L-1 (Basic Chemistry)

IUPAC

Compounds

- Organic
  * living organism
  (plants & animals)
- INORGANIC
  * non-living organism
  (Mineral & gases)

Berzelius :- It is impossible to convert inorg. Comp into organic Compound.

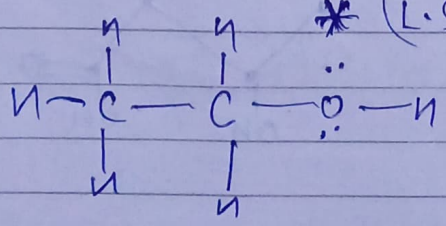
Wohler :- $NH_4^+ \bar{O}-C\equiv N \xrightarrow[H_2O]{\Delta} NH_2-\overset{\overset{O}{\|}}{C}-NH_2$

In org. Salt (ammonium Cyanate) — org. Compound (Urea)

Representation of Organic Compounds

1. Molecular formula: shows no. & type of atoms; no. info about Connectivity.
   Ex C_2H_6O

2. Lewis structure: show all atoms, bonds & lone pairs
   * (L.S. also known as Non Condensed)



3. Condensed formula: show atoms & Connectivity; no bonds or lone pairs
   Ex CH_3CH_2OH

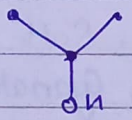
4) Partially Condended formula: Condend Structure that shows Some bond / Lonepairs

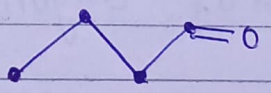
$CH_3CH_2-\ddot{O}-H$

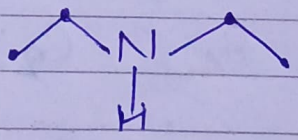
5) Bond line structure -

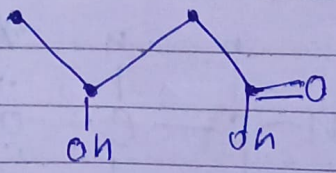
i) only C-C bonds are represented
ii) Hetero atoms are always represented
iii) Longest C-C chain is represented in zig-zag pattern
iv) Double bonds are shown with two lines and triple bonds with three lines

Ex i) $CH_3-CH_2-CH_2-CH_3$ 

ii) $CH_3-CH(OH)-CH_3$ 

iii) $CH_3-CH_2CH_2CHO$ 

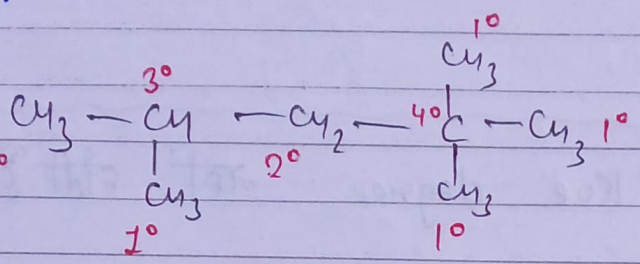
iv) $CH_3-CH_2NHCH_2CH_3$ 

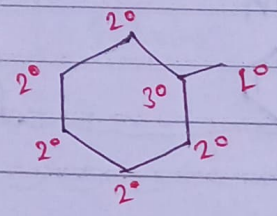
v) $CH_3-CH(OH)-CH_2-COOH$ 

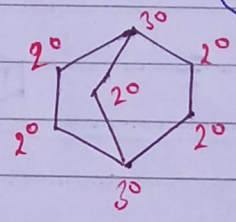
Degree of Carbon.

The no. of C atoms directly attached with the Carbon

Ex

1. 

2. 

3) 

$1^\circ C = 5$

$1^\circ H = 5 \times 3 = 15$

$2^\circ C = 1$

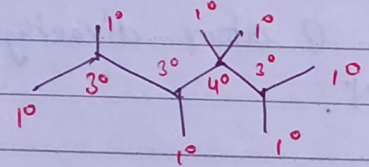
$2^\circ H = 1 \times 2 = 2$

$3^\circ C = 1$

$3^\circ H = 1 \times 1 = 1$

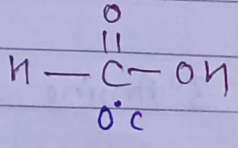
$4^\circ C = 1$

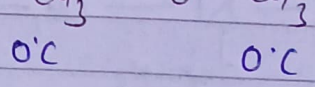
$4^\circ H = 0$

4) 

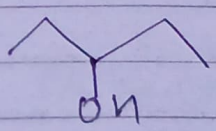
M.I* → Agar किसी Carbon से कोई और C. ना जुड़ा हो तो उसको Super primary Carbon ($0^\circ C$) बोलते है।

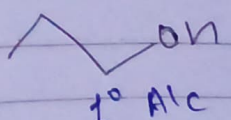
Ex

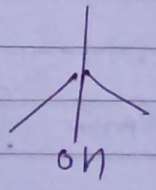
1) 

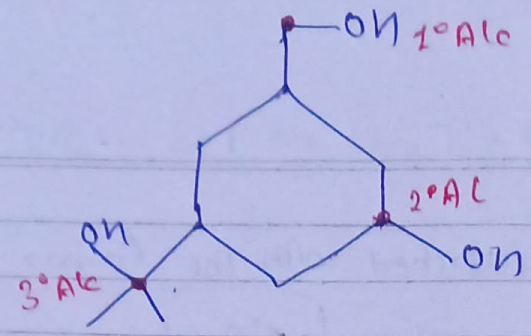
2) 

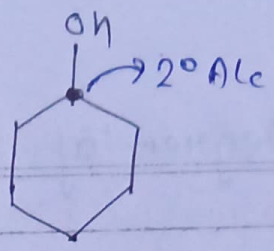
Degree of Alcohol. : The degree of Carbon at which —OH group is present

1)  2° Alcohol

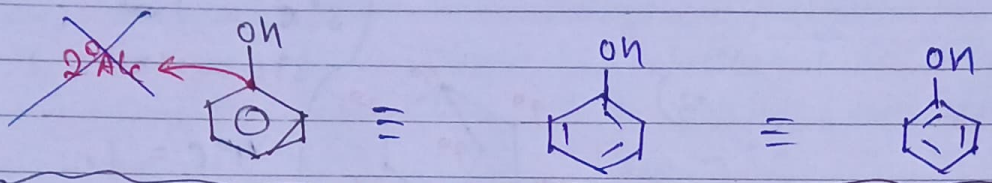
2)  1° Alc

3)  3° Alc

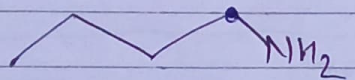
4. 

5) 

MI* . phenol ki koe degree नहीं होती है।



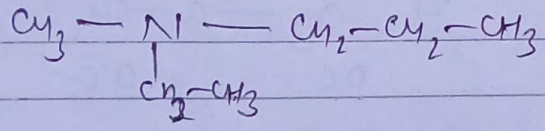
Degree of Amines: The no. of C atom directly connected with the N.

1) 

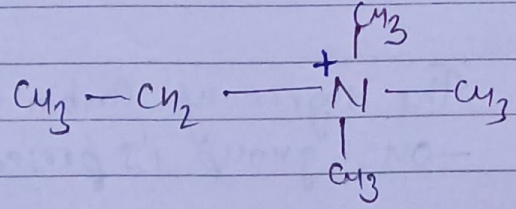
1° Amine

2) 

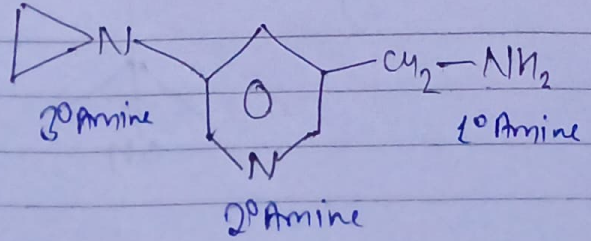
2° Amine

3.) 

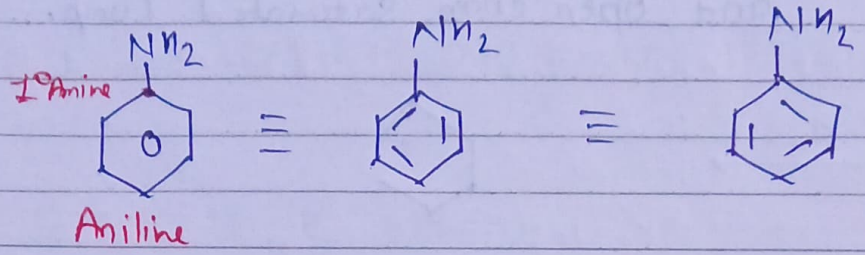
3° Amine

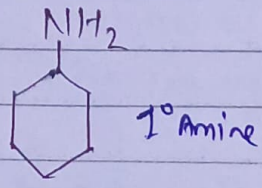
4) 

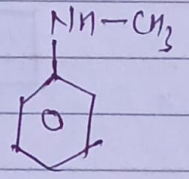
4° Amine

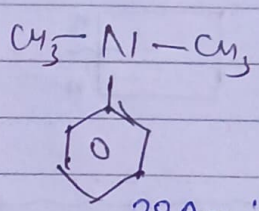
5) 

MI* :- Aniline की degree होती है but phenol की नहीं होती



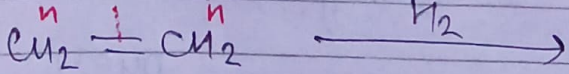
6) 

7) 

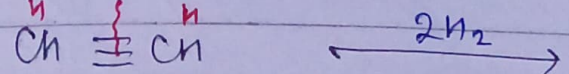
8) 

(D.U) : Degree of unsaturation
or
(I.H.D) : Index of hydrogen deficiency.
or
(U.I) : unsaturation index
or
(D.B.E) : Double bond Equivalents.

Case I : No of H_2 Molecules are required to Convert a molecule (multiple bond) into open chain saturated Compound



D.U = 1

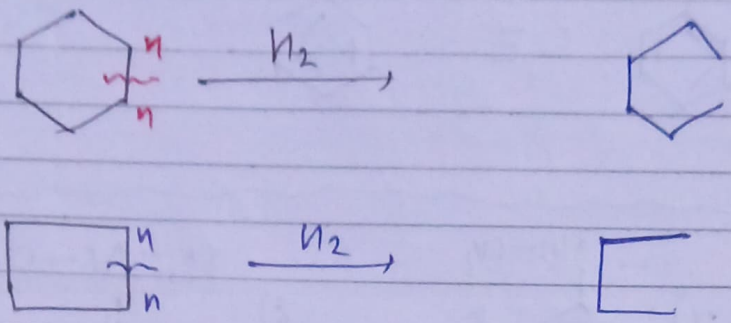


D.U = 2

MI* :- 1 π bond की D.U एक होती है।

Case 2: (for Ring) How many bond are cleaved to form and open chain saturated Comp.

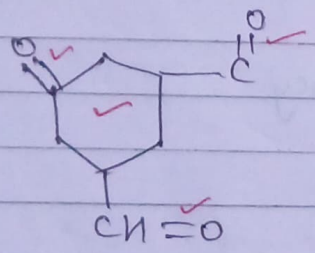
(1)



M.P* – 1 Ring Ki Du 1. होती है।

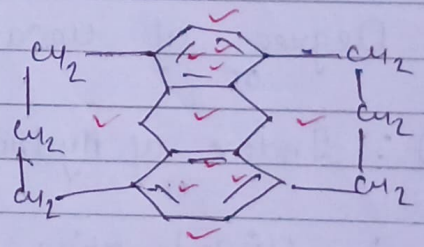
Q Find DU.

1)



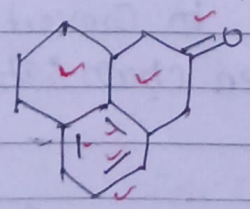
D.U = 4

2)



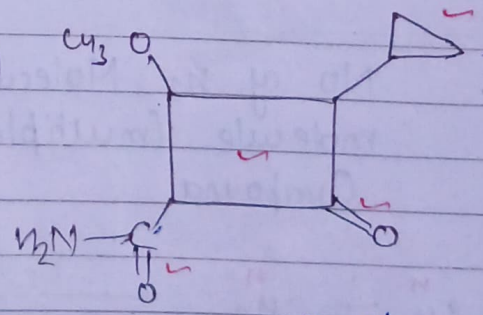
D.U = 11

3)



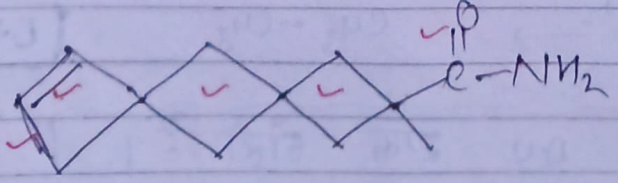
D.U = 7

4)



Du = 4

5)



D.U = 5

* if Molecular formula is given

$$D.U = (C+1) - \frac{(H+X-N)}{2}$$

C = no of 'C' atoms
H = no of 'H' atoms
X = no of 'X' atoms
N = no of 'N' atoms

Q Find D.U. ??

i) C_4H_6 $\quad D.U = (C+1) - \frac{(H+X-N)}{2}$

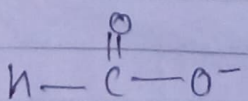
$= (4+1) - \frac{(6+0-0)}{2} = 5-3 = 2.$

ii) C_4H_8 $\quad DU = (4+1) - \frac{(8+0-0)}{2} = 5-4 = 1$

iii) $C_5H_{10}Cl_2$ $\quad DU = (5+1) - \frac{(10+2-0)}{2} = 6-6 = 0$

iv) C_3H_6O $\quad DU = (3+1) - \frac{(6-0-0)}{2} = 4-3 = 1$

MI* :- D.U fractional bhi हो सकती है।

Ex  $HCO_2^{\ominus}$

$D.U = (1+1) - \frac{(1+0-0)}{2} = 2 - \frac{1}{2} = \frac{3}{2}$

$D.U = 1.5$

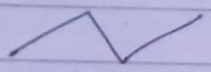
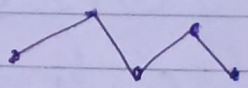
Homologues: Compounds Having

i) Same functional grp. (Same family / Same General formula)
ii) Diff Molecular formula
iii) Diff Molecular weight
iv) Difference in CH_2 unit.

Ex (A) CH_3-CH_3 (C_2H_6) $+CH_2$ → (B) $CH_3-CH_2-CH_3$ (C_3H_8)

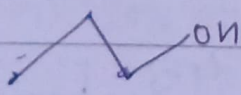
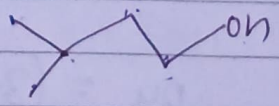
(A) and (B) are Homologes.

Q) Identify Homologues or not?

i)  (C_4H_{10}) &  (C_5H_{12})

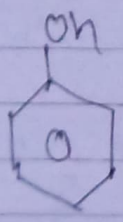
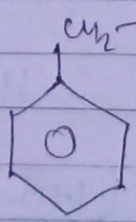
$+CH_2$

Hence: Homologue.

ii)  (C_3H_8O) &  ($C_5H_{12}O$)

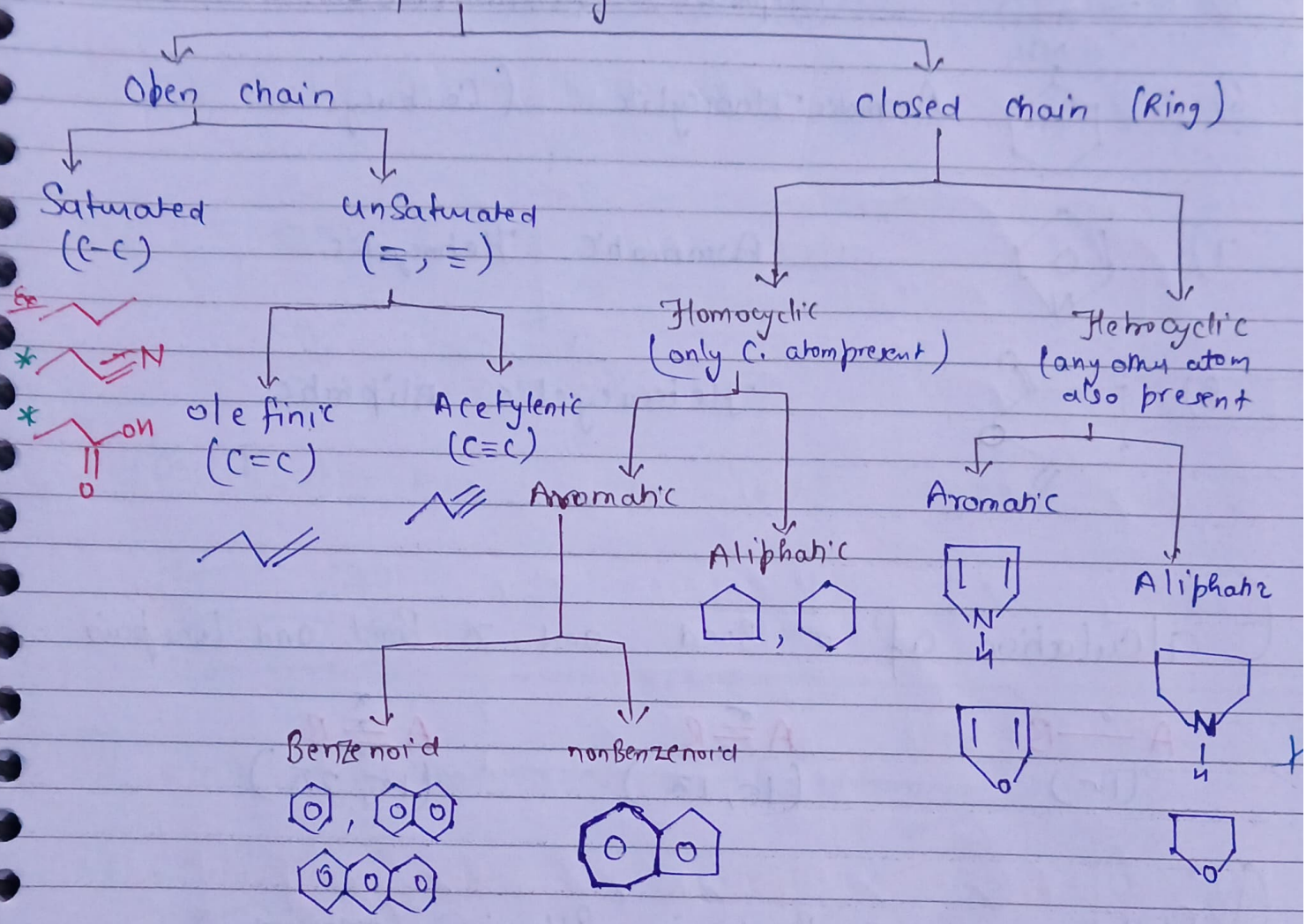
$+CH_2$ → $CH_4H_{10}O$ → $+CH_2$

Homologues

3)  (phenol) &  (Alcohol)

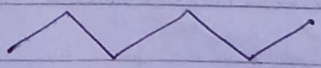
are not Homologue.

Classification of O.C.



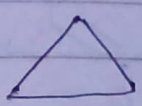
- Classification of O.C.

Identify the type of organic Compound

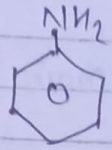
①  Saturated open chain

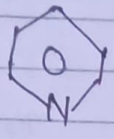
2) $CH_2 = CH - CH = O$ Unsaturated open chain

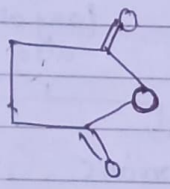
3) $CH_3 - CH_2 - CH = O$ Saturated open chain

4)  Homocylic (Carbocyclic)

5)  (Aliphatic) Heterocyclic

6)  Aromatic Homocylic (Carbocyclic

7)  Aromatic Heterocyclic

8)  Heterocyclic Aliphatic

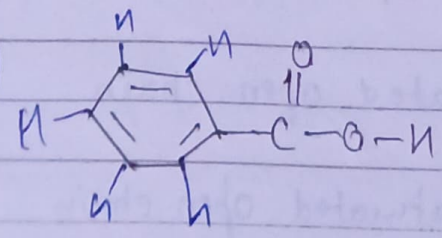
Calculation of σ Bond and π Bond and Lone pair

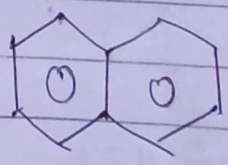
A—B (1σ) A=B (1σ, 1π) A≡B (1σ, 2π)

Q Find σ and π Bonds in following Compounds ?

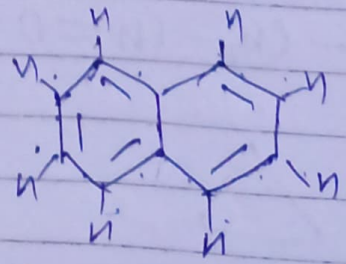
1) $CH_3-CH_2-CH=CH_2$ (11σ, 1π)

11) $H-C\equiv C-CH_2-CH_3$ (9σ, 2π)

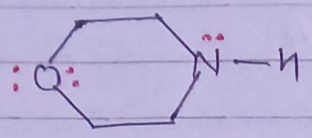
3)  (15σ, 4π)

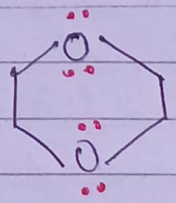
4) 

III

 (29σ, 5π)

Q Find no. of Lone pairs in

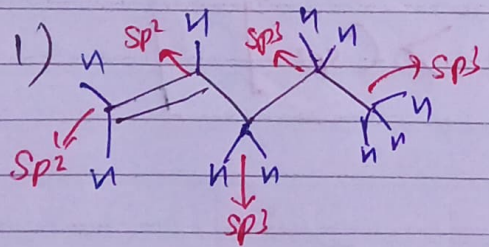
1)  $lp = 3$

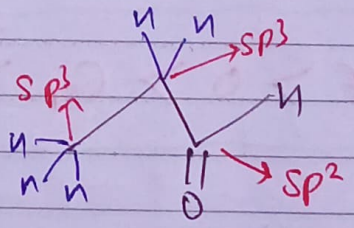
2)  $lp = 4$

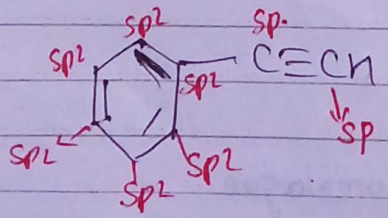
Hybridisation of C in Organic Compound.

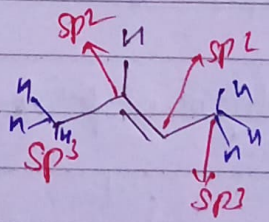
4σ ⟶ sp^3
3σ ⟶ sp^2
2σ ⟶ sp

Q Find hybridisation of each 'C' atom

1) 

2) 

3) 

4) 

E.N. of hybrid orbitals.

% s character ↑ E.N ↑

$$\% s = \frac{\text{S orbital}}{\text{Total orbitals}} \times 100\%$$

for Sp ; $\% s = \frac{1}{2} \times 100\% = 50\%$

Sp^2 ; $\% s = \frac{1}{3} \times 100 = 33.33\%$

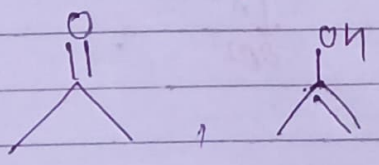
Sp^3 ; $\% s = \frac{1}{4} \times 100 = 25\%$

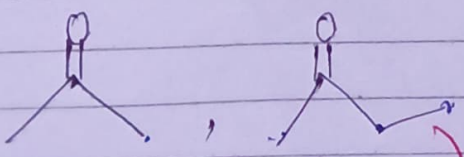
∴ E.N $Sp > Sp^2 > Sp^3$

MI* $[F > O > C_{sp} > N > C_{sp^2} > C_{sp^3}]$

Practice Ques.:

Q Find Homologous pair ?

1)  Not Homologue

2) 

C_3H_6O , C_4H_8O

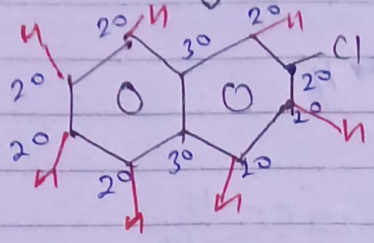
$+CH_2$

Lower Homo of C_4H_8O

Higher Homologue of C_3H_6O

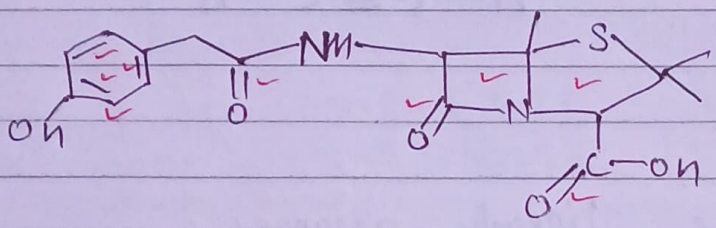
Homo

Q How many 2°H are present



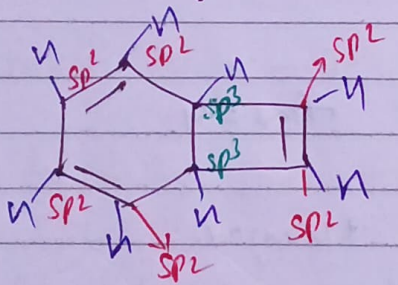
2°H = 7

Q Find DU in amoxicillin.



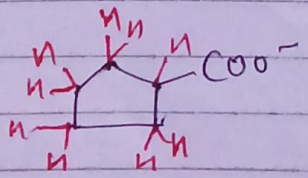
DU = 9

Q The no. of sp^2-sp^2 σ Bond in



sp^2-sp^2 σ bond = 4.

Q Find D.U



$C_6H_9O_2^-$

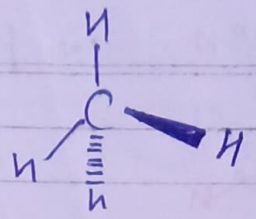
$DU = (6+1) - \frac{(9-0-0)}{2}$

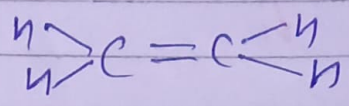
$= 7 - \frac{9}{2} = \frac{14-9}{2} = \frac{5}{2} = 2.5$

Q Find D.B.E

$C_6H_8Cl_4$

$D.U = (6+1) - \frac{(8+4-0)}{2} = 7 - 6 = 1$

sp^3 — CH_4 — 
log 109.5°

sp^2 — $CH_2=CH_2$ — 
120°

sp — $CH\equiv CH$ — $H-C\equiv C-H$
180°

Q How many atoms are linearly arranged.

$CH\equiv CH$

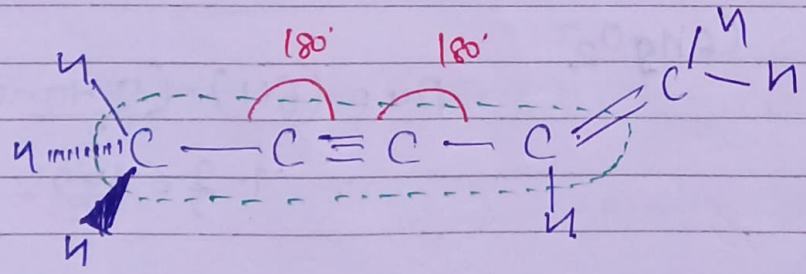
sp → sp

$H-C\equiv C-H$ Ans = 4.

Q How many C atoms are linearly arranged

sp^3 sp sp sp^2 sp^2

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



1-2

Common name

- on the basis of Source
- On the basis of name of discovers
- on the basis of Nature
- on the basis of Structure

on the basis of Source	On the basis of name of discovers	on the basis of Nature	on the basis of Structure
CH_4 Marsh gas	Ring X	OH	Hydrocarbons
CH_3COOH acetic acid (acetum)	Gridnard's Reagent	OH Glycol.	&
	R_2CuLi		derivatives
HCOOH formic acid formica (Redant)	Gilman's Reagent	OH	
CH_3OH wood spirit		OH	
		OH Glycerol	

Nomenclature of hydrocarbons. (Common name)

- Prefix + word root + Suffix

No. of C.	word Root
1	meth
2	Eth
⋮	
9	non
10	dec
11	undec
12	dodec
20	eicos
30	hricont
40	tetracont
50	pentacont
100	hect

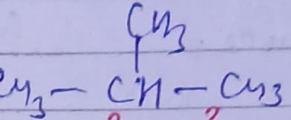
Alkane :

CH_4 methane

C_2H_6 ethane CH_3-CH_3

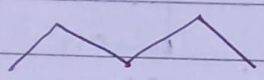
C_3H_8 propane $CH_3-CH_2-CH_3$

C_4H_{10} $CH_3-CH_2-CH_2-CH_3$ n-butane

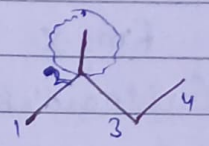


iso-butane

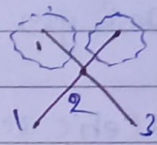
C_5H_{12}



n-pentane

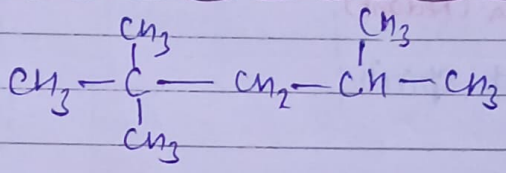


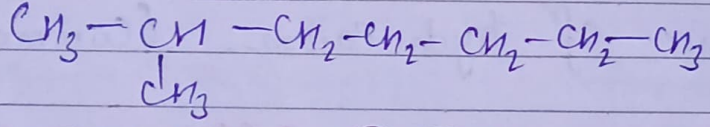
iso-pentane



neo-pentane

M.I* Isooctane



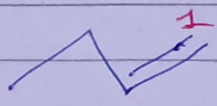
(X) 

Alkene : Common name : Alkylene

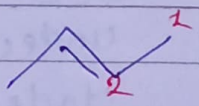
1) C_2H_4 : $CH_2=CH_2$ ethylene

2) C_3H_6 : $CH_3-CH=CH_2$ propylene

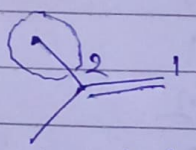
3) C_4H_8 :



α-butylene



β-butylene



iso-butylene

Alkynes : Common name : $CH \equiv CH$ acetylene

1) $CH_3-C\equiv CH$ methyl acetylene

2) $CH_3-C\equiv C-CH_3$ dimethyl acetylene

3) $C_2H_5-C\equiv C-CH_3$ Ethyl methyl acetylene

Nomenclature of hydrocarbon derivatives

Case. (1) Radical Based —

1) CH_4 CH_3- methyl

2) $CH_3-\overset{\downarrow}{C}H_3$ CH_3-CH_2- Ethyl

3) $CH_3-\overset{\downarrow}{C}H_2-\overset{\downarrow}{C}H_3$ $CH_3-CH_2-CH_2-$ n-propyle

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

4) $CH_3-CH_2-\overset{\downarrow}{C}H_2-\overset{\downarrow}{C}H_3$ $CH_3-CH_2-CH_2-CH_2-$ n-butyl

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

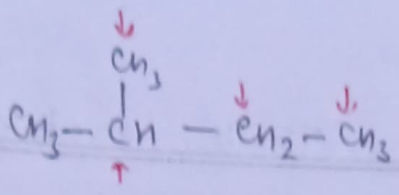
5) $CH_3-\underset{|}{\overset{CH_3}{CH}}-CH_3$ $CH_3-\underset{|}{\overset{CH_3}{CH}}-CH_2-$ Iso-butyl

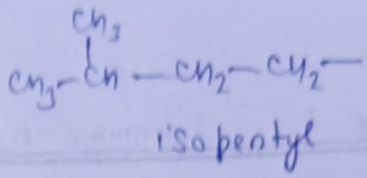
$CH_3-\underset{|}{\overset{CH_3}{C}}-CH_3$ tertiary butyl

6) $CH_3-CH_2-CH_2-CH_2-CH_3$ $CH_3-CH_2-CH_2-CH_2-CH_2-$ n-pentyl

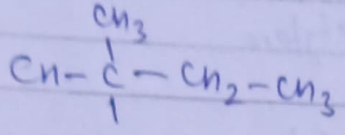
$CH_3-CH_2-\underset{|}{CH}-CH_2-CH_3$ Sec pentyl

$CH_3-CH_2-CH_2-\underset{|}{\overset{*}{C}H}-CH_3$ active Sec pentyl

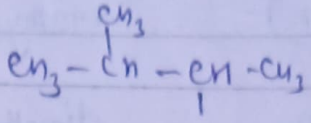
⑦ 



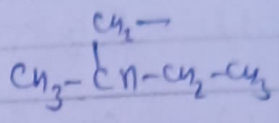
isopentyl



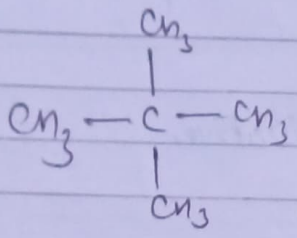
tert-pentyl

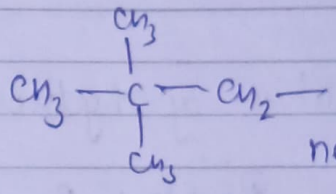


active sec pentyl



active pentyl

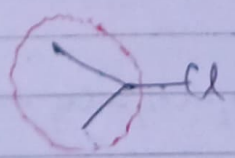
⑧ 



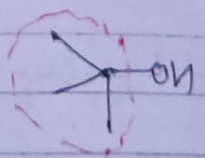
neo-pentyl

	Functional Grp	Common Name
1)	$-OH$	Alcohol
2)	$-NH_2$	amine
3)	$-SH$	thio alcohol
4)	$-OR$	ether
5)	$-\overset{O}{\overset{\|\|}{C}}-$	Ketone
6)	$-X$	halide
7)	$-CN$	cyanide
8)	$-NC$	isocyanide

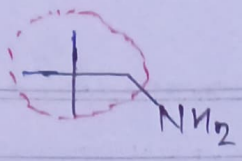
Q Write Common names:

1) 

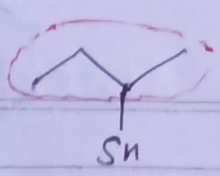
isopropyl chloride

2) 

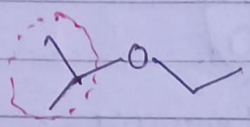
tert-butyl alcohol

3) 

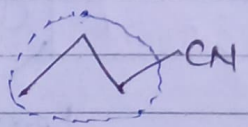
neopentyl amine

4) 

Sec butyl thioalcohol

5) 

ethyl isopropyl ether

6) 

n-propyl cyanide

* Some more Common names.

1) $CH_2=CH_2$ $CH_2=CH-$ ethenyl (Vinyl)

2) $CH_2=CH-CH_3$ $CH_2=CH-CH_2-$ 2-propenyl (Allyl)

$CH_2=\overset{CH_3}{\overset{|}{C}}-$ (isopropenyl)

$CH_3-CH=CH-$ (1-propenyl)

3) $CH\equiv CH$ $HC\equiv C-$ Ethynyl

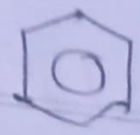
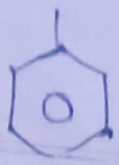
4) $CH\equiv C-CH_3$ $CH_3-C\equiv C-$ 1-propynyl $CH\equiv C-CH_2-$ 2-propynyl (propargyl)

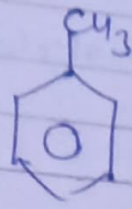
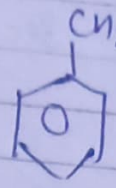
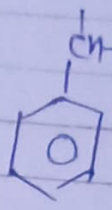
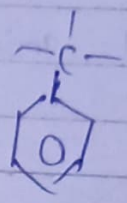
5) $R-CH_3$

$R-CH_2-$ Alkyl

$R-\overset{|}{C}H-$ Alkylidene

$R-\overset{|}{\underset{|}{C}}-$ Alkylidyne

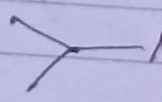
(7)   Phenyl

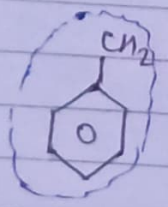
(8)   Benzyl  Benzylidene (Benzal)  Benzylidyne (Benzo)

Q Write Common Name

1) $CH \equiv C - CH_2 - OH$ Propargyl Alcohol

2.) $CH_2 = CH - CH_2 - \underset{\underset{O}{\|}}{C} - CH = CH_2$ Allyl Vinyl Ketone

3)  Isopropyl isocyanide

4)  Benzyl bromide

Case 2: Functional group Based.

F.Gr	Common Name
$-COOH$	.... ic acid
$-COOR$	alkyl .... ate
$-\underset{\underset{O}{\|}}{C} - O - \underset{\underset{O}{\|}}{C} -$	.... ic anhydride
$-\underset{\underset{O}{\|}}{C} - Cl$	.... yl chloride
$-\underset{\underset{O}{\|}}{C} - NH_2$	.... amide
$-CHO$	.... aldehyde
$-CN$	.... o nitrile
$-NC$	.... o isonitrile.

C_1	form
C_2	Acet
C_3	propion
C_4	Butyr (n, iso)
C_5	Valer (n, iso, neo)
$C=C-C$	acryl
$C-C=C-C$	Crotor
$CH_3-\overset{O}{\overset{\|}{C}}-$	pyruv

Q Write Common name

(1) $H-\overset{O}{\overset{\|}{C}}-OH$ formic acid

(2) $CH_3-\overset{O}{\overset{\|}{C}}-OH$ acetic acid

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

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

(5) $CH_3-\underset{CH_3}{\underset{|}{\underset{CH_3}{\underset{|}{C}}H}}-COOH$ neo Valeric acid

(6) $CH_2=CH-COOH$ acrylic acid

(7) $CH_3-CH=CH-CHO$ Crotonaldehyde

(8) $CH_3-\overset{O}{\overset{\|}{C}}-COOH$ pyruvic acid

(9) $CH_3-\underset{CH_3}{\underset{|}{CH}}-CH_2-CONH_2$ Isovaleramide

(10) CH_3-CN acetonitrile

IUPAC NAMING

Rule: Prefix + Word Root + Suffix

Substituent	2° prefix	1° prefix	Word Root	1° Suffix	2° Suffix
-R	alkyl	cyclo	meth	- ane	principal functional group
$-NO_2$	nitro	Bicyclo	eth	= ene	
-NO	nitraso	Spiro	prop	≡ yne	
-OR	alkoxy			=, = adiene	
-X	halo			≡, ≡ adiyne	
·C-C (O)	epoxy			=, ≡ enyne	

Principal Functional group (P.F.G)

Priority order:

$$-COOH > -SO_3H > -\overset{O}{\overset{\|}{C}}-O-\overset{O}{\overset{\|}{C}}- > -\overset{O}{\overset{\|}{C}}-OR > -\overset{O}{\overset{\|}{C}}-Cl > -\overset{O}{\overset{\|}{C}}-NH_2 >$$

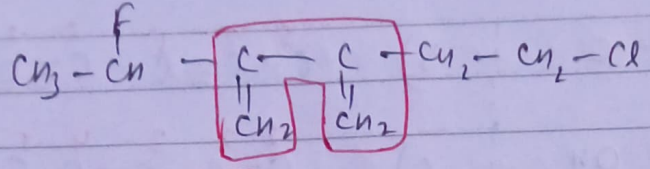
$$-CN > -NC > -CHO > -\overset{O}{\overset{\|}{C}}- > -OH > -SH > -NH_2$$

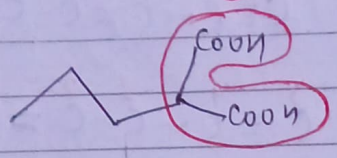
① Selection of principal chain

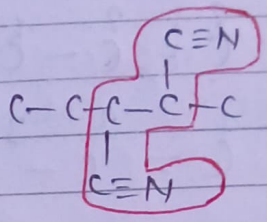
P.F.G > multiple bond (=, ≡) > no. of C. atoms > max. no. of Substituent

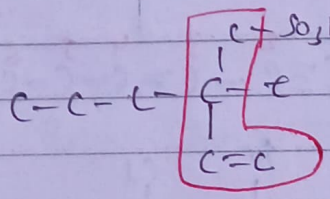
> lowest set of Locants (2,3), (2,4) > alphabetical order.

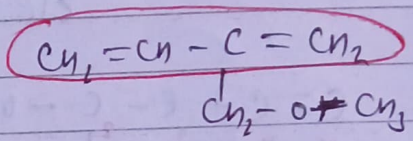
Q Select principal chain &

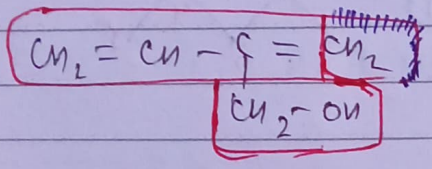
1) 

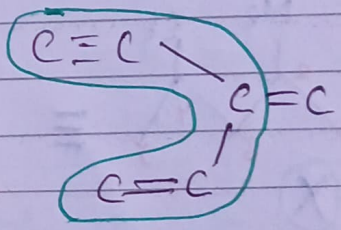
11) 

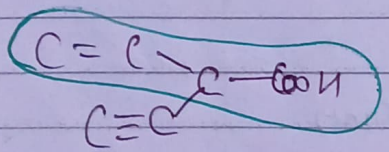
3) 

4) 

5) 

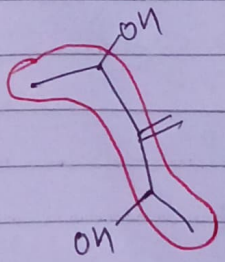
6) 

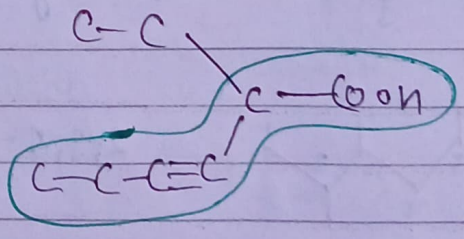
7 

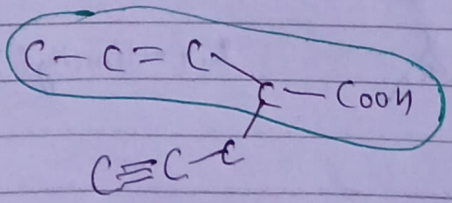
(8) 

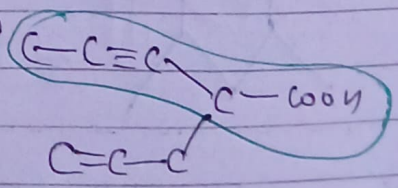
MI* = > ≡

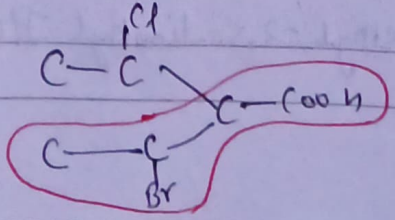
when Equidistant

(9) 

(10) 

(11) 

(12) 

(13) 

(2) Numbering of principal chain

1) $\overset{1}{C}\equiv\overset{2}{C}-\overset{3}{C}-O-C$

2) $\overset{3}{C}=\overset{2}{C}-\overset{1}{C}-OH$

3) $\overset{1}{C}=\overset{2}{C}-\overset{3}{C}-Cl$ (Cl)

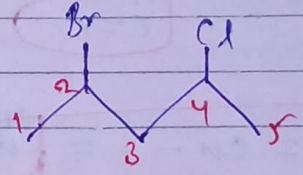
4) $C=C-C-C-OH$ (1C)

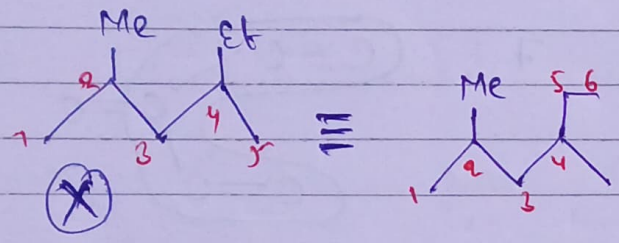
5) $\overset{5}{C}-\overset{4}{C}\equiv\overset{3}{C}-\overset{2}{C}=\overset{1}{C}$

6) $\overset{1}{C}\equiv\overset{2}{C}-\overset{3}{C}=\overset{4}{C}-\overset{5}{C}$

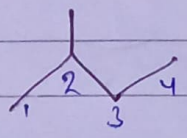
7) $\overset{5}{C}\equiv\overset{4}{C}-\overset{3}{C}-\overset{2}{C}=\overset{1}{C}$

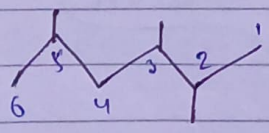
8) $\overset{1}{C}\equiv\overset{2}{C}-\overset{3}{C}=\overset{4}{C}-\overset{5}{C}-\overset{6}{C}=\overset{7}{C}$

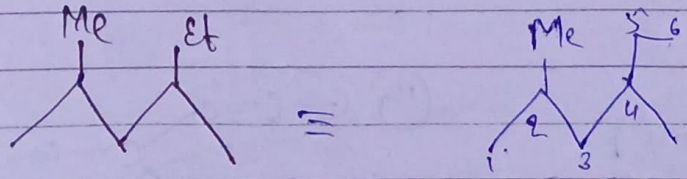
9) 

10) 

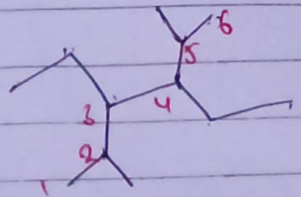
Naming of hydrocarbons · (Alkanes)

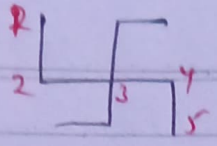
1) 
2-methyl Butane

2) 
2,3,5-trimethyl Hexane

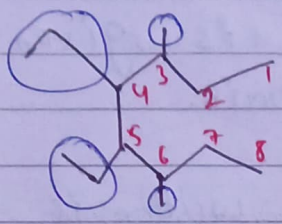
4) 

2,4-dimethyl Hexane

5) 
3,4 diethyl-2,5-dimethyl Hexane

5) 

3-3-diemyl pentane

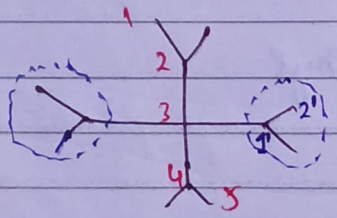
6) 

4,5-diemyl-3,6-dimemyl octane

7) $CH_3-\underset{\underset{Et}{|}}{CH}-\underset{\underset{Et}{|}}{CH}-CH_3 \equiv CH_3-\overset{3}{\underset{\underset{2\,CH_2}{|}}{CH}}-\overset{4}{\underset{\underset{5\,CH_2}{|}}{CH}}-CH_3$

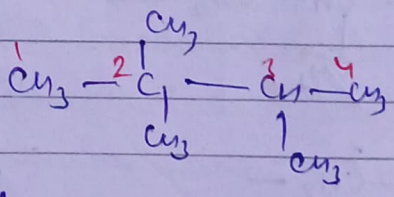
$1\,CH_3 \quad 6\,CH_3$

3,4-dimemyl-Hexane

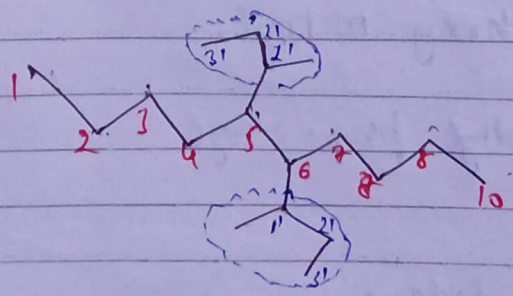
8) 

2,4-dimemyl
3,3-bis-(1'memyl emyl) pentane

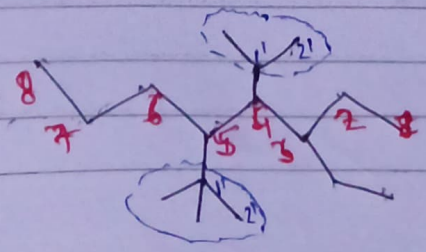
9) $(CH_3)_3\,CH\,(CH_3)_3$



2,2,3-trimemyl Butane

10) 

5,6-Bis (1'-memyl propyl)
Decane

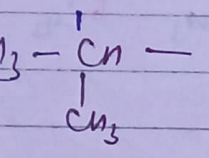
10) 

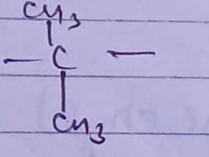
~~2,2-dimemyl (1'-dimemyl emyl)~~
5-(1'-dimemyl emyl)-3-emyl-
(1'-memyl emyl) octane

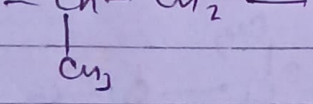
Complex Substituent.

1. Substituted side chains are called Complex.
2. In Complex Side chain, Carbon is given first which is attached with main chain.
3) Name of Complex Substituent is written is small bracket.

Examples:-

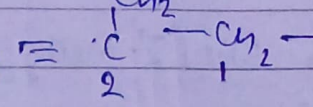
1)  — 1 methyl ethyl

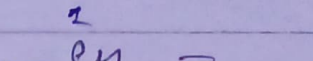
2)  — 1,1-dimethyl ethyl

3)  — 2 methyl propyl

4) $Cl-\overset{1}{C}H_2-$ — 1-chloro methyl

5) $HO-\overset{1}{C}H_2-$ — 1-hydroxy methyl

6)  — 2-methyl prop-2-enyl

7)  — Ethylidene

Numerical prefix for Complex Substituent

Numeral prefix	for Complex
2	bis
3	tris
4	tetrakis

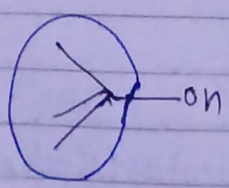
Alphabetically order of Substituent

1) only prefix iso, neo, cyclo are Considered rest all like di, tri, tetra, Sec, tert ~~[illegible]~~ are not Considered to decide priority.

Ex. isobutyl
neopentyl
cyclopentyl
isopropyl
dimethyl
Sec butyl
tert butyl

2) First alphabet written in small bracket is always Considered to decide priority in Complex Substituent.
Ex (dimethyl ethyl)

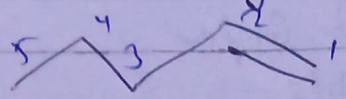
(3) when name of side chain is written according to Common name then Complex Substituent is treated as Simple Substituent.

Ex 

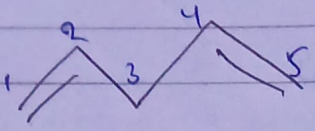
tert butyl alcohol
(Common name)

L-3

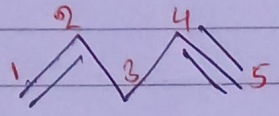
Alkene & Alkynes

1 

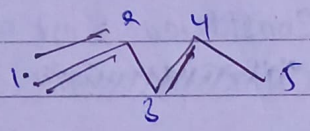
pentene

2 

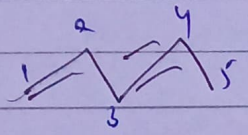
penta-1,4-diene

3) 

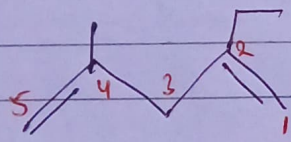
pent 1,4-ene,4-yne

4) 

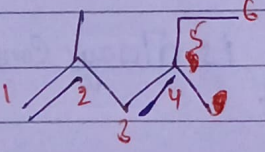
pent-3-en-1-yne

5) 

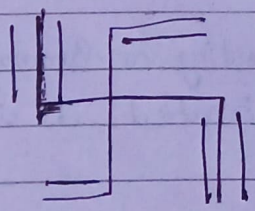
pent-1-ene 3-yne

6) 

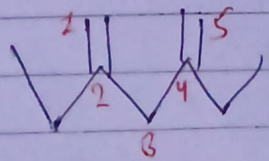
2-Emyl-4-methyl penta-1,4-diene

7) 

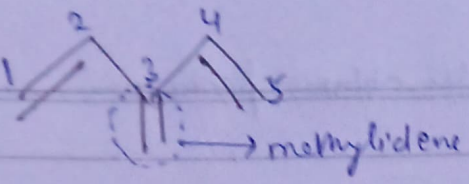
~~4-Emyl-4-methyl hexa-1,3~~
2,4-dimethyl hexa-1,3-diene

8) 

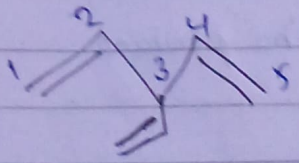
3,3-diemynyl penta-1,4-diene

9) 

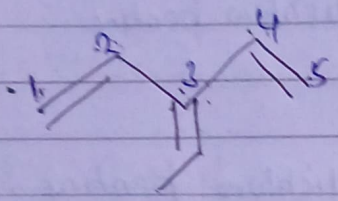
2,4-diemyl penta-1,5-diene

(10) 

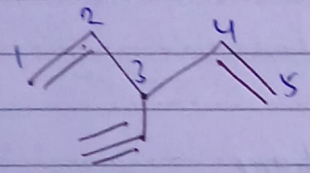
3-methylidene penta-1,4-diene

(11) 

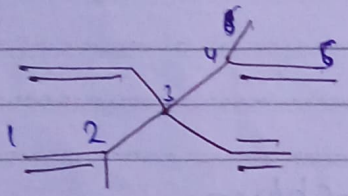
3-ethenyl penta-1,4-diene.

(12) 

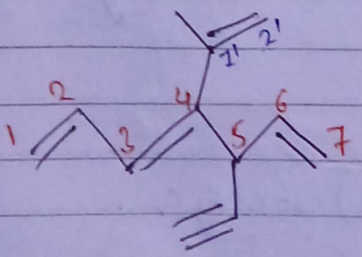
3-ethylidene penta-1,4-diene.

(13) 

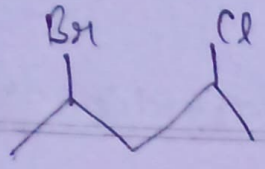
3-Ethynyl-penta-1,4-diene

(14) 

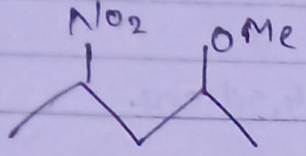
3-ethenyl-3-ethynyl-2,4-dimethyl penta-1,4-diene

(15) 

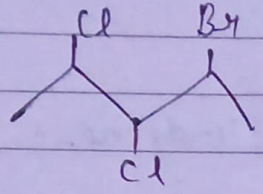
5-Ethynyl-4-(1-methyl Ethenyl) Hepta-1,3,6-triene.

1) 

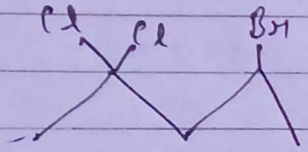
2-Bromo-4-chloro pentane

2) 

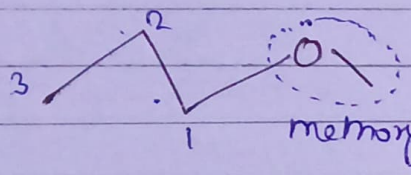
2-Memoxy-4-Nitro pentane

3) 

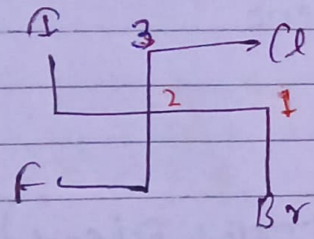
2-Bromo-3,4-dichloro pentane

4) 

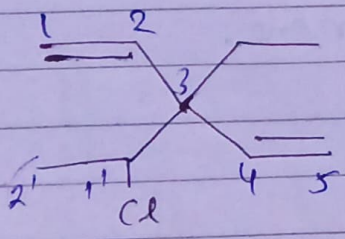
1-Bromo-2,2-dichloro pentane

5) 

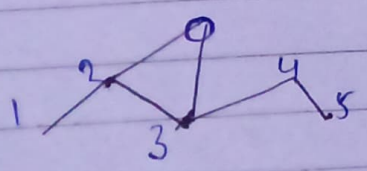
1-memoxy propane

6) 

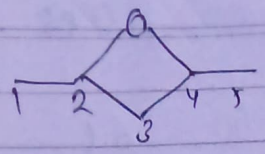
1-Bromo-3-chloro
2-fluoro memye-2-iodomethyl propane

7) 

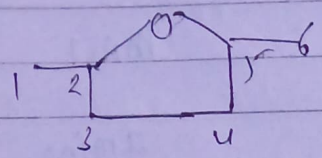
3-(1'-chloro Ethyl)-5-ethyl penta-1,4-diene

8) 

2,3-epoxy pentane

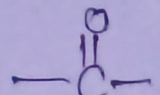
(5) 

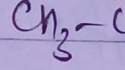
2,4-epoxy pentane

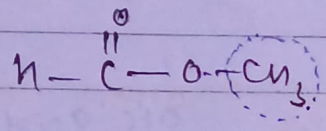
(6) 

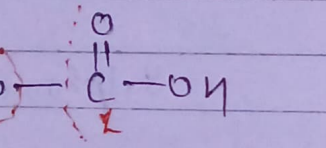
2,5-epoxy ~~pentane~~ Hexane

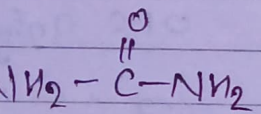
	Functional Group	prefix	Suffix
1)	$-COOH$	Carboxy	oic acid
2)	$-SO_3H$	Sulpho	Sulphonic acid
3)	$R-C(=O)-O-C(=O)-R$	—	oic anhydride
4)	$-C(=O)-OR$	alkoxy Carbonyl	oate
	$R-C(=O)-O-$	alkanoyl oxy	
5)	$-C(=O)-Cl$	chloro Carbonyl	oly chloride
6)	$-C(=O)-NH_2$	amino Carboxyl or Carbamoyl	amide
7)	$-CN$	cyano	nitrile
8)	$-NC$	isocyano	isonitrile
9)	$-CHO$	oxo → (if C in main chain) formyl (if C is not in main chain)	al

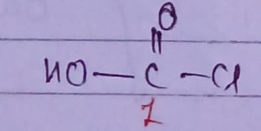
10		oxo or keto	one
11)	$-OH$	hydroxy	ol
12)	$-SH$	mercapto	thiol
13)	$-NH_2$	amino	amine

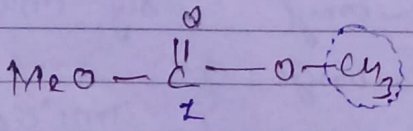
1)  Ethane - 1-nitrile

2)  methyl methanoate

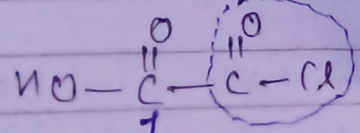
3)  1-hydroxy methanoic acid

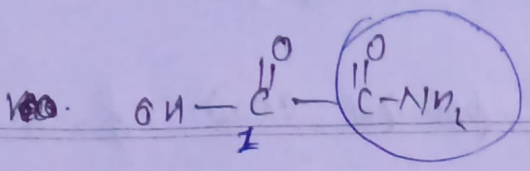
4)  1-amino methanamide

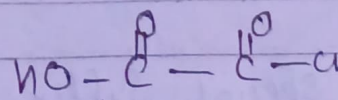
5)  1-chloro-methanoic acid

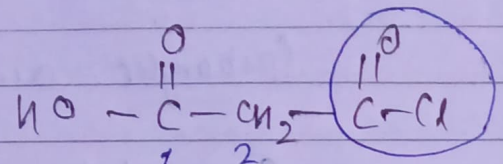
6)  methyl-1-methoxy methanoate

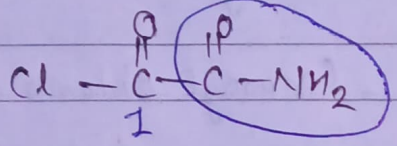
* If Carbon Containing FG is present as Substituent then except aldehyde its Carbon is not included in main chain

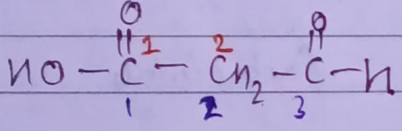
7)  1-chloro Carbonyl methanoic acid

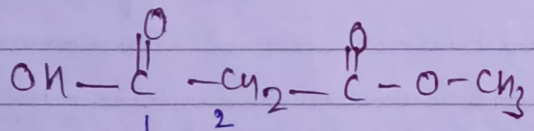
(8)  1-amino Carbonyl methanoic acid

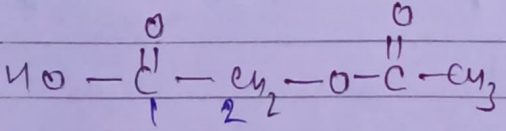
(9)  2-oxo-propanoic acid

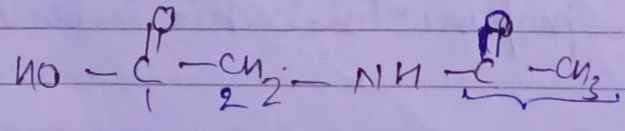
(10)  2-chloro carbonyl Ethanoic acid

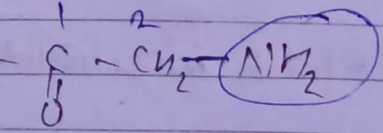
11)  1-amino Carbonyl oyl chloride

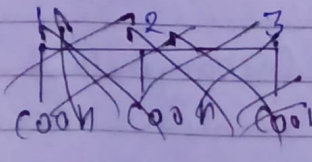
2-formyl Ethanoic acid.
or
12)  3-oxo-propanoic acid

13)  2-methoxy Carbonyl Ethanoic acid

14)  2-Ethanoyl oxy Ethanoic acid

15)  2-Ethanoyl amino Ethanoic acid

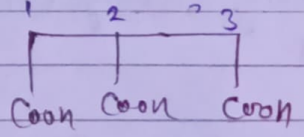
16)  2-amino Ethanal

17) 

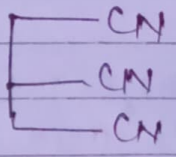
(Handicapted Name)

If C is not the part of principal chain of 'e' containing F.G.

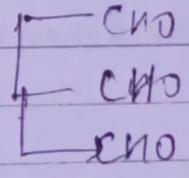
	F.G.	Special Suffix
1)	COOH	Carboxylic acid
2)	COOR	Carboxylate
3)	COCl	Carbonyl chloride
4)	$CONH_2$	Carboxamide
5)	CN	Carbonitrile
6)	CHO	Carbaldehyde

1) 

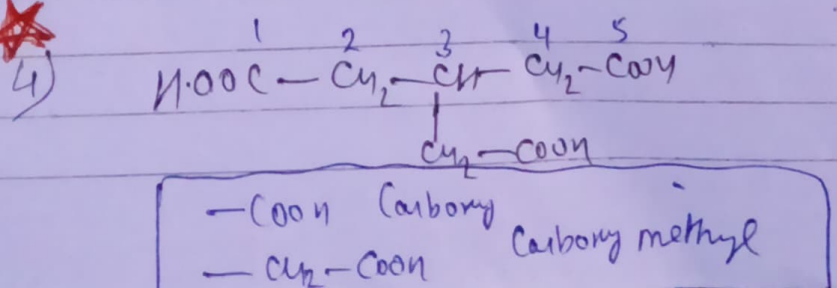
propane-1,2,3-tric Carboxylic acid

2) 

propane-1,2,3-tric Carbonitrile

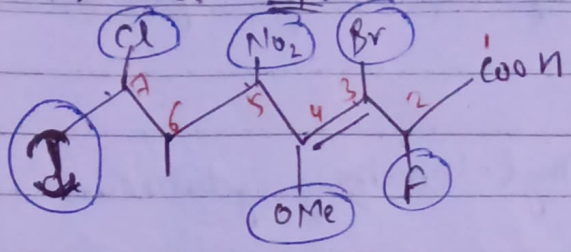
3) 

propan-1,2,3,-tricarbaldehyde

4) 

3-Carboxymethyl pentane-1,5-dioic acid.

Practice Q.

1) 

3-Bromo-7-chloro-2-fluro-
Iodo-4-methoxy-6-methy
-5-Nitro-Hept-3-en-1-oic a

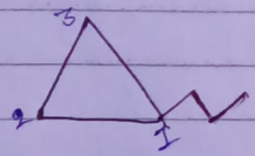
L-4

Nomenclature of Cyclic Compounds.

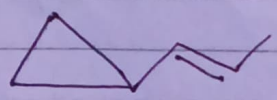
i) P.F.G > Multiple Bonds > no. of C > Ring

ii) if C containing F.G are directly attached with ring then they are taken as part of ring

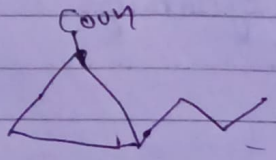
iii) if no of Carbons are same, priority Ring > Chain

i) 

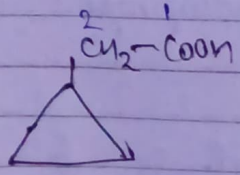
1-propyl cyclopropane

ii) 

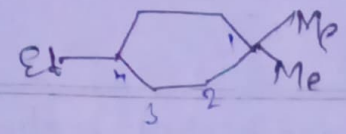
1-Cyclopropyl propene

iii) 

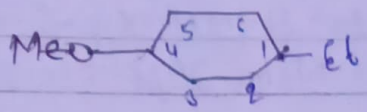
2-propyl cyclopropane-1-Carboxylic acid

iv) 

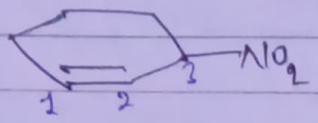
2-cyclopropyl-Ethanoic acid

(5) 

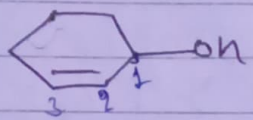
4-Ethyl-1,1-dimethyl Cyclo hexane

(6) 

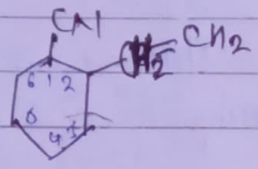
1-Ethyl-4-methoxy Cyclohexane

(7) 

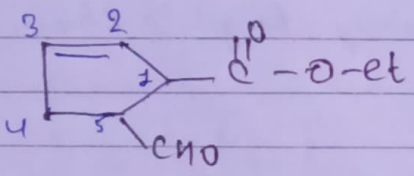
3-Nitro Cyclo Hex-1-ene

(8) 

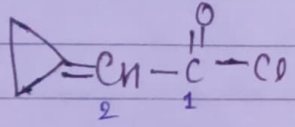
Cyclo Hex-2-en-1-ol.

(9) 

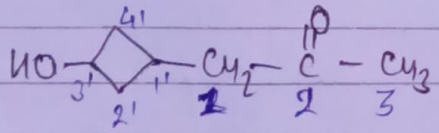
2-Ethenyl Cyclohexane Carbonitrile

(10) 

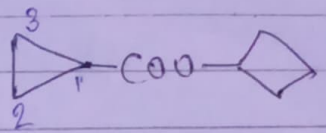
Ethyl-5-formylcyclopent-2-en-1-oate Carboxylate

(11) 

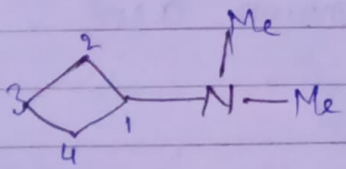
2-Cyclopropylidene Ethanoyl chloride

(12) 

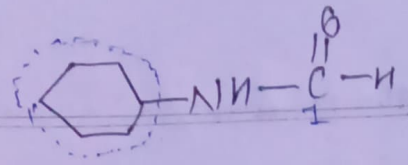
1(-3'-hydroxy Cyclobutyl) propan-2-one

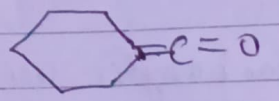
(13) 

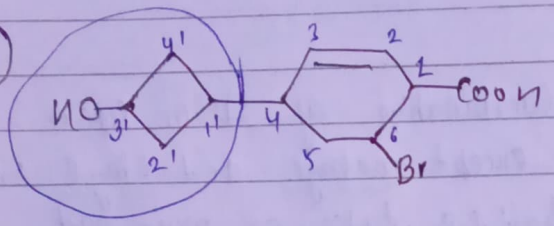
Cyclobutyl cyclopropane Carboxylate

(14) 

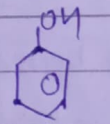
N,N-dimethyl Cyclobutan-1-amine

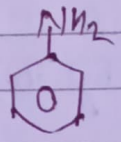
(15)  N-Cyclohexyl methanamide

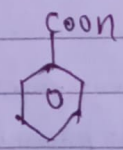
(16)  Cyclohexylidene methan-1-one.

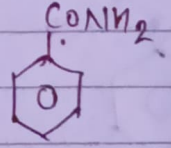
(17)  6-Bromo
4-(3'-hydroxy cyclobutyl)
Cyclohex-2-ene-1-Carbonyl ac

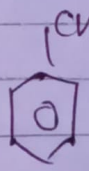
IUPAC naming of Benzen derivatives

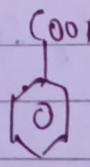
a)  phenol

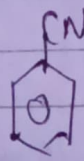
b)  Aniline

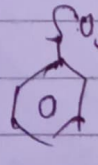
c)  ~~Acetic~~ Benzoic acid

d)  Benzamide

e)  Benzaldehyde

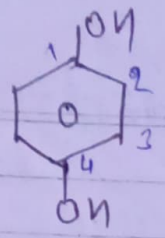
f)  Benzoate

g)  Benzonitrile

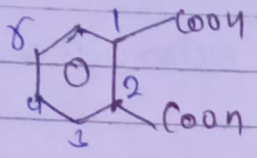
a)  Benzene Sulphonic acid

Rule 1: if organic Compound is having one F.G. then Common name is ~~written~~ written in IUPAC

Rule 2: If more than one F.G are present then numbering is done according to IUPAC rule.

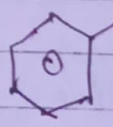
1) 

Benzene-1,4-diol.

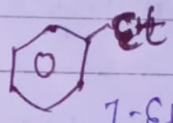
b) 

Benzene-1,2-dicarboxylic acid.

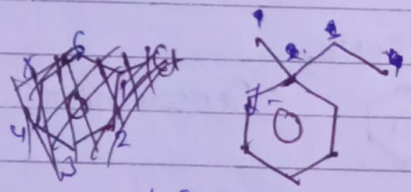
Rule 3: If hydrocarbon is combination of both open part and ring then except methyl and ethyl in all other cases open part is taken as main part.

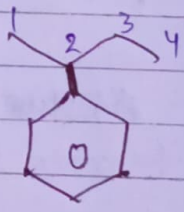
1) 

1-methyl benzene

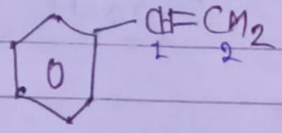
ii) 

1-Ethyl benzene

2) 
1-Ethyl-1-methyl Benzene

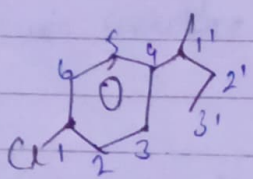
4) 

2-phenyl butene

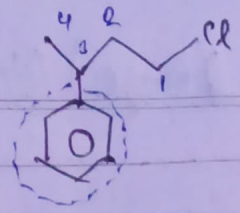
5) 

1-phenyl ethene

Rule 4: If organic compound is having F.G then part having F.G. is taken as main part.

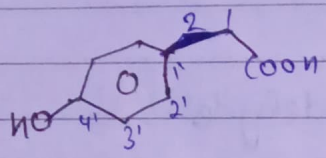
1) 

1-chloro-4-(1-methyl propyl) Benzene

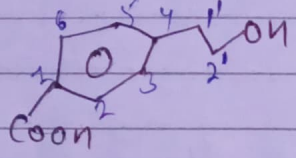
2) 

1-chloro-3-phenyl Butane

Rule 5: if both part are having F.G than part having P.F.G is taken as main part.

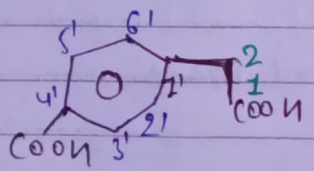
1. 

2-(4-hydroxy phenyl) Ethanoic acid

2. 

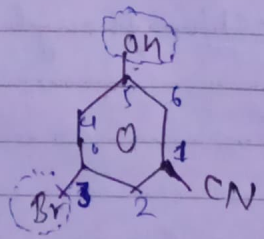
4-(2'-hydroxy Ethyl) Benzoic acid.

MI* – If there is choice priority is given to open part

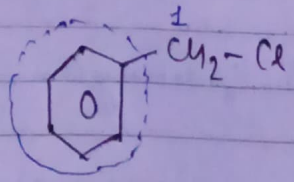
3) 

2-(4-Carboxy phenyl) Ethanoic acid

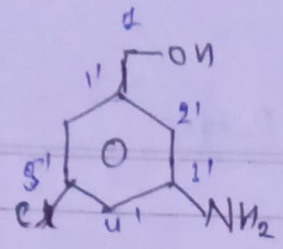
Practice Ques

(1) 

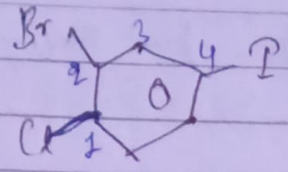
3-Bromo-5-hydroxy Benzonitrile

(2) 

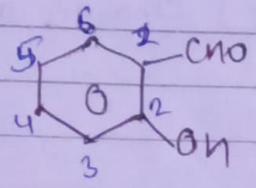
1-chloro-1-phenyl Methane

3. 

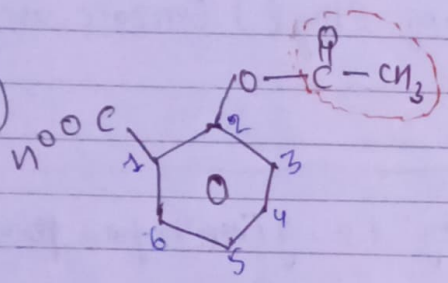
1-(3'-Amino-5'-chloro phenyl) Methanol.

4) 

2-Bromo-1-chloro-4-Iodo Benzene

5) 

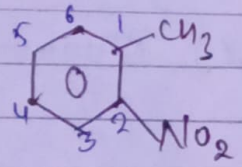
2-hydroxy Benzaldehyde

6) 

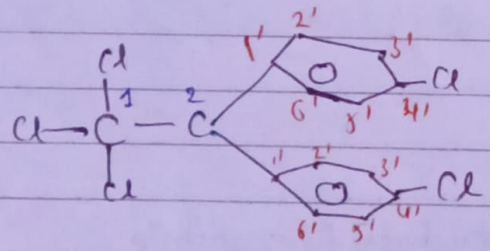
2-ethanoyl oxy benzoic acid.

(or)

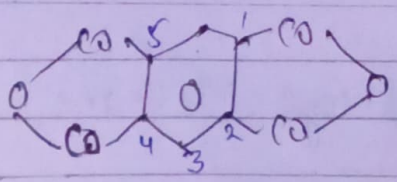
2-acetoxy benzoic acid.

7) 

1-methyl-2-nitro benzene

8) 

1,1,1-trichloro-2,2-(Bis-4-chlorophenyl) Ethane.

9) 

Benzene-1,2,4,5-tetra Carboxylic anhydride

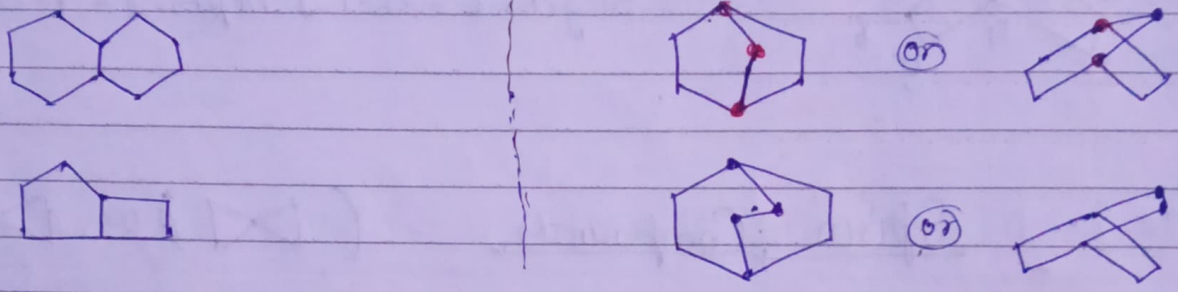
L-5

Naming of bicyclo and spiro Compounds.

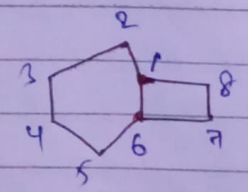
Rule :- Prefix + bicyclo / or / spiro + [x.y.z] / [x.y] + word root + Suffix

Case (1) : Bycle Compounds

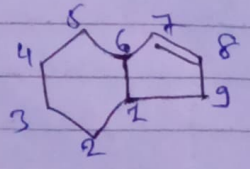
Fused | Bridge



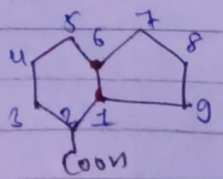
Note :- Numbering Bridge 'C' से करेंगे और Bdi Ring से जाएंगे।

(1) 

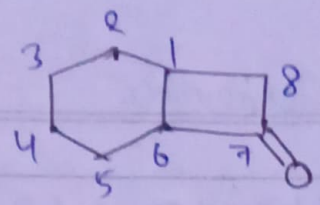
Bicyclo [4.2.0] octane.

(2) 

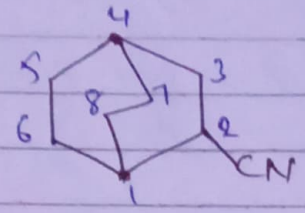
Bicyclo [4.3.0] non-7-ene.

(3) 

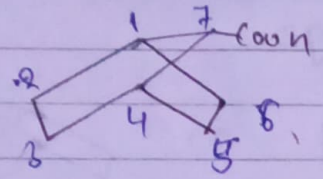
Bicyclo [4.3.0] nonane-2-Carboxylic acid.

4) 

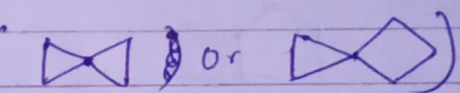
Bicyclo [4.2.0] octane-7-one

5) 

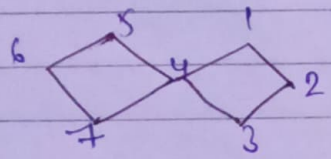
Bicyclo [2.2.2] octane-2-carbonitrile

6) 

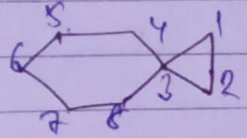
Bicyclo [2.2.1] Heptane-7-Carboxylic acid

Case 2. Spiro Compounds ()

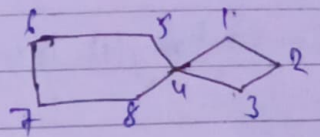
MI* – jis Carbon से Ring शुरू से उसके pass वाले 'C' से (choti Ring) numbering करनी है।

1) 

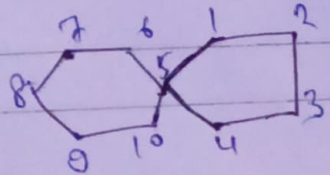
Spiro [3.3] Heptane

2) 

Spiro [2.5] octane

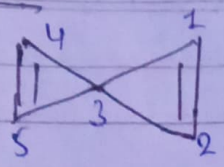
3) 

Spiro [3.4] octane

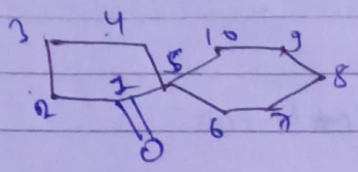
4) 

Spiro [4.5] Decane

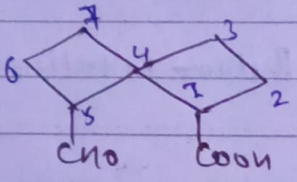
Practice

1) 

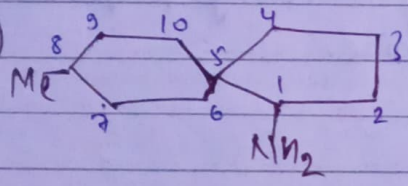
Spiro [2.2] penta-1, 4-diene

2) 

Spiro [4.5] Decan-1-one

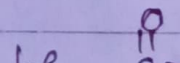
3) 

5-formyl Spiro [3.3] Heptane-1-carboxylic acid.

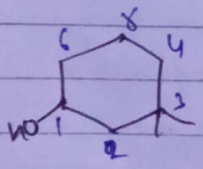
4) 

8-Methyl Spiro [4.5] Decane-1-amine

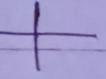
Previous Year Questions

(i) 

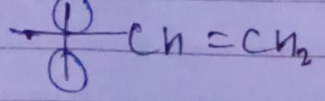
Benzene Carbonyl chloride

(ii) 

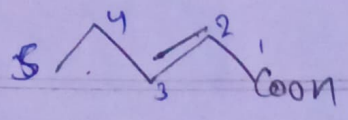
3,3-dimethyl cyclohexan-1-ol

(iii) 

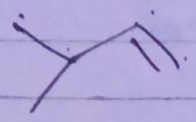
2,2-dimethyl propane

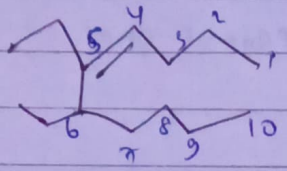
(iv) 

3,3-dimethyl But-1-ene

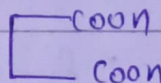
5) 

pent-2-en-1-oic acid

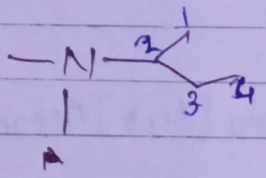
6) 
3-methyl Butene

(7) 

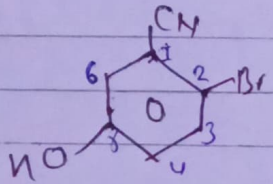
5,6-diethyl Dec-4-ene

(8) Succinic acid 

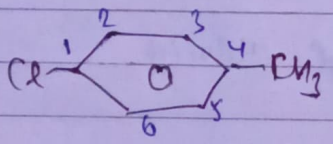
Butane-1,4-dioic acid

9) 

N, N-dimethyl ~~Propanamine~~
butan-2-amine

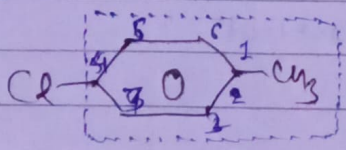
(10) 

2-Bromo-5-hydroxy-Benzene Carbonitrile
⇓
Benzonitrile (also)

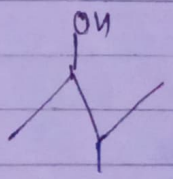
(11) 

1-chloro-4-methyl Benzene

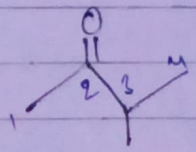
(or)



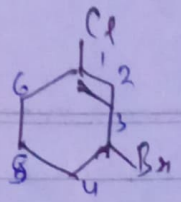
4-chlorotoluene

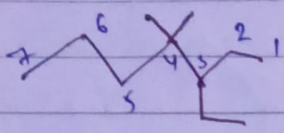
(12) 

3-methyl butan-2-ol

(13) 

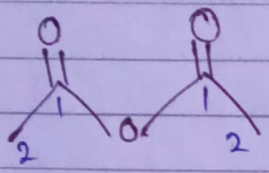
3-methyl Butan-2-one

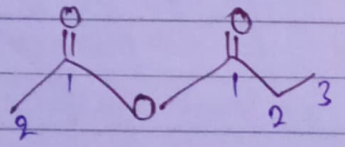
(14)  3-bromo-1-chloro cyclohex-1-ene

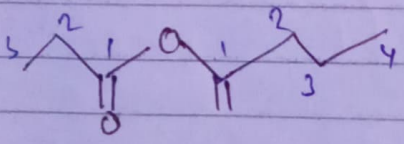
(15) 

3-ethyl-4,4 dimethyl Heptane

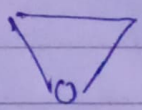
IUPAC Naming of anhydride

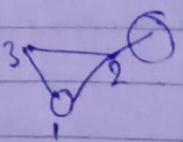
1)  Ethanoic anhydride

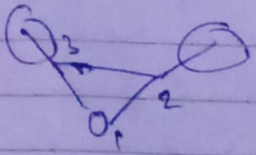
2)  Ethanoic propanoic anhydride
less no. of C more no. of C

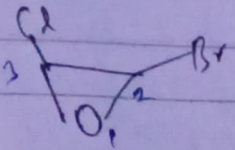
3)  propanoic Butanoic anhydride

Iupac. of Epoxy (oxirane)

 oxirane

(I)  2-methyl oxirane

(II)  2,3-dimethy oxirane

(3)  2-Bromo-3-chloro-oxirane