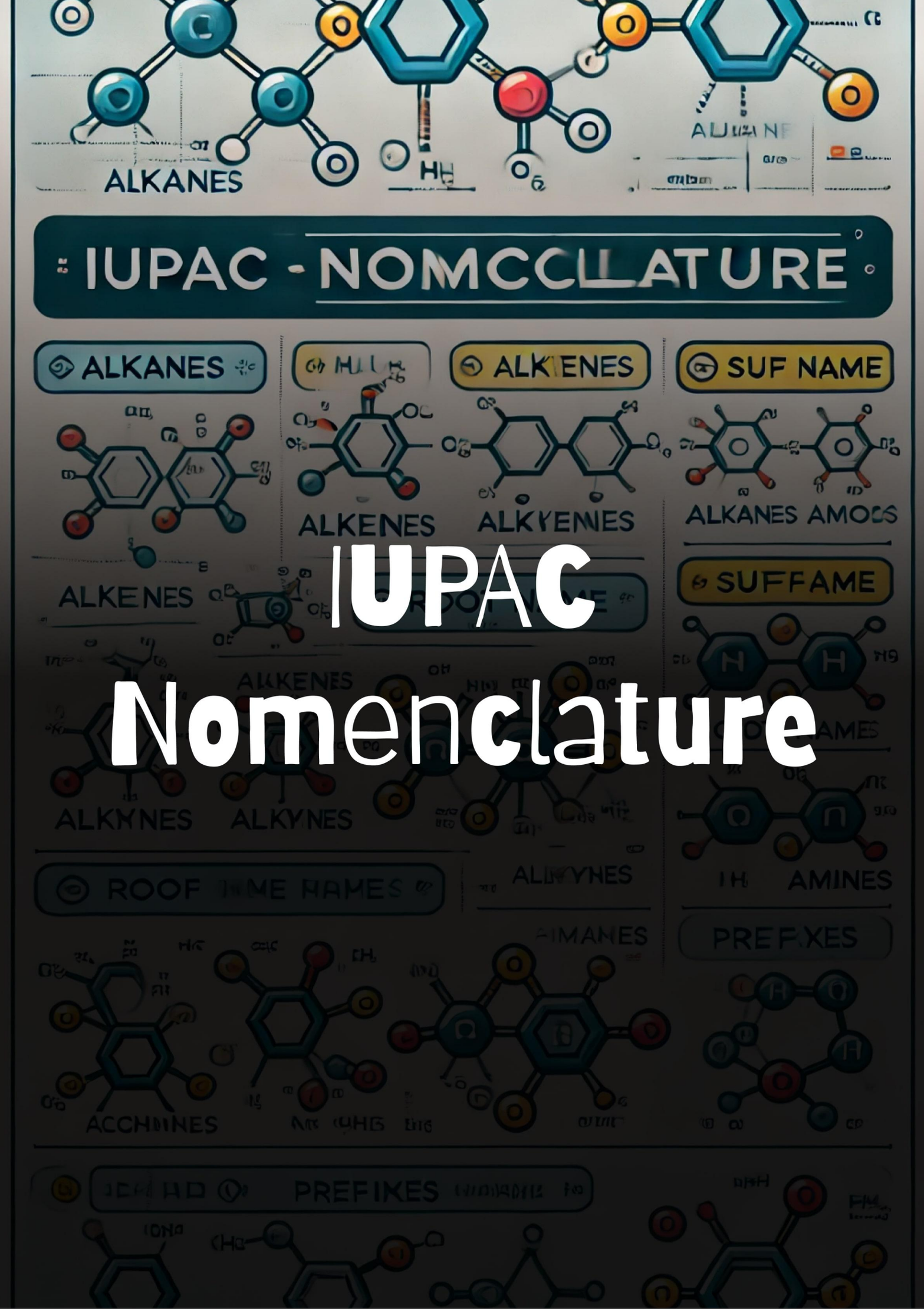


IUPAC Nomenclature.

Introduction (2° Prefix + 1° Prefix + Wordroot + 1° Suffix + 2° Suffix)
nomenclature of saturated compound.
" " unsaturated compound.
" " cyclic "
" " Bicyclo "
" " Spiro "
" " monofunctional group
" " Polyfunctional group
" " ether
" " Benzene derivative

IUPAC

2	1	0	1	2
2° Prefix / Secondary Prefix	1° Prefix / primary prefix	Wordroot	1° Suffix / primary suffix	2° Suffix / Secondary suffix
prefix			suffix	

P + W + S

* 2° Prefix.

Tells us about side chain / branching / substituent in an organic compound

-X (halo)	$-NO_2$ (nitro) $\{-N(=O)=O\}$
-F (Fluro)	
-Cl (Chloro)	-N=O (nitroso) {-No}
-Br (Bromo)	
-I (Iodo)	-O-N=O (nitrite)

$-R$ (alkyl)

① $-CH_3$ methyl

② $-CH_2CH_3$ ethyl

③ $-CH_2CH_2CH_3$ propyl

$CH_3\underset{|}{CH}CH_3$ isopropyl $\longrightarrow$ $\{CH_3-\underset{|}{CH}-CH_3\}$

④ $-CH_2CH_2CH_2CH_3$ butyl (n-butyl)

$CH_3\underset{|}{CH}CH_2CH_3$ secondary butyl or sec butyl

$CH_3-\underset{|}{CH}-CH_2-$ isobutyl
$\quad\quad CH_3$

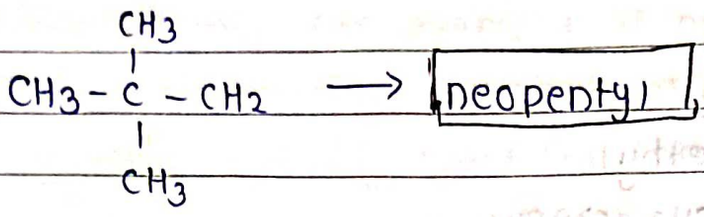
$CH_3-\overset{CH_3}{\underset{|}{\overset{|}{C}}}-CH_3$ Tertiary butyl
Tert. butyl

⑤ $CH_2-CH_2-CH_2-CH_2-CH_3$ n-pentyl

$CH_3-CH_2-CH_2-\underset{|}{CH}-CH_3$ } sec pentyl

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

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




Phenyl

Benzyl

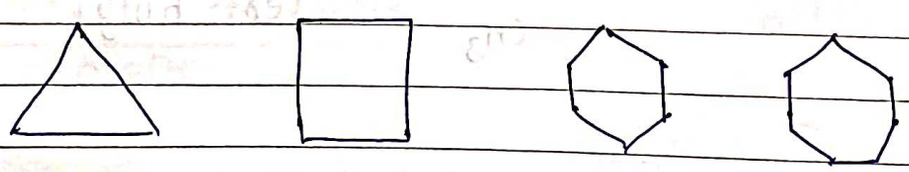
$CH_2 = CH \longrightarrow$ Vinyl

$CH_2 = CH - CH_2 \longrightarrow$ Allyl

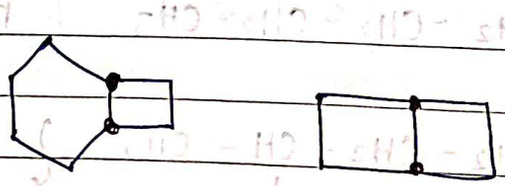
$CH \equiv C -$ Ethynyl

* 1° Prefix

Tells us about whether compound is closed chain or rin

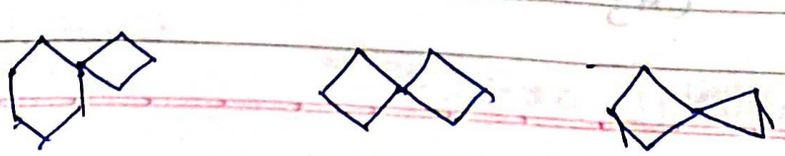


Bicyclo →



Bicyclo - Two cycles are fused into one another having more than one common carbon.

Spiro - Two cycle are fused into one another having one common carbon



* Word root

no. of carbon		Wordroot
1	-	meth
2	-	eth
3	-	prop
4	-	but
5	-	pent
6	-	hex
7	-	hep
8	-	oct
9	-	non
10	-	dec

* 1° Suffix

Tells us about the saturation / unsaturation in the comp
(= or ≡ bond)

single bond - ane

double bond ene / two double bond - diene
three " " - triene

triple bond - yne / two triple bond - diyne.

=, ≡ ene/yne ~~ey~~ enyne

Two vowels can't come together. or one vowel and one y can't come together.
then former vowel is cancelled

= ≡ ≡ → enediyne
= = ≡ → dien/yne {dienyne}

* 2° Suffix

Tells us about functional group in compound

↓

will be discussed later on

* Nomenclature of Saturated compounds

only 3 steps -

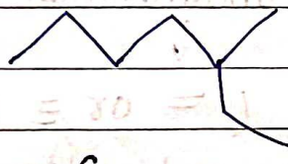
① Selection of parent chain

② Numbering of parent chain

③ Naming of compound

Selection of Pa

Rule 1 - Carbon chain having maximum no. of carbon will be taken as parent chain



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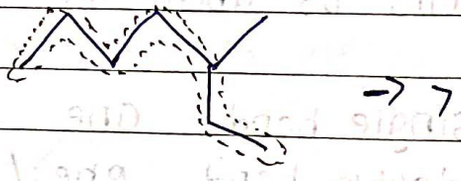

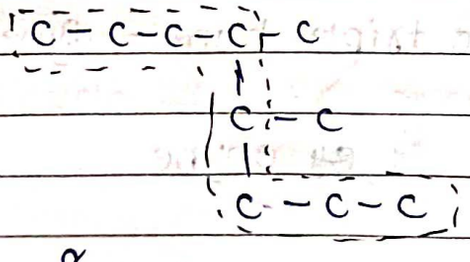

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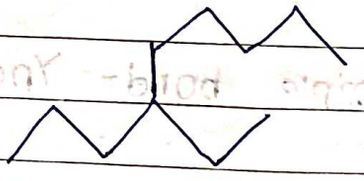
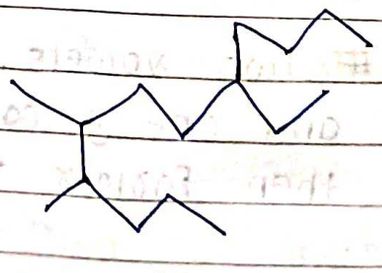
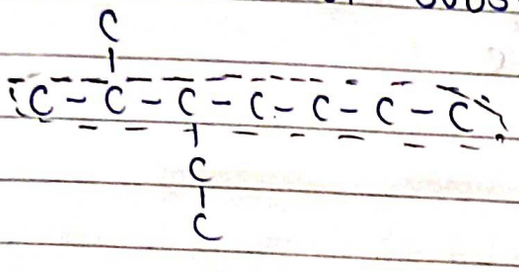


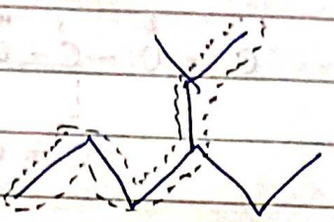
9 carbon

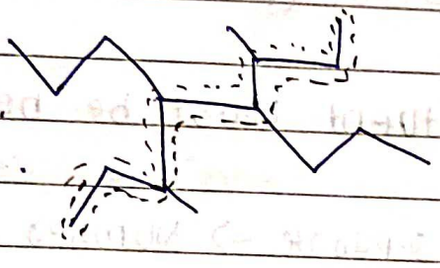


12 carbon

Rule 2 - When more than one parent chain is present then select that carbon chain which has more no. of substituent

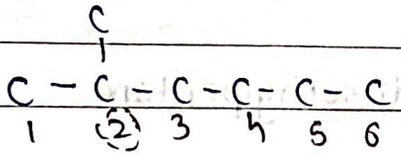




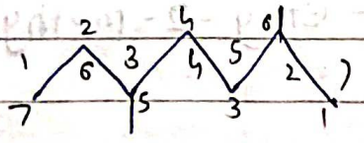


② Numbering of PC

Rule 1 - Numbering is done in such a way that substituent gets lowest locant number.

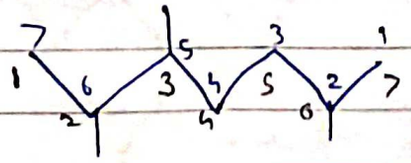


Rule 2 - In case of more than one substituent then follow first point principle



(3,6) ✗

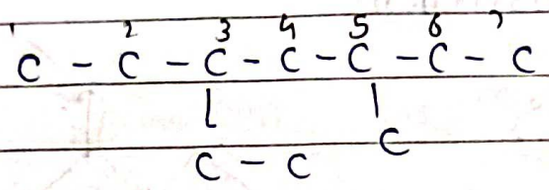
(2,5) valid



(2,3,6) ✓

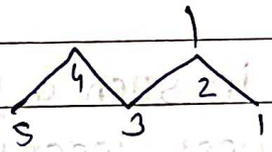
(2,5,6)

Rule 3 - If first point difference rule fails, then numbering is done alphabetically.

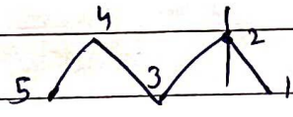


③ Naming of Compound.

① locant no. of substituent must be before name of substituent
② Hyphen is used to separate → Number & letter
③ Comma is used to separak → Number & Number
④ No gap between letter & letter

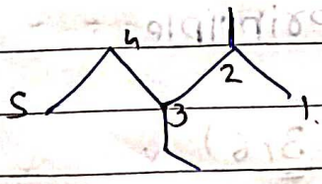


2-methyl



2,2-dimethylpentane

Rule-3 - always follows alphabatical order in naming of substituents

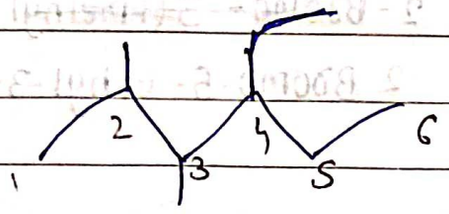


3-ethy-2-methyl pentane

Rule 4 - In case of more than one substituent

2 - di
3 - tri
4 - tetra
5 - penta

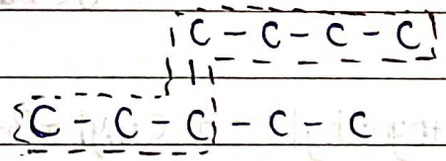
Note - When di, tri, tetra are used for normal substituents then these are not considered for alphabatical order : But when these are used for complex substituent then it is considered in alphabatical order



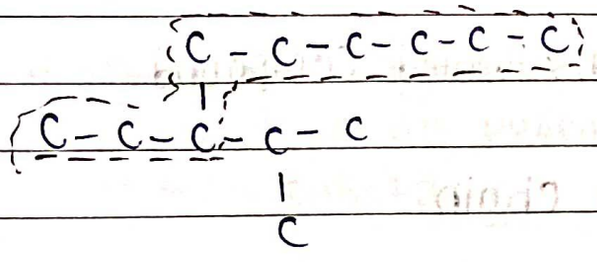
4 ethyl -2,3- dimethyl hexane

naming of

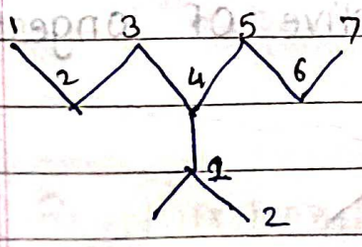
* Complex substituent



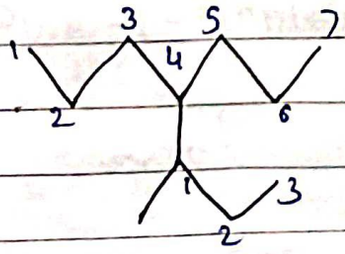
(normal substituent)



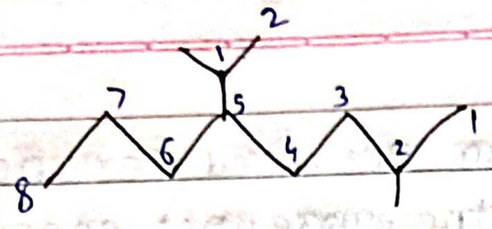
(complex substituent)



4-(1 methyl ethyl) heptane



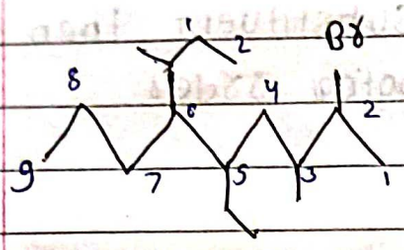
4 - (1-methyl propyl) heptane



5 = ~~(1-methylethyl)~~

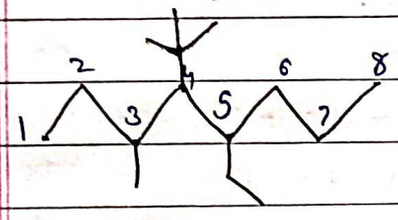
Br

2-Bromo-5-(1 methyl ethyl) octan.



~~2-Bromo-5-(1-methyl~~

2 Bromo-5-ethyl-3-methyl-6-(1 methyl propyl) nonane.



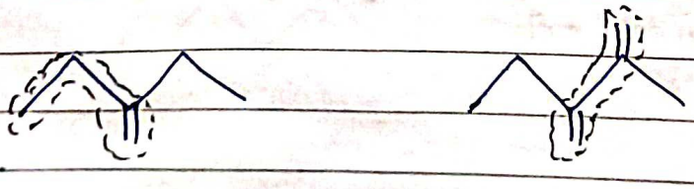
✗ 5 ethyl-3-methyl-4-(~~1~~, 1-dimethylethyl octane.

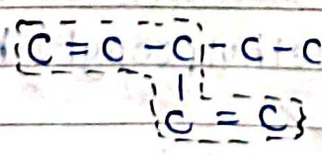
✓ 4-(1,1-dimethylethyl)-5-ethyl-3-methyl octane

* Nomenclature of Unsaturated Compound.

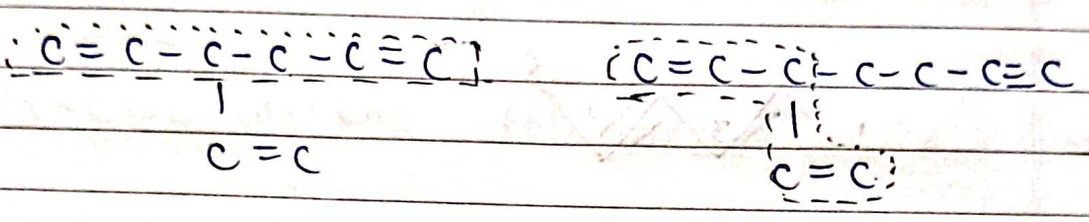
① Selection of Parent chain.

Rule 1- Parent chain contains maximum number of multiple bonds irrespective of longest carbon chain

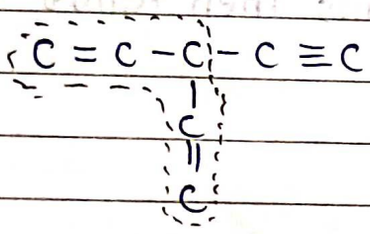




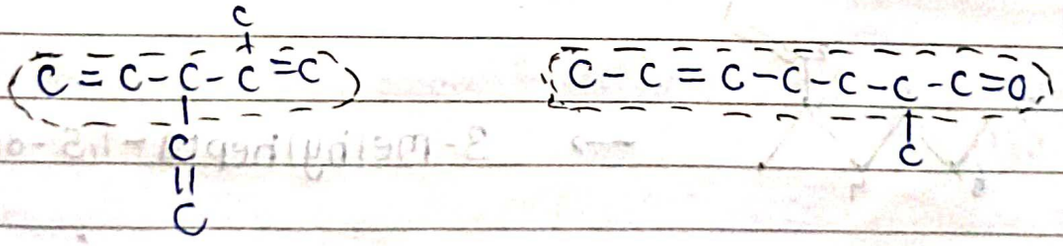
Rule 2 - If number of multiple bond is same, then select that multiple bond which have max^m no. of carbon



Rule 3 - If above two rule fails, then select that carbon chain as parent chain which contains more no. of double bond rather than triple bond

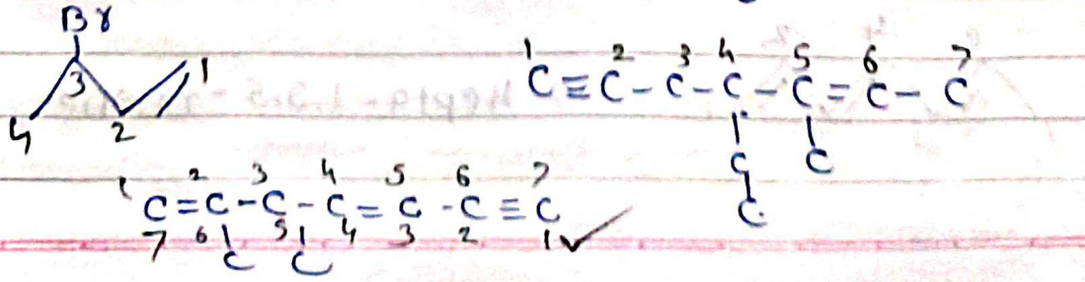


Rule 4 - If above 3 rule fails then select that carbon chain on parent chain which contain max no. of substituent

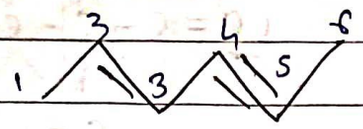


② Numbering of Parent Chain.

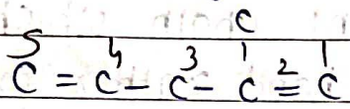
Rule -1 - multiple bond should get lowest locant number



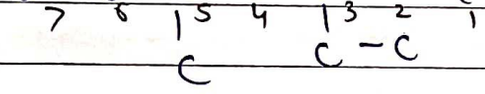
Rule 2 - when locant number is same from both end then numbering should be done from that end which gives lowest locant no. to double bond

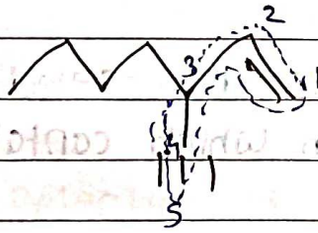


Rule 3 - If above two rules fails, then select that numbering which gives lowest locant to substitu

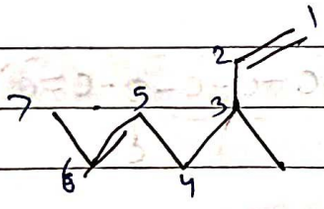


RULE 4 - If above 3 Rule fails then follow alphabatic order

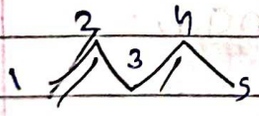




→ 3-butylpent-1-ene-4-yne



→ 3-methylhepta-1,5-diene

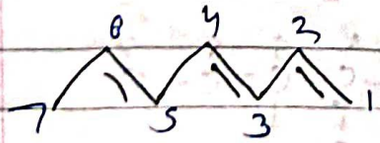


= Penta-1,3-diene

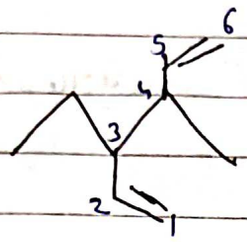
diene, triene, tetraene

↓

w.r.t root

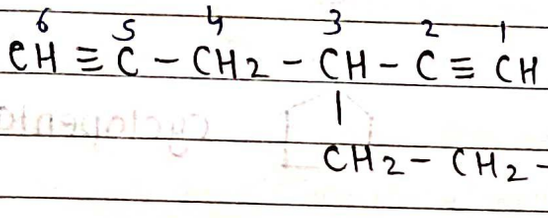


→ Hepta-1,3,5-triene

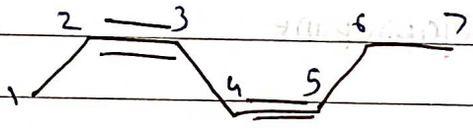


3-ethyl-4-methyl hexa-1,5 diene

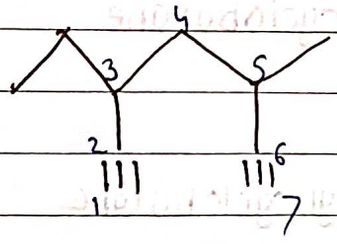
$CH_3-C\equiv C-CH_2-CH_3$ Pent-2-yne



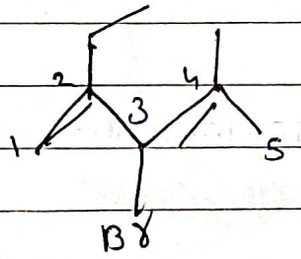
→ 3-propylhexa-1,5-dyne



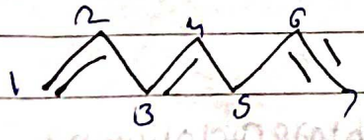
→ Hepta-2,4-dyne



→ 3-ethyl-5-methyl hepta-1,6 diyne



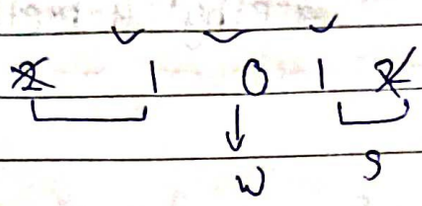
→ 2-Bromo-2-ethyl-4-methylpenta-1,3-diyne.



→ Hepta-1,3 dien-6-yne

* Nomenclature of cyclic compound - Bicyclo, spiro

Rule - 1.

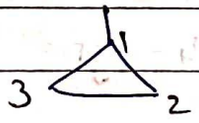


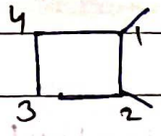
 cyclopropane

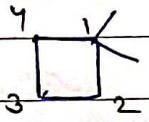
 - cyclohexane

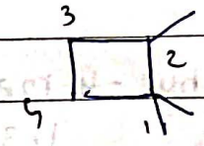
 cyclobutane

 cyclopentane

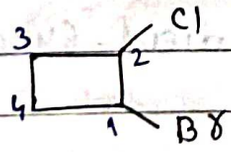
 → 1- methylcyclopropane

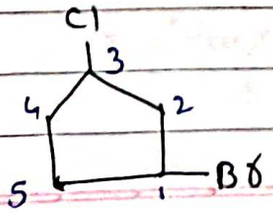
 — 1,2 - dimethylcyclobutane

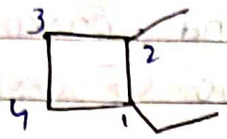
 — 1,1 - dimethyl cyclobutane

 — 1,1,2 - trimethylcyclobutane

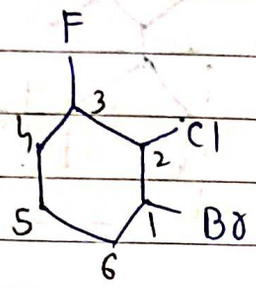
IF more than one substituent, then follow alphabatical order

 → 1- bromo - 2- chloro cyclobutane

 → 1 - Bromo - 3 - chloro cyclopentane

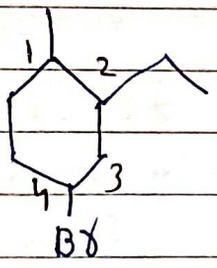


1 - ethyl - 2 - methyl cyclobutane.



1 - Bromo - 2 - Chloro - 3 - Fluoro cyclohexane

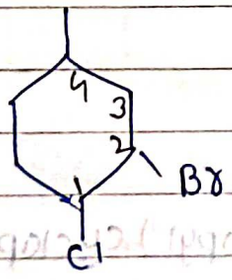
Rule-3 - If more than two substituent are present then follow lowest locant Rule.



~~(1,3,4) Br~~

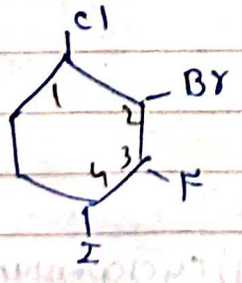
✓ (1,2,4) - methyl

4 - Bromo - 2 - ethyl - methyl cyclohexane



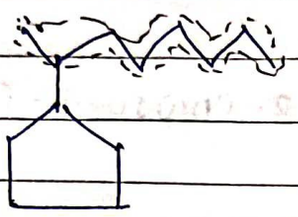
(1,2,4) - Cl

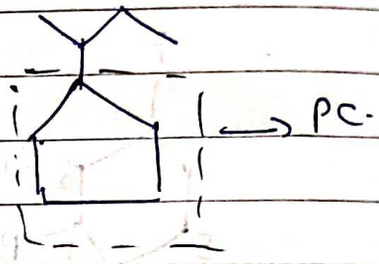
2 - Bromo - 1 - Chloro - 4 - Fluoro cyclohexane



→ 2 - Bromo - 1 - Chloro - 3 - Fluoro - 4 - Iodo - cyclohexane

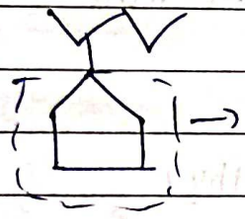
Rule-4. In case of cyclic compound. parent chain is that chain which contains more no. of carbon. (it may be cyclic or open chain)

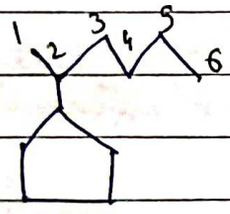




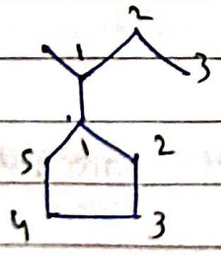
Bahubali Trick

Rule 4- If both cycle & open chain have same no. of carbon. then cycle will be parent chain

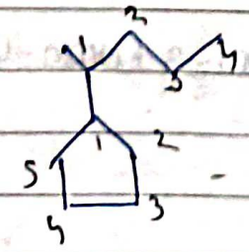




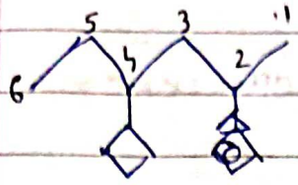
2 - Chloropentylhexane



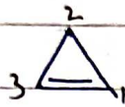
1- (1-methylpropyl) cyclopentane



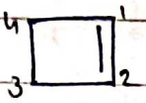
1-(1-methylbutyl) cyclopentane



4-cyclobutyl-2-cyclopenthylhexane

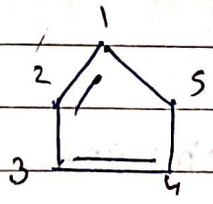


- cycloprop-1-ene



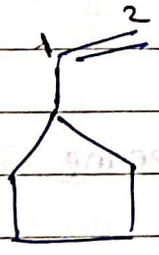
- cyclobut-1-ene

- cyclobuta-1,3-diene

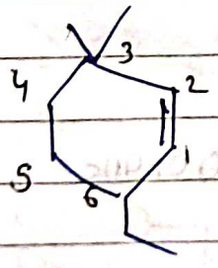


→ cyclopenta 1,3-diene

Rule 5- If multiple bond is present then parent chain must contain ~~more~~ maximum no. of multiple bond

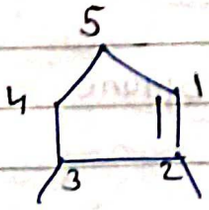


1-cyclopentyeth-1-ene

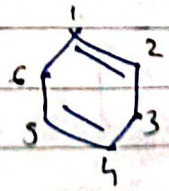


(1,3,3,6)

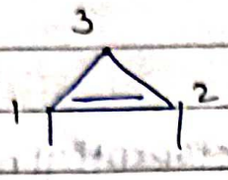
6-ethyl-3,3-dimethyl cyclohex-1ene



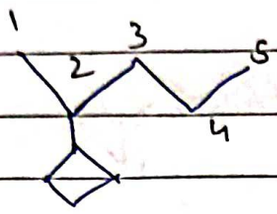
2,3-dimethyl cyclopent-1-ene



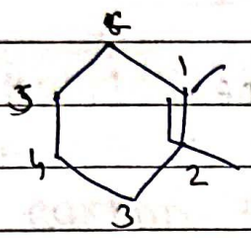
cyclohexa-1,4-diene



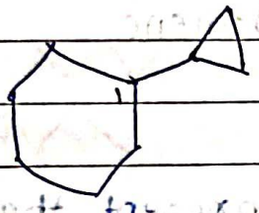
→ 1,2-dimethylcycloprop-1ene



2-cyclobutyl pentane.

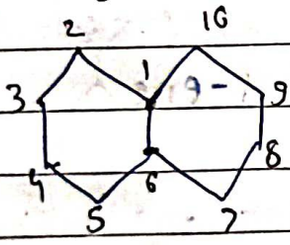


1,2-dimethylcyclohex-1ene.

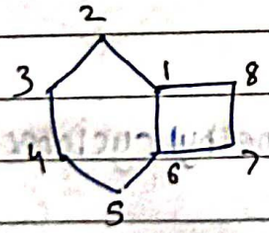


1-cyclopropylcyclohexane.

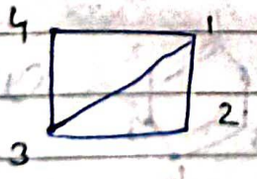
* Bicyclo



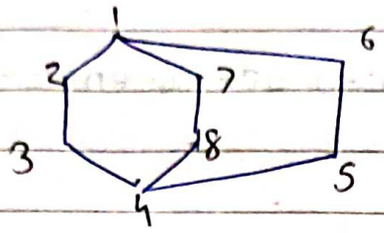
Bicyclo[4.4.0]decane.



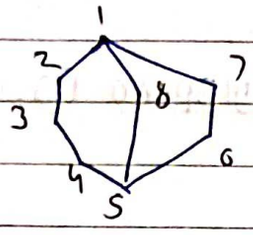
Bicyclo[4.2.0]octane.



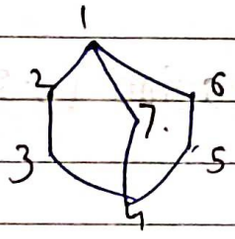
Bicyclo[1.1.0]butane



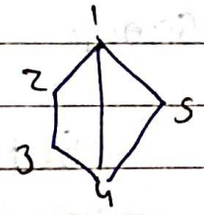
Bicyclo [2-2-2] Octane



Bicyclo [3-2-1] octane.

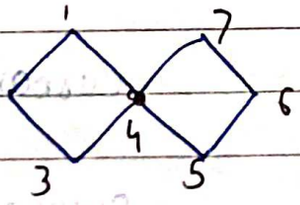


Bicyclo [2-2-1] heptane

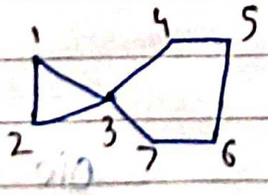


Bicyclo [2-1-0] pentane

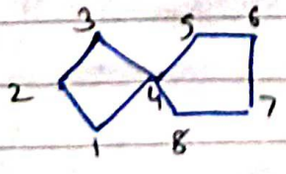
* Spiro



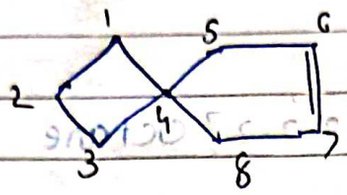
spiro [3-3] heptane



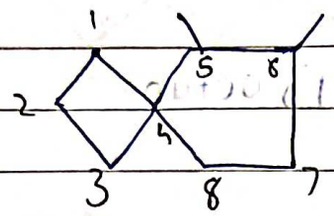
spiro [2-4] heptane



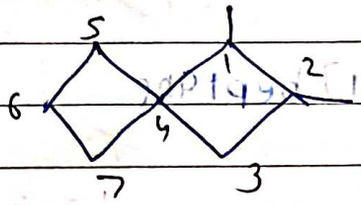
→ spiro [3-4] octane



Spiro [3.4] oct-6-ene

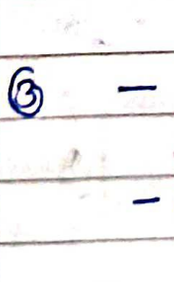
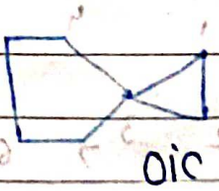


5,6-dimethylspiro [3,4] octane



1,2-dimethylspiro [3.3] heptane.

* Seniority Table → 13 Functional Group

Functional Group	Prefix	Suffix.
① -COOH carboxylic acid	X	Oic acid
-COOH	carboxy	carboxylic acid
② $-SO_3H$ Sulphonic acid	Sulpho	Sulphonic acid
③ 	X	 Oic anhydride

anhydride

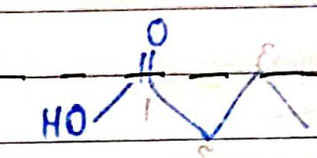
④ $-\overset{O}{\overset{\|}{C}}-O-R$ (ester) — alkyl-oate

$-\overset{O}{\overset{\|}{C}}-O-R$ — alkoxycarbonyl — alkyl-carboxylate

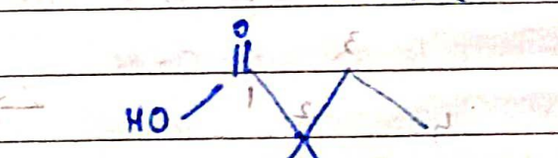
⑤ $-\overset{O}{\overset{\|}{C}}-X$ — acid halide — oylhalide

$-\overset{O}{\overset{\|}{C}}-X$ — Haloformyl — carbonyl halide

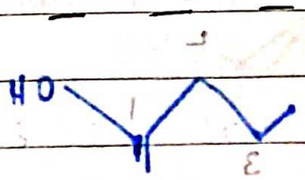
⑥ $-\overset{O}{\overset{\|}{C}}-NH_2$ — X — amide



$-\overset{O}{\overset{\|}{C}}-NH_2$ — carbonyl — carboxamide



⑦ $-C\equiv N$ — cyano — carbonitrile

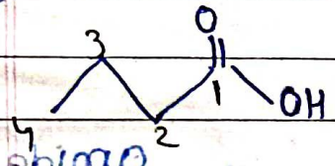


⑧ $-N\equiv C$ — isocyano — carbylamide

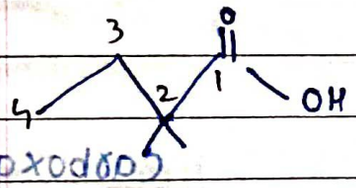
⑨ $-\overset{O}{\overset{\|}{C}}-H$ — oxo — al

$-\overset{O}{\overset{\|}{C}}-H$ — formyl — carbaldehyde

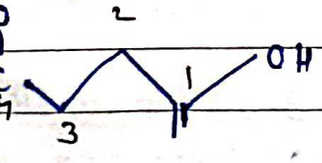
(10)	$-\overset{O}{\overset{\|}{C}}-$	Oxo / keto	one
(11)	$-OH$	hydroxy	ol
(12)	$-SH$	mercepto	thiol
(13)	$-NH_2$	amino	amine



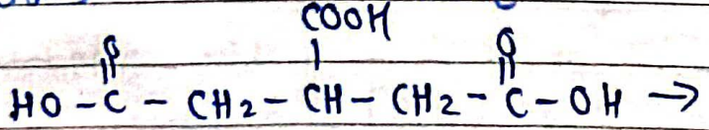
→ Butane-1-oic acid (2)



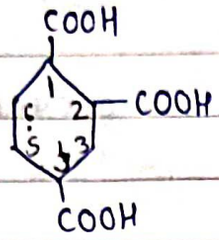
→ 2,2-dimethylbutane-1-oic acid



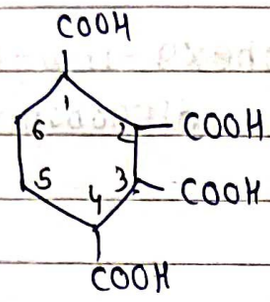
→ Butane-1,4-dioic acid (7)



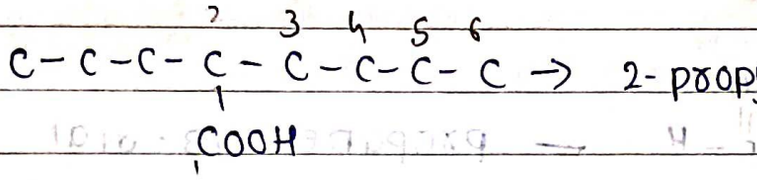
→ Propane-1,2,3, tricarboxylic acid (8)



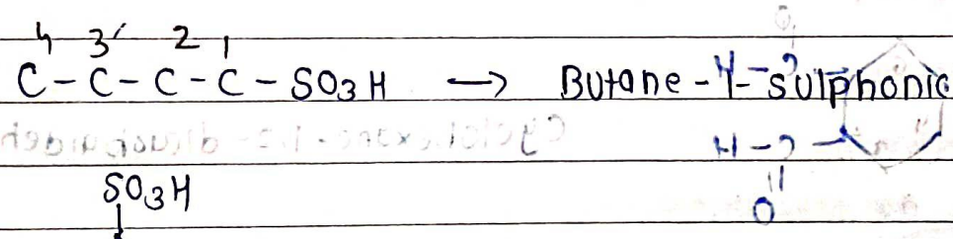
Cyclohexane-1,2,3-tricarboxylic acid



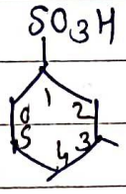
Cyclohexane-1,2,3,4-tetracarboxylic acid



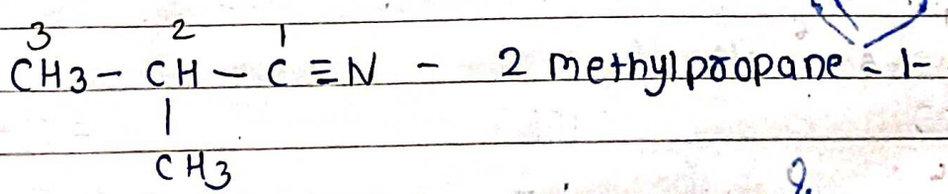
2-propylhexane-1-oic acid



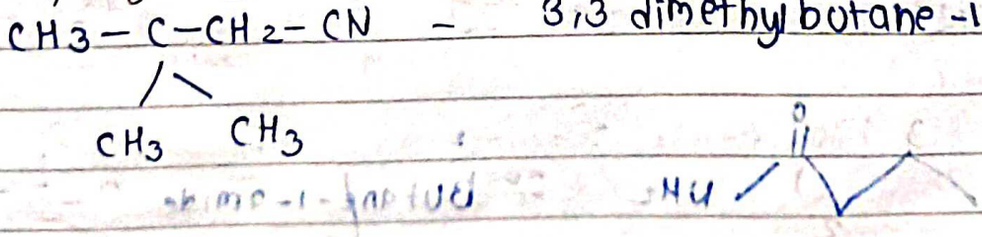
Butane-4-sulphonic acid



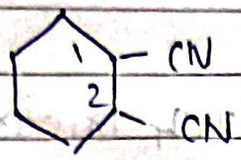
Cyclohexane-1,3-disulphonic acid



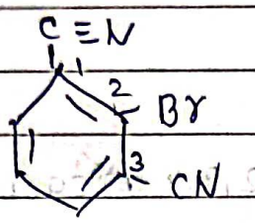
2 methylpropane-1-nitrile



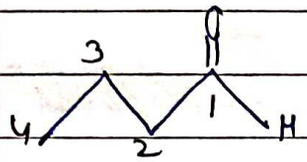
3,3 dimethylbutane-1-nitrile.



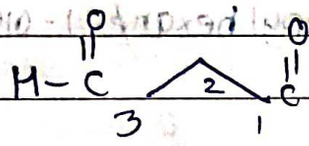
Cyclohexane-1,2-dicarbonitrile.



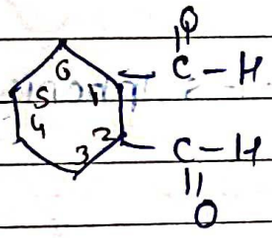
2-Bromocyclohexa-1,5,-diene-1,3-dicarbonitrile



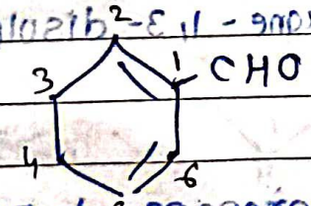
Butanal-1-al



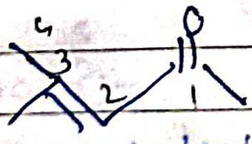
propane-1,3-dial



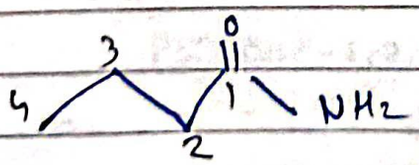
Cyclohexane-1,2-dicarbaldehyde



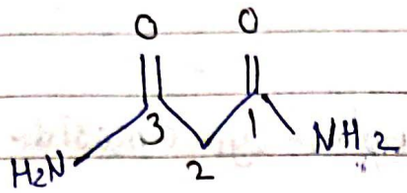
Cyclohexa-1,5-diene-1-carbaldehyde



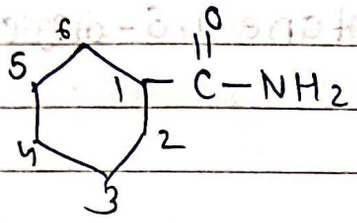
3-methylbut-2-enal-1-al



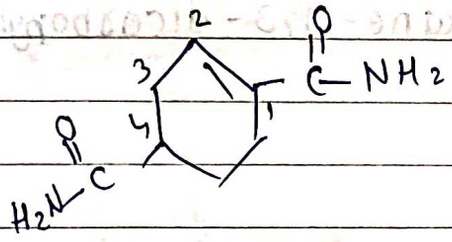
Butanal-1-amide



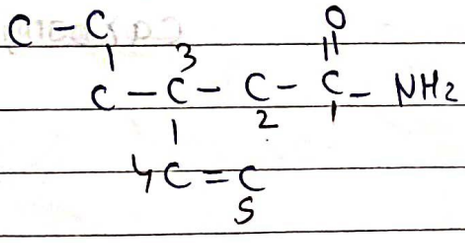
propane-1,3-diamide



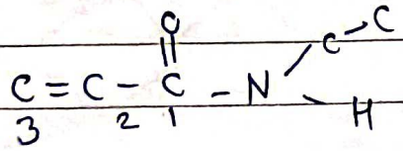
cyclohexane-1-carbamide.



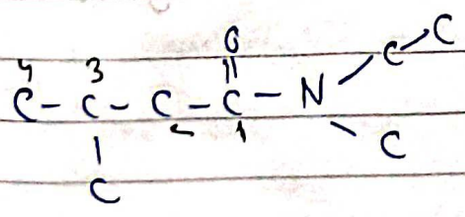
cyclohexane-1,4-dicarbamide



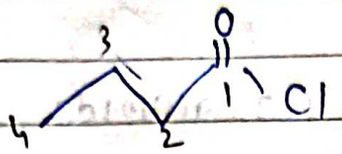
3-propylpent-4-enyl-1-amide



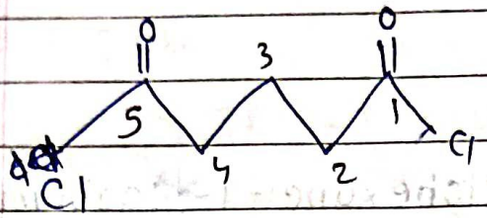
N-ethylprop-2-enyl-1-amide



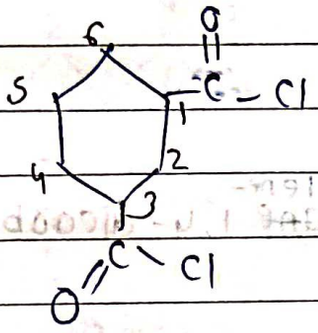
N-ethyl-N,3-dimethylbutanyl-1-amide



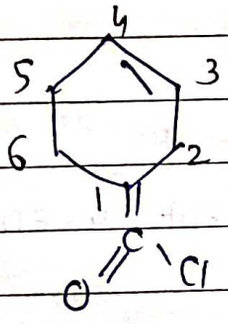
Butanoyl chloride



Pentane-1,5-dioylchloride

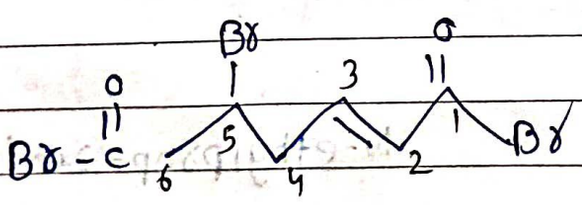


cyclohexane-1,3-dicarbonyl chloride

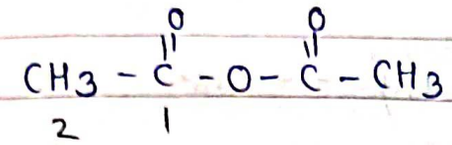


cyclohex-3-enoyl chloride

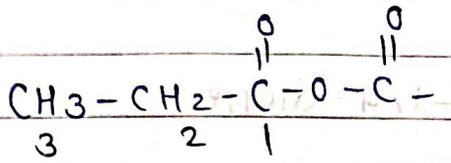
carbonyl chloride



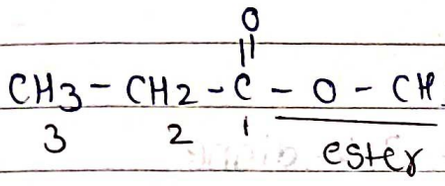
5-Bromohex-2-ene-1,6-dioyl bromide



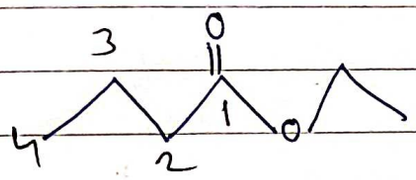
ethanoic -1- oic anhydride



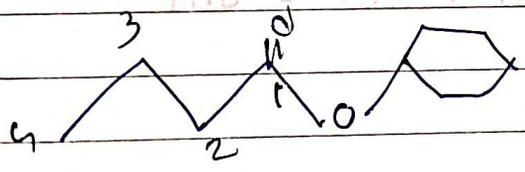
ethanoic propanoic anhydride



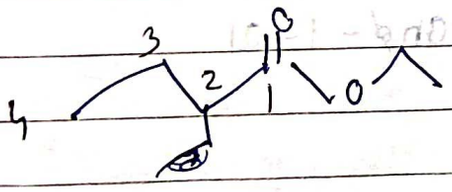
methylpropane -1- oate



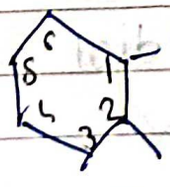
ethylbutanoic -1- oate



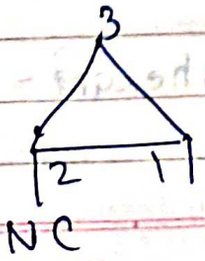
cyclohexylbutanoic -1- oate



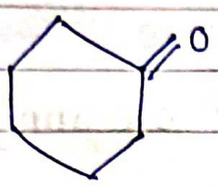
ethyl-2-methylbutanoic -1- oate



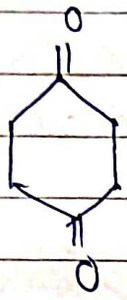
2-methylcyclohexane -1- carbylamine



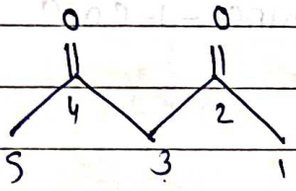
Cyclopropane - 1,2 - dicarbylamine



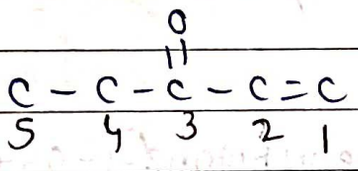
Cyclohexane -1- one



Cyclohexane-1,4-dione

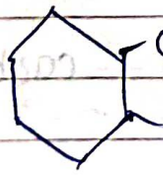


Pentane-2,4-dione

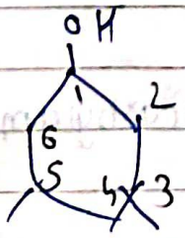


Pent-1-ene-3-one

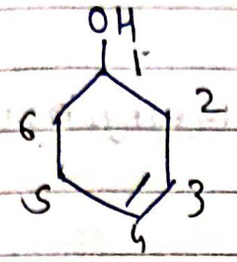
Cyclohexan-1-ol



Cyclohexane-1,2-diol

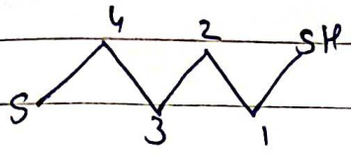


3,5-dimethylcyclohexan-1-ol

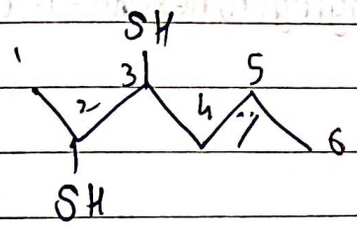


Cyclohex-3-ene-1-ol

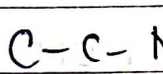
Cyclohexane-1-thiol



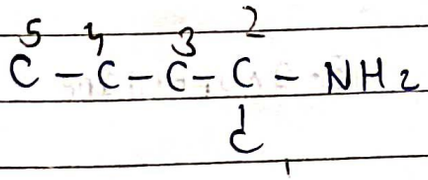
Pentane-1-thiol



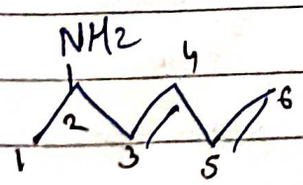
Hex-4-ene-2,3-dithiol



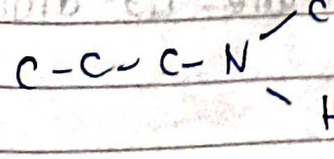
ethanε-1-amine



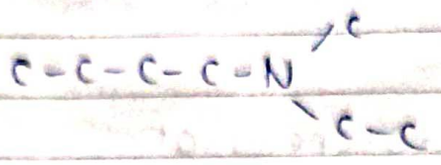
Pentanε-2-amine



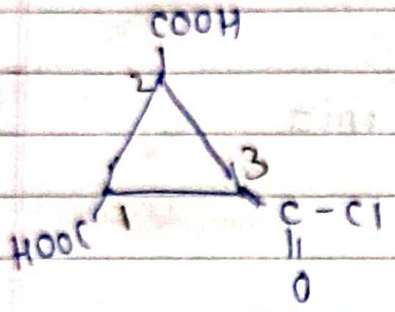
Hexa-3,5-dienε-2-amine



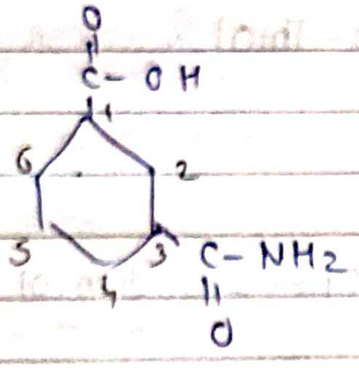
N-ethylpropanε-1-amine



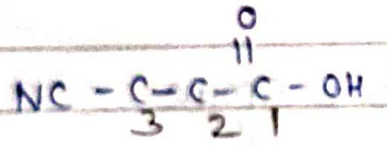
N-ethyl-N-methylbutan-1-amine



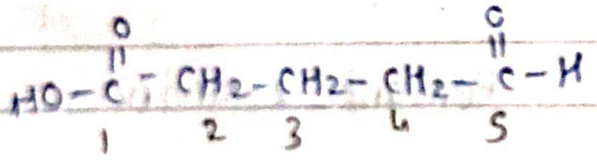
3-chloroformylcyclopropane-1,2-dicarboxylic acid



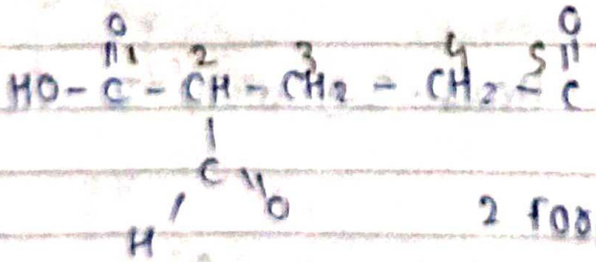
3-carbamoylcyclohexane-1-carboxylic acid



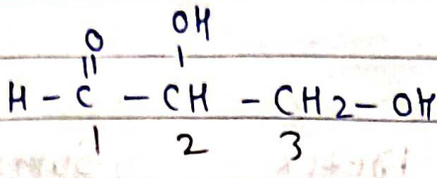
3-cyanopropanoic acid



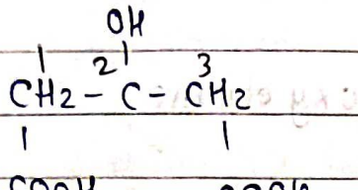
5-oxopentanoic acid



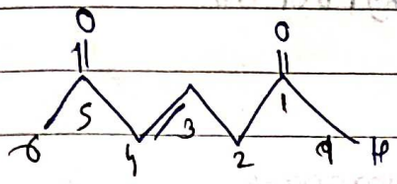
2-formylpentane-1,5-dioic acid



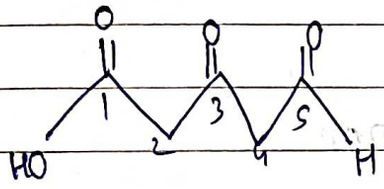
→ 2,3-dihydroxy propanal-1-al



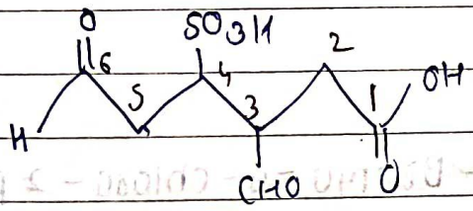
→ 2-hydroxypropane-1,2,3-tricarboxylic acid



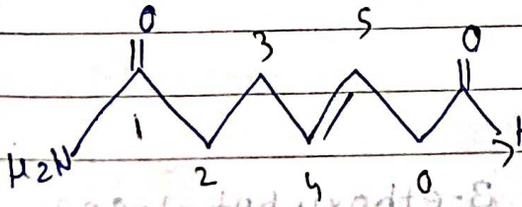
5-Oxo hex-3-ene-1-al.



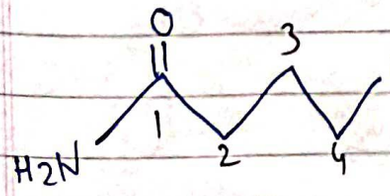
3,5-dioxopentanal-1-oic acid



3 Formyl-6-Oxo-4-Sulphohexanal-1-oic acid



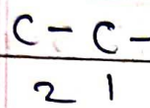
7-Oxohept-4-enal-1-amide



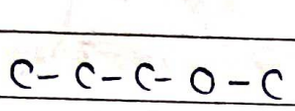
4-cyanobutanal-1-amide

* Ether

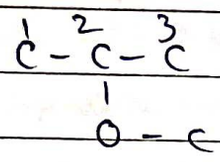
Functional group	Prefix	Suffix
-OR	Alkoxy	✗



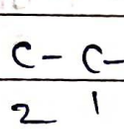
1- methoxy ethane



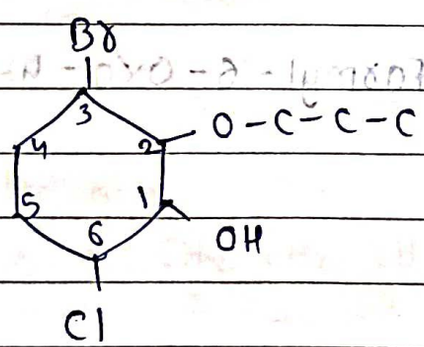
1- methoxypropane



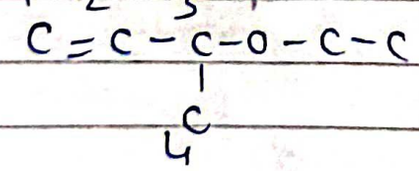
2- methoxypropane



1- ethoxyethane

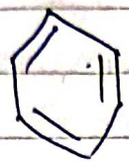


3- Bromo -6- chloro - 2 propoxy cyclohexane- 1-ol

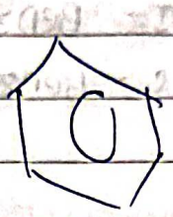


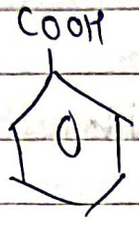
3- ethoxy but -1-ene

* Benzene derivative



→ Benzene →



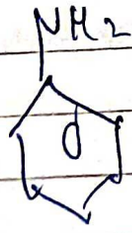


- IUPAC- Benzene carboxylic acid
common name - Benzoic acid

IUPAC- Benzene carbaldehyde
common- Benzaldehyde

I- Benzene carbonitrile
C- Benzonitrile

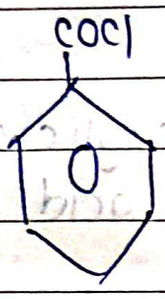
I- Benzenol
C- Phenol



I- Benzenamine
C- Aniline

I- methyl Benzene
C- Toluene

I- Benzene carboxamid-
C - Benzamide



I= Benzene carbonylchlorid-
C- Benzoylchloride