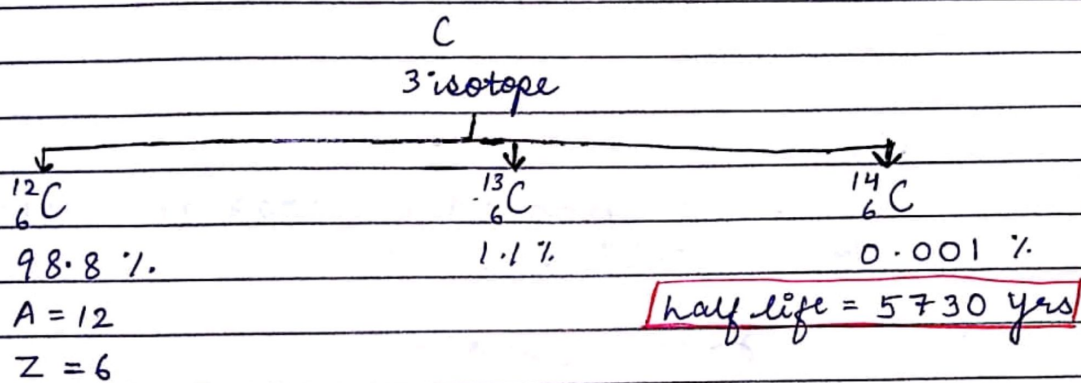


15/11/17

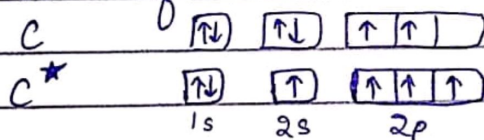
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Organic Chemistry is the study of compds. containing carbon.

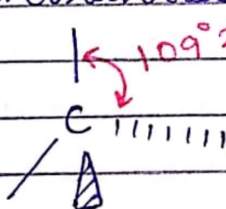


Characteristic of C :-

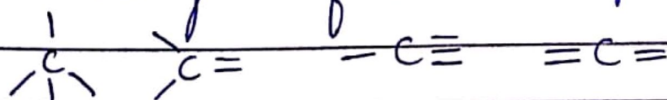
1. Tetraivalent : C form 4 bond in excited state.



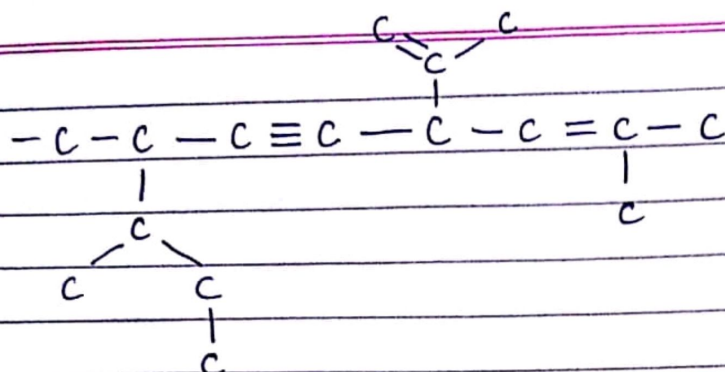
2. Tetrahedral : 4 bonds are directed towards corner of tetrahedron.



3. Tendency to form multiple bond :

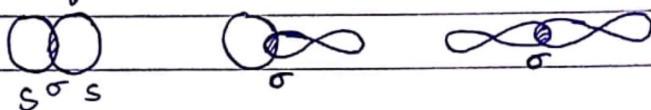


4. Catenation : Self linking property of C to form long chain.

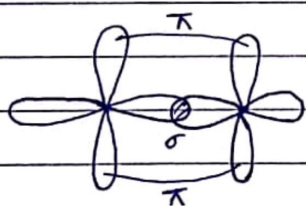


5. Hybridisation :

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



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

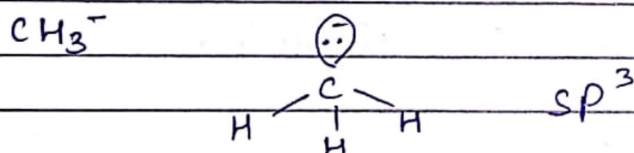
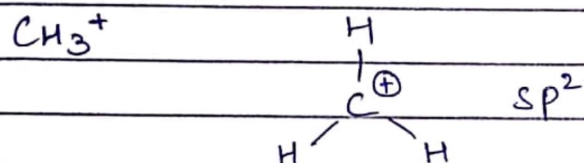


Note :- ① σ bond is stronger than π -bond because the extent of overlapping is more in σ bond.

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

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

S.No. = no. of σ bond + no. of lp.



E.N. $\propto$ % s-char

	sp	sp^2	sp^3
% s char	$\frac{1}{2} \times 100$ = 50%	$\frac{1}{3} \times 100$ = 33.3%	$\frac{1}{4} \times 100$ = 25%

E.N. $\rightarrow sp > sp^2 > sp^3$
3.25 2.75 2.5

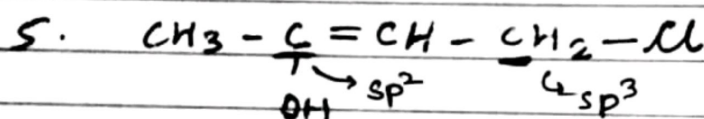
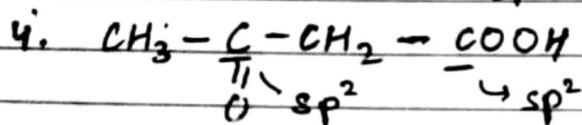
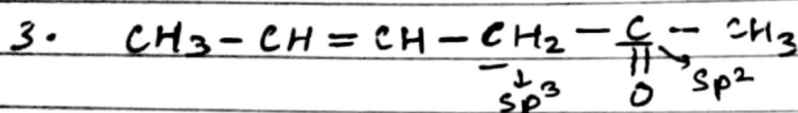
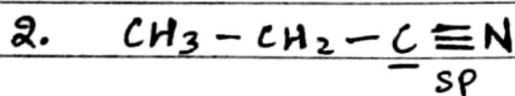
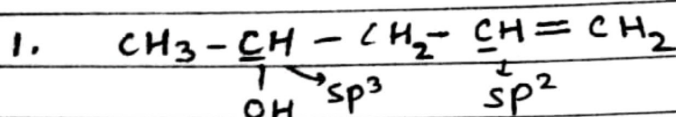
B.L. $\propto \frac{1}{E.N.}$ $sp < sp^2 < sp^3$

B.S. $\propto E.N$ $sp > sp^2 > sp^3$

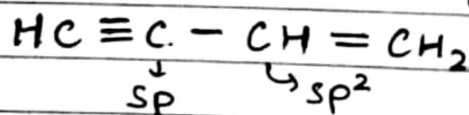
or

B.S. $\propto \frac{1}{B.L}$

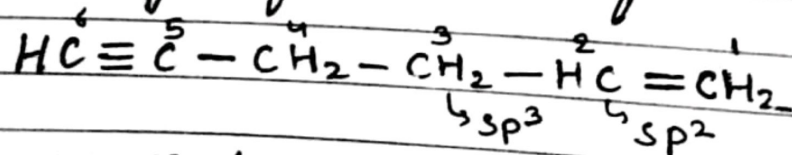
Ques Find hyb. of underlined C ?



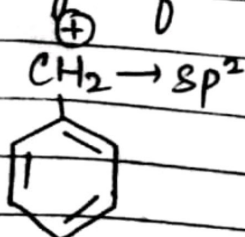
Ques Find hybridisation of C-C single bond



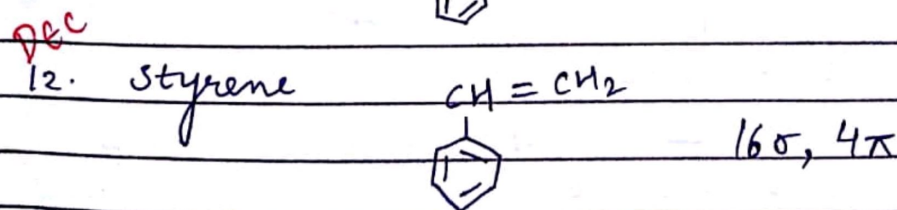
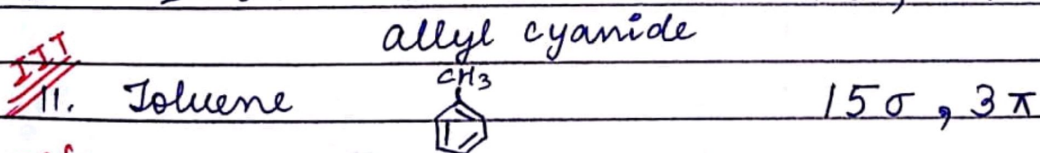
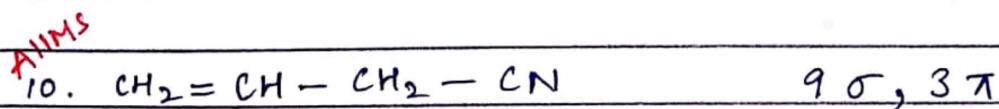
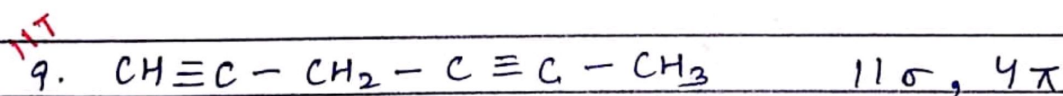
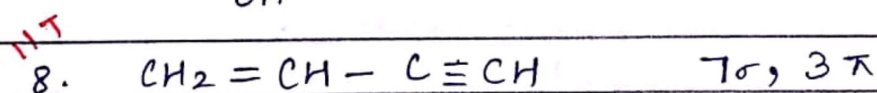
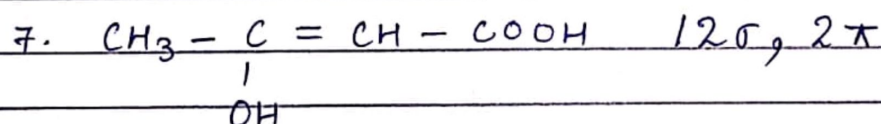
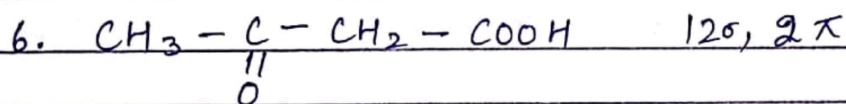
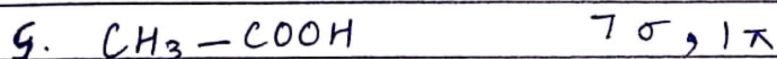
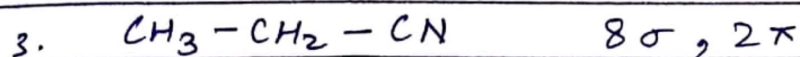
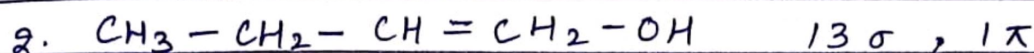
Ques Find hyb. of C₂ & C₃ in following



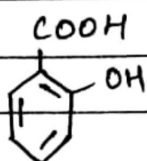
Ques Find hyb. of Carbonium ion ?



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

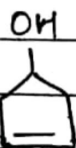


13.



16 σ , 4 π

14.



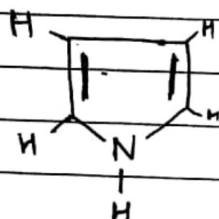
14 σ , 1 π

15.



23 σ , 2 π

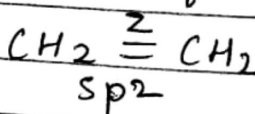
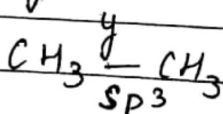
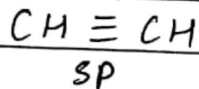
16.



10 π , 2 π

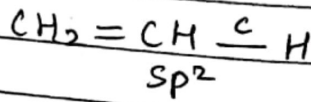
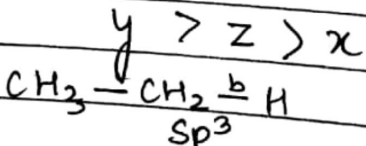
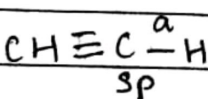
Ques Arrange following in $\uparrow$ ing order of B.L.?

(1)



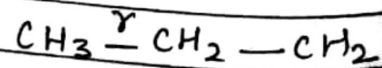
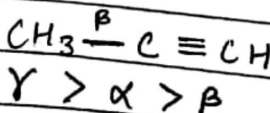
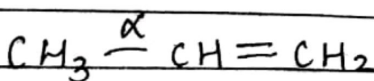
B.L. $\propto \frac{1}{\text{E.N}}$

(2)



$\text{y} > \text{z} > \text{x}$
 $\text{b} > \text{c} > \text{a}$

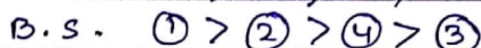
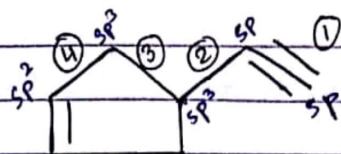
(3)



111

PAGE NO.: 7
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(4)

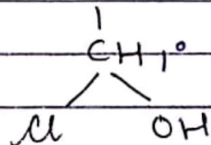
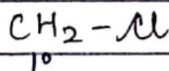
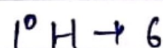
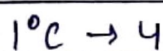
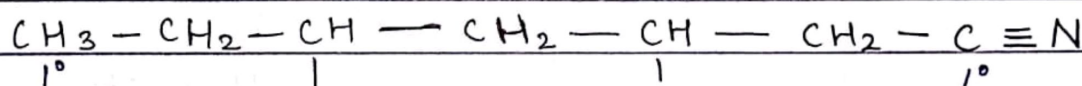


Type of Carbon and Hydrogen :-

1. Primary Carbon & Primary Hydrogen :-

$1^\circ \text{C} \rightarrow \text{C}$ which is attached to only 1° carbon.

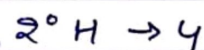
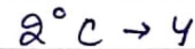
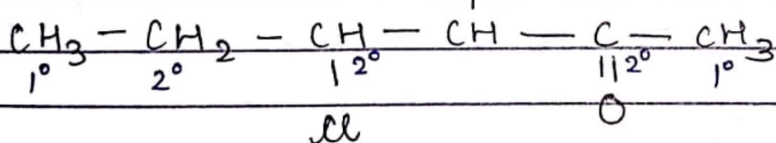
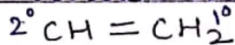
$1^\circ \text{H} \rightarrow \text{H}$ which is attached to only 1°C .



2. Secondary Carbon & Secondary Hydrogen :-

$2^\circ \text{C} \rightarrow \text{C}$ which is attached to 2° carbon.

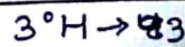
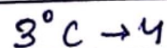
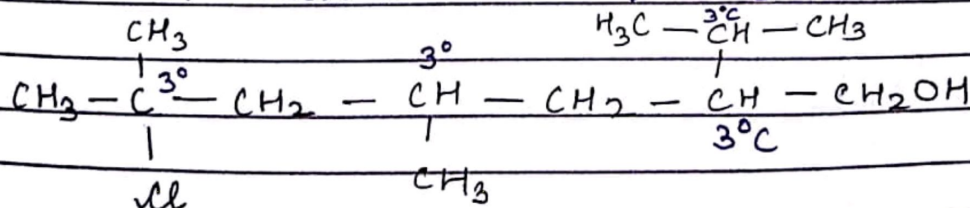
$2^\circ \text{H} \rightarrow \text{H}$ which is attached to 2°C .



3. Tertiary Carbon & Tertiary Hydrogen :-

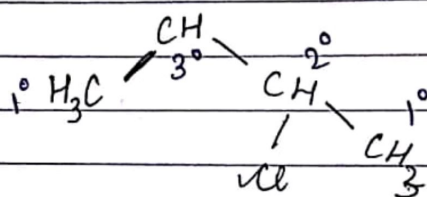
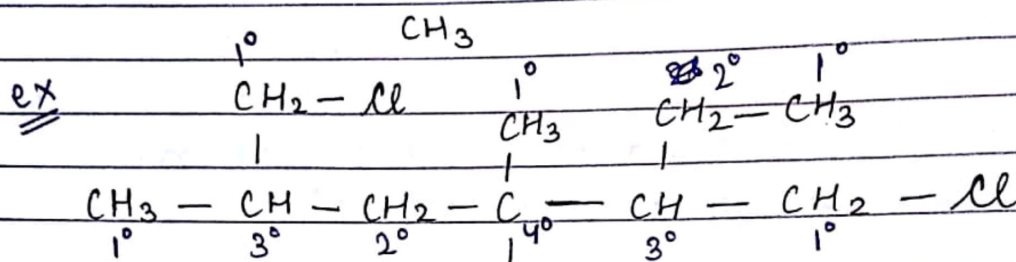
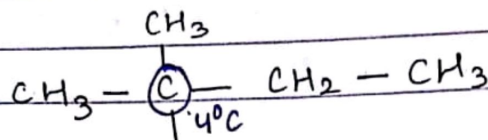
$3^\circ \text{C} \rightarrow \text{C}$ which is attached to 3° carbon.

$3^\circ \text{H} \rightarrow \text{H}$ which is attached to 3°C .



4. Quaternary Carbon :-

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



$$1^\circ\text{C} \rightarrow 7\text{C}$$

$$1^\circ\text{H} \rightarrow 19\text{H}$$

$$2^\circ\text{C} \rightarrow 3\text{C}$$

$$2^\circ\text{H} \rightarrow 5\text{H}$$

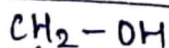
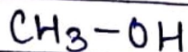
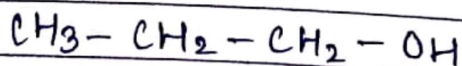
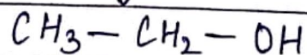
$$3^\circ\text{C} \rightarrow 3$$

$$3^\circ\text{H} \rightarrow 3$$

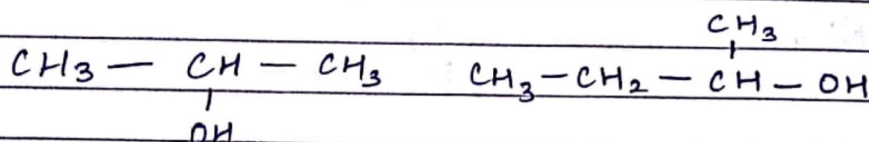
$$4^\circ\text{C} \rightarrow 1$$

Type of Alcohol :-

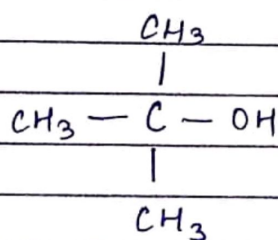
1. Primary Alcohol :- (1°OH) The alcoholic compd. in which OH gp. is attached to 1°C .



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

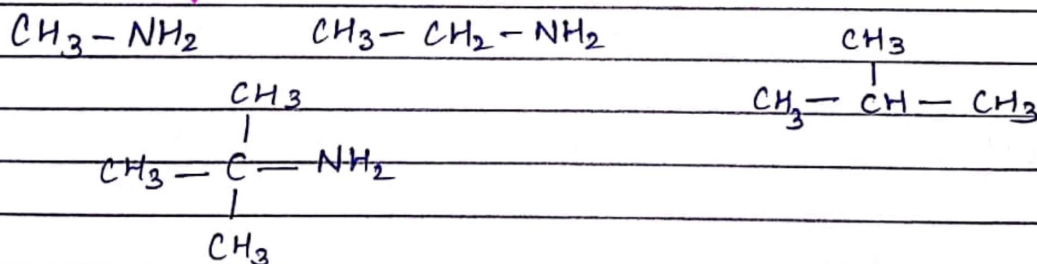


3. **Tertiary Alcohol** : The alcoholic compd. in which OH gp is attached to 3°c

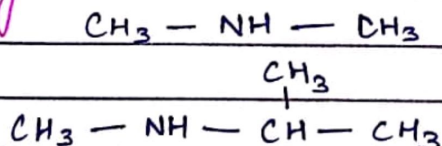


Type of Amine :-

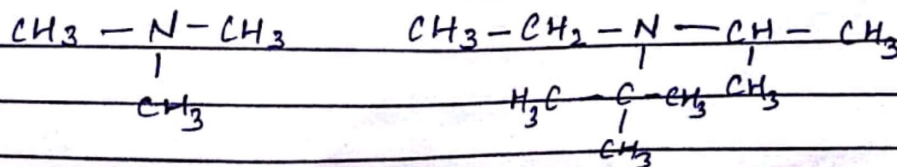
1. **Primary Amine** : N is attached to only 1 C atom.



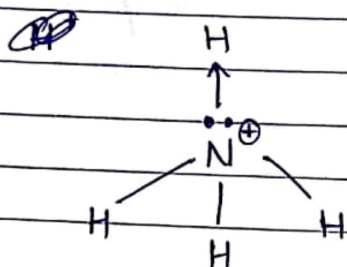
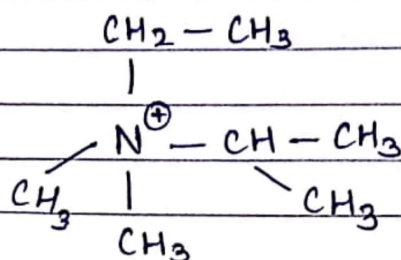
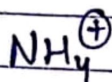
2. **Secondary Amine** :- N is attached to 2 C atom.



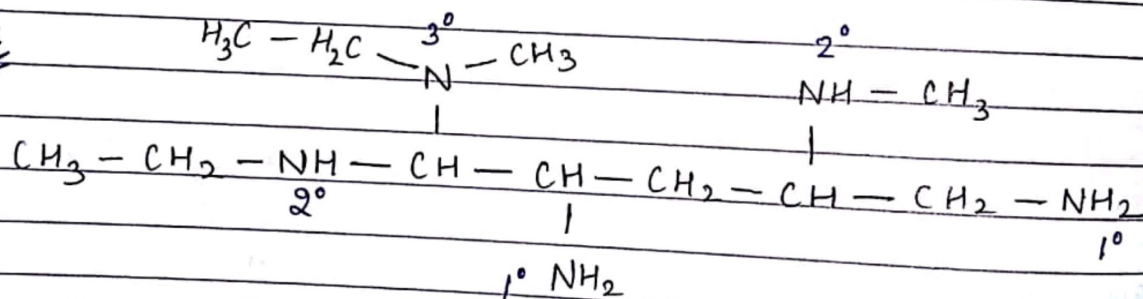
3. **Tertiary Amine** :- ~~in~~ⁱⁿ which N is attached to 3 C atom.



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



ex



Classification and Nomenclature

Classification :-

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

① Based on structure :-

Open chain / aliphatic / acyclic

Closed chain / Cyclic

Saturated

Unsaturated

Homocyclic

Heterocyclic

C-C

+ alkanes

C_nH_{2n+2}

Paraffins

$CH_3-CH_2-CH_3$

$CH_3-\underset{\substack{| \\ H \\ | \\ O}}{C}-OH$

$CH_3-CH=O$

C=C

Olefinic bond
alkene

C_nH_{2n}

C≡C

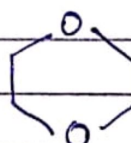
acetylenic bond
alkyne

C_nH_{2n-2}

alicyclic aromatic



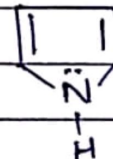
Alicyclic



Aromatic



Pyridine



Pyrrole

Ques which of the following is unsaturated compo

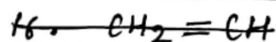
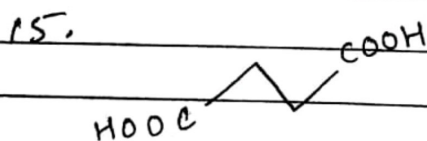
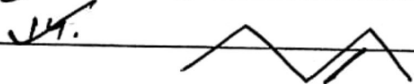
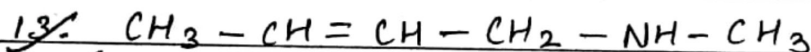
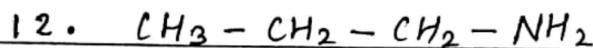
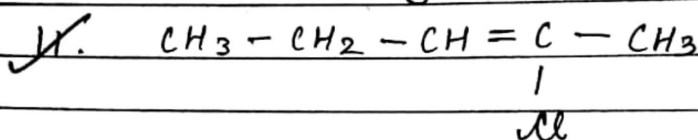
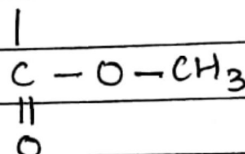
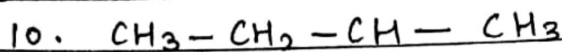
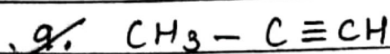
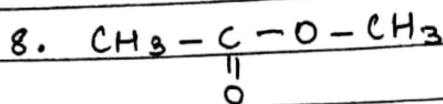
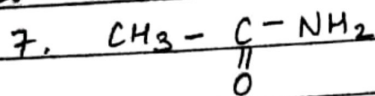
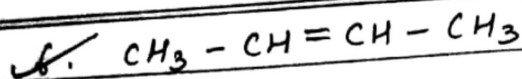
1. C_3H_8 X

2. CH_3-CHO X

3. CH_3-COOH X

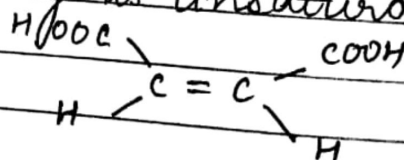
4. C_3H_4

5. $CH_3-CH_2-CH_2-OH$

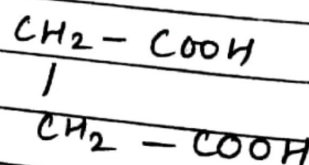


Ques which of the following is unsaturated?

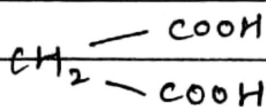
1. Maleic acid



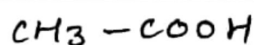
2. Succinic acid



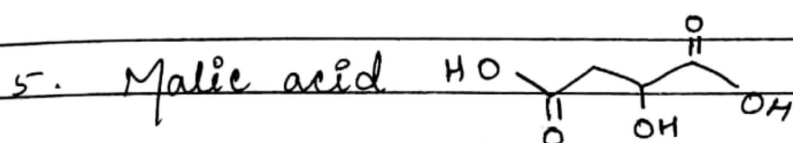
3. Malonic acid



4. acetic acid



5. Malic acid



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

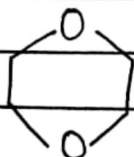
A:- acetic acid is saturated compd. ✓
R: acetic acid have $\text{C} = \text{O}$ bond. ✓ (2)

A: acetic acid have $\text{C} = \text{O}$ bond. (2)

R: acetic acid is saturated compd.

Ques find no. of heteroatoms in following ?

①



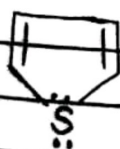
2

2.



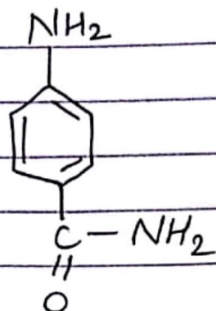
1

3.



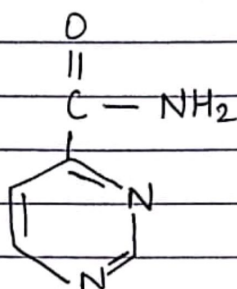
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4.



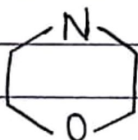
0

5.



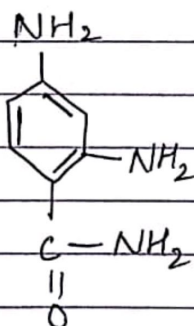
2

6.



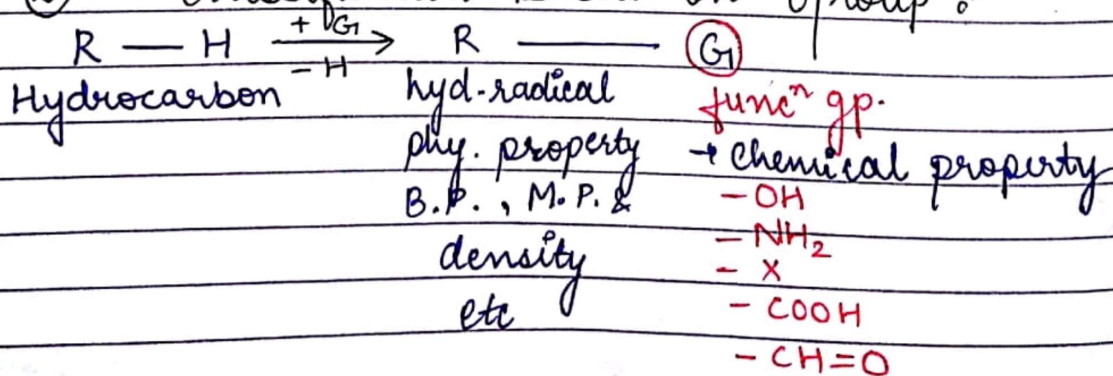
2

7.



0

(2) Classification based on Group :-



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
- $CH_3-\underset{|}{CH}-CH_3$ iso-propyl

Normal :- straight chain hydrocarbon
• no branching

eg

$\begin{array}{c} CH_2-CH_3 \\ | \\ CH_3-CH_2 \end{array}$
n-butane


 $CH_3-CH_2-CH_2-CH_2-CH_2-CH_3$
n-hexane

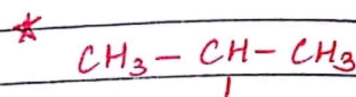
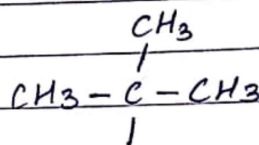
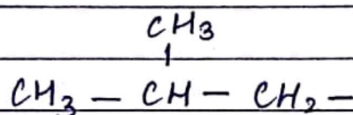
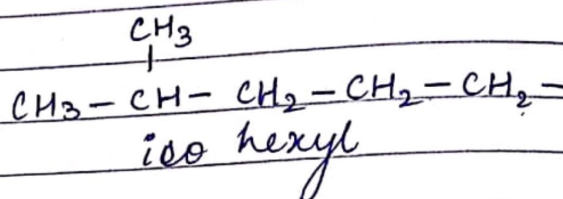
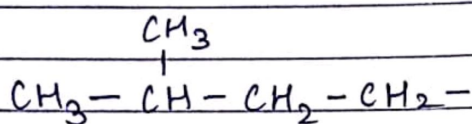
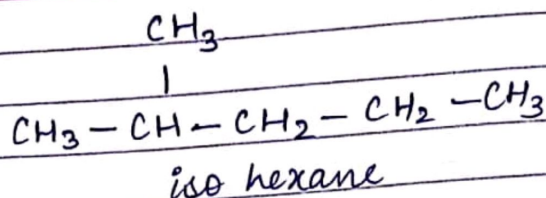
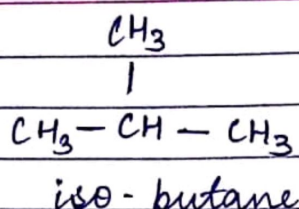
$\begin{array}{c} CH_3 \\ | \\ CH_3-CH_2 \end{array}$
propane


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.

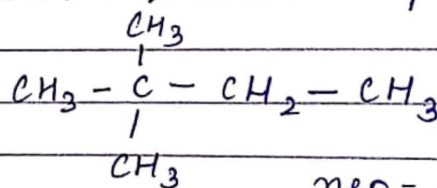
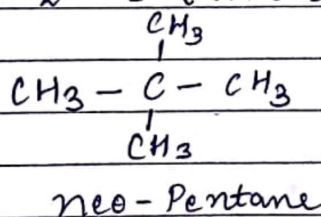


iso-butyl

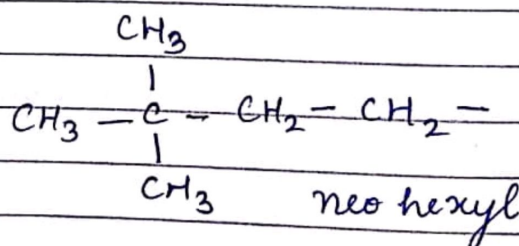
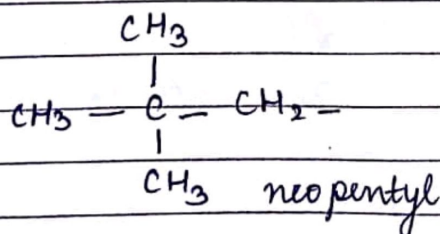
t-butyl

isopropyl

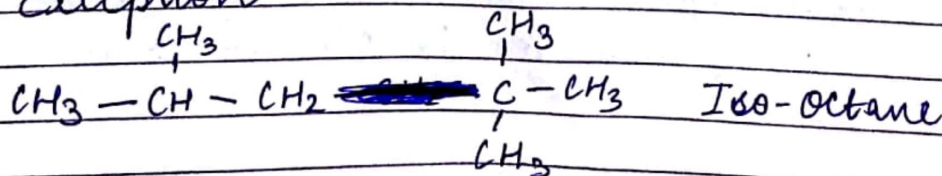
Neo :- When 2 methyl gp. is attached to 2nd last C or 2nd C (in case of alkane) c/a neo compd.

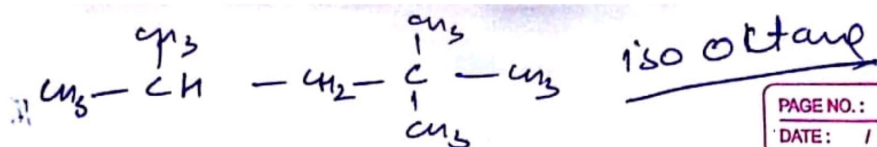


neo-hexane

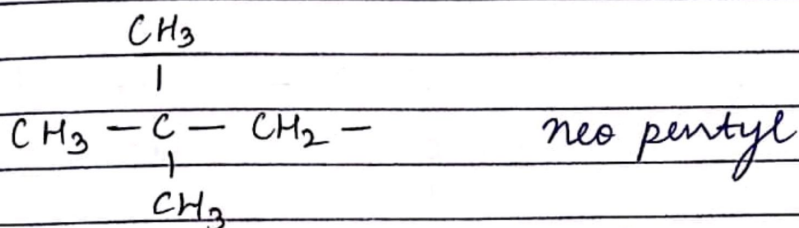
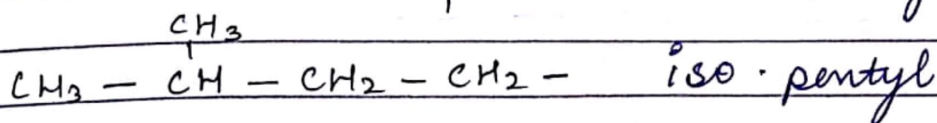
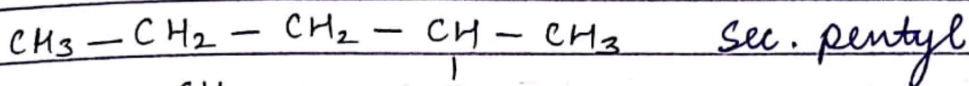
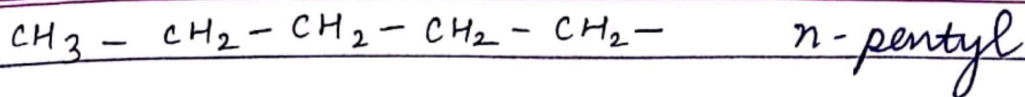


Exception

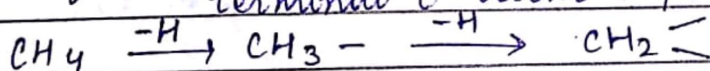




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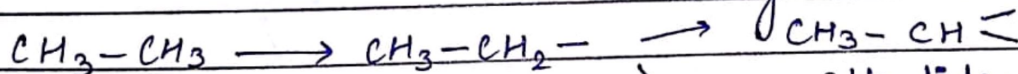


Bivalent :- 2 valency free
from same C-atom $\rightarrow$ alkylidene
from vicinal C-atom $\rightarrow$ alkylene
terminal C-atom $\rightarrow$ polymethylene



Methylidene
or

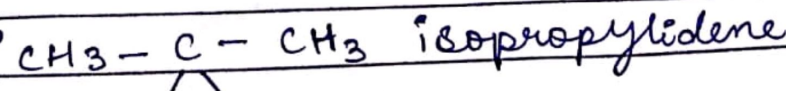
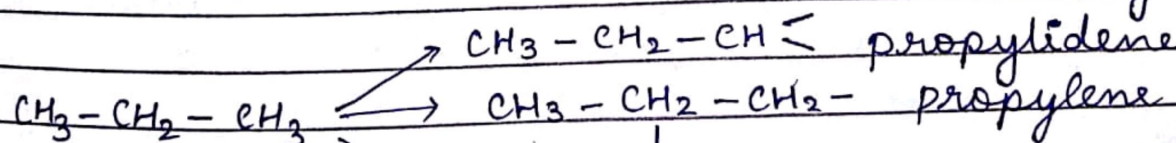
Methylene

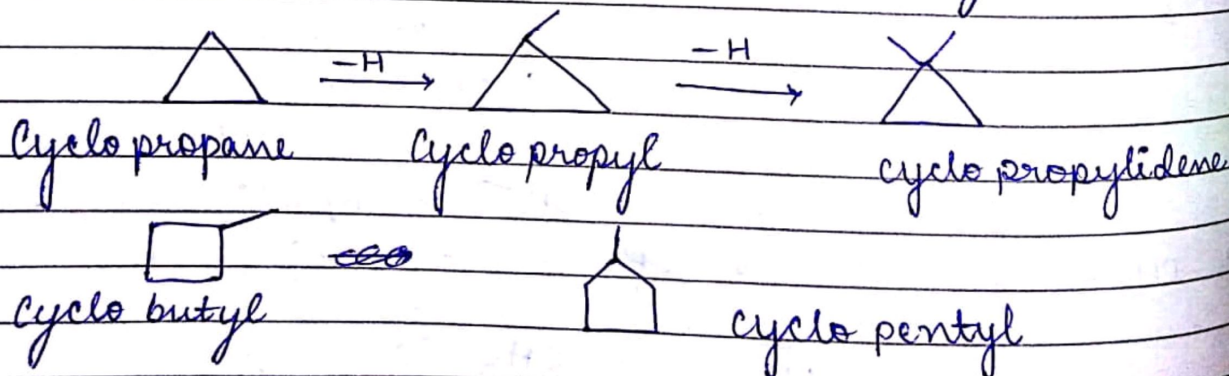
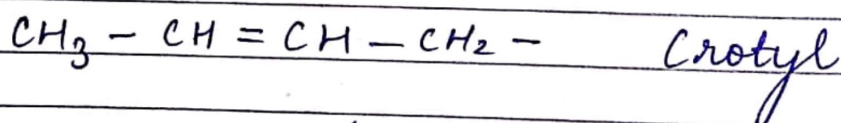
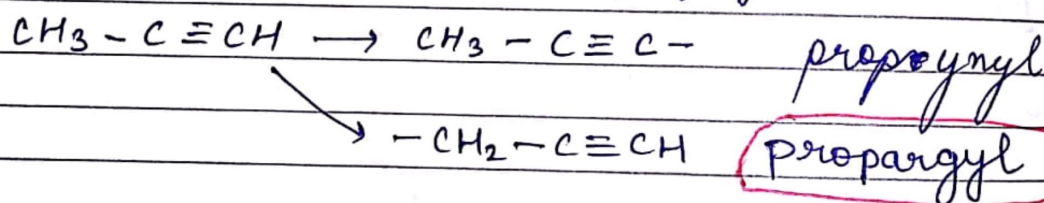
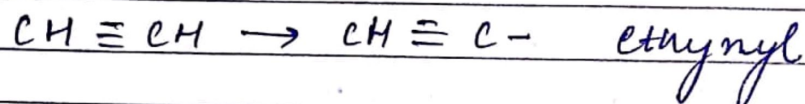
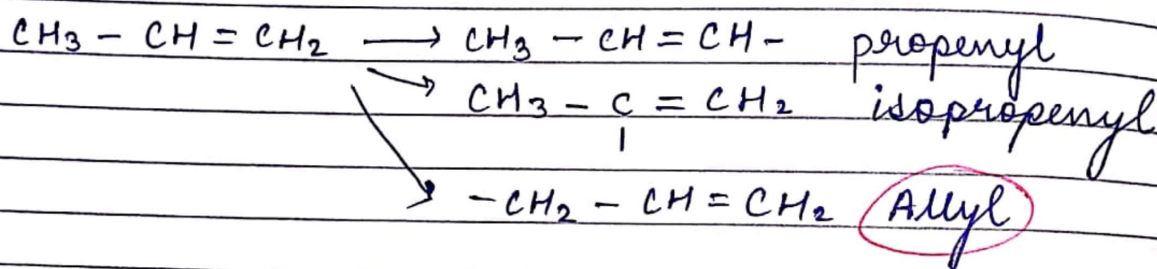
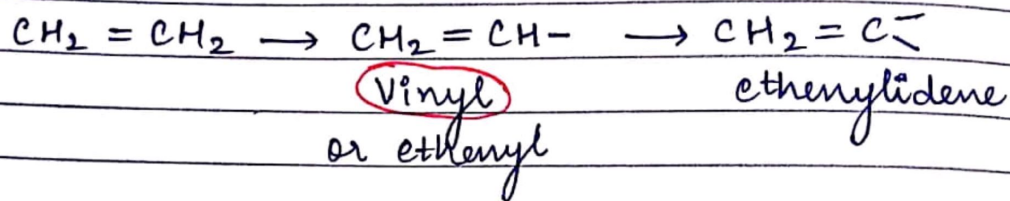
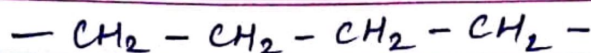


ethylidene



ethylene

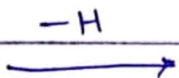




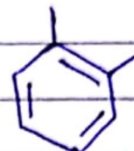
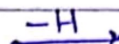
Aromatic :



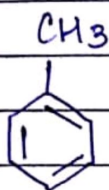
benzene
or
phene



phenyl



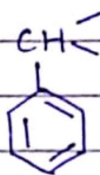
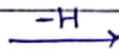
phenylene



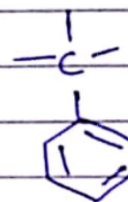
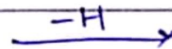
toluene



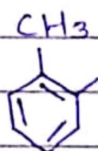
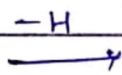
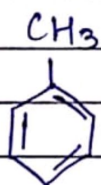
benzyl



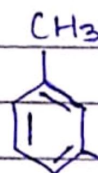
benzal



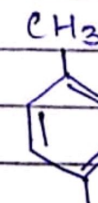
benzoic



o-tolyl



m-tolyl



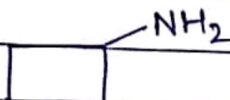
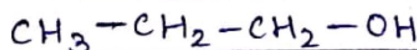
p-tolyl

Concept of Homology :-

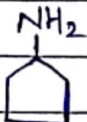
Those compds which have same structural features as well as same general formula but differ by $-CH_2-$ groups/a homologs & series is c/a homologous series.



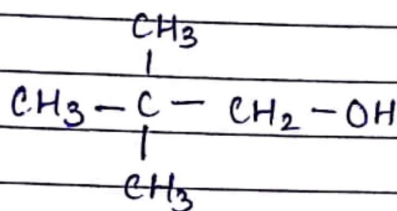
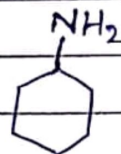
&



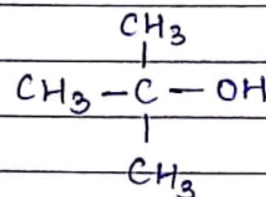
&



&

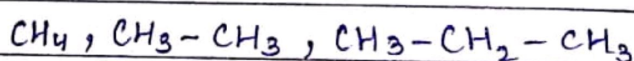
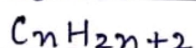


&

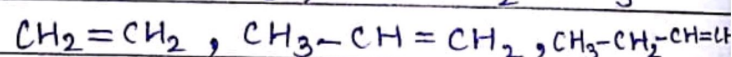
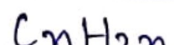


Gr. F.

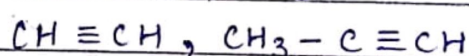
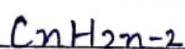
alkane



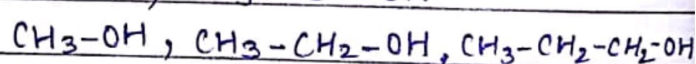
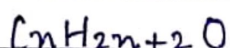
alkene



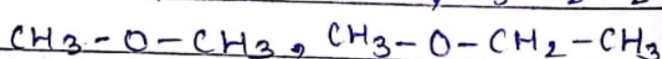
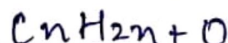
alkyne



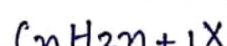
Alcohol



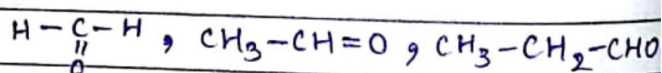
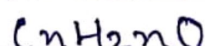
ether



Halide

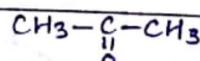
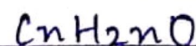


aldehyde

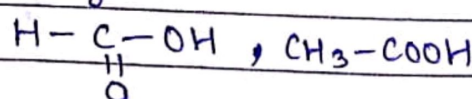
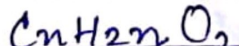


or

Ketone

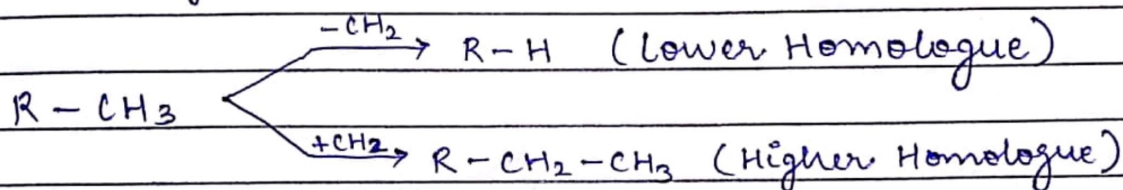


acid/ester

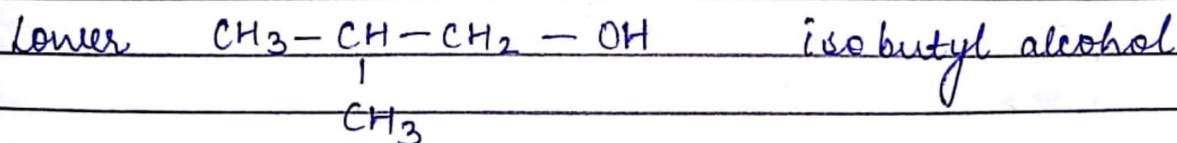
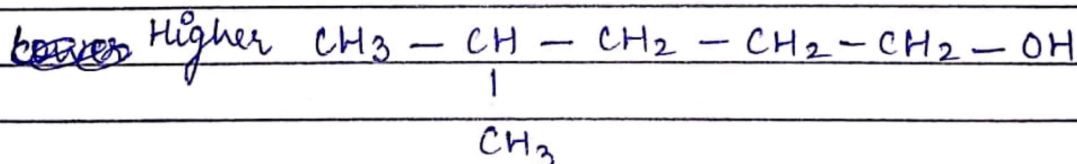
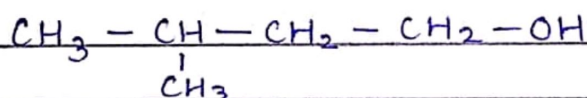


Characteristics of Homologues :-

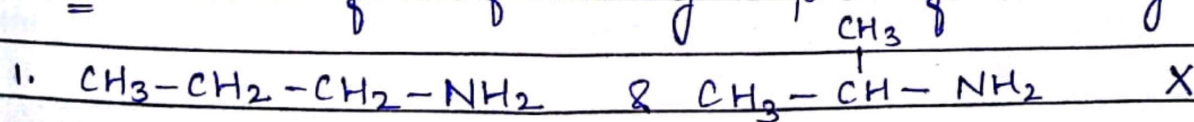
1. Have same general formula i.e. same method of preparation.
2. Have same type of atom.
3. have same functional gp. hence similar chemical property.
4. Have different physical property.
5. 2 successive members differ by CH_2 - gp i.e. a weight of 14 unit.

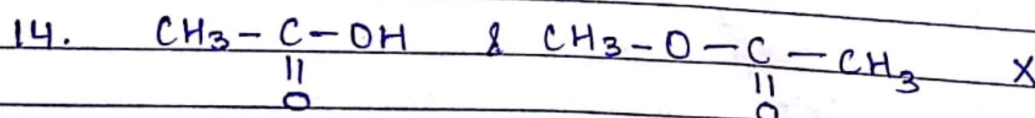
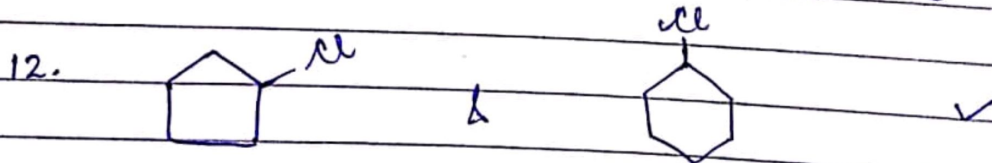
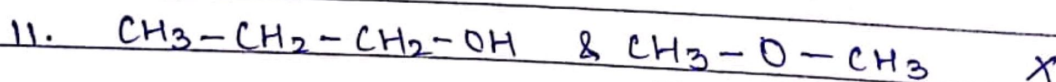
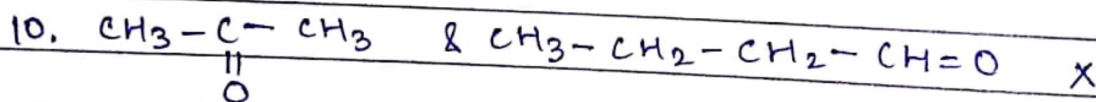
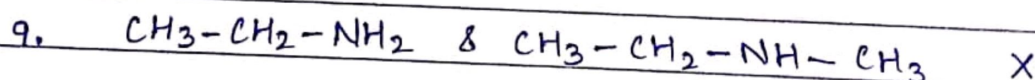
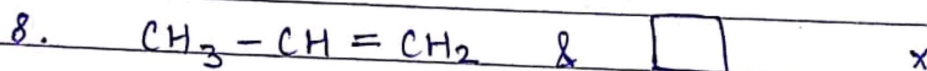
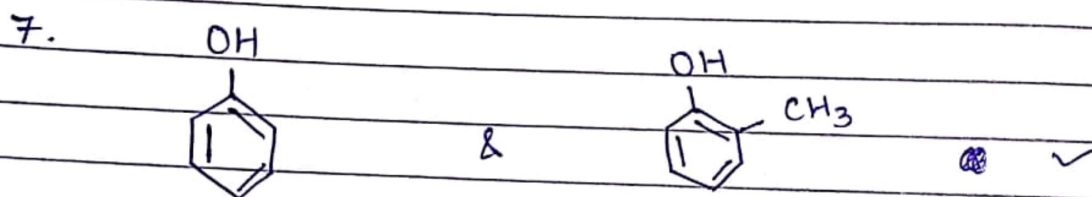
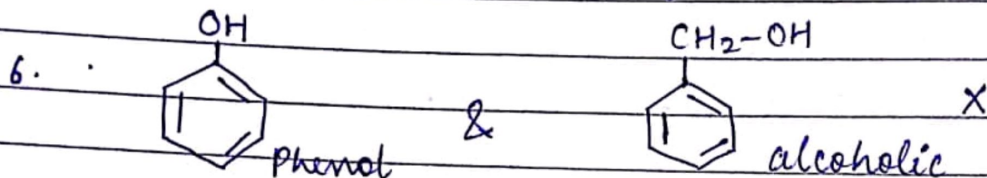
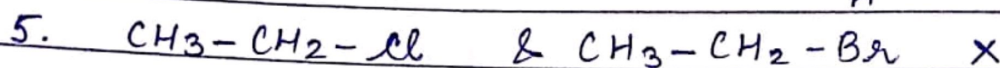
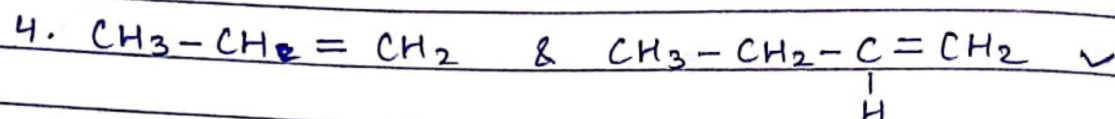
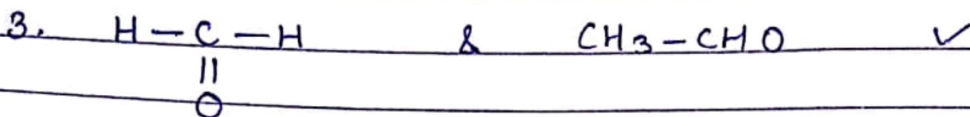


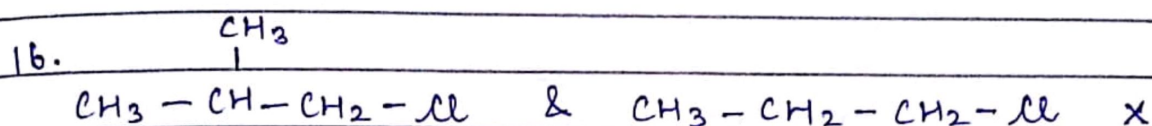
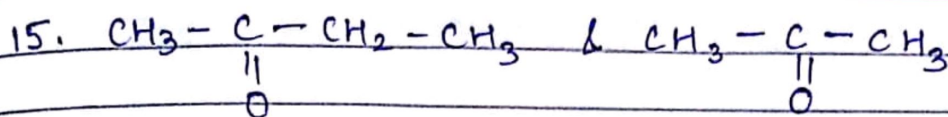
Ques Write lower & higher homologue of isopentyl alcohol.



Ques Which of the following is pair of Homologues?







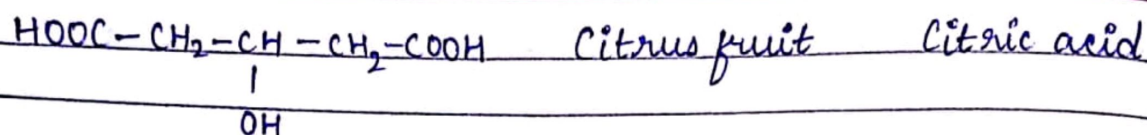
Nomenclature :-

Common Name	Derived Name	IUPAC system
-------------	--------------	--------------

1. Common Name OR TRIVIAL NAMING :-

- based on source of origin.

Structure	Source	Common Name
CH_4	Marshy area	Marsh Gas
$\text{CH}_3 - \text{OH}$	distillation of wood	wood spirit
HCOOH	formica (Red Ant)	formic acid
$\text{CH}_3 - \text{COOH}$	acetum (Vinegar)	acetic acid
$\text{CH}_3 - \underset{\text{OH}}{\underset{ }{\text{CH}}} - \text{COOH}$	Milk	Lactic acid
$\text{C}_3\text{H}_7 - \text{COOH}$	Butter	butyric acid
$\text{HOOC} - \text{CH}_2 - \underset{\text{OH}}{\underset{ }{\text{CH}}} - \text{COOH}$	Apple	Malic acid
$\text{HOOC} - \underset{\text{OH}}{\underset{ }{\text{CH}}} - \underset{\text{OH}}{\underset{ }{\text{CH}}} - \text{COOH}$	tamarind tar	tartaric acid



(R) — (G)
hydrocarbon func gp

Common Name
functional Group

① Non-Terminating
(with ^{out} C containing func gp)
eg -OH, -NH₂, -O-, -C(=O)-

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

1. Non terminating

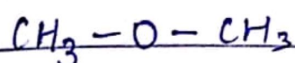
Suffix

-OH	alcohol
-SH	thio alcohol
-X	Halide
-NH ₂	amine
-NH-	amine
-N-	amine
-O-	ether
-S-	thio ether
-C(=O)-	ketone

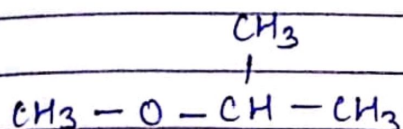
Polyvalent func gp:-

- If same hydrocarbon gp is attached then di, tri, tetra etc used.
- If diff. hydrocarbon are attached then write them in alphabetical order

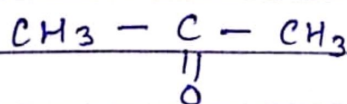
Note:- di, tri, tetra, primary, secondary, etc. are not considered in alphabetical order while terms iso, neo are considered in alphabetical order



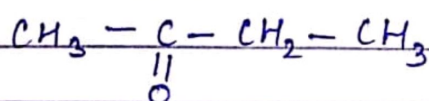
dimethyl ether



isopropyl methyl ether



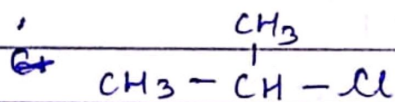
dimethyl ketone



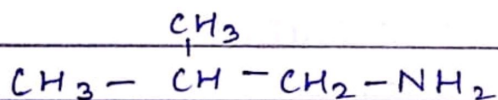
ethyl methyl ketone



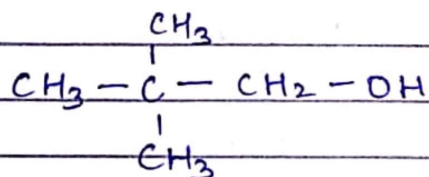
ethyl alcohol



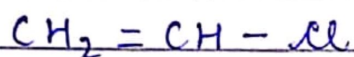
isopropyl chloride



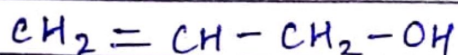
isobutyl amine



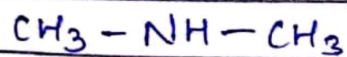
neo pentyl alcohol



Vinyl chloride



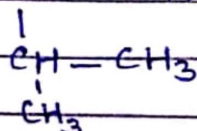
allyl alcohol



dimethyl amine



ethyl isopropyl methyl amine



H Terminating fun^c gp :-

Prefix :-

Total no. of C

1C

2C

3C

4C

5C

Prefix

form

acet

propion

butyr - ⁿ Iso

Valer

①

3C + 1db

C - C = C

acryl

(u

4C + 1db

C - C = C - C

croton

eg

Suffix :-

P. fg

-COOH

-C(=O)-O-R

-C(=O)-X

-CHO

-C(=O)-O-C(=O)-

-CN

-NC

-C(=O)-NH₂

Suffix

ic acid

alkyl - - - ate

yl halide

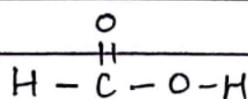
aldehyde

ic anhydride

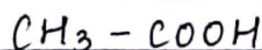
o nitrile

o isonitrile

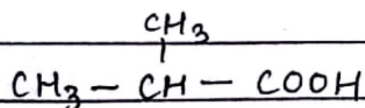
amide



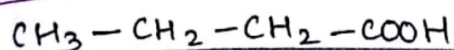
formic acid



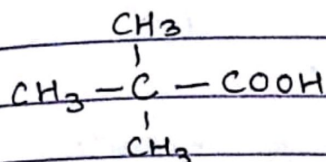
acetic acid



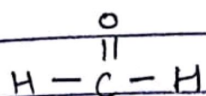
isobutyric acid



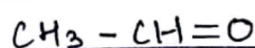
n-butyric acid



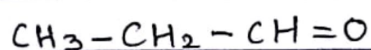
neo valeric acid



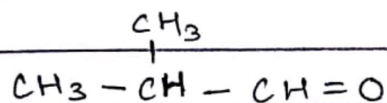
formaldehyde



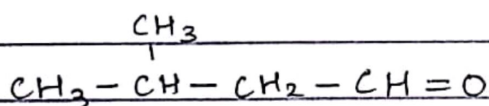
acetaldehyde



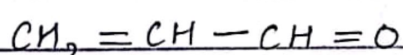
propionaldehyde



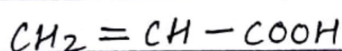
isobutyraldehyde



isovaler aldehyde



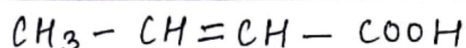
acryl aldehyde



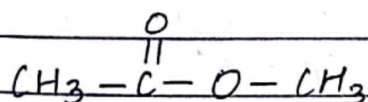
~~croton~~ acrylic acid



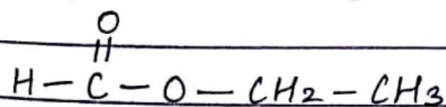
croton aldehyde



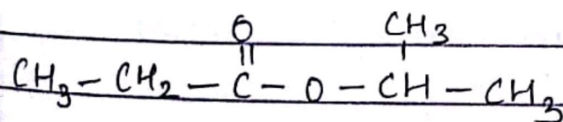
crotonic acid



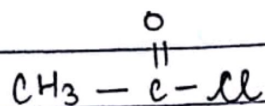
methyl acetate



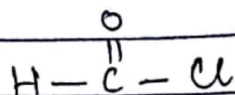
ethyl formate



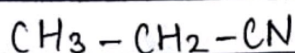
isopropyl etho acetate



acetyl chloride



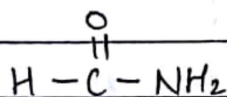
formyl chloride



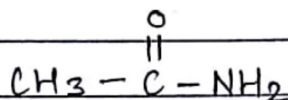
propionitrile



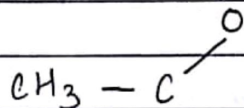
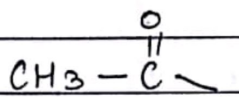
acetonitrile



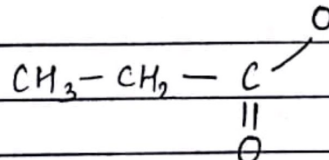
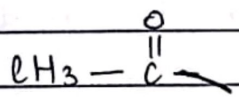
formamide



acetamide



acetic anhydride



acetic propionic anhydride

DERIVED NAME :

selection of parent chain

(3) Based on famous homolog

$4^\circ\text{C} > 3^\circ\text{C} > 2^\circ\text{C} > 1^\circ\text{C}$

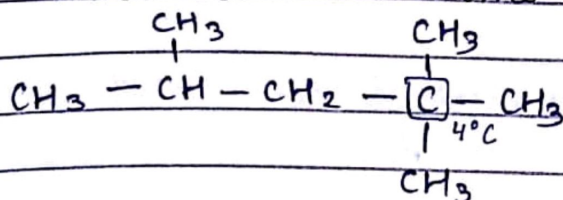
alkane :- CH_4 methane

$\text{CH}_3 - \boxed{\text{CH}_3}$ methyl methane

$\text{CH}_3 - \text{CH}_2 - \boxed{\text{CH}_2} - \text{CH}_3$ ethyl methyl methane

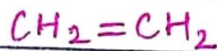
$\text{CH}_3 - \boxed{\text{CH}}(\text{CH}_3) - \text{CH}_2 - \text{CH}_3$ ethyl dimethyl methane

Ques write derived name of iso-octane?



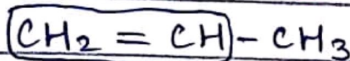
isobutyl trimethyl methane

alkene :



ethylene

[Fg > multiple bond
=>=]



methyl ethylene

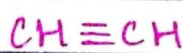


sym. dimethyl ethylene

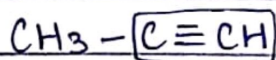


unsym. dimethyl ethylene

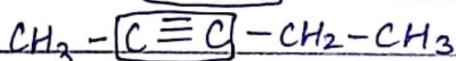
alkyne :



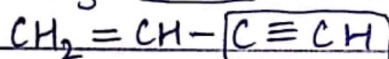
acetylene



methyl acetylene



ethyl methyl acetylene

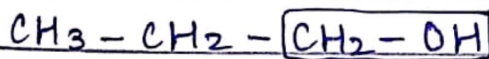


Vinyl acetylene

alcohol :



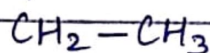
Carbinol



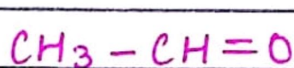
ethyl Carbinol



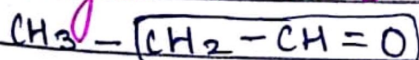
ethyl methyl carbinol



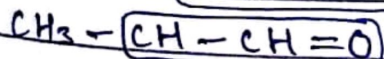
aldehyde :



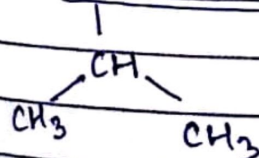
acetaldehyde



methyl acetaldehyde



isopropyl methyl acetaldehyde



acid : $\text{CH}_3\text{-COOH}$ acetic acid

$\begin{array}{c} \text{CH}_2\text{-CH}_3 \\ | \\ \text{CH}_3\text{-CH-COOH} \end{array}$ ethyl methyl acetic acid

$\text{CH}_3\text{C(COOH)}$

$\begin{array}{c} \text{Cl} \\ \diagdown \\ \text{Cl-C-COOH} \\ \diagup \\ \text{Cl} \end{array}$ trichloro acetic acid

Ketone : $\text{CH}_3\text{-C(=O)-CH}_3$ acetone

$\text{CH}_3\text{-CH}_2\text{-C(=O)-CH}_2\text{-CH}_2\text{-CH}_3$

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.

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

PRIORITY ORDER OF FUNCTIONAL GROUP :-

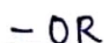
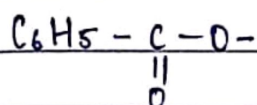
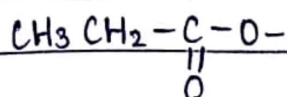
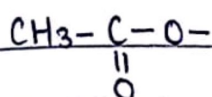
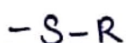
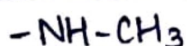
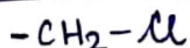
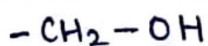
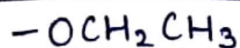
Functional Gp.	Prefix	Suffix
- (C)OOH (carboxylic acid)	x	oic acid
- COOH	carboxy	carboxylic acid
- SO ₃ H (Sulphonic acid)	sulpho	sulphonic acid
$\begin{array}{c} \text{O} \\ \\ - (C) > O \\ \\ - (C) > O \\ \\ \text{O} \end{array}$ (anhydride)	x	oic anhydride

Functional Group	Prefix	Suffix
- (C)OOR (ester)	X	alkyl --- oate
- COOR	alkoxy carbonyl or carbalkoxy	alkyl --- carboxylate
- (C)OX (acid halide)	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 $\equiv$ (C) (isocyanide)	X	isonitrile
- NC	isocyano/ carbonyl amino	carbonyl 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

- R	Prefix alkyl
- X	halo
- NH ₂	amino
- N $\begin{smallmatrix} \nearrow O \\ \searrow O \end{smallmatrix}$	nitrone
- O - N = O	nitrite
- N = O	nitroso

Substituents



Prefix

ethoxy

hydroxy methyl

chloro methyl

methyl amino

thio

alkyl thio

acetoxy/ethanoxy

propanoxy

benzoxy

alkoxy

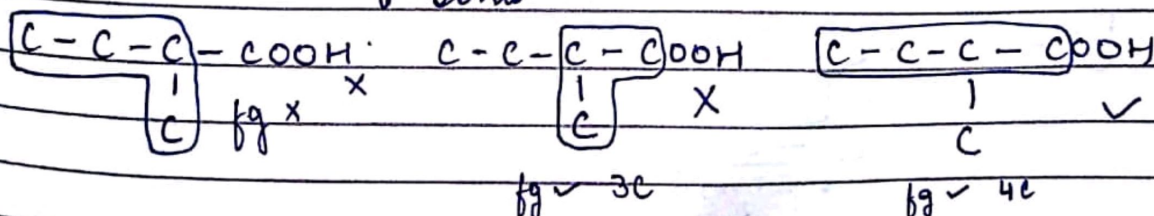
Rules of IUPAC :-

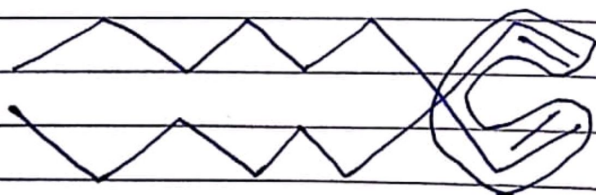
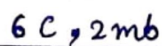
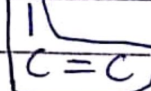
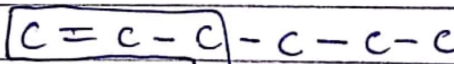
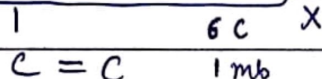
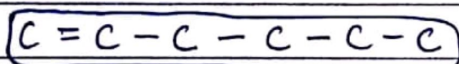
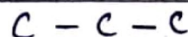
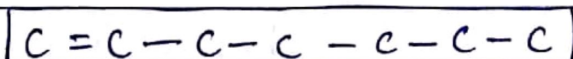
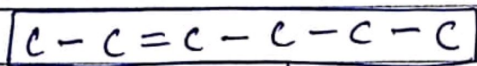
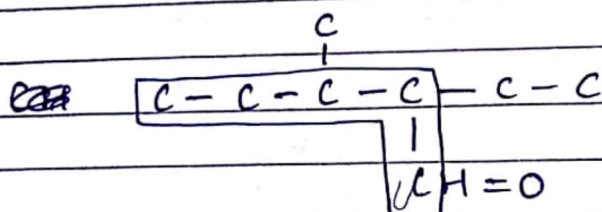
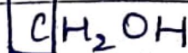
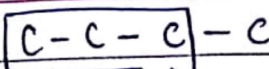
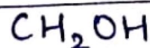
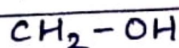
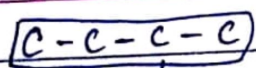
1. Selection of Principal Carbon chain
2. Numbering of P.C.C.

1. Selection of Principal Carbon Chain (P.C.C)

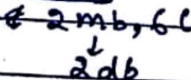
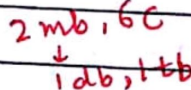
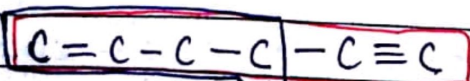
P.C.C. will be that largest longest continuous chain of carbon which have

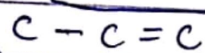
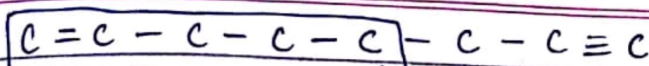
Pfg > Max^m no. of multiple bond > max. no. of C-atom



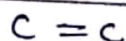
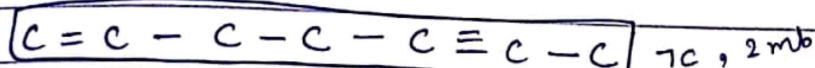


If symmetric molecule is +nt then priority is given to double & bond over triple bond

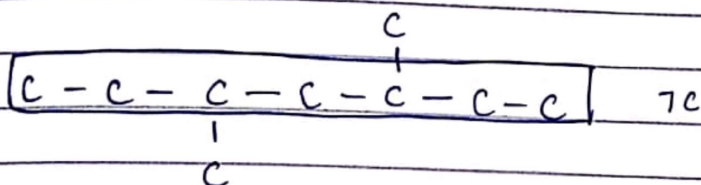




8c, 2mb
2db

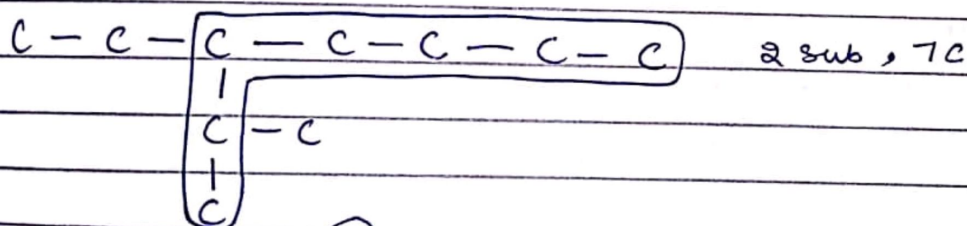


7c, 2mb

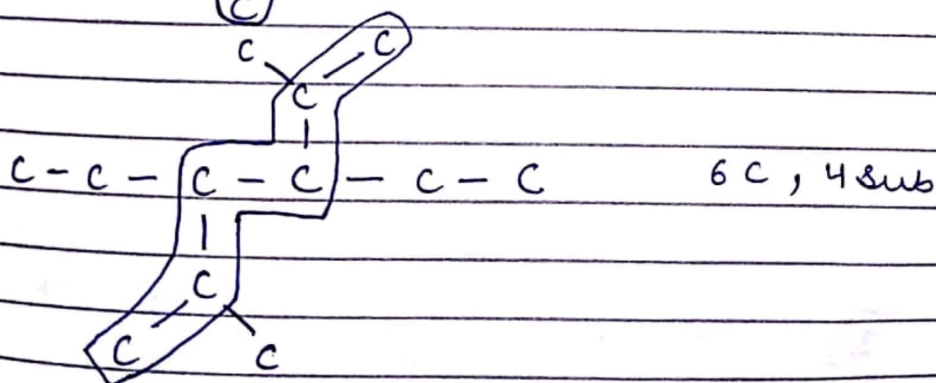


7c

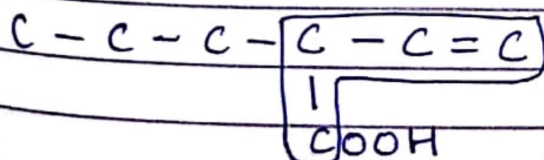
If 2 diff. P.C.C. have same no. of C in a molecule
then that P.C.C. will be selected as P.C.C.
which have max^m no. of sb (/ more branching)



2 sub, 7c



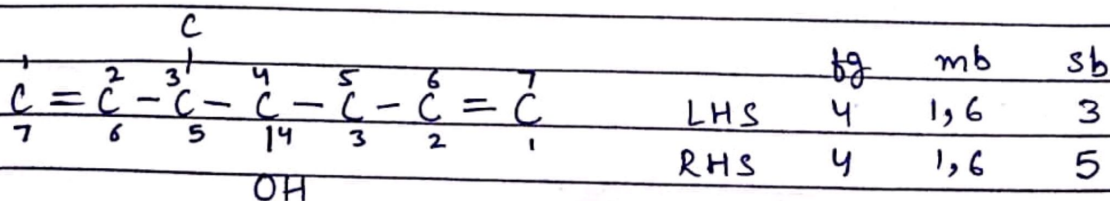
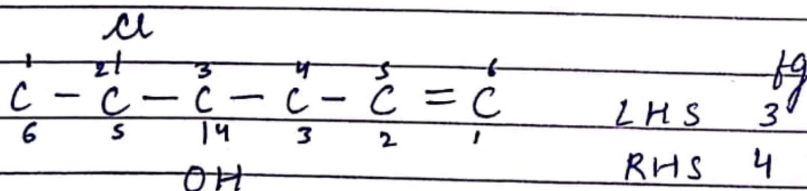
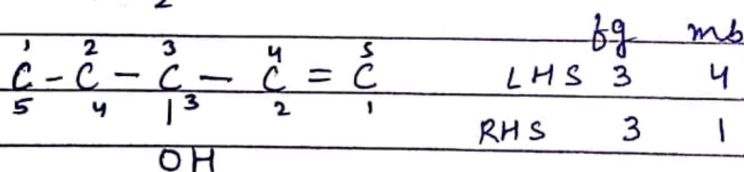
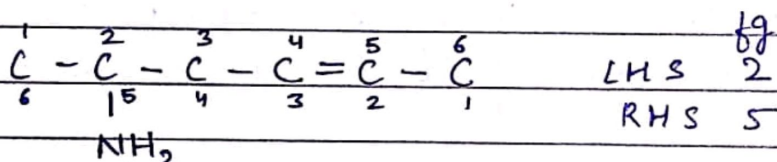
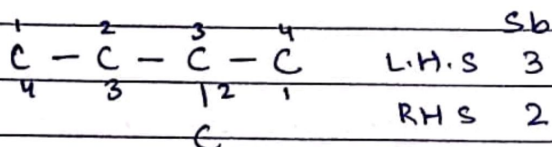
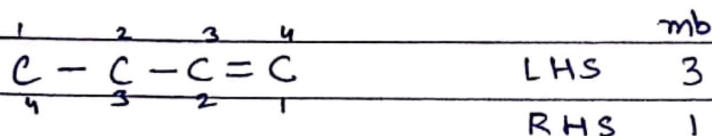
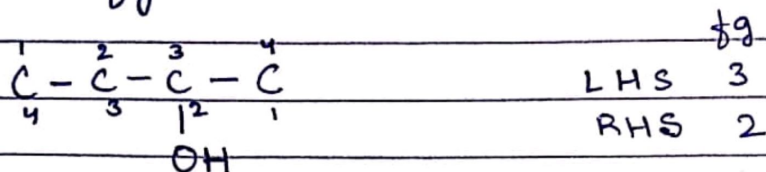
6c, 4sub



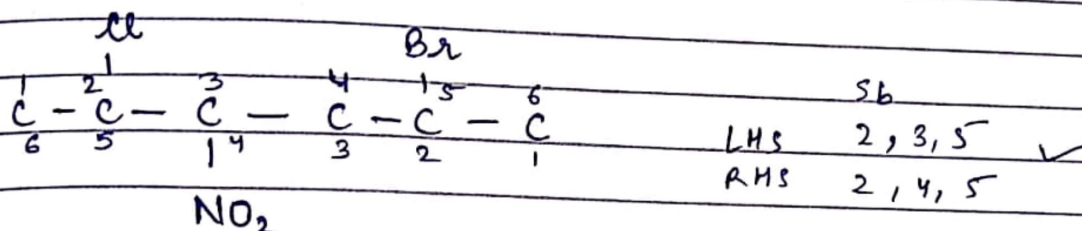
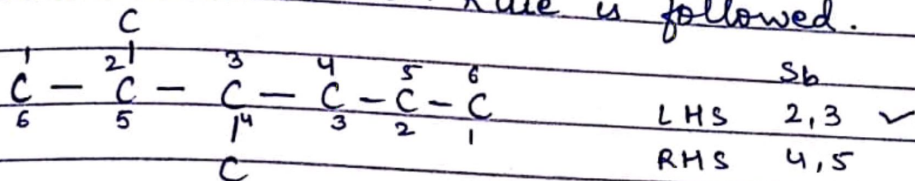
COOH

Numbering of P.C.C.:-

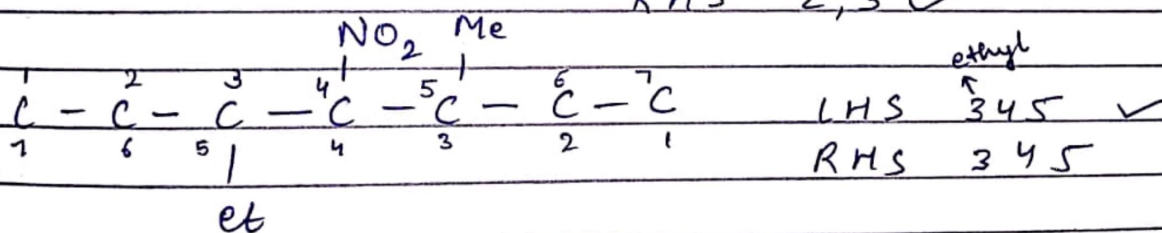
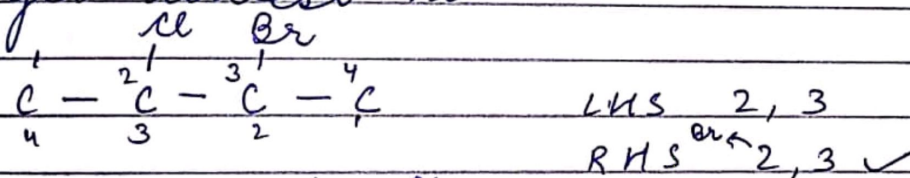
- ① Lowest no. will given to
Pfg > Mb > Sb



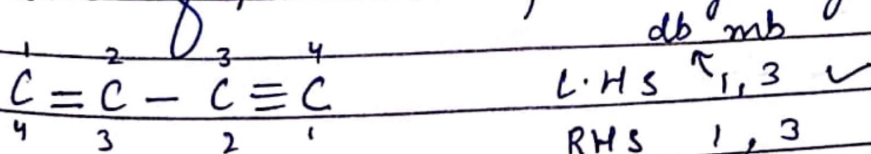
- ② If more than one substituent are +nt then least locant no. Rule is followed.



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

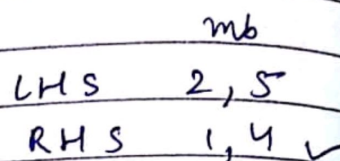
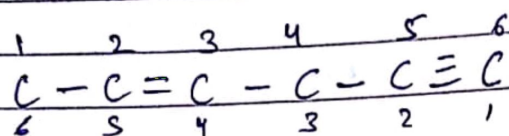
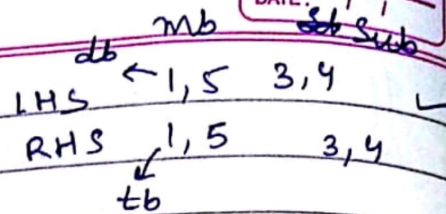
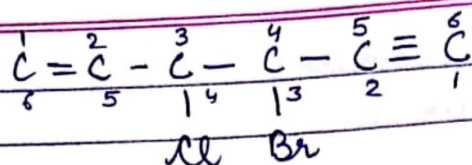


4. If db & tb are at similar posⁿ from either side of PCC then priority is given to dbⁿ

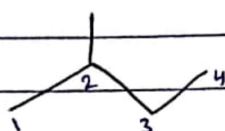


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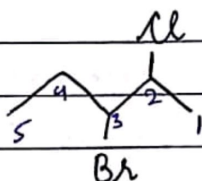
DATE: 11/11/20



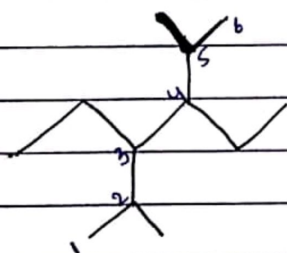
Ques



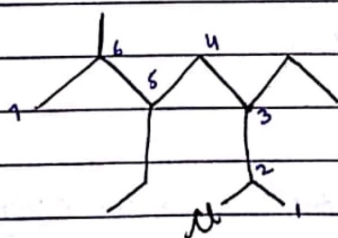
2-Methyl Butane



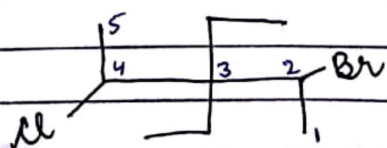
3-Bromo-2 Chloro Pentane



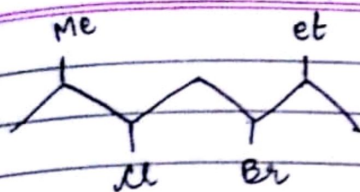
3,4 diethyl - 2,5 dimethyl
Hexane



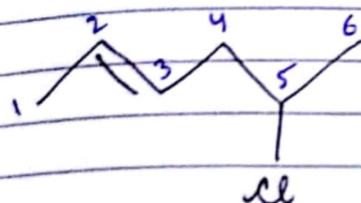
2-chloro - 3,5 - diethyl - 6-methyl
heptane



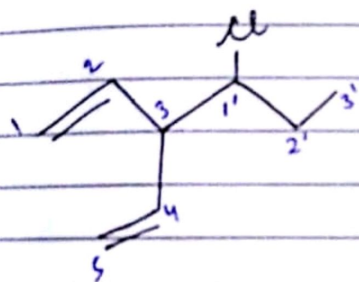
2-Bromo - 4-Chloro - 3,3-diethyl
Pentane



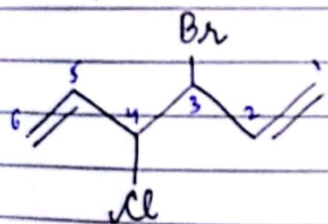
5-Bromo-3-Chloro, 2,6-dimethyl
Octane



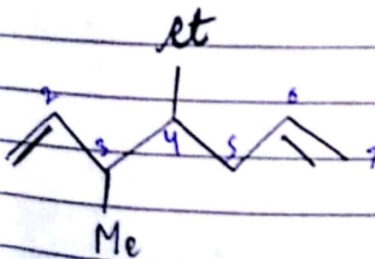
5-Chloro - ~~Hex~~ Hex-2-ene



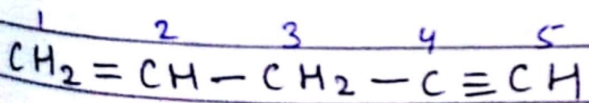
3 (1'-Chloro Propyl) ~~Pent~~ Pent-
1,4-diene



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

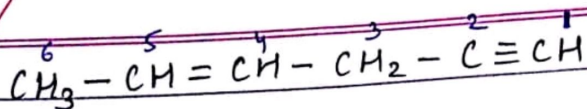


4-ethyl-3-methyl-hept-1,6-di
ene

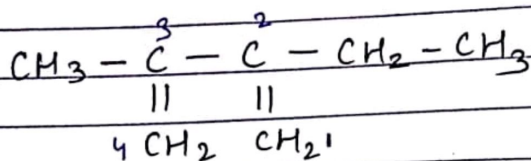


Pent-1-ene-4-yne

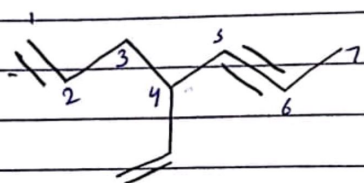
AIW-7-10



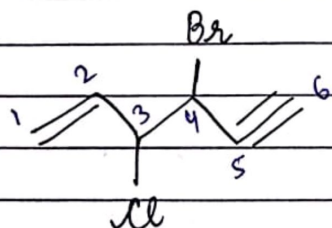
Hex-4-ene-1-yne



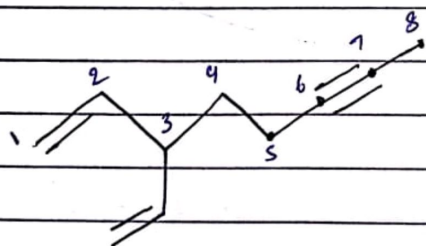
2-Ethyl-3-Methyl
But-1,3-diene



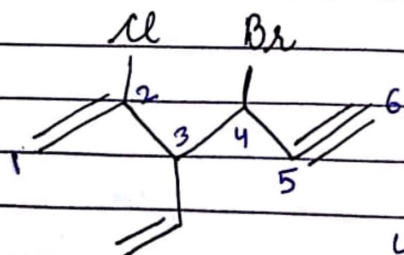
4-~~Ethyl~~ Vinyl hept-1-ene-5-yne
or
4-ethenyl hept-1-en-5-yne



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



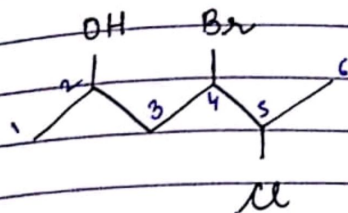
3-ethenyl-Oct-1-ene-6-yne



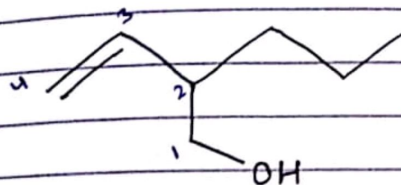
4-Bromo-2-Chloro-3 Ethenyl-
Hex-1-ene-5 yne

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

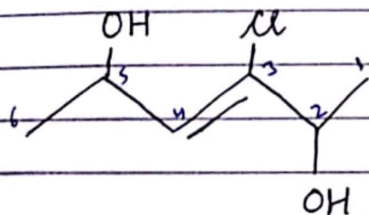
$-OH$ Prefix Hydroxy
Suffix ol



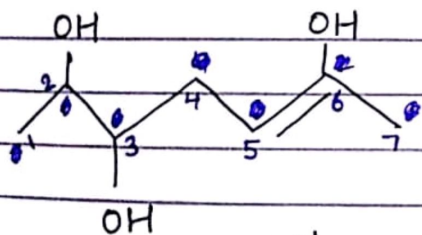
4-Bromo-5-Chloro-2-Hexanol



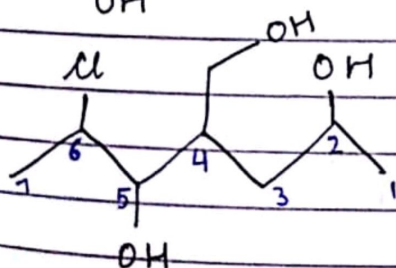
2-Propyl-But-3-ene-1-ol



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

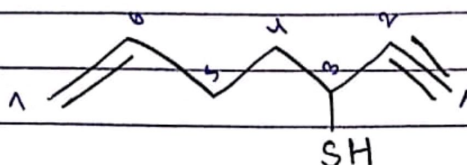


hept-5-ene-2,3,6-triol



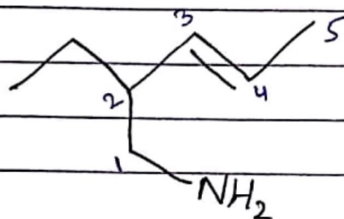
6-Chloro-4-hydroxy Methyl hept-2,5-diol

-SH Prefix Suffix
 mercapto thiol

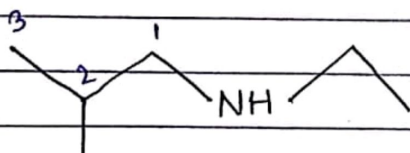


Hept - 6 - ene - 1 - yne
- 3 - thiol

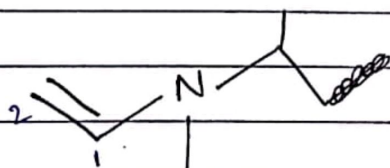
-NH₂ Prefix Suffix
 amino amine



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

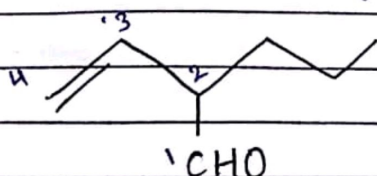


N - ethyl - 2 - methyl
Propanamine

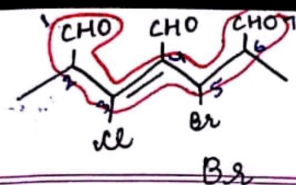


N - isopropyl - N - methyl
ethene amine

-CHO Prefix Suffix
 ^{oxo}formyl al
 carbonyl carbonyl

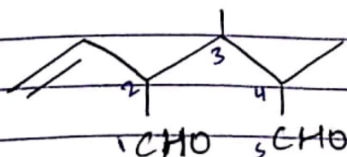


2 - Propyl But - 3 - enal

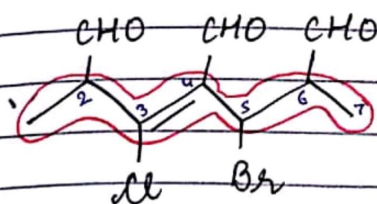


5-Bromo - 3-chloro - 4-formyl - 2,6-dimethyl
heptan-1,7-dial

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DATE: / /

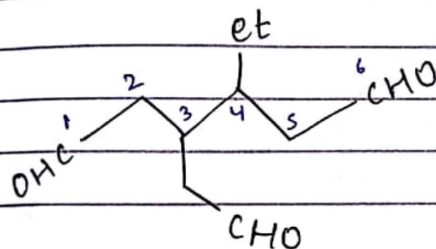


3-Bromo - 2-ethenyl - 4-methyl
Pentan-1,5-dial

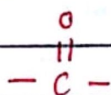


5-Bromo - 3-chloro hept - 3-ene - 2,4,6 -
tricarbaldehyde

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

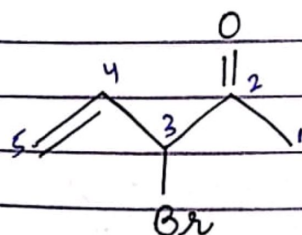


4-ethyl - 3-formyl methyl -
hexan-1,6-dial

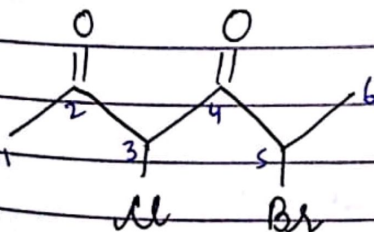


Prefix
oxo / keto

Suffix
one



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



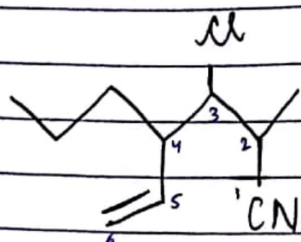
5-Bromo - 3-chloro hexan-2,4-dione

-CN

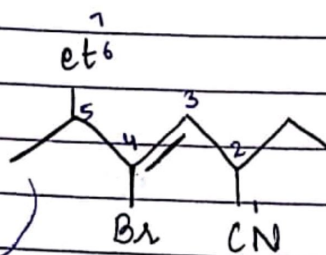
-(C)N
-CN

x
cyano

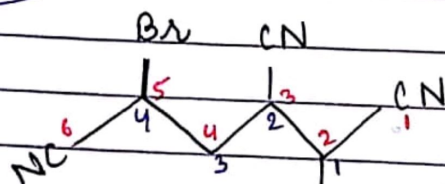
nitrile
carbonitrile



3-chloro-2-methyl-4-propyl-hex-5-ene nitrile

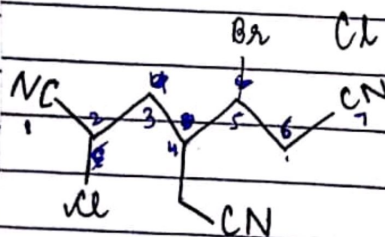


4-bromo-2-ethyl-5-methylhept-3-ene nitrile



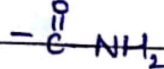
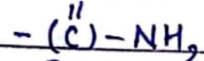
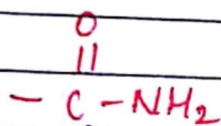
PKg
LHS 1,3,4
RHS 1,2,4 ✓

4-bromo-1-chlorobutane-1,2,4-carbonitrile



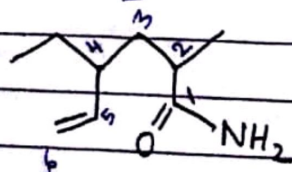
5-bromo-2-chloro-3-cyano hexane-1,6-dinitrile

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



x
carbamoyl

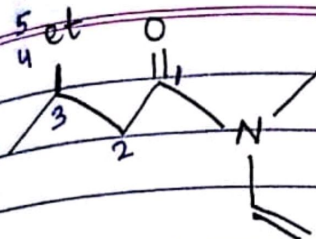
amide
carboxamide



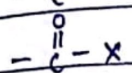
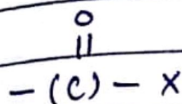
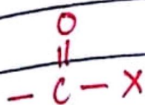
4-ethyl-2-methyl-hex-5-ene amide

PAGE NO. : 45

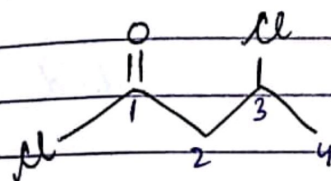
DATE : / /



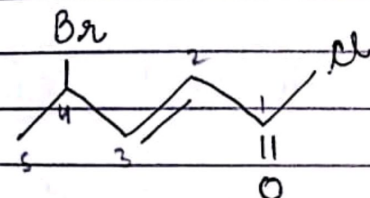
N-ethyl-3, N-dimethyl Pentanamide



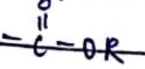
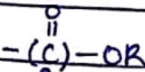
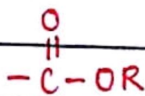
X
halo formyl
acyl halide
carbonyl halide



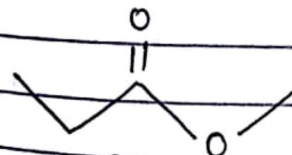
3-Chloro-Butanoyl Chloride



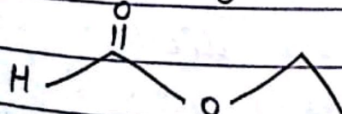
4-Bromo-Pent-2-eneyl Chloride



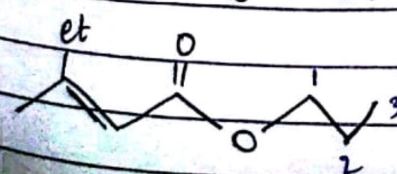
X
alkoxy carbonyl
alkyl --- oate
alkyl --- carboxylate



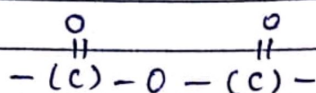
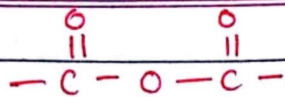
methyl - Propanoate



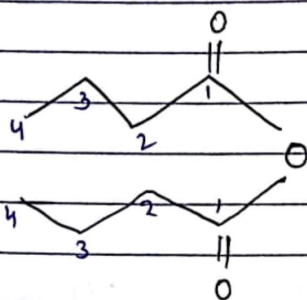
Ethyl - Methanoate



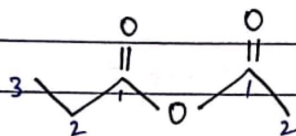
Propyl
Ethyl - 3-Methyl-Pent 2-ene oate



x oic anhydride



Butanoic anhydride

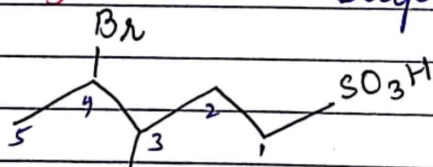


Ethanoic - Propanoic anhydride

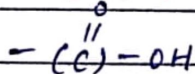


Sulpho

sulphonic acid

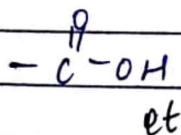


4-Bromo - 3-Methyl
Pentane sulphonic
acid.



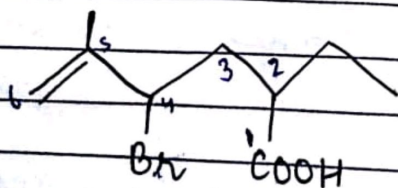
x

oic acid



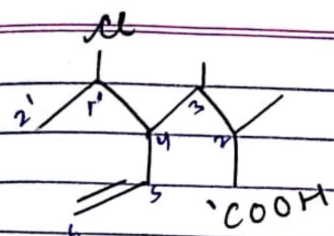
carboxy

carboxylic acid

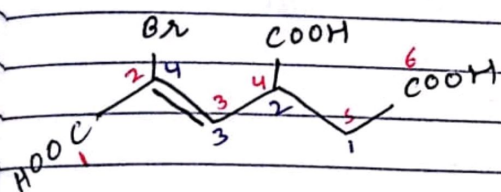


4-Bromo - 2,5-diethyl
hex-5-ene-oic acid

PAGE NO.: 47
DATE: / /

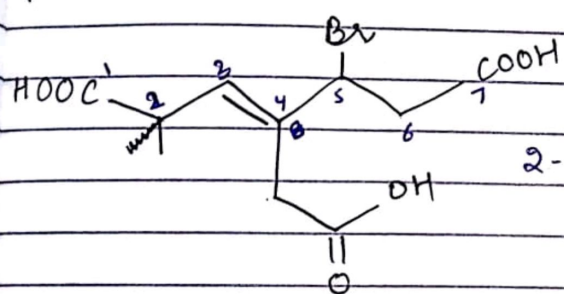


4 (1-Chloro Ethyl) - 2, 3 - dimethyl
hex - 5 - ene - oic acid



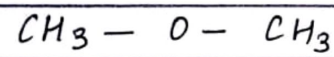
2-bromo - 4 - carboxy hex - 2 - ene -
1, 6 - dioic acid

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

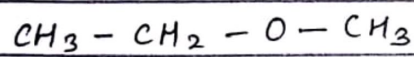


5 - Bromo - 4 - carboxy ethyl
2 - Methyl - Hept - 3 - ene - 1, 7 - dioic
acid

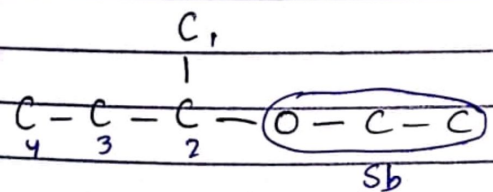
IUPAC Naming



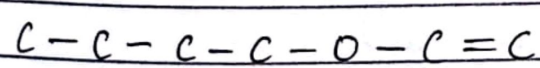
methoxy methane



methoxy ethane

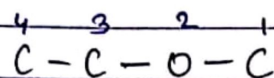


2 - ethoxy butane

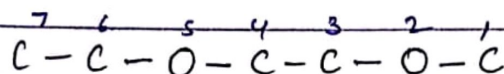


butoxy ethene

Oxa - system → 0th C atom is 1st locant no. 2nd is 2

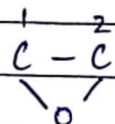


2-oxa-butane



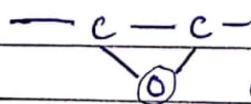
2,5-dioxa heptane

Cyclic ether

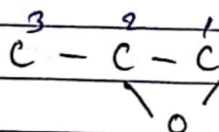


epoxy ethane

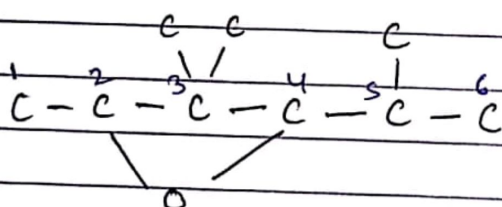
or oxirane (trivial name)



epoxy

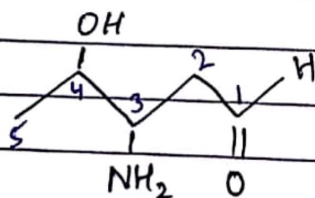


1,2-epoxy propane

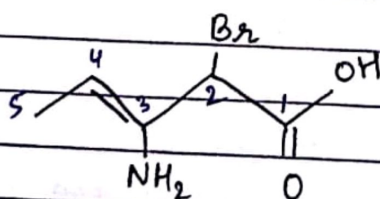


2,4-epoxy - 3,3,5-trimethyl hexane

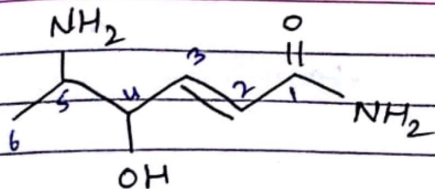
IUPAC Naming of Polyfunctional group :-



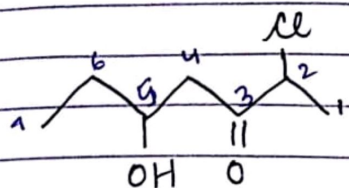
3-amino - 4-hydroxy
Pentanal



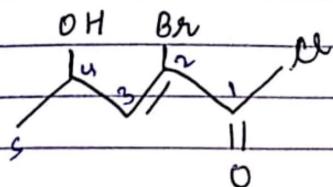
3-amino - 2-Bromo - Pent-3-ene
oic acid



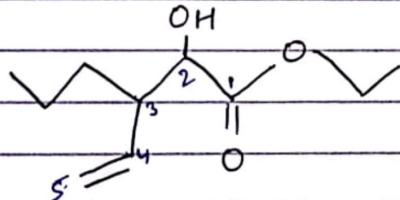
5-amino-4-hydroxy
hex-2-ene amide



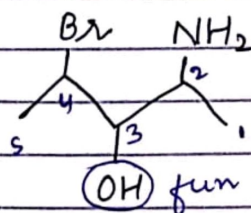
2-chloro-5-hydroxy heptan-
3-one



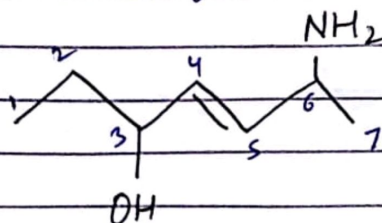
2-bromo-4-hydroxy
Pent-2-ene oyl chloride



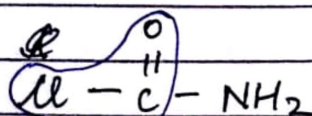
ethyl-2-hydroxy-3-propyl
Pent-4-ene oate



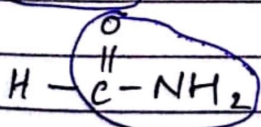
2-amino-4-bromo-3-hydroxy Pentan-^{3-ol}
~~amine~~



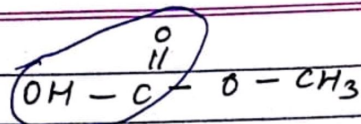
6-amino hept-4-ene-3-ol



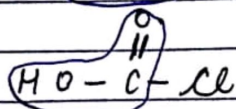
amino-methanoyl chloride



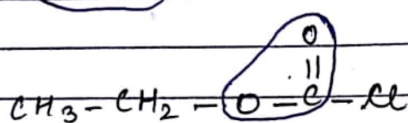
methanamide



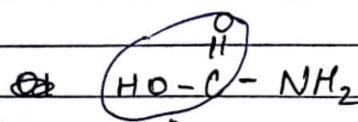
methoxy methanoic acid



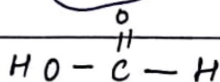
chloro methanoic acid



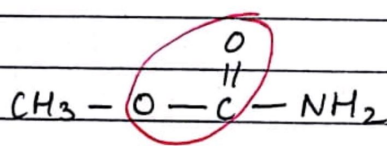
ethyl chloro methanoate



amino methanoic acid

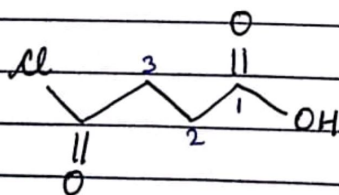


methanoic acid

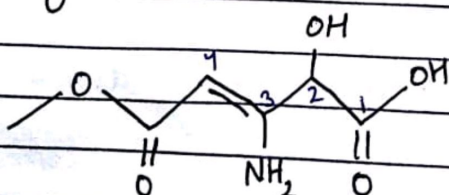


methyl amino methanoate

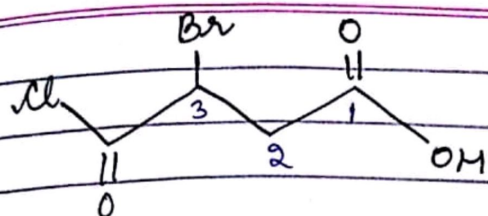
Note : In polyfunctional gp containing substance if C-containing func gp is +nt as substituents then its C is not considered in P.C.C. but in case of $-\text{CHO}$ & $-\overset{\text{O}}{\parallel}\text{C}-$ its C can be included in chain.



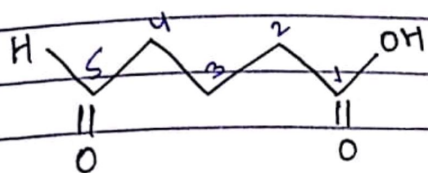
chloro formyl
3-methyl chloride - Propanoic acid



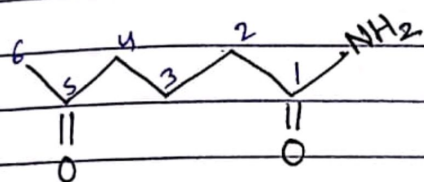
3-amino - 2-hydroxy - 4-methyl
carbonyl - 3-bute noic acid



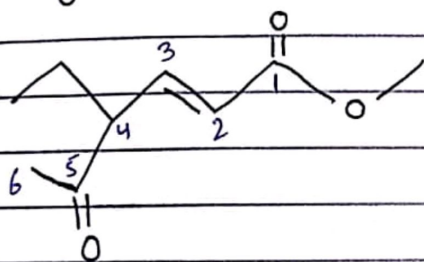
3-Bromo - 3 - Chloroformyl
Propanoic acid



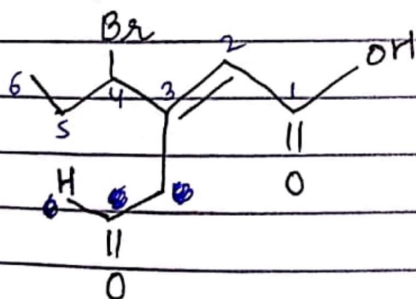
5 - Oxo - Pentanoic acid



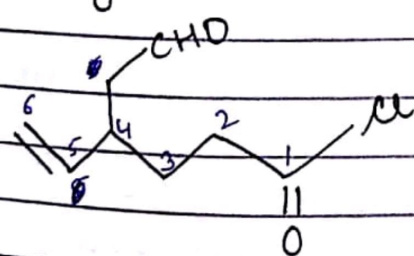
5 - Keto - Hexanamide



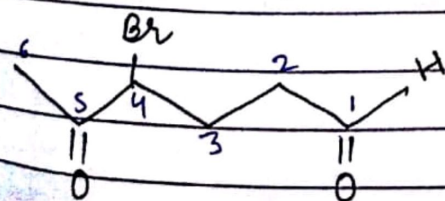
4-ethyl - methoxycarbonyl
5 - keto Hex - 2-ene methyl
Hex-2-ene oate



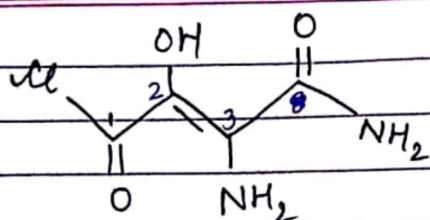
~~5 - Keto - 3 - Bromo Propyl~~
~~Hex - 2-ene oic acid~~
4-Bromo - 3 - methyl formyl hex - 2-enoic
acid



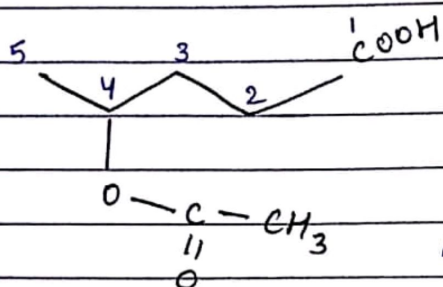
formyl methyl
4 - Methyl formyl - 5 - hexenoyl
chloride



4 - Bromo - 5 - keto
Hexanal



3-amino-3-carboxamoyl
2-hydroxy Prop
-2-ene-chloro
amide chloride

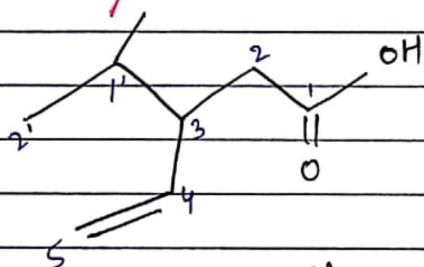


4-ethanoyloxy pentanoic
acid

or

4-acetoxy Pentanoic acid

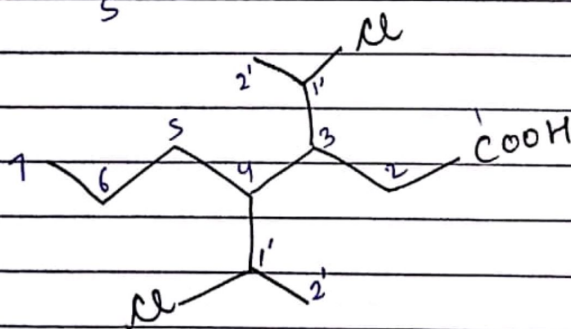
Complex Substituent :-



3 isopropyl Pent-4-enoic
acid

or

3 (1'-methyl ethyl) pent-4-enoic
acid

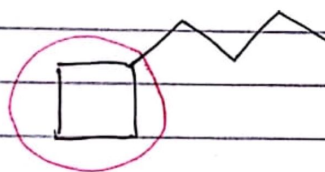
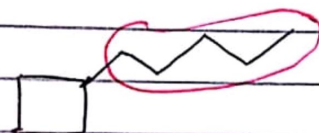
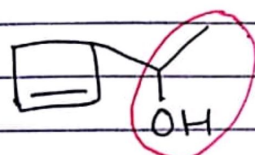
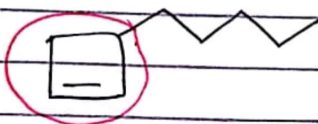
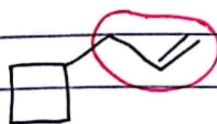
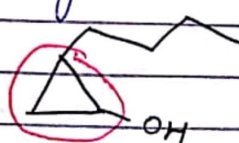


bis-3,4-(1'-chloroethyl)
heptanoic acid

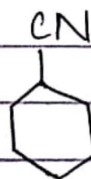
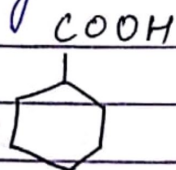
IUPAC name of Cyclic compounds :-

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

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.



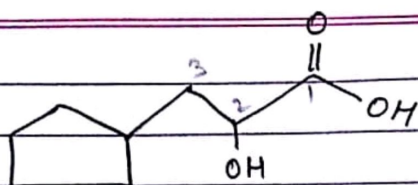
cyclo hexane
carbonitrile

cyclo hexane
carboxylic acid

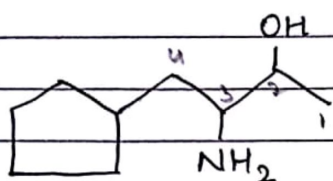
Numbering as usual

Note:- (1) ring prefix → cyclo

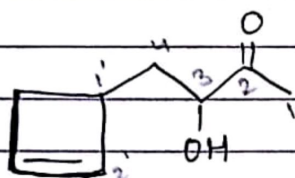
(2) word cyclo is considered in alphabetical order



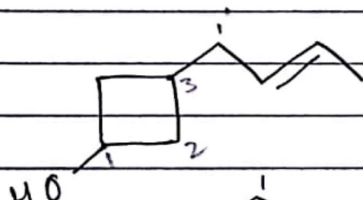
3-cyclopentyl-2-hydroxy
Propanoic acid



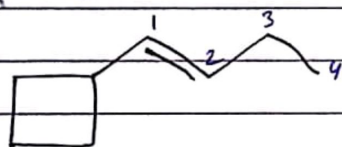
3-amino-4-cyclopentyl
-Butan-2-ol



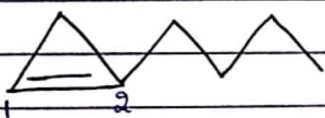
4 (2'-cyclobutenyl) -3-hydroxy
-2-butanone



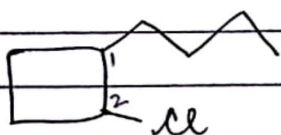
3 (2'-butenyl) butanol



~~2~~ 1-cyclobutyl But-1-ene



2-Butyl-cyclo Propene



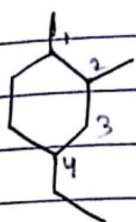
1-Butyl-2-Chloro-cyclo Butane



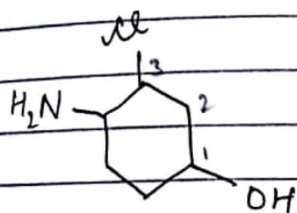
1-Ethyl-4-Methyl cyclo hexane



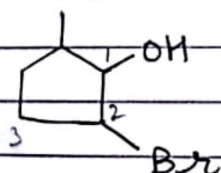
4-Ethyl-1,1-dimethyl cyclohexane



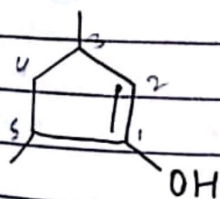
4-Ethyl-1,2-dimethyl cyclohexane



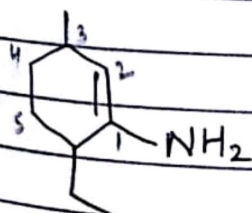
4-amino-3-chloro cyclohexanol



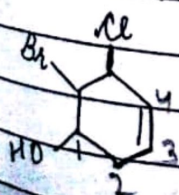
2-Bromo-5-methyl cyclo Pentanol



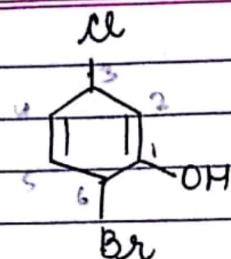
3,5-dimethyl cyclo Penteneol



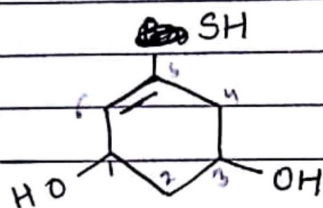
6-Ethyl-3-Methyl cyclo Hexeneamine



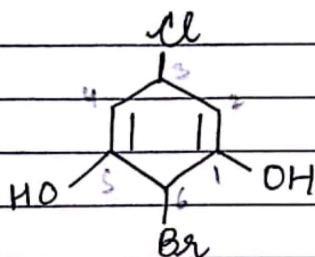
6-Bromo-5-Chloro-cyclo hex-3-eneol



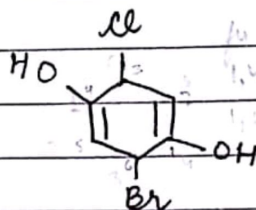
6-bromo-3-chloro-cyclohex-1,4-diene-1-ol



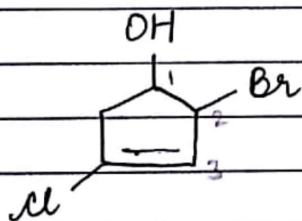
5-mercapto-cyclohex-5-ene-1,3-diol



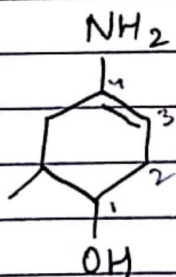
6-bromo-3-chloro-cyclohex-1,4-diene-1,5-diol



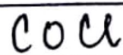
3-bromo-6-chloro-cyclohex-1,4-diene-1,4-diol



2-bromo-4-chloro-cyclopent-3-en-1-ol

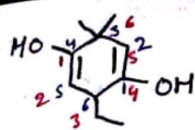


4-amino-6-methyl-cyclohex-3-en-1-ol



1-carbonyl chloride-cyclohexane





$\begin{matrix} \text{Pt} & \text{mb} & \text{sb} \\ 1,4 & 1,4 & 3,3,6 \\ 1,4 & 1,4 & 3,6,6 \end{matrix}$

PAGE NO.: 57
DATE: / /

4

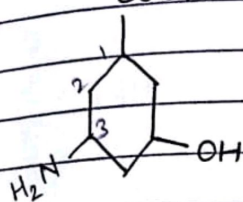
CH_2CHO

2-cyclohexyl ethanal



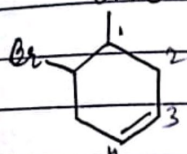
COOH

3-amino-5-hydroxy-cyclohexane carboxylic acid



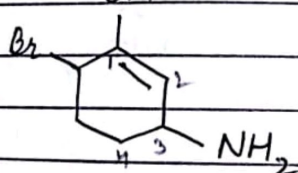
CHO

6-Bromo-cyclohex-3-ene-carbaldehyde



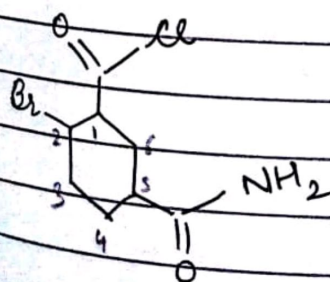
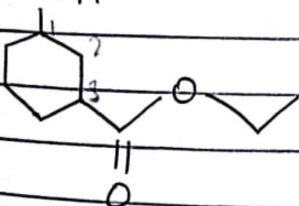
CN

3-amino-6-bromo-cyclohexene carbonitrile



COOH

3-ethoxy carbonyl-cyclohexane carboxylic acid



2-Bromo-5-carbamoyl cyclohexane carbonyl halide

IUPAC Name of Aromatic



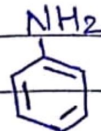
Benzene



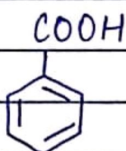
Toluene



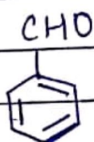
Phenol



Aniline



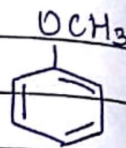
Benzoic acid



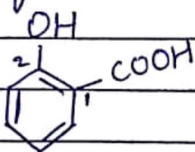
Benzaldehyde



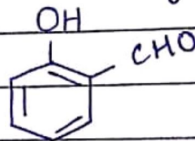
Benzonitrile



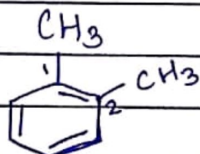
Anisole



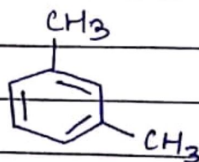
Salicylic acid
2-hydroxy benzoic acid



Salicylaldehyde
2-hydroxy benzaldehyde



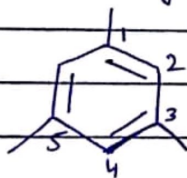
1,2-dimethyl benzene
o-Xylene



m-Xylene



p-Xylene



1,3,5-trimethyl benzene
or
mesitylene

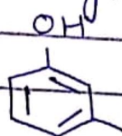
Rule: ~~It~~ If aromatic compd is consist of open and closed chain then PCC will be

- ① which have P func gp.
- ② Open chain if it have more than 2 carbon

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



2-methyl Phenol
o-Cresol



CH₂-COOH



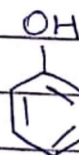
2-ethyl-4-methyl
benzoic acid



2-phenyl ethanoic acid



CH₂-CH₂-CHO



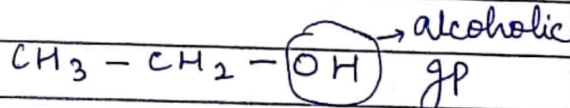
CH₂-OH

3-phenyl propanal

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



phenolic gp
Phenol



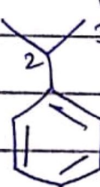
Alcoholic gp has more priority than phenolic gp.



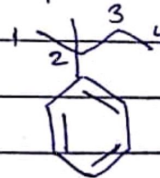
methyl benzene



ethyl benzene

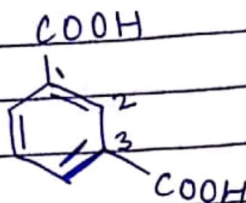


2-phenyl
propane

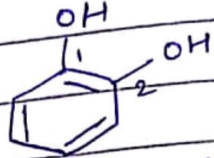


1-Chloro-3-phenyl propane

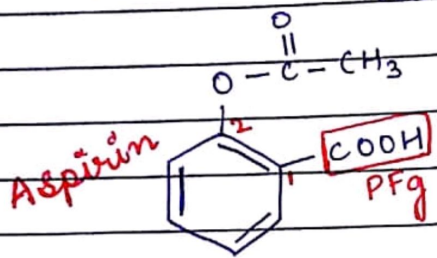
If more than 2 fun^c gp are +nt



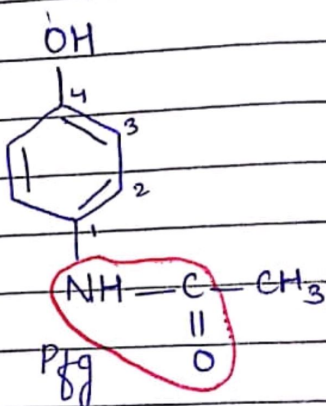
benzene-1,3-dicarboxylic acid



catechol
benzene-1,2-diol

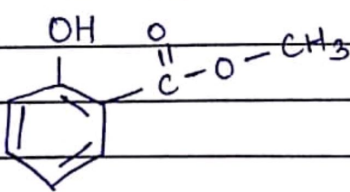


2-ethanoyl oxy benzoic acid
2-acetoxy benzoic acid
acetyl salicylic acid

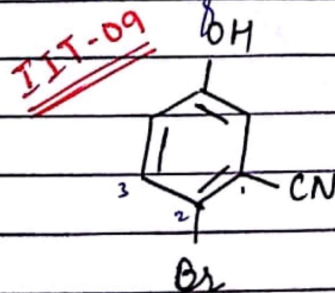


N-(4-hydroxy phenyl)
ethanamide

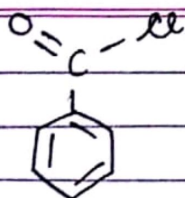
Paracetamol



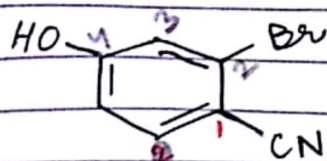
IUPAC methyl-2-hydroxy Benzoate
common methyl salicylate
- "oil of winter green"



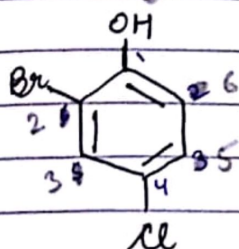
2-Bromo-5-hydroxy phenyl cyano benzo nitrile



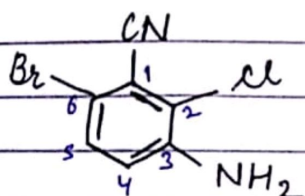
Benzene carbonyl chloride



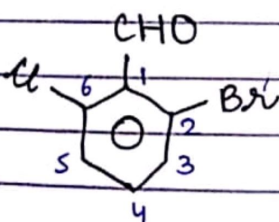
6-Bromo-4-hydroxy
benzene benzo nitrile



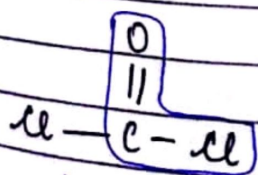
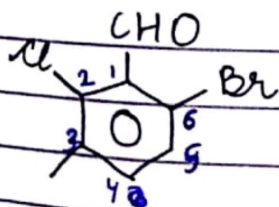
2-Bromo-4-Chloro-benzanol



3-amino-6-Bromo-2-chlorobenzonitrile
Benzo-nitrile.



2-Bromo-6-Chloro-Benzaldehyde

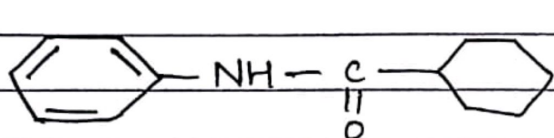
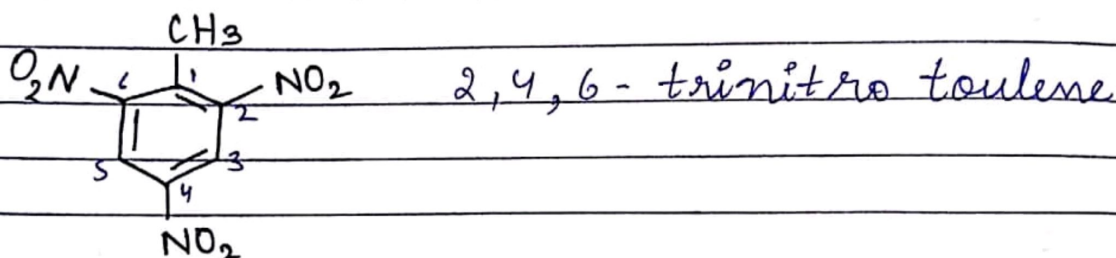


Phosgene gas

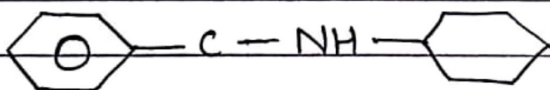
poisonous gas

Chloro-methyl anoyl chloride

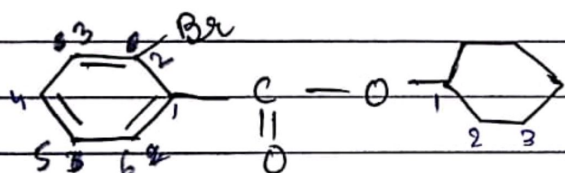
CCl_4 tetrachloro methane
 $CHCl_3 \rightarrow$ chloroform / 1, 1, 1 - trichloro methane
tear gas $\rightarrow CCl_3 \cdot NO_2$
tri chloro nitro methane



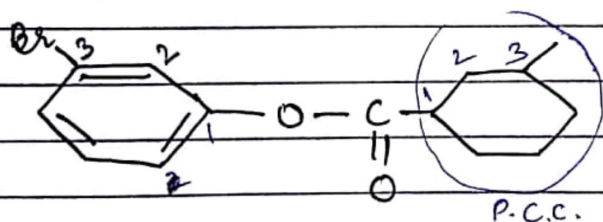
cyclo hexane
N - Phenyl carbox
Carboxamide hexane



N - cyclo - hexyl benzene
carboxamide



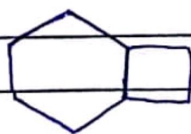
(4-methyl cyclo hexyl) -
6 - Bromo Benzoate



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

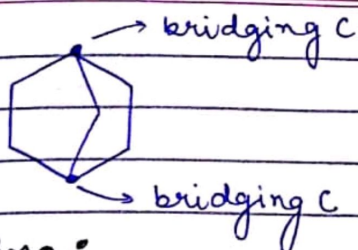
Bicyclo Compounds

4 rings are fused



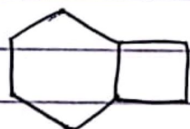
General formula $\rightarrow C_n H_{2n-2}$
min C $\rightarrow 4$ C



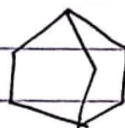


Naming:

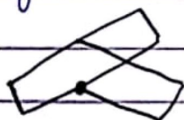
- Prefix $\rightarrow$ bicyclo
- no. of C-atoms in bridges are written in $\downarrow$ order in square bracket separated by full stop (.)
- []
- word root $\rightarrow$ total no. of C-atom



bicyclo [4.2.0] Octane

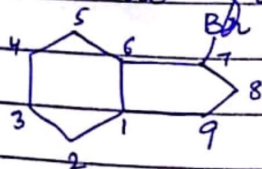


bicyclo [2.2.1] heptane

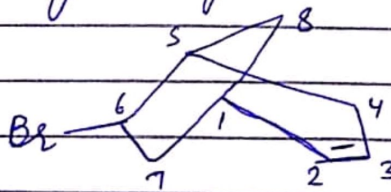


bicyclo [2.2.2] Octane

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

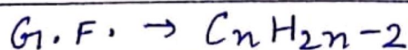
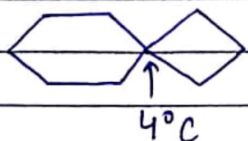


bicyclo [3.2.1]
6-bromo-
Oct-2-ene

Spiro - compounds :-

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

eg



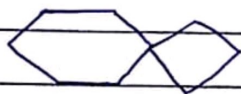
min. no. of C $\rightarrow 5C$



Naming :-

• Prefix spiro

- no. of C atoms in ring are written in $\uparrow$ order
- word root, suffix.



Spiro [3.5] nonane



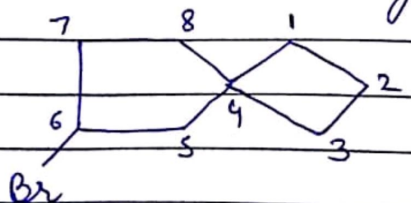
Spiro [2.2] Pentane



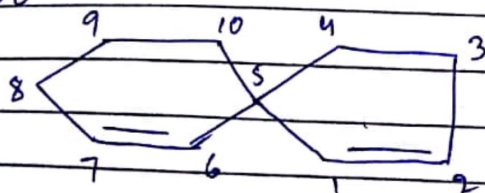
Spiro [2.4] heptane

* Sub is +nt

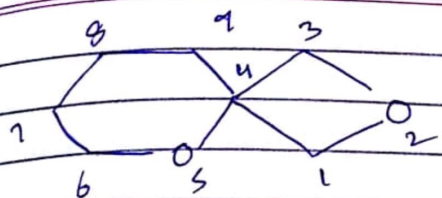
Numbering starts from adjacent carbon to common C & move through smaller ring to large ring



Spiro [3.4] - 6 - Bromo
Octane



Spiro [4.5] dec-1,6-
diene



spiro [3.5] 2, 5 dioxanone

Extra different org i.e. no common carbon



1-Chloro - 4-Methyl benzene
4-Chloro - toluene

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