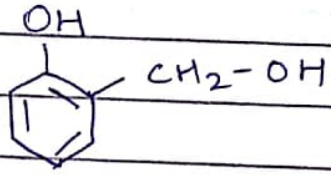


2-ethyl-4-methyl benzoic acid

2-phenyl ethanoic acid

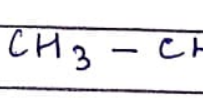


3-phenol propanal



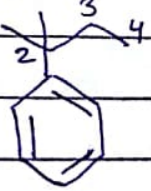
✓2-hydroxy methyl phenol
≡(2-Hydroxy phenyl)-methanol

OH → phenolic gp
Phenol



alcoholic gp

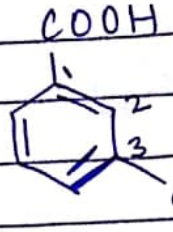
Alcoholic gp has more priority than phenolic gp.



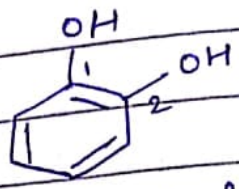
methyl benzene ethyl benzene 2-phenyl propane

1-Chloro-3 phenyl propane

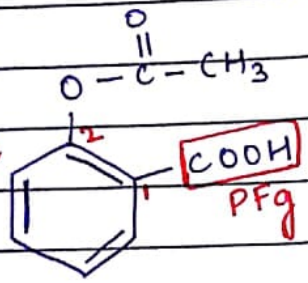
If more than 2 fun^{c} gp are ⁺ⁿᵗ



benzene-1,3-dicarboxylic acid

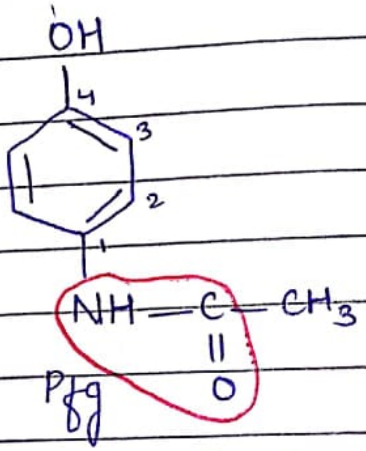


catechol
benzene-1,2-diol



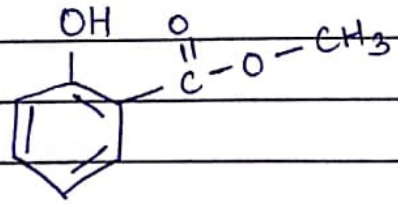
Aspirin
PFg

2-ethanoyl oxy benzoic acid
2-acetoxy benzoic acid
acetyl salicylic acid



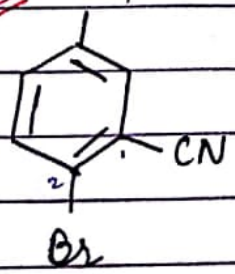
PFg

N-(4-hydroxy phenyl) ethanamide
Paracetamol



IUPAC
methyl-2-hydroxy Benzoate
common methyl salicylate
→"oil of winter green"

IIT-09



* 2-Bromo-5-hydroxy ~~phenyl cyano~~ benzo nitrile

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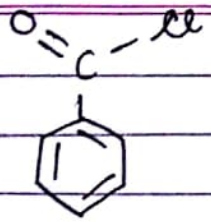
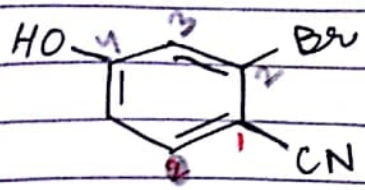
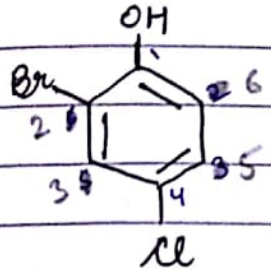


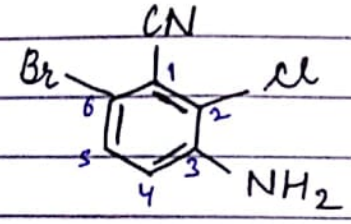
Benzene carbonyl chloride



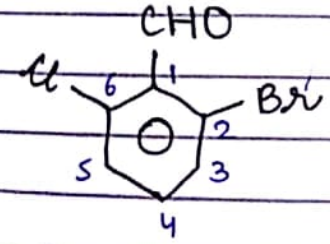
6 - Bromo - 4-hydroxy ~~benzene~~ benzo nitrile



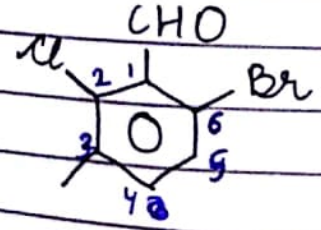
2 6 - Bromo - 4-Chloro - benzanol

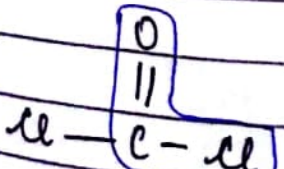


3 - amino - 6 - Bromo - 2 - Chloro ~~Ste~~
Benzo - nitrile.



2 - Bromo - 6 - Chloro - Benzaldehyde





Phosgene gas
poisonous gas
Chloro - methanoyl chloride

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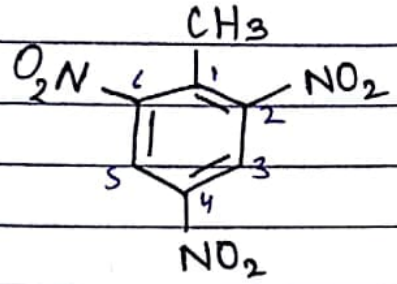
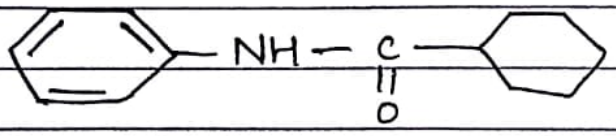
CCl_4 tetrachloro methane

$CHCl_3$ → chloroform / 1,1,1 - trichloro methane

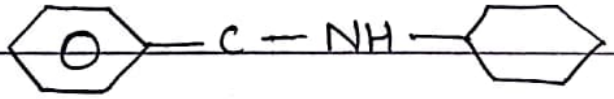
tear gas → $CCl_3.NO_2$
trichloro nitro methane



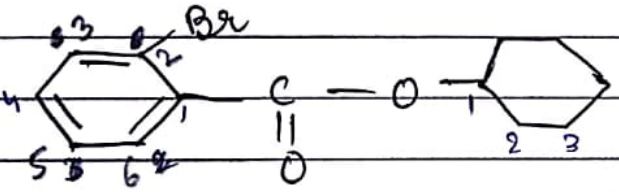
2,4,6 - trinitro toulene



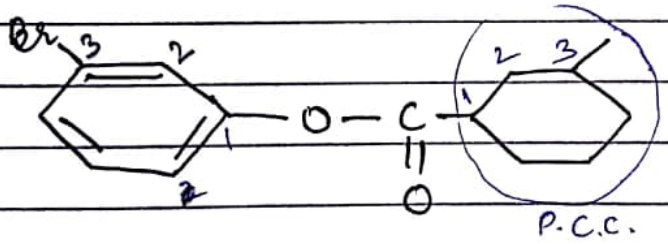
N - Phenyl ~~carbox~~ cyclo hexane carboxamide ~~hexane~~



N - cyclo - hexyl benzene carboxamide



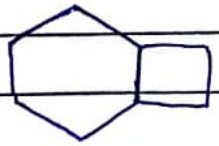
(4 - methyl cyclo hexyl) - 6 - Bromo Benzoate



(5 - bromo phenyl) - 3 methyl cyclo hexane carboxylate

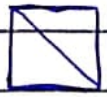
Bicyclo compounds

4 rings are fused



General formula → C_nH_{2n-2}

min C → 4C



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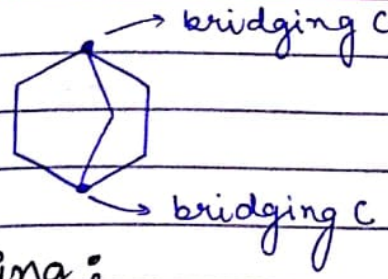
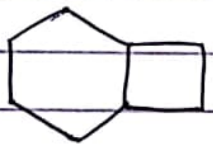
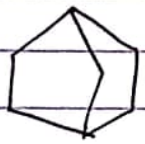


Naming:

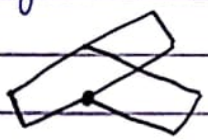
- Prefix → bicyclo
- no. of C-atoms in bridges are written in ↓ order in square bracket separated by full stop (.)
  [ ]
- word root → total no. of C-atom



bicyclo [4.2.0] Octane

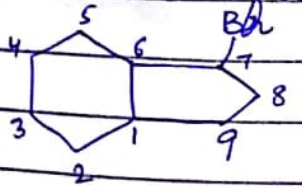


bicyclo [2.2.1] heptane

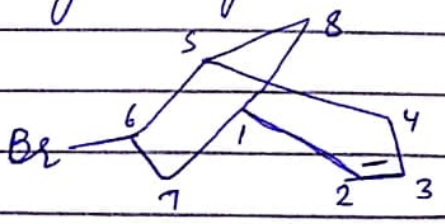


bicyclo [2.2.2] Octane

If Subs. is +nt then numbering start from bridged carbon & then we move from large ring to small ring



bicyclo [4.3.0] -7-Bromo nonane



bicyclo [3.2.1] 6-bromo-Oct-2-ene

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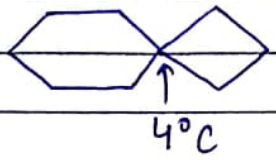
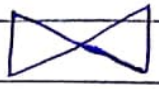
Spiro - compounds :-

When 2 rings are fused at common carbon (4°C)

eg 

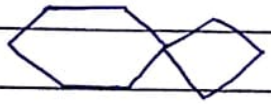
G.F. → C_nH_{2n-2}

min. no. of C → 5C

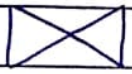


Naming :-

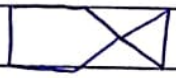
- Prefix spiro
- no. of C atoms in ring are written in ↑ order
- word root, suffix.



Spiro [3.5] nonane



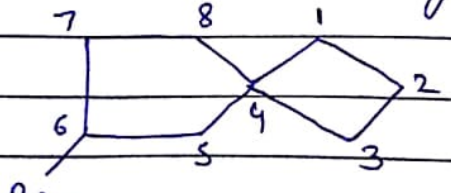
Spiro [2.2] Pentane



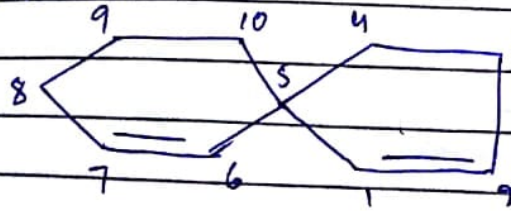
Spiro [2.4] heptane

* Sub is +nt

Numbering starts from adjacent carbon to common C & move through smaller ring to large ring



Spiro [4.3.4] - 6 - Bromo Octane



Spiro [4.5] dec - 1, 6 - diene

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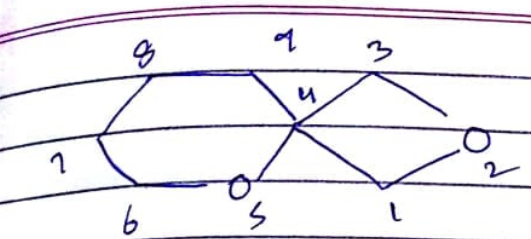
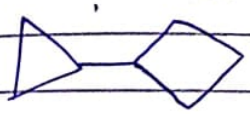
c)



spiro [3.5] 2,5 dioxa nonane

Extra different org i.e. no common carbon



1 - Chloro - 4 - Methyl benzene
4 - Chloro - toulene