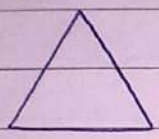
* Nomenclature of cyclo- compound:

1.) cyclic compound are given by prefixing the cyclo before their parent chain word root.

eg:



cyclopropane

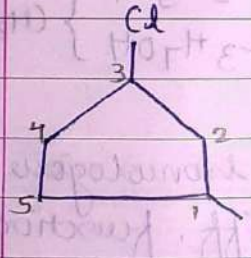
cyclobutane.

cyclopentane

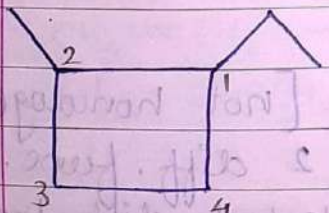
cyclohexane.

2.) if 2 substituents are present at symmetrical position then follow alphabetical order.

eg:



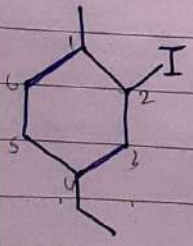
1- Bromo - 3-chloro cyclopentane.



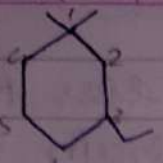
1- Ethyl - 2- methyl cyclobutane.

3.) if more than 2 substituents are present in an unsymmetrical position then numbering should be done according to lowest locant (number) rule.

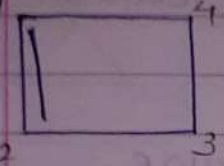
eg:



4-Ethyl-2-Iodo-1-methyl cyclohexane

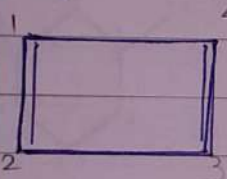


3-Ethyl-1,1-dimethyl cyclohexane.

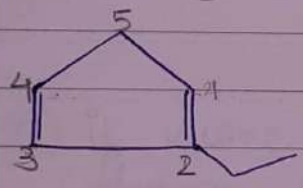
eg: 

Cyclo but-1-ene.

4.) if multiple double bonds are present in a parent cyclic chain then numbering are given accordingly.

eg: 

Cyclo buta-1,3-diene

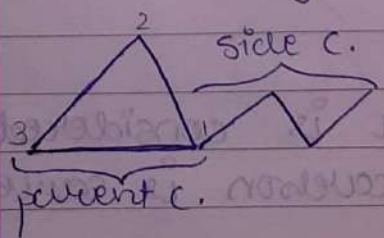


2-Ethyl cyclopenta-1,3-diene

→ Identification of parent chain and side chain (locant):

* Rules:

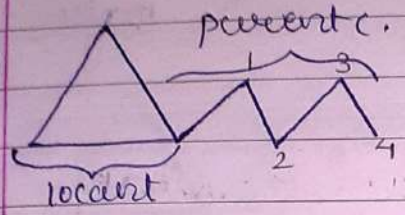
1.) if number of carbons in ring are more than or equal to number of carbons in side chain then ring is considered as parent chain.

eg: 

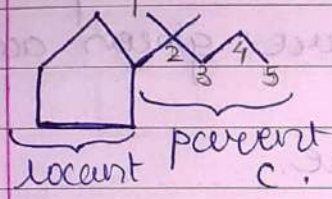
1-Propyl cyclopropane.

2.) if number of carbons in ring is less than number of carbons in side chain then side chain is considered parent carbon chain.

eg:

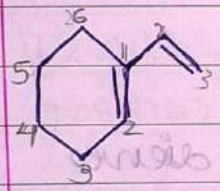


1- cyclopropyl butane.

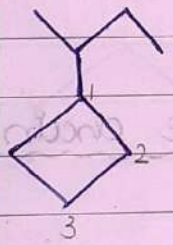


2- cyclopentyl - 2- methyl pentane.

eg



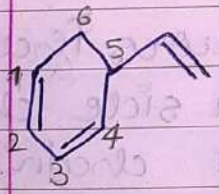
1- Ethenyl cyclohexene



or

1- (methyl-propyl) cyclobutane

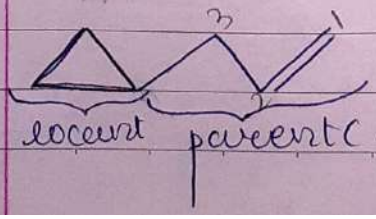
1- sec. butyl cyclobutane



5- Ethenyl cyclohexa-1, 3-diene

3.) double bond having part is considered as parent chain if no. of carbon is same along both sides.

eg:

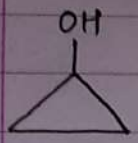


3- cyclopropyl prop-1- ene.

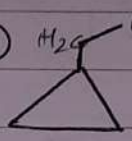
$CH_2=CH_2$

(ethylene → ethene)

Q:5 Name the following compounds:

a) 

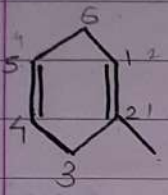
cyclopropanol

b) 

cyclopropyl methanol

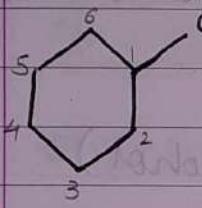
[

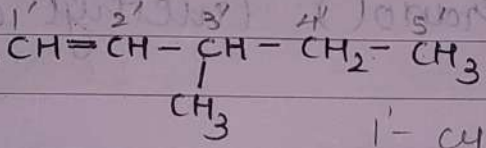
]

c) 

2-methyl-cyclohexa-1,4-diene.

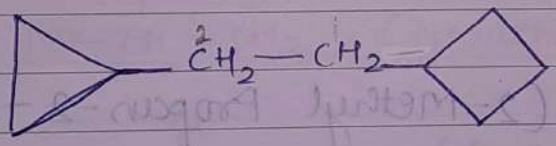
1-methyl-cyclohexa, 1,4-diene.

(d) 

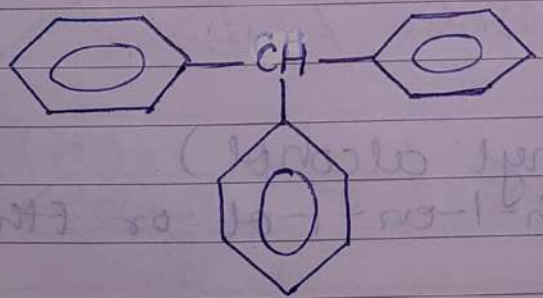


1'-cyclohexyl-3'-methylpent-1-ene.

4.) If more than one ring is available in the compound or molecule then rings are considered as a locant.

eg: 

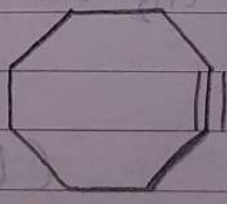
1-cyclobutyl-2-cyclopropyl ethane.

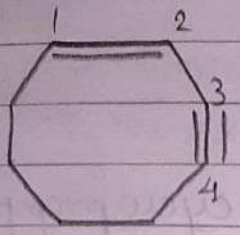


Triphenyl methane

$[C_6H_5]_3CH$

* 
Benzyne
(unstable)

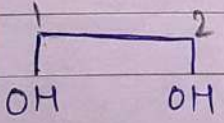

cyclo-Octyne

* 

Cyclo Oct-1-ene-3-yne.

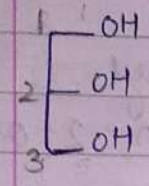
* Nomenclature of functional groups:

⟹1.) Alcohol: (OH) (-ol)

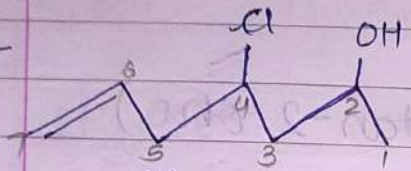
- CH_3OH (methanol) (methyl alcohol) (C.N) (Super primary)
- CH_3CH_2OH (ethanol) (ethyl alcohol) (C.N) (1° alcohol)
- $CH_3-\overset{2}{C}H(-CH_3)-OH$ (2° alcohol) (propan-2-ol)
- $CH_3-\overset{2}{C}(-CH_3)(-CH_3)-OH$ (2-Methyl Propan-2-ol) (3° alcohol)
- $\overset{2}{C}H_2=CH-OH$ (Vinyl alcohol) (C.N) (Eth-1-en-1-ol or Ethenol) (Vinyl.)
- $\overset{3}{C}H_2=\overset{2}{C}H-\overset{1}{C}H_2-OH$ (Allyl alcohol) (C.N) (Prop-2-en-1-ol)
- 

(Ethylene glycol) (C.N) (Ethan-1,2-diol)

PVC → polyvinyl chloride.



(Glycerol) (CIN)
(Propan-1,2,3-triol)

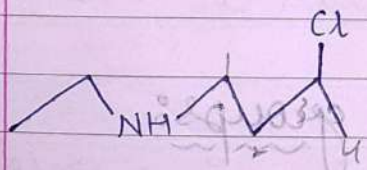


(4-Chloro) hept-6-en-2-ol).

Cyclo pentanol

2.) Amines:

- CH_3-NH_2 (1° amine) (Methanamine)
- $CH_3-NH-CH_3$ (2° amine) (N-methyl methanamine).
- $CH_3-N(CH_3)-CH_3$ (3° amine) (N,N-dimethyl methanamine)
- $CH_3-NH-CH_2-CH_3$ (N-methyl ethanamine) (2° amine)

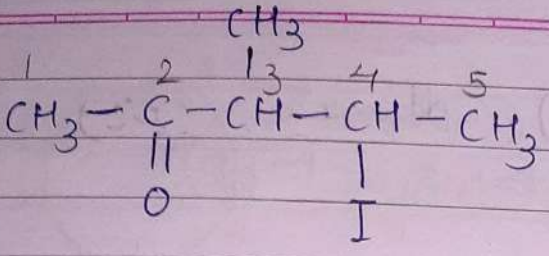


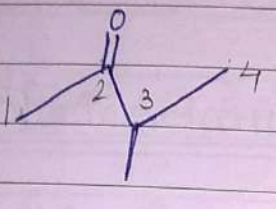
3-Chloro-N-ethyl butanamine

3.) Ketone: (-CO-) (-one)

- $CH_3-C(=O)-CH_3$ Propan-2-one (2-propanone) (ACETONE)
- $CH_3-CH_2-C(=O)-CH_3$ Butan-2-one (2-butanone)

ON = old nomenclature

- 
(4-Iodo-3-methyl Pentan-2-one)

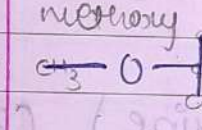
- 
(3-Methyl butan-2-one)

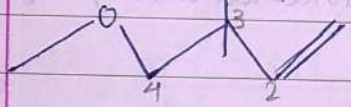
⟹ 4.) Ether: simple (R–O–R) mixed (R–O–R')

- This functional group is always treated as a locant or substituent.

- $CH_3-O-CH_2-CH_3$ (Methoxy ethane) (Ethyl methyl ether) ON.

- CH_3-O-CH_3 (Methoxy methane) (Dimethyl ether) ON

- 
(2-Methoxy propane)

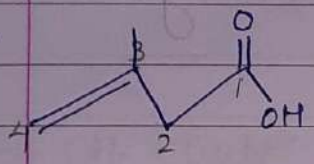
- 
(3,3-Dimethyl hex-1-en-4-ether)

⟹ 5.) Carbon containing functional groups:

⟶ –COOH ; –COCl ; $-CONH_2$; –COOR ; $-CO-$; –CHO ; –CN ; etc.

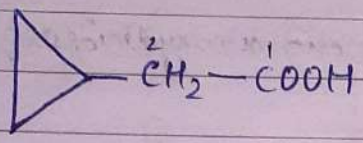
⟶ always given 1 number.

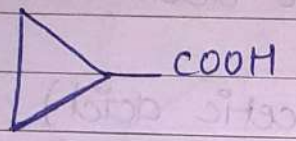
1.) **Carboxylic acid:** $-COOH$ $\left(-\overset{O}{\overset{\|}{C}}-OH\right)$ (-oic)

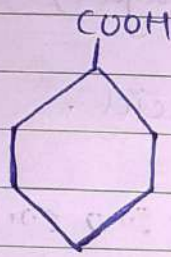
- $HCOOH$ (methanoic acid) (Formic acid) C.N
- CH_3COOH (Ethanoic acid) (Acetic acid) C.N
  (5% mixed with H_2O gives vinegar)
- 
  3-Methyl but-3-enoic acid.

	CN	Comp. form	IUPAC
1) Oxalic acid		COOH | COOH	Ethan-1, 2-dioic acid
2) Malonic acid		COOH | CH_2 | COOH	Propan-1, 3-dioic acid
3.) Succinic acid		COOH | $(CH_2)_2$ | COOH	Butan-1, 4-dioic acid
4.) Glutaric acid		COOH | $(CH_2)_3$ | COOH	Pentan-1, 5-dioic acid
5.) Adipic acid (used in Nylon 66)		COOH | $(CH_2)_4$ | COOH	Hexan-1, 6-dioic acid

OMSGA

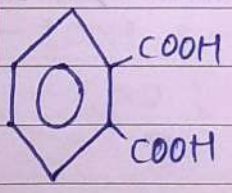
-  2-cyclopropyl ethanoic acid.

-  Cyclopropane carboxylic acid.

-  Cyclohexane carboxylic acid.

-  Benzene carboxylic acid
or
Benzoic acid.

* if carbon containing functional groups directly attached to the ring then the ring is considered as parent chain and for that functional group we use special suffixes.

*  Phthalic acid
(Benzene-1,2-dicarboxylic acid)

11. Acid anhydride:

$$\begin{matrix} R'-CO \\ R-CO \end{matrix} \!\!> O \quad (\text{-oic anhydride})$$

- $HCOOH + HCOOH \xrightarrow{-H_2O} \begin{matrix} H-CO \\ H-CO \end{matrix} \!\!> O$ or $HCOOCOH$

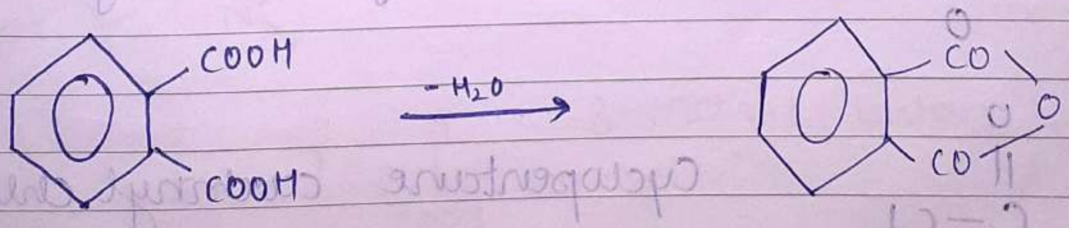
Methanoic acid — Methanoic anhydride

- $CH_3COOH + CH_3COOH \xrightarrow{-H_2O} \begin{matrix} CH_3-CO \\ CH_3-CO \end{matrix} \!\!> O$ — $CH_3CO\ O\ COCH_3$

Ethanoic acid — Ethanoic anhydride

- $HCOOH + CH_3COOH \xrightarrow{-H_2O} \begin{matrix} H-CO \\ CH_3-CO \end{matrix} \!\!> O$

formic + acetic ⟶ Ethanoic methanoic anhydride

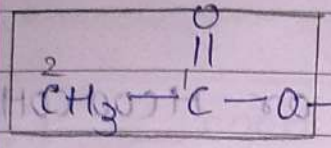
- 

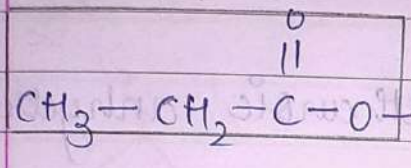
Phthalic acid — Phthalic anhydride

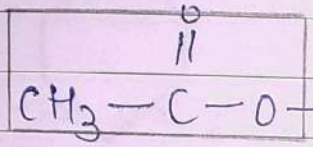
or

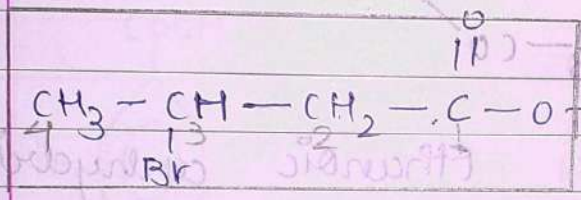
Benzene-1,2-dicarboxylic anhydride

III.) Ester: (−C(=O)−O−R) (-oate) (alkoxycarbonyl-)

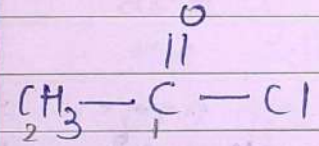
-  Methyl ethanoate

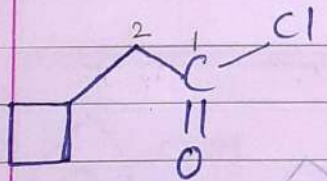
-  Methyl propanoate

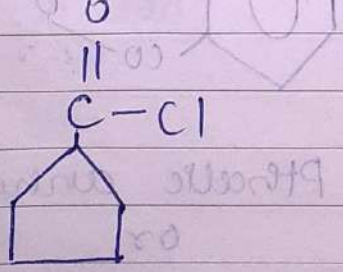
-  Ethyl ethanoate

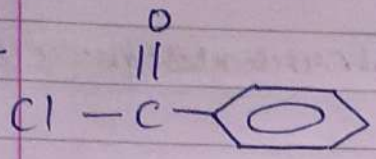
-  3-Bromo methyl butanoate

IV.) Acid chloride: (-oyl halide)

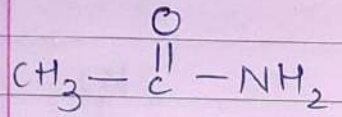
-  Ethanoyl chloride

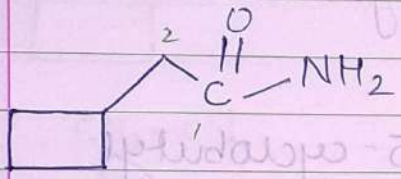
-  2-cyclobutyl ethanoyl chloride

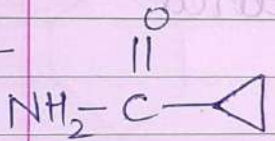
-  Cyclopentane carbonyl chloride

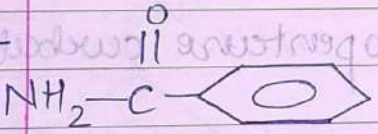
-  Benzoyl chloride

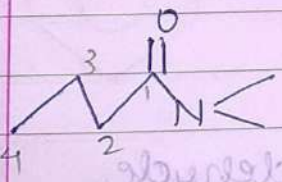
V.) **Amide:** $(-\overset{O}{\overset{\|}{C}}-NH_2)$ (carboxamide -), (-amide)
(carbamide-)

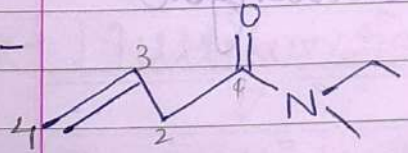
-  Ethanamide

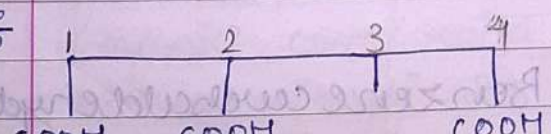
-  2- Cyclobutyl Ethanamide

-  Cyclopropane methanamide

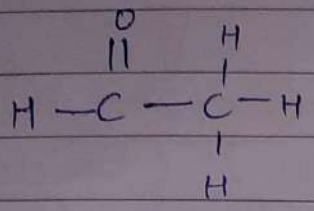
-  Benzene carbamide
or Benzene carboxamide

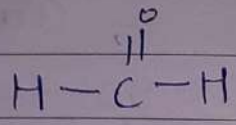
-  N,N- Dimethyl Butanamide

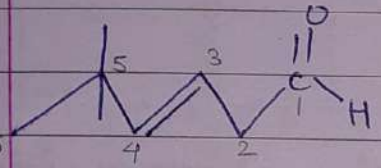
-  N,-Ethyl- N -methyl but-3-en-amide

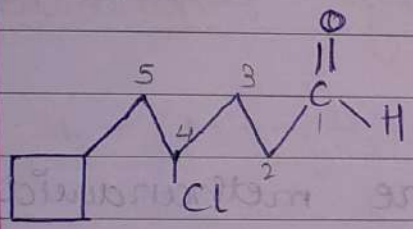
eg:-  3- Methyl butan-1,2,4 -tricarboxylic acid.

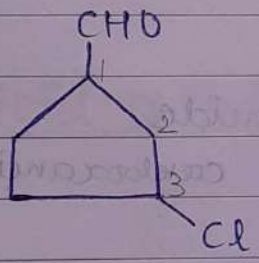
VI.) Aldehyde: (–C(=O)–H) (al) (carbaldehyde)

- 
Ethanal

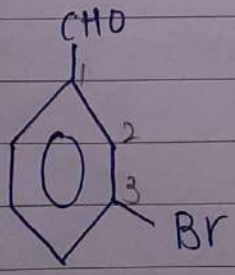
- 
Methanal

- 
5,5- Dimethyl Hex-3-en-1-al.

- 
4-Chloro-5-cyclobutyl pentanal

- 
3-Chloro cyclopentane carbaldehyde

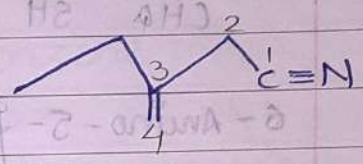
- 
Benzene carbaldehyde

- 
3-Bromo Benzene carbaldehyde

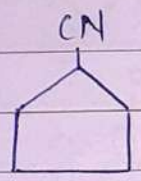
VIIb) **Cyanide:** (C-C≡N) (nitrile) (carbonitrile)

- $H-\overset{H}{\underset{H}{\overset{|}{\underset{|}{C}}}}-C\equiv N$ Ethanenitrile

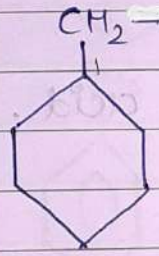
- $H-C\equiv N$ Methanenitrile

- 

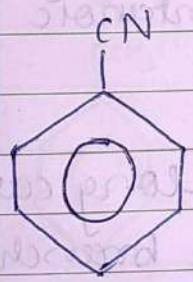
3-Ethyl but-3-ene-nitrile

- 

Cyclopentane carbonitrile

- 

Cyclohexyl ethanenitrile

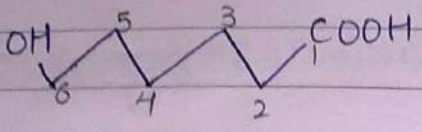
- 

Benzene carbonitrile

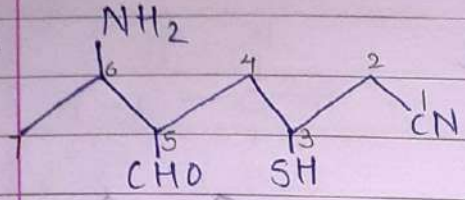
* Multifunctional groups:

- if multiple functional groups are present in an organic compound then the principle functional groups (suffix-2) are always 1 one the basis of functional group priority order supre-macy while, all other functional groups are written as prefix-2 in alphabetic order.

Oxo = used when CHO of C counted in numbering not used when CHO = branch.

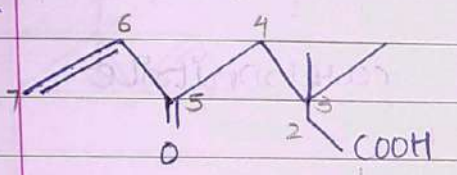
- 

6-Hydroxy hexanoic acid.

- 

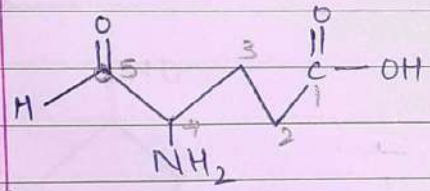
NH_2 - amino
CHO = oxo / formyl
SH = mercapto

6-Amino-5-formyl-3-mercapto heptanenitrile

- 

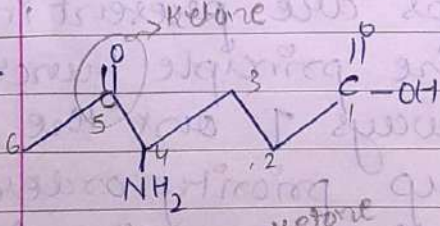
CO = (ketone) Oxo

3,3-Dimethyl-5-oxo hept-6-enoic acid.

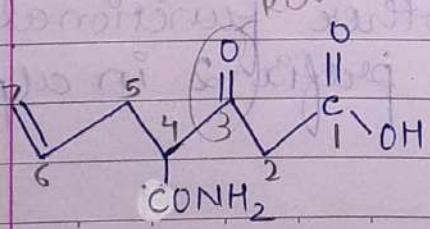
- 

4-Amino-5-oxo pentanoic acid

* if CHO group is available in long carbon chain at middle position or as a branch then we use term FORMYL as prefix-2 but if it is at terminal position we use OXO as prefix-2.

- 

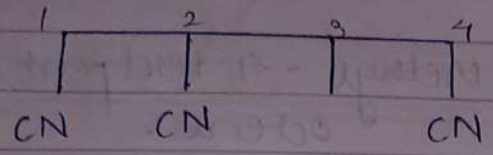
4-Amino-5-oxo hexanoic acid.

- 

4-Carbamoyl-3-oxo hept-6-enoic acid.

NH_2 = amino $CONH_2$ = carbamoyl

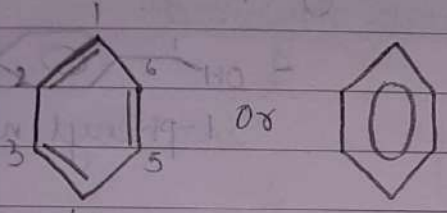
-



3- Methyl butane-1,2,4 trinitrile

* Benzene and their derivatives:

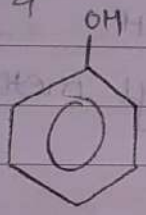
1.)



or

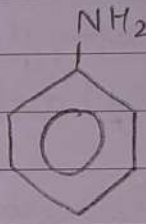
Benzene
or
Cyclohexa-1,3,5 triene

2.)



Phenol

3.)



Aniline
(Amino benzene)

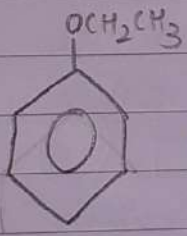
4.)

Toluene
(Methyl benzene)

5.)

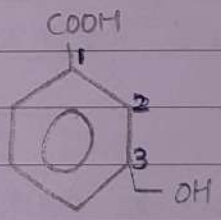
Anisole
(Methoxy benzene)

6.)



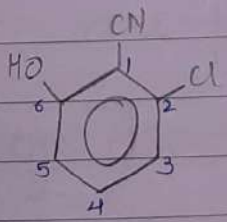
Phenetol
(Ethoxy benzene)

7.)



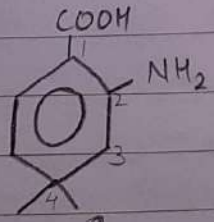
3-Methyl hydroxy benzoic acid
benzene carboxylic

8.)



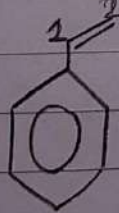
2-chloro-6-hydroxy benzene carbonitrile.

9.)



2-Amino-4,4-dimethyl benzoic acid.

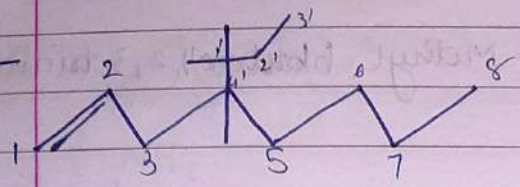
10.)



1-Phenyl ethene $C_6H_5 - CH=CH_2$

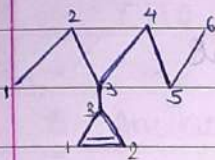
g3/01

* Extras (by me)

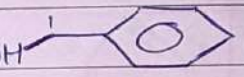
- 

4-Methyl-4-tert pentyl octene.
due to tertiary C

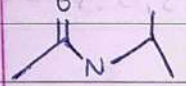
or 4-methyl-(1',1'-dimethyl propyl)-1 octene

- 

3-Hexyl cyclopropene.

- 

1-phenyl methanol

- 

N-isopropyl methanamide

(N-methyl ethyl) methanamide.

-HCOOH

(Methyl methanoate)

* Acetylsalicylic acid:

→

* 

→

* Acetone:

* Oxylene:

→