

IUPAC Nomenclature

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5) IUPAC of

* anhydride, ester, ...> 9
amide, amine

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* NCERT> 15

→ Hydrocarbons & Benzene> 16

→ Haloalkanes & Haloarenes> 17

→ Alcohols, phenols & ethers> 18

→ Carbonyl Compounds> 19

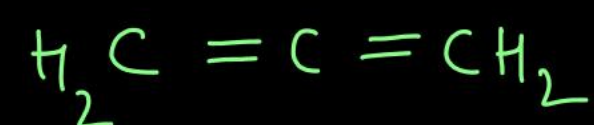
* Imp acids> 21

☆ Practice> 22

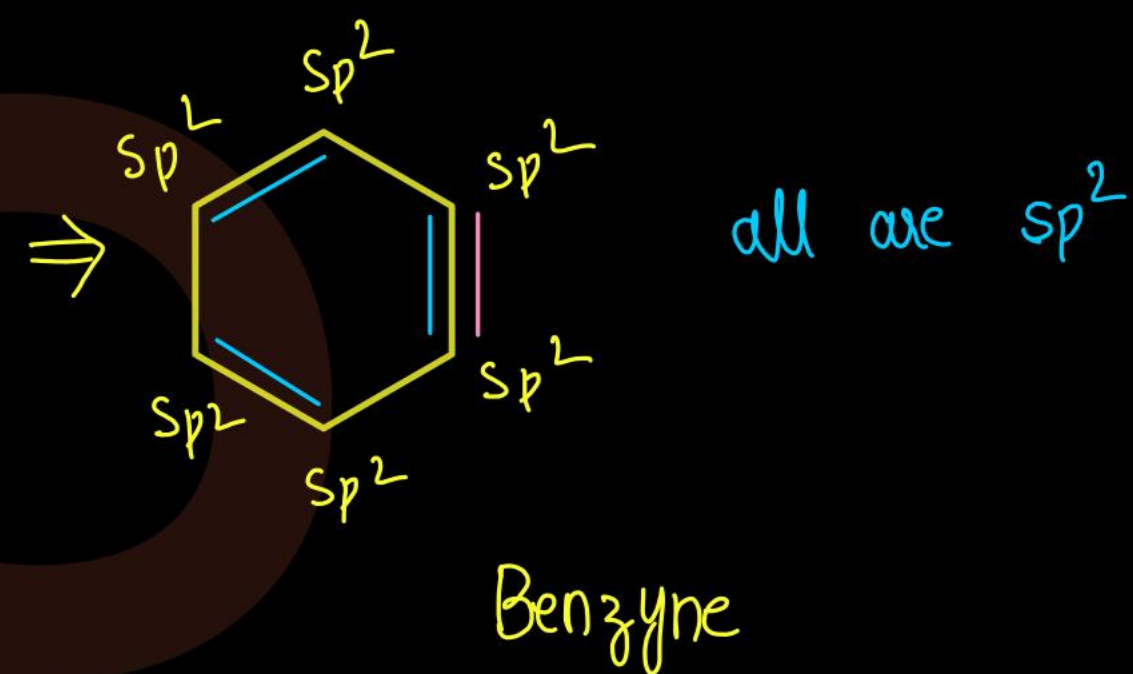
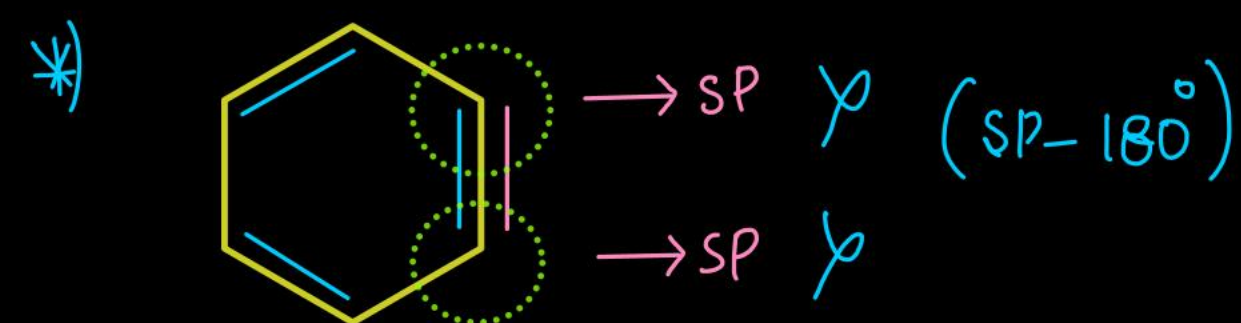
1) Hybridisation / Geometry :

		<u>H.O</u>	<u>A.O</u>
*) sp^3	$\begin{array}{c} \\ -C- \\ \end{array}$	4	0
sp^2	$\begin{array}{c} \diagup \\ C= \\ \diagdown \end{array}$	3	1
sp	$-C \equiv / = C =$	2	2

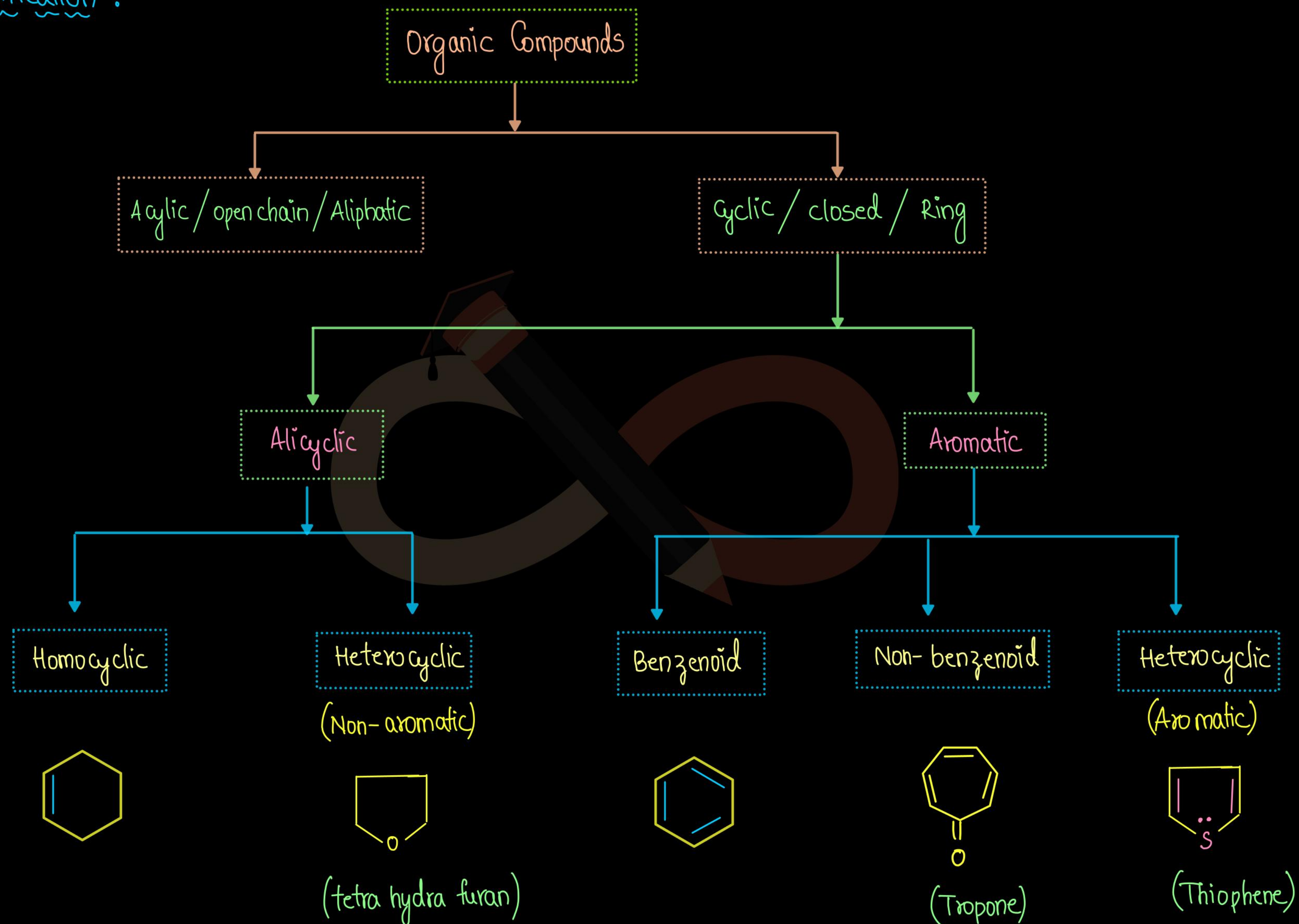
*) Cumulenes :

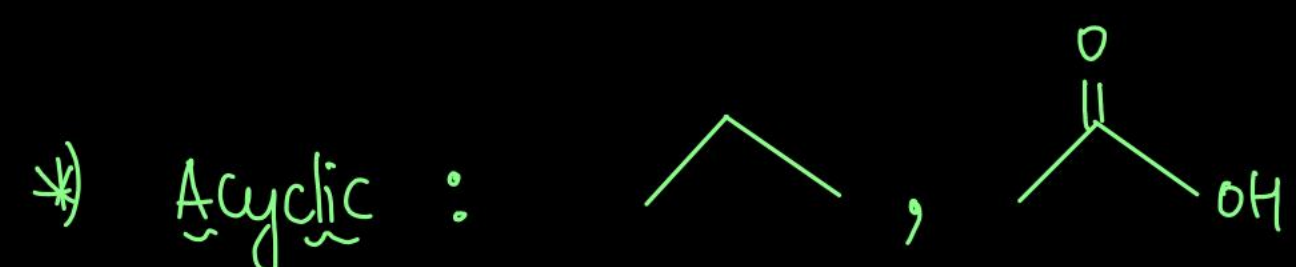


$\Rightarrow$ odd no. of '=' $\rightarrow$ Planar
 even no. of '=' $\rightarrow$ Non-planar

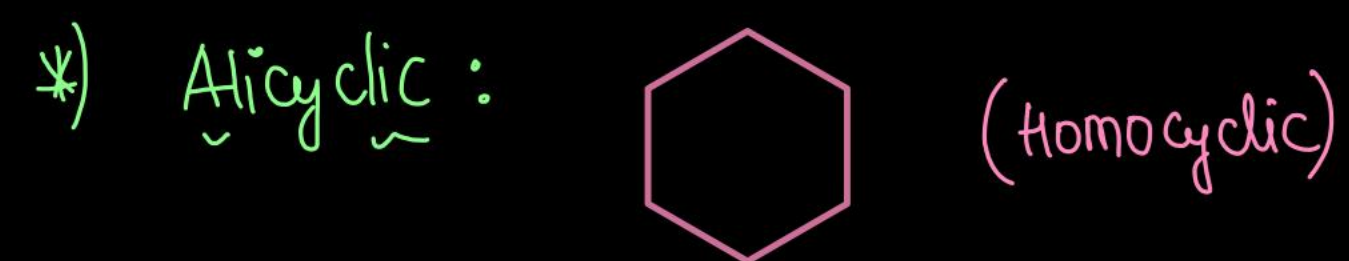


2) Classification :





* Heterocyclic Aromatic Comp :-



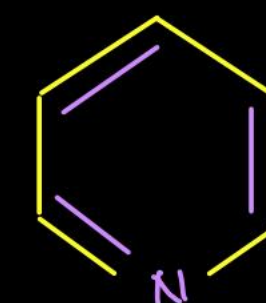
(heterocyclic)



furan



Thiophene



pyridine

* Aromatic :

1> cyclic

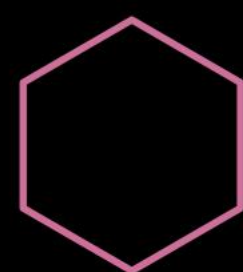
2> Conjugation

* 3> Planar

4> Huckel's rule ($4n+2 \pi e^-$)

} If any 1 cond is failed $\Rightarrow$ Non-aromatic

Ex:-



$\rightarrow$ cyclic $\checkmark$

$\rightarrow$ planar $\checkmark$

$\rightarrow 2 \pi e^- \checkmark$

but no conjugation

* Nomenclature

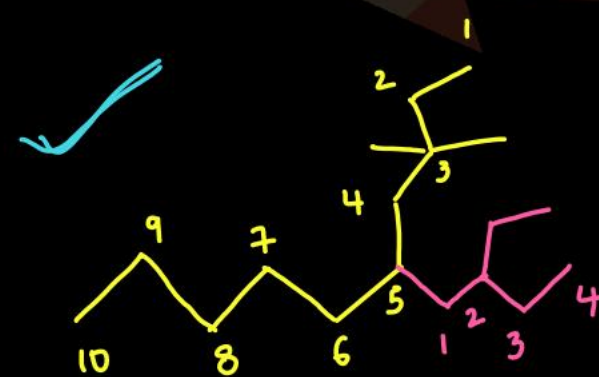
<u>Prefix</u>	+	<u>Word Root</u>	+	<u>Suffix-1</u>	+	<u>Suffix-2</u>
<u>sub</u> R- alkyl OR- alkoxy		meth eth tri but		ane ene yne		Principal F.G -- oic acid -- amide

Rules:-

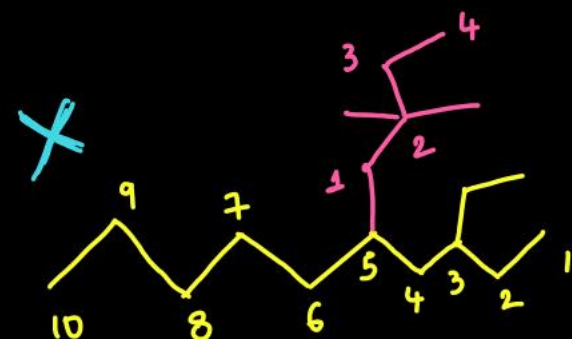
- 1> longest Carbon chain
- 2> lowest numbering
- 3> Suffix, Prefix, ---
- * 4> di, tri, tetra → not considered in alphabetical order
- 5> Same number → alphabetical order
- 6> Branched alkyl grp → parenthesis + (...)
- * In alph order ; iso, neo ✓
sec, tert ✗
- * Same no. of Carbons → more branches



3-ethyl 1,1-dimethyl cyclohexane ✓
 1,1-dimethyl 3-ethyl cyclohexane ✗



5 - (2-ethylbutyl) - 3,3 dimethyl decane
 (3)



5 - (2,2 dimethyl butyl) - 3 ethyl decane
 (2)

functional group:-



Order: PFG > Multiple bonds > No. of atoms > Max no. of Subs > Lowest locant > Alphabetic order

Class	F.G	Suffix	Prefix
Carboxylic acids	$-\text{COOH}$	oic acid	Carboxy
Sulphonic acids	$-\text{SO}_3\text{H}$	sulphonic acid	Sulpho
acid anhydride	$-\text{C}(=\text{O})-\text{O}-\text{C}(=\text{O})-$	-oic anhydride	—
Esters	$-\text{COOR}$	-oate	alkoxy Carbonyl
Acyl halides	$-\text{COX}$	-oyl halide	halo Carbonyl
Amides	CONH_2	amide	Carbonyl
Nitriles	CN	-nitrile	Cyano

Aldehydes	$-\text{C}(=\text{O})-\text{H}$	-al	formyl (aldo)
Ketones	$-\text{C}(=\text{O})-$	-one	oxo
Alcohols	$-\text{OH}$	-ol	hydroxy
Amines	$-\text{NH}_2$	-amine	amino
Ethers	$-\text{R}-\text{O}-\text{R}$	—	alkoxy

Note :-

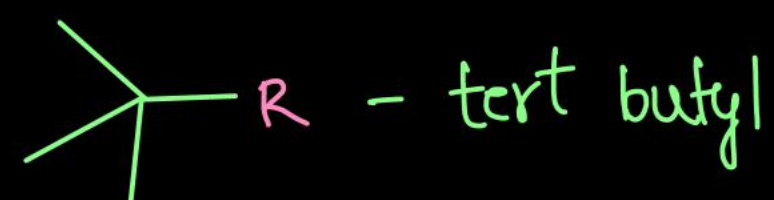
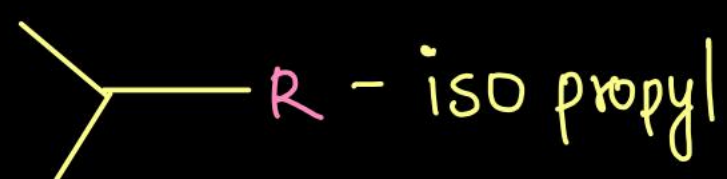
*) Homologous Series :- (family)

ex:- Carboxylic acids

1st member $\text{H}-\text{COOH}$

2nd member CH_3-COOH

*) Special branches

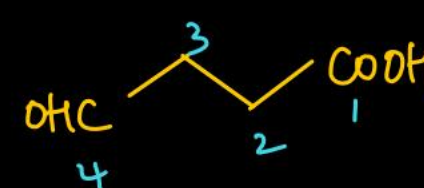


<u>*)</u>	<u>Subs</u>	<u>Prefix</u>
	$-\text{X}$	Halo
	$-\text{N}_3$	azide
	$-\text{NO}$	Nitroso
	$-\text{NO}_2$	Nitro
	$-\text{O}-\text{R}$ (Ethers)	Alkoxy
	$-\text{OCH}_3$	methoxy
	$-\text{R}$	alkyl

*) formyl , aldo / Carboxy :-

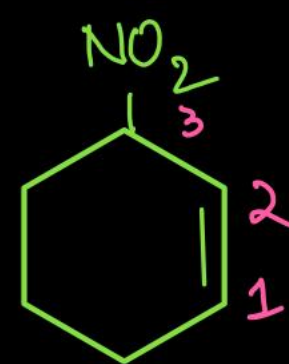
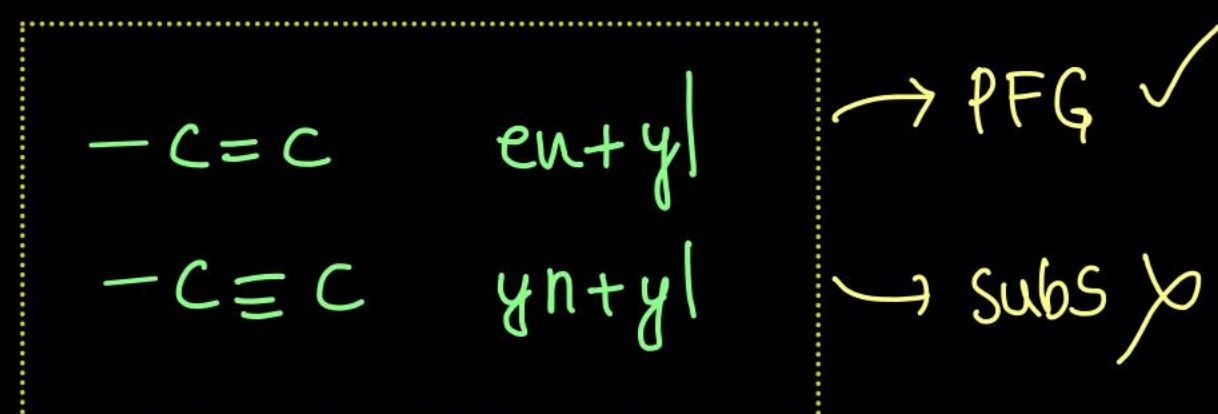


3-formyl propanoic acid



4-aldo butanoic acid
(or)
Carboxy

*)



3-nitro cyclo hex-1-ene ✓

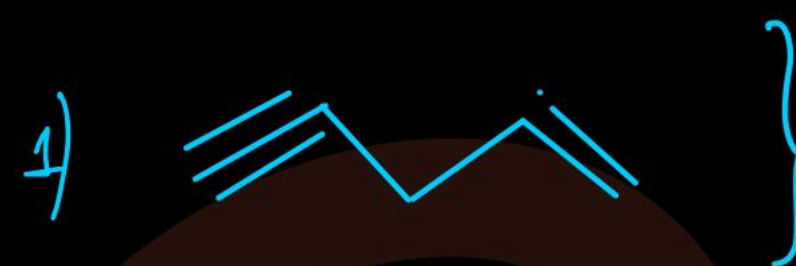
1-nitro cyclo hex-2-ene ✗

Nitro is not PFG but = is ✓

*) = (vs) ≡

*) Same number ⇒ (= > ≡)

otherwise ⇒ lowest number



pent-1-en-4-yne ✓

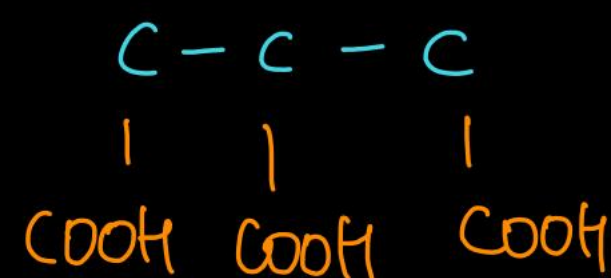
pent-4-en-1-yne ✗



pent-3-en-1-yne ✓

pent-2-en-3-yne ✗

*) If more than 2 PFG are present

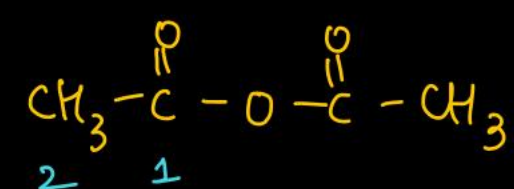


⇒ propane 1,2,3-tricarboxylic acid

* IUPAC of anhydride

a) symmetrical

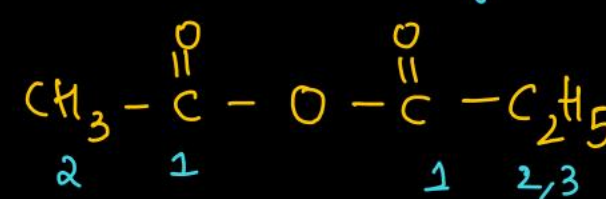
↳ alkanoid anhydride



ethanoic anhydride

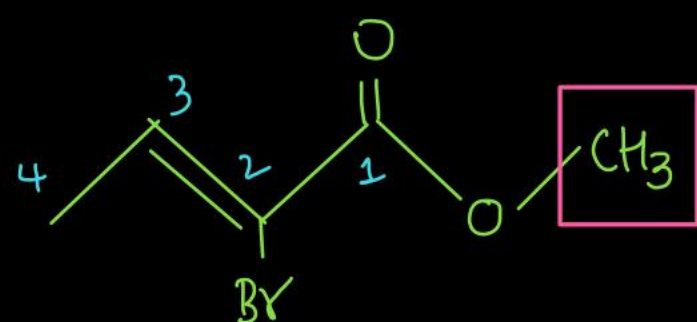
b) unsymmetrical

↳ Alkanoid alkanoid anhydride



ethanoic methanoic anhydride

* IUPAC of ester

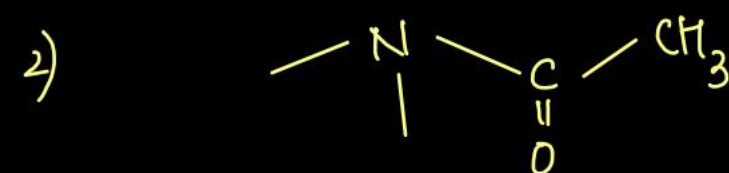


Methyl 2-bromo but-2-en-1-oate

* IUPAC of amides



N-propyl ethan-1-amide



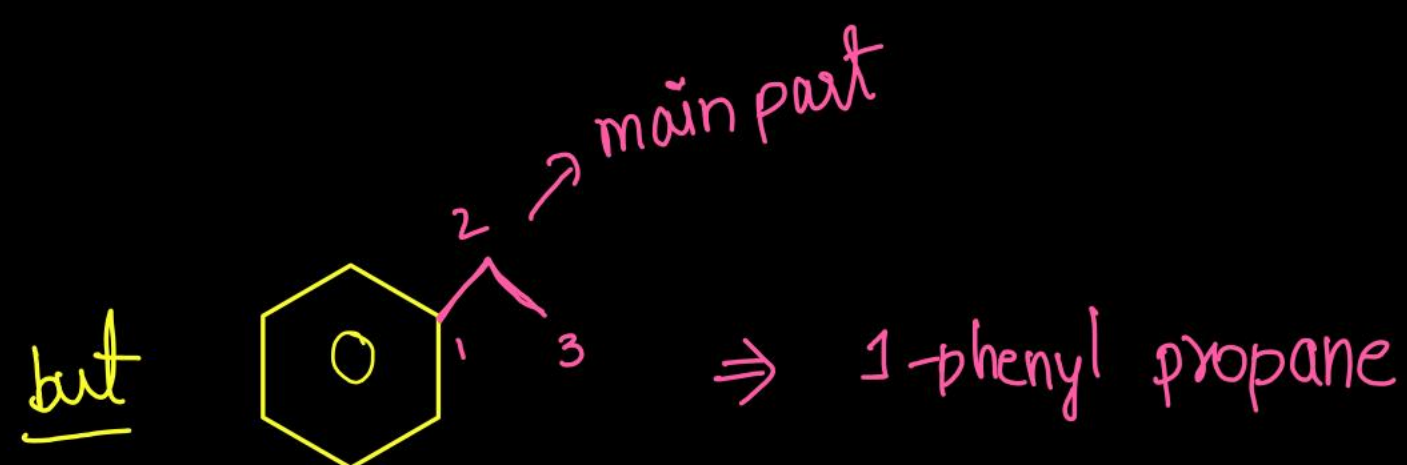
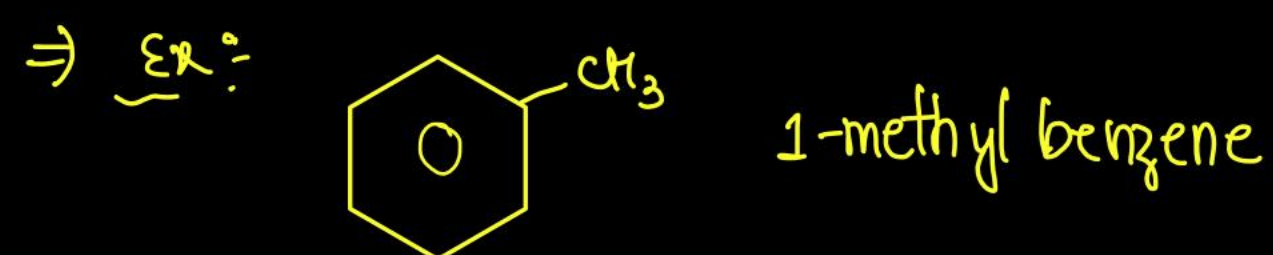
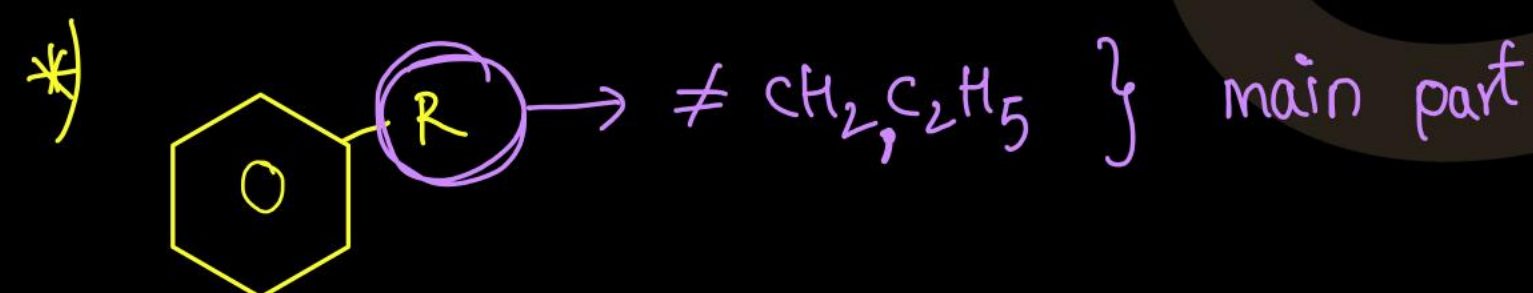
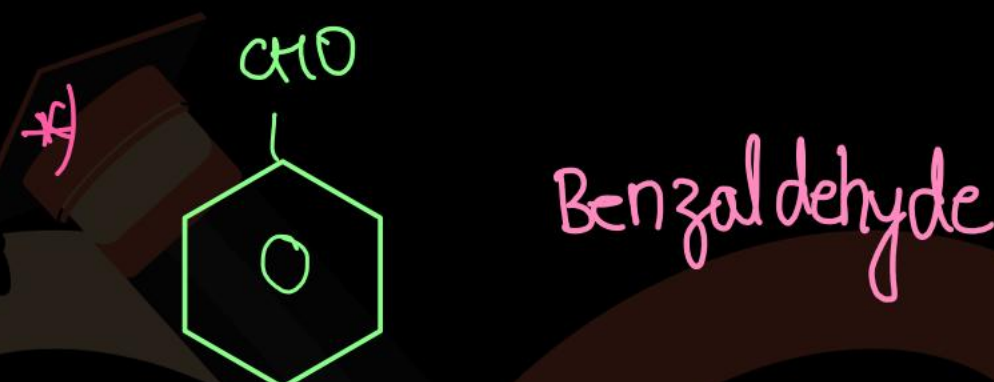
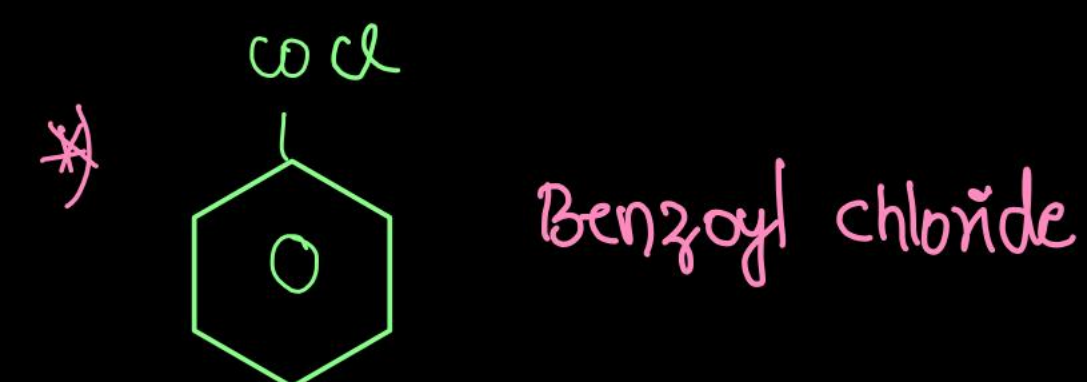
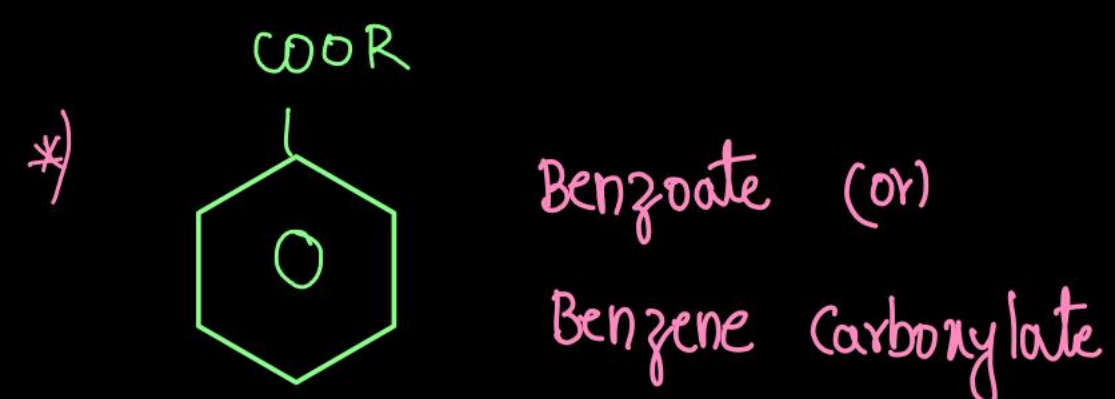
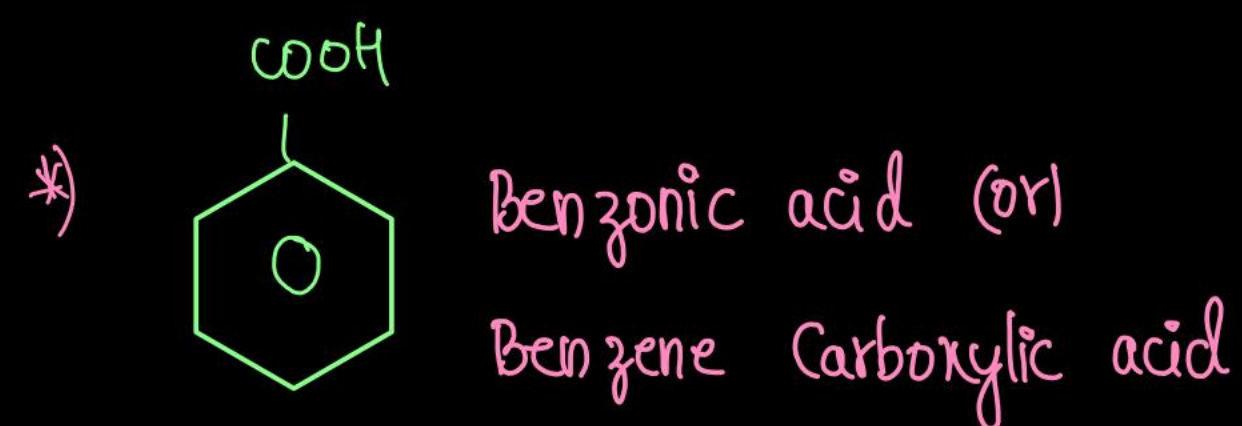
N,N dimethyl ethan-1-amide

Amines

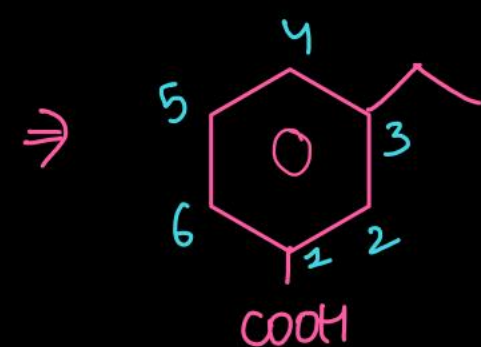


N-methyl ethanamine

Nomenclature of Substituted Benzene Compounds



* If FG is attached directly, then it is taken as main part



3-ethyl benzoic acid

IUPAC of Cyclo Compounds :

* Prefix + Word root + Suffix-1 + Suffix-2

* PFG > multiple bonds > No. of C-atoms > Ring

* If Carbon containing FG is directly attached with the ring, then it is taken as part of ring

* If no. of Carbons are same ⇒ ring > chain

F.G

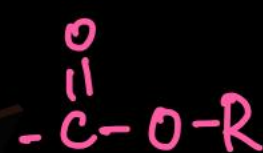
Special Suffix

Carboxylic acid



Carboxylic acid

Ester



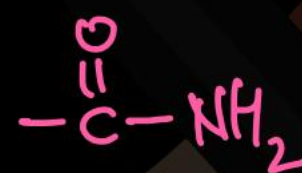
Carboxylate

acid halide



Carbonyl halide

acid amide



Carboxamide

Cyanide

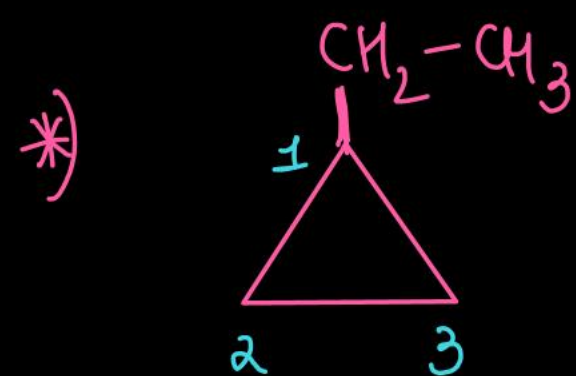


Carbonitrile

aldehyde

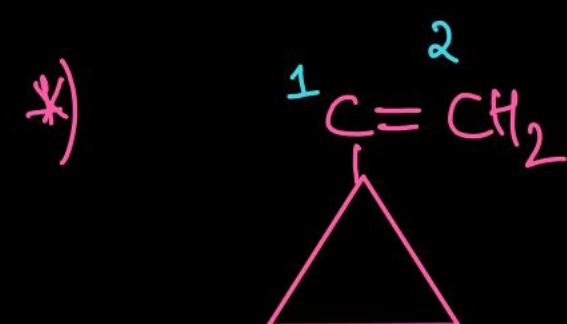


Carbaldehyde

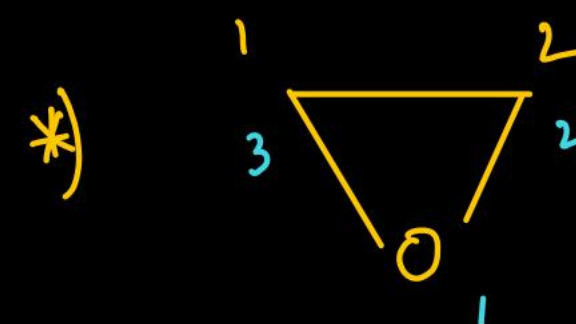


1-ethyl Cyclo propane

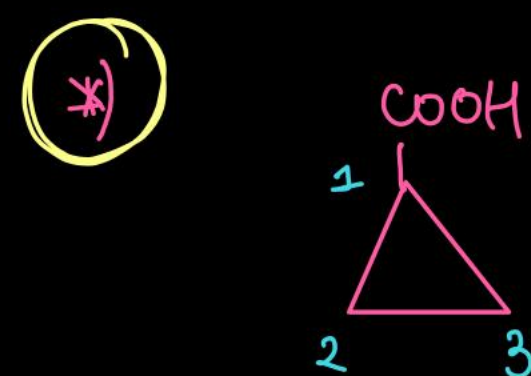
IUPAC of Cyclic Ether



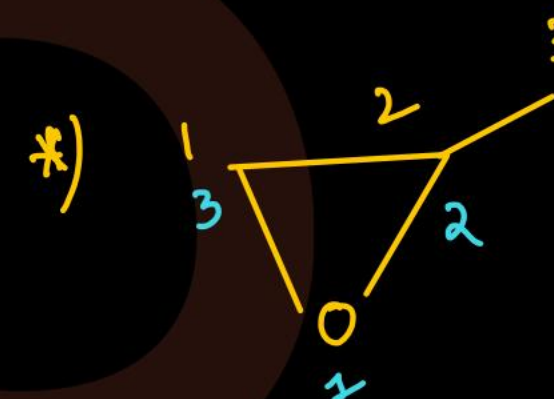
1-Cyclopropyl eth-1-ene



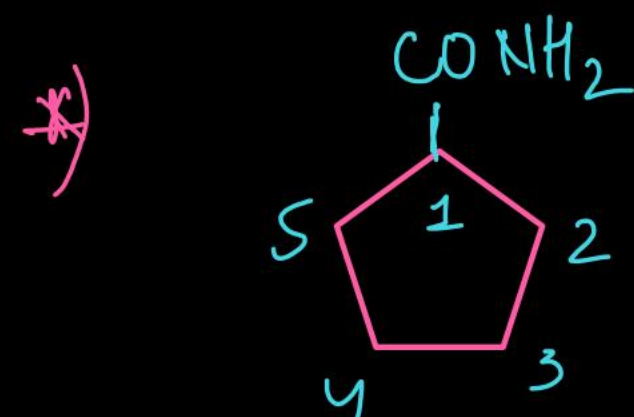
1,2- epoxy ethane
(oxirane)



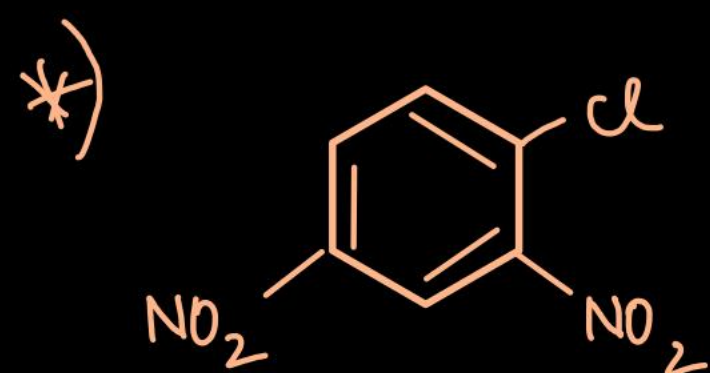
propane - 1-Carboxylic acid



1,2- epoxy propane
(2-methyl oxirane)

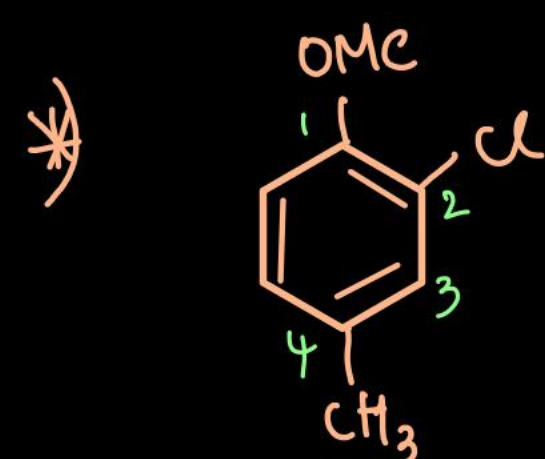


Cyclo petane -Carboxamide

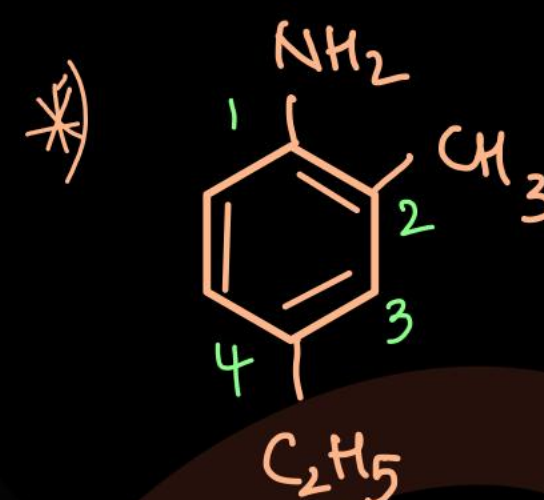


1-chloro-2,4-dinitrobenzene ✓

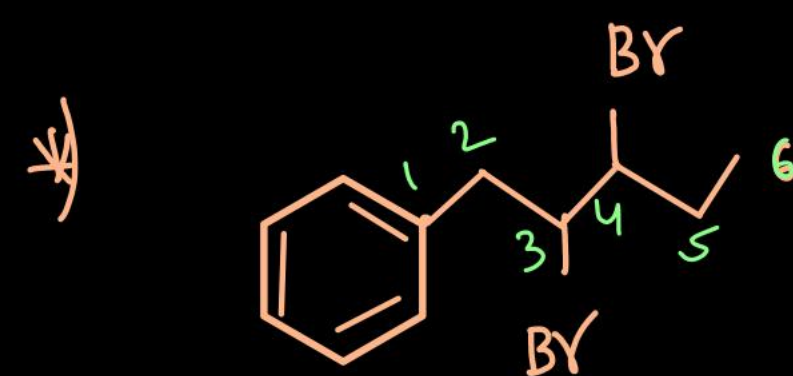
4-chloro-1,3-dinitrobenzene ✗



2-chloro 4-methyl anisole



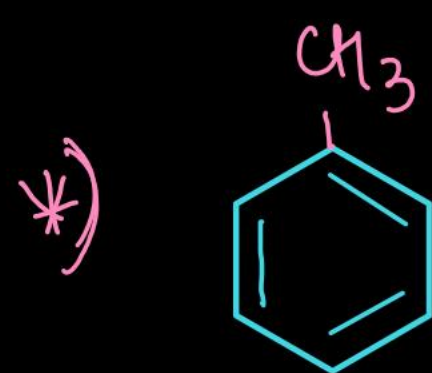
4-ethyl 2-methyl aniline



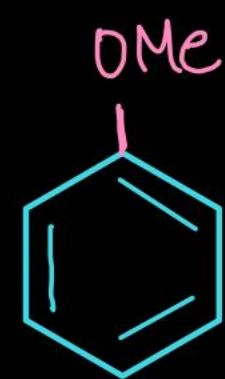
3,4 dibromo 1-phenyl
pentane

Benzenes is attached to alkane
it is considered as Subs $\Rightarrow$ Phenyl (C_6H_5-)

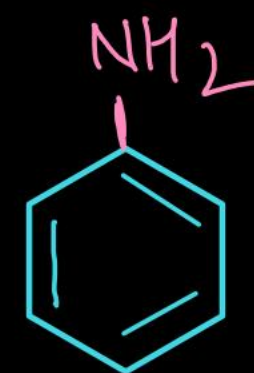
NCERT :-



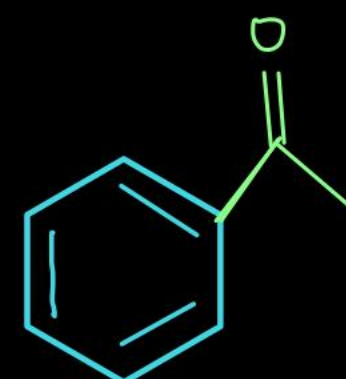
Toluene



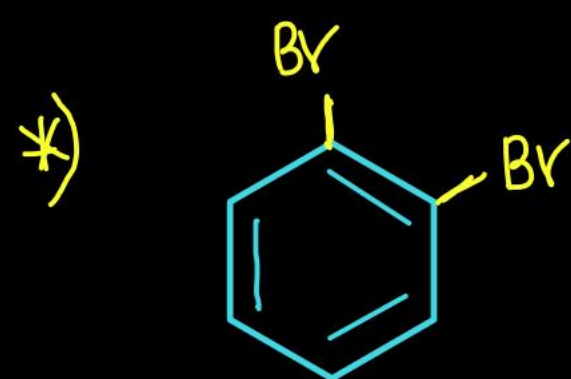
Anisole



Aniline

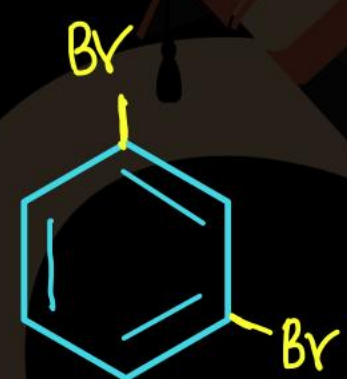


Acetophenone



1,2 dibromo

o-dibromo



1,3 dibromo

m-dibromo

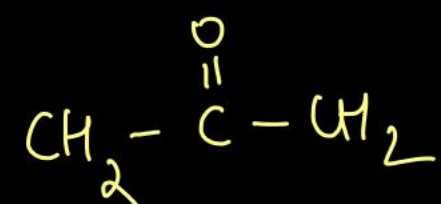


1,4 dibromo

p-dibromo

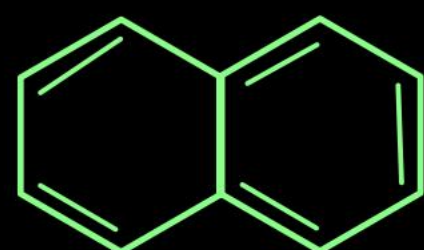


formaldehyde

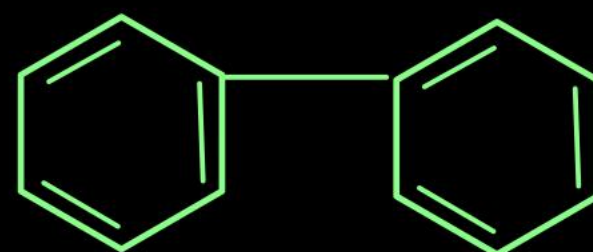


Acetone

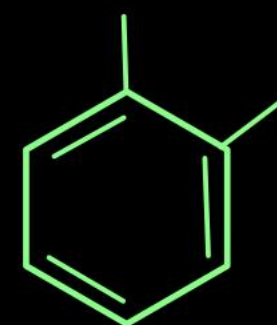
Hydrocarbons :-
(Benzene)



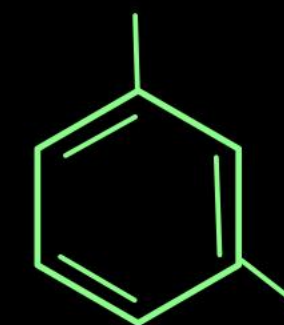
Napthalene



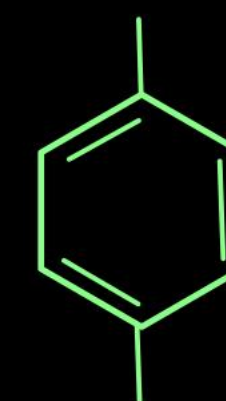
biphenyl



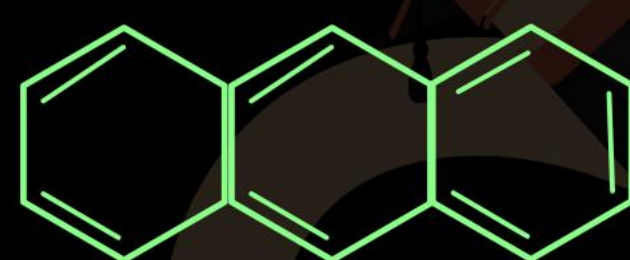
O-xylene



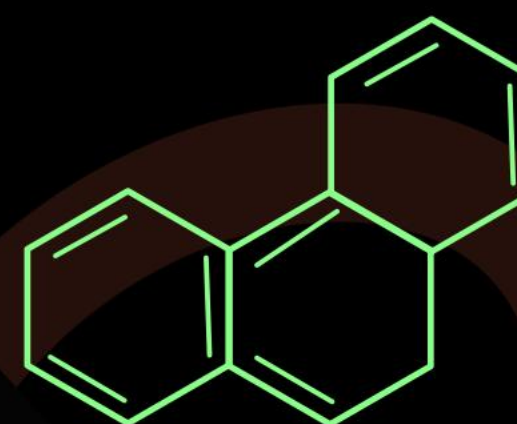
m-xylene



P-xylene



Anthracene

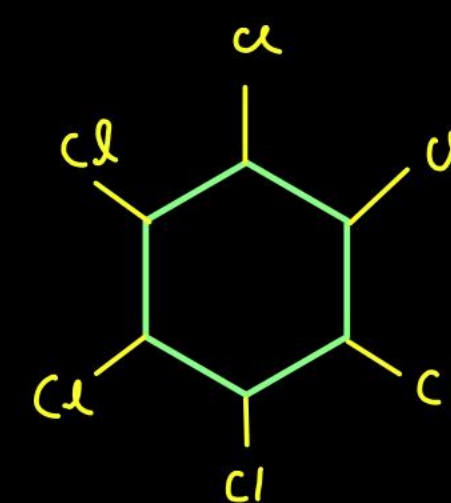


phenanthrene



(HBC) C_6Cl_6
Hexachloro benzene

*



$(C_6H_6Cl_6)$

Gamma-xane (Lindane)

γ -BHC

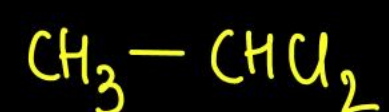
(Benzene hexachloride)

Halo alkanes, arenes :-

*) dihaloalkanes having the same type of halogen are named as follows;

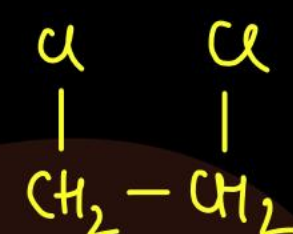
- i) Same carbon : Geminal Alkylidene
- ii) adj carbon : vicinal Alkylene dihalides

Ex:-



Ethylidene chloride
(gem-chloride)

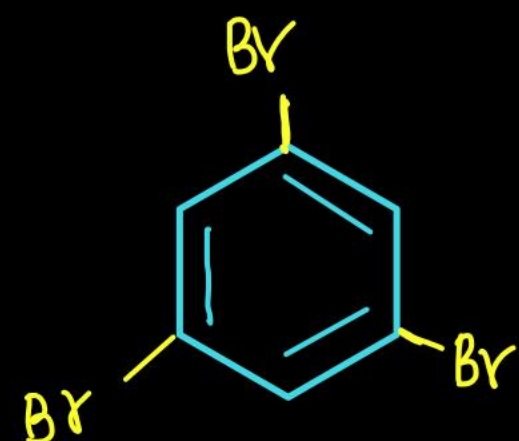
1,1 di chloro ethane



Ethylene chloride
(vic-chloride)

1,2 di chloro ethane

*)

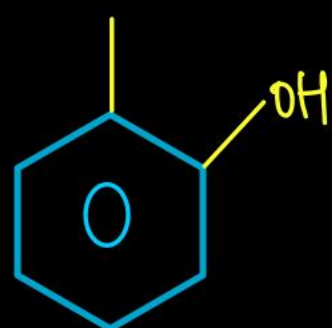


Syn-tetrabromo benzene

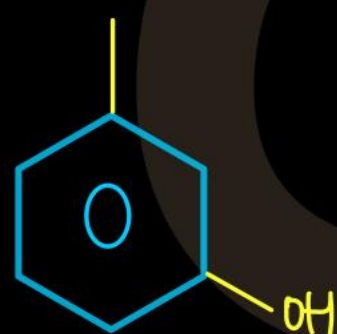
Alcohols :-



Phenols :-



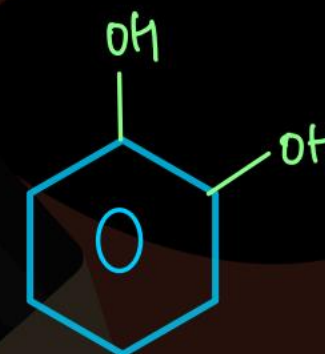
O-Cresol



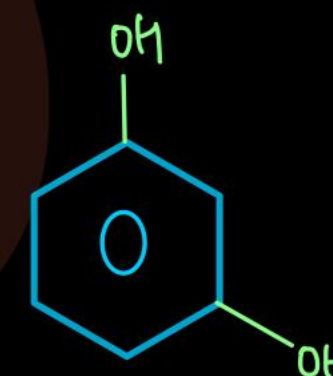
m-Cresol



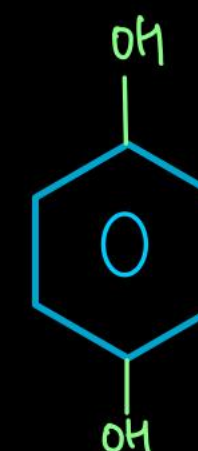
P-Cresol



Catechol



Resorcinol



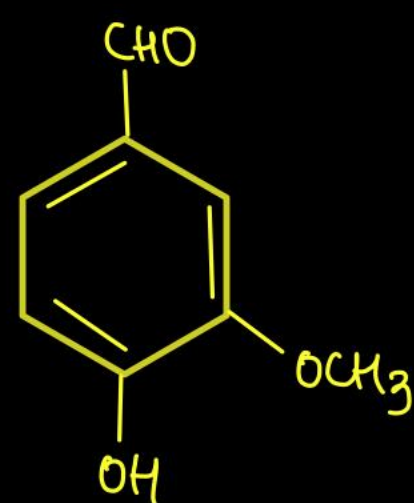
Hydroquinone / quinol

Ethers :

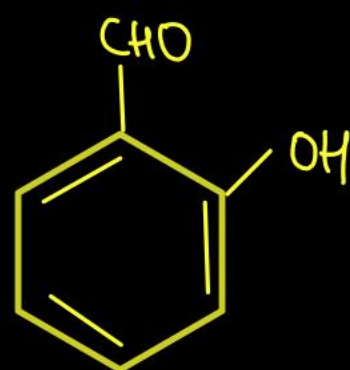


ethyl methyl ether [IUPAC - 1 methoxy ethane]

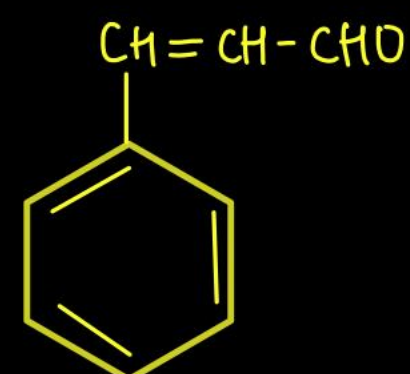
Carbonyl Compounds :-



Vanillin

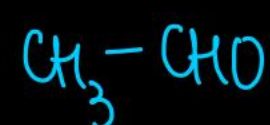


Salicylaldehyde



Cinnamaldehyde :

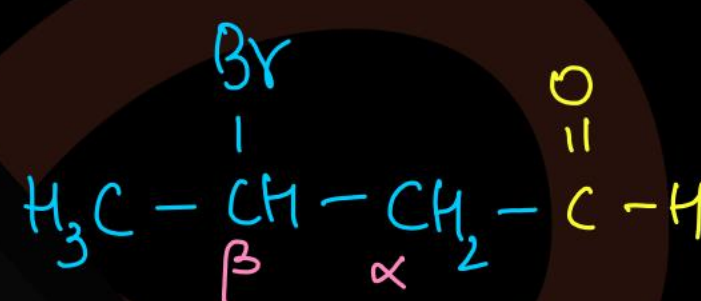
Aldehydes



acetaldehyde

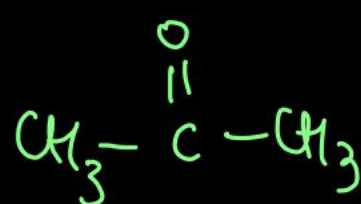


Benzaldehyde

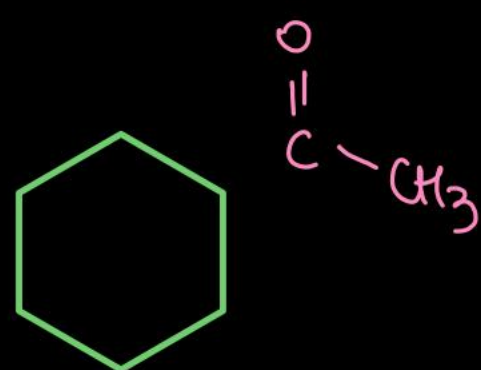


β - Bromobutaldehyde

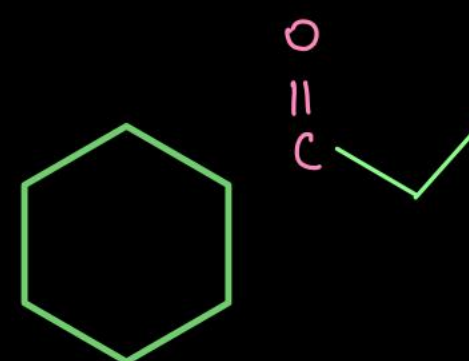
Ketone :



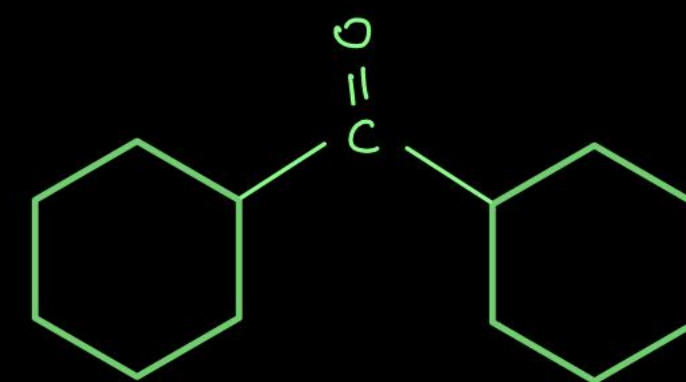
Acetone



Acetophenone



propiophenone

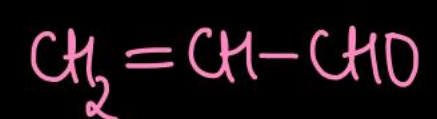


Benzophenone

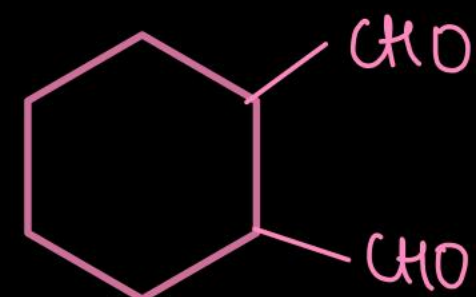
Imp Common Names :



valeraldehyde

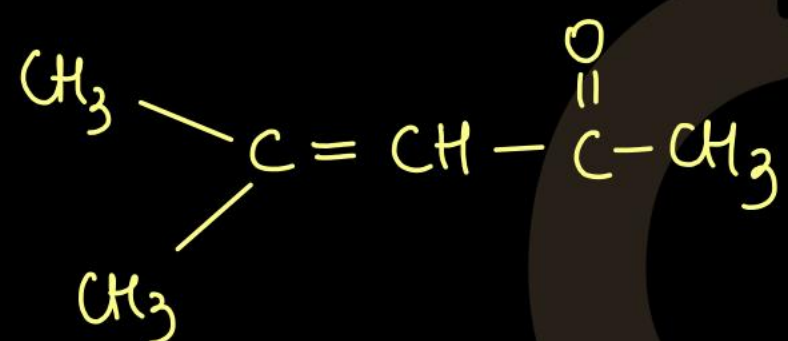


Acrolein



Phthalaldehyde

(*)



mesityl oxide

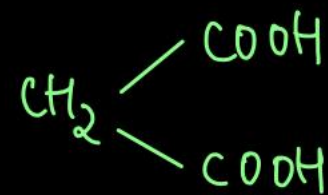


4-methyl Pent-3-en-2-one

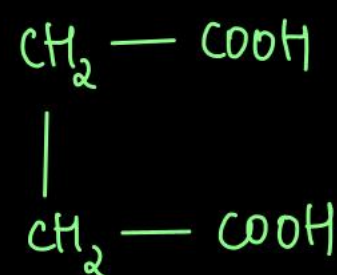
Imp Acids :-



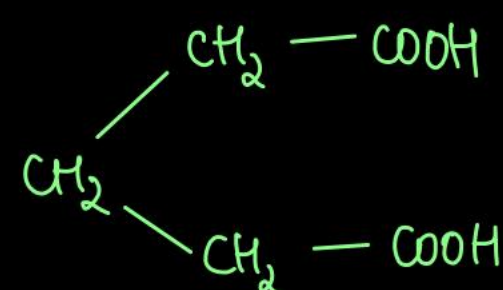
oxalic acid



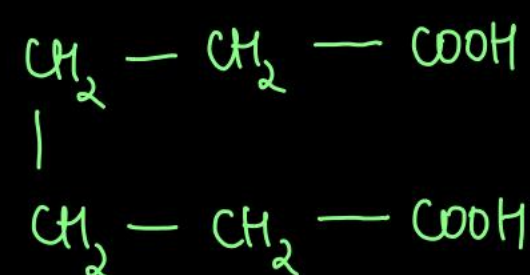
Malonic acid



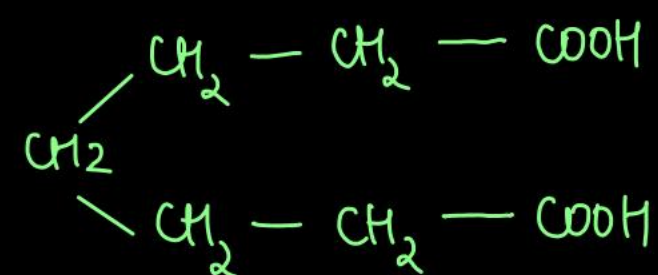
Succinic acid



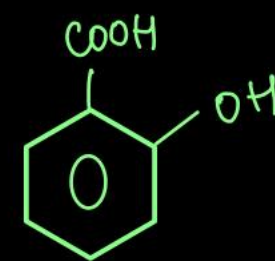
Glutaric acid



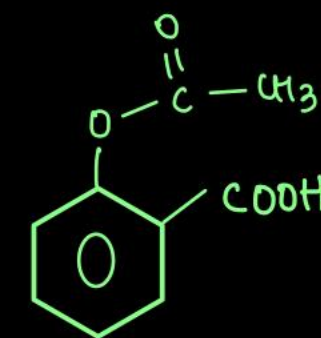
Adipic acid



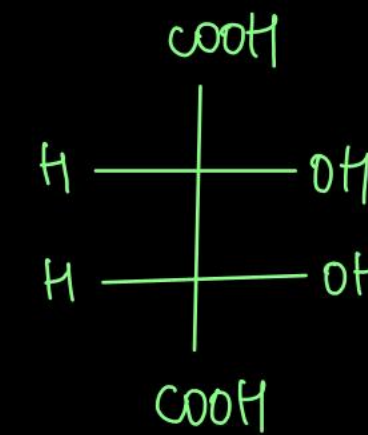
Piclenic acid



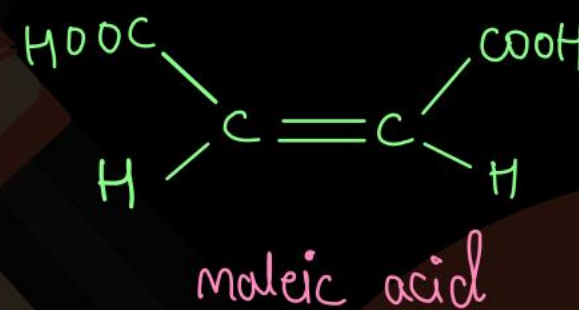
Salicylic acid



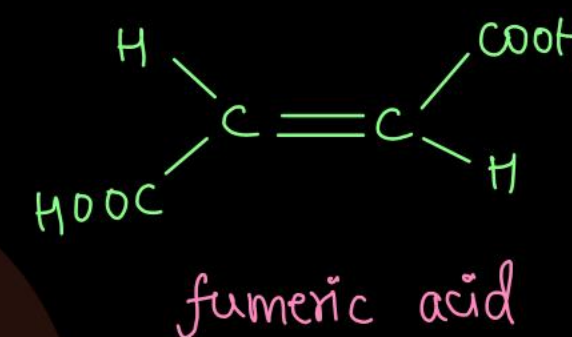
acetyl salicylic acid
(Aspirin)



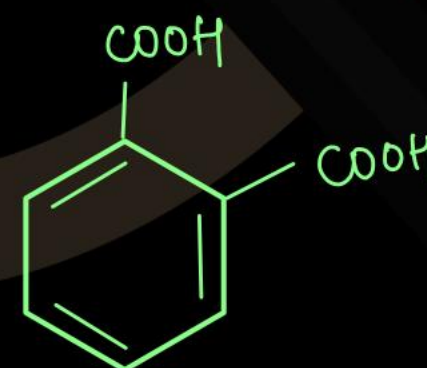
tartaric acid



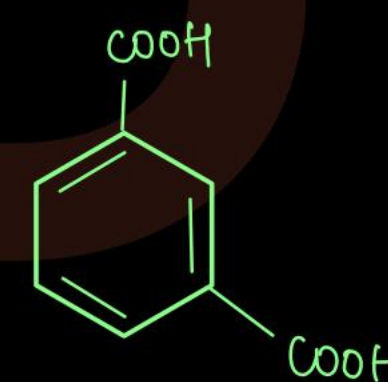
maleic acid



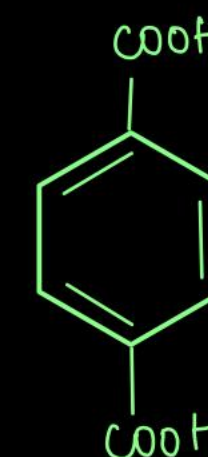
fumaric acid



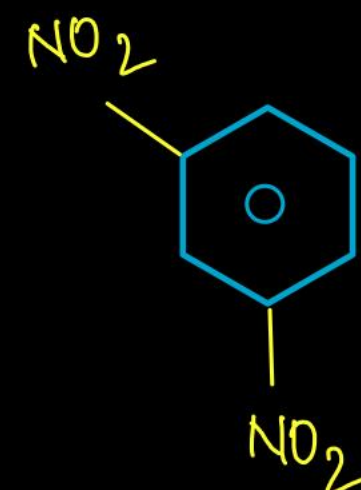
Phthalic acid



Isophthalic acid

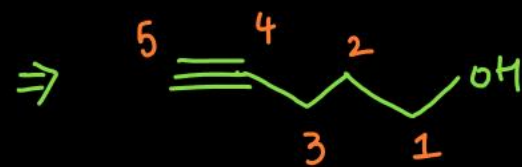


Terephthalic acid

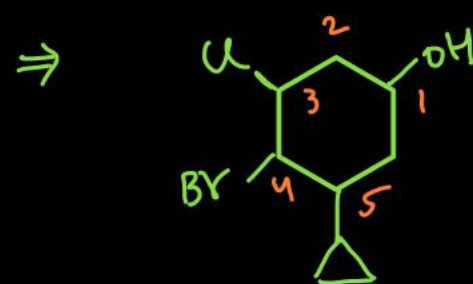
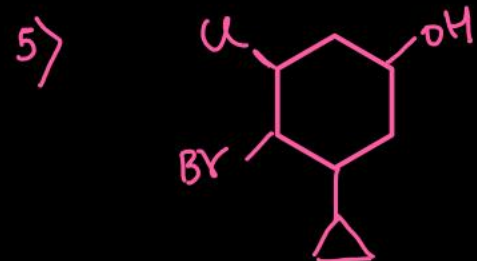


Picnic acid

Examples :-

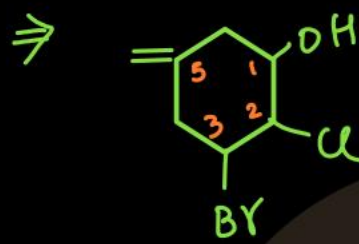
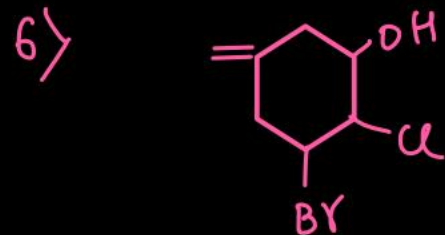


Pent-4-yn-1-ol



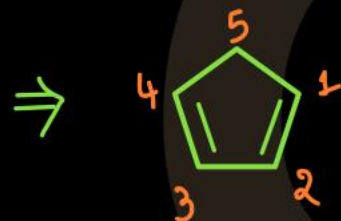
4-bromo 3-chloro

5-(cyclopropyl) cyclohexan-1-ol

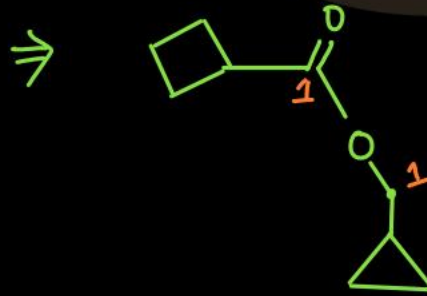
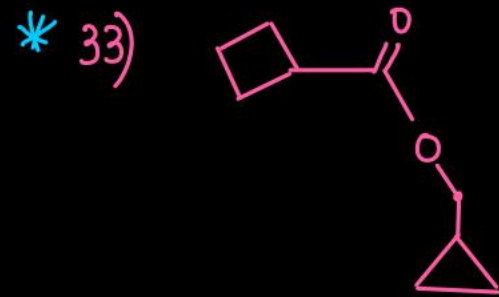


3-bromo 2-chloro

5-(methyldiene) Cyclohexan-1-ol

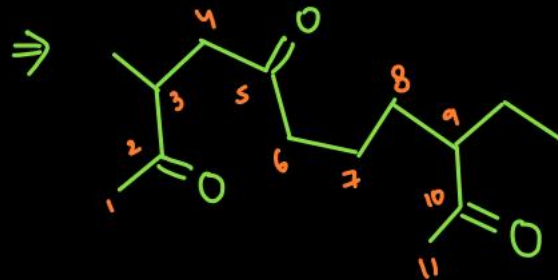
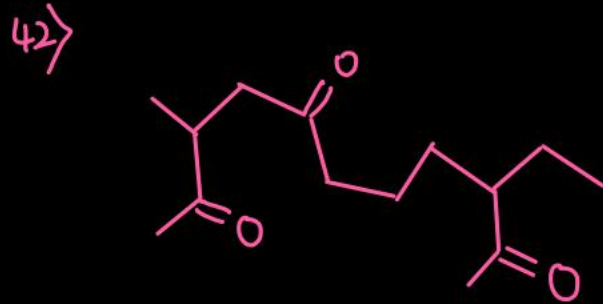


Cyclo penta-1,3 diene



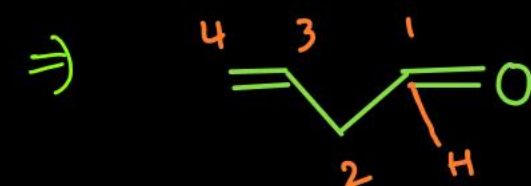
Cyclopropyl methyl Cyclobutane Carboxylate

(cyclobutyl methanoate)X

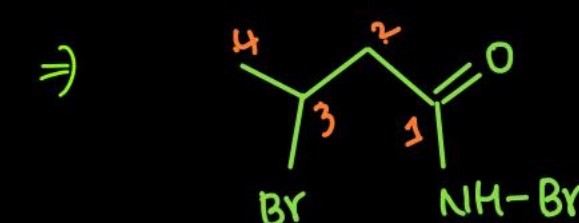
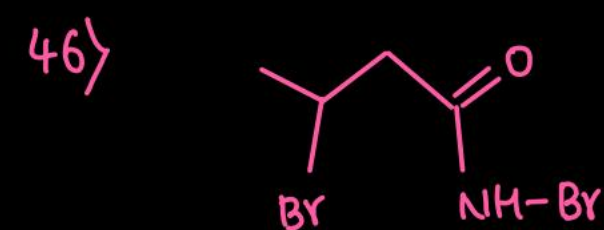


9-ethyl 3-methyl

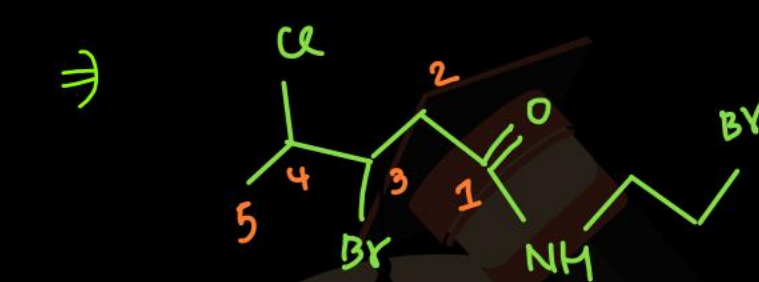
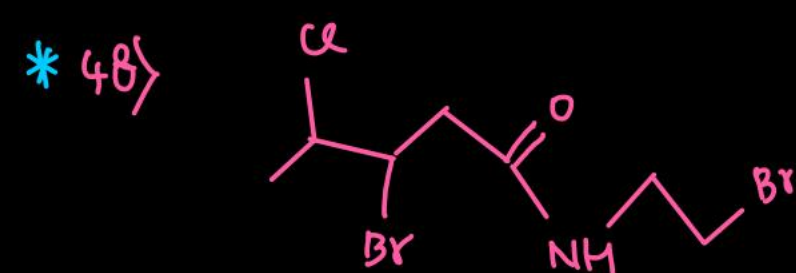
undecane - 2,5,10 triol



but-3-en-1-al



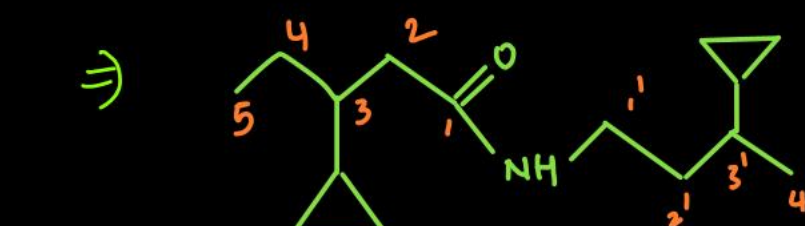
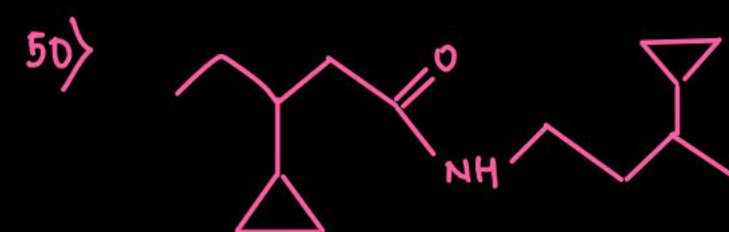
N,3-dibro
butanamide



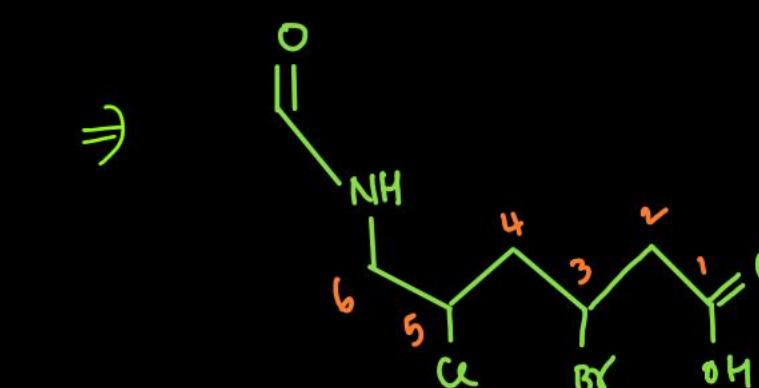
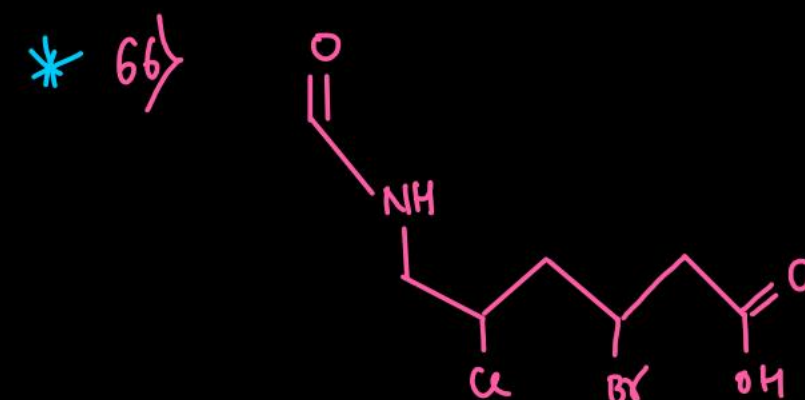
3-bromo N-(bromoethyl)
4-chloro pentanamide



N,3-diethyl
N-propyl pentanamide

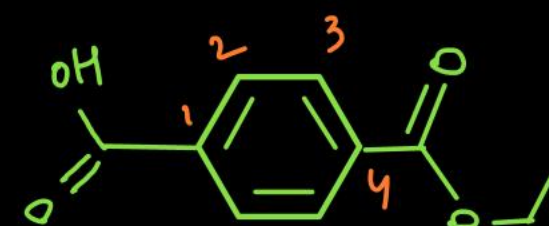


3-cyclopropyl
N-(3-cyclopropylbutyl)
pentanamide



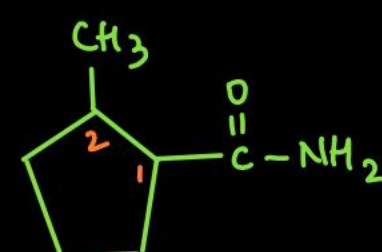
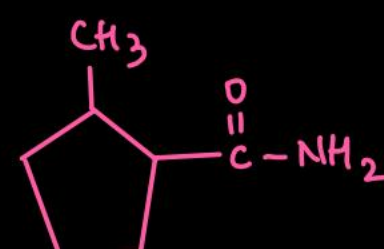
3-bromo 5-chloro
6-(formylamino)
hexanoic acid

* 78)



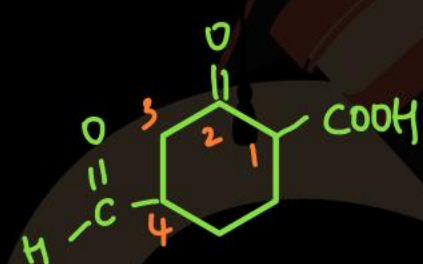
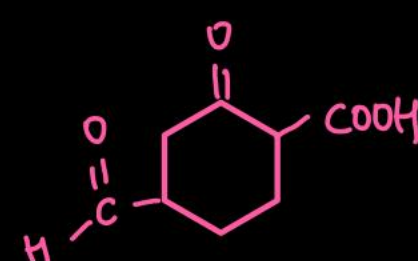
4-(ethoxy Carbonyl)
benzoic acid

99)



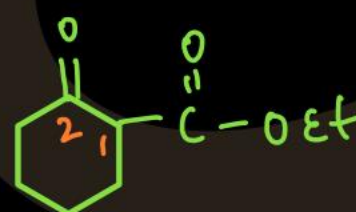
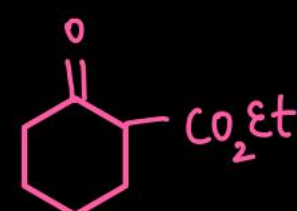
2-methyl
Cyclo petan Carboxamide

102)



4-formyl 2-oxo
Cyclo hexan-1-carboxylic acid

* 105)



Ethoxy 2-oxo
Cyclo hexan Carboxylate