CHAPTER 21

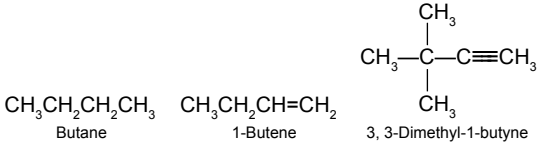
NOMENCLATURE OF ORGANIC COMPOUNDS

21.1 CLASSIFICATION OF ORGANIC COMPOUNDS

All the known organic compounds have been broadly divided into the following classes. These are discussed below

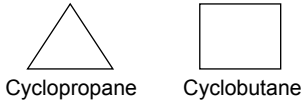
21.1.1 Acyclic Compounds

Example:

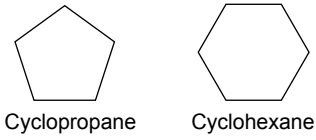


21.1.2 Cyclic Compounds

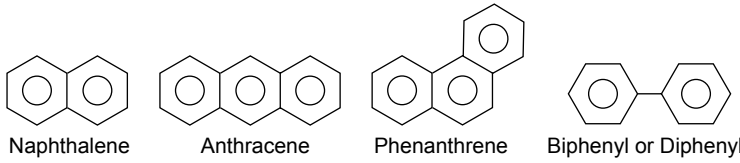
(a) **Homocyclic compounds:** Contain rings which are made up of only one kind of atoms. These are of two types:



(i) **Alicyclic compounds:** are carbocyclic compounds which resemble aliphatic compounds in their properties. For example

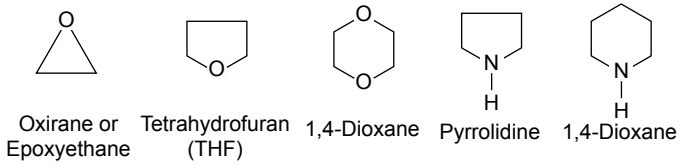


(ii) **Aromatic compounds:** These are also called benzenoid compounds or arenes. For example

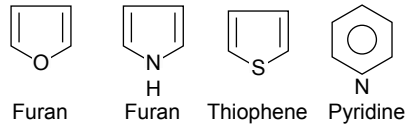


(b) **Heterocyclic compounds:** Cyclic compounds containing one or more heteroatoms (e.g., O,N,S, etc.) in the ring are called heterocyclic compounds. These are of two types:

(i) **Alicyclic heterocyclic compounds:** Heterocyclic compounds which resemble aliphatic compounds in their properties are called alicyclic heterocyclic compounds, For example



(ii) **Aromatic heterocyclic compounds.** Heterocyclic compounds which resemble benzene and other aromatic compounds in most of their properties are called aromatic heterocyclic compounds. For example



21.2 SYSTEM OF NOMENCLATURE FOR ORGANIC COMPOUNDS

Nomenclature of organic compounds consists of the following two systems.

21.2.1 Trivial System or Derived System

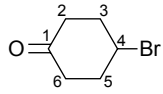
In the trivial system, the name of the compound could indicate a compound source from which it is derived.

Compound	Source	Root Word
Malec acid	Apples	Malus
Tartaric acid	Grapes	Tartar
Acetic acid	Vinegar	Acetum
Formic acid	Ants	Formical
Citric acid	Lemon	Citrus

21.2.2 IUPAC Name or Standard System

According to the IUPAC rule, 'Any given organic structure has only one IUPAC name and any IUPAC name represents only one molecular structure of compound'. The complete IUPAC name of an organic compound consists of the following parts:

Secondary prefix + Primary prefix + Word root + Primary suffix + Secondary suffix



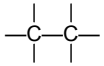
4-Bromo + Cyclo + Hex + an (e)* +1-one
(Sp) (Pp) (Wr) (Ps) (Ss)

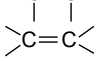
(a) **Root word:** Select the word root to denote the longest possible continuous chain of carbon atoms containing the functional group.

Chain Length	Root Word	Chain Length	Root Word	Chain Length	Root Word
C_1	Meth-	C_2	Eth-	C_3	Prop-
C_4	But-	C_5	Pent-	C_6	Hex-
C_7	Hept-	C_8	Oct-	C_9	Non
C_{10}	Dec	C_{11}	Undec	C_{12}	Dodec
C_{13}	Tridec	C_{14}	Tetradec	C_{15}	Pentadec
C_{20}	Eicos				

(b) **Suffix:** They are of two types:

Primary suffix. A primary suffix is added to the word root to indicate whether the carbon chain is saturated or unsaturated. The three basic primary suffixes are:

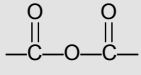
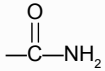
 -ane Alkane

 -ene Alkene

—C≡C— -yne Alkyne

If the carbon chain contains more than one double or triple bonds, then the name of root word is modified by adding 'a' suffix.

21.2.2.1 Secondary Suffix

	Functional group	Suffix	Prefix
1. Carboxylic acids	—COOH	-oic acid	Carboxy
2. Anhydride		-oic anhydride	---------
3. Ester		-oate	Carboalkoxy
4. Acid halide		-oyl halide	Haloformyl or halomethanoyl
5. Amide		-amide	Carbomoyl or carboxamido

(Continued)

6. Cyanides	—C≡N	nitrile	Cyano
7. Isocyanide	—N≅C	isonitrile	Isocyano
8. Aldehydes		-al	Formyl or methanoyl or aldo
9. Ketones		-one	Oxo, keto
10. Alcohol	–OH	–ol	Hydroxyl
11. Ethers	–O–	-----	Alkoxy
12. Amines	$-NH_2$	amine	Amino

(c) **Secondary suffix:** A secondary suffix indicates the functional group present in the organic compound. Some important secondary suffixes are:

Chain terminating functional group when attached with alicyclic ring have different secondary suffix.

—C≡N	Carbonitrile		Carboldehyde
	Carboxylic acid		Carboxamide
	Carbonyl halide		Carboxylate

Prefix: Prefixes are of two types:

(a) **Primary prefix:** A primary prefix is used simply to distinguish cyclic compound from acyclic compounds. For example, in case of carbocyclic compounds, a primary prefix cyclo is used immediately before the word root.

(b) **Secondary prefix:** In the IUPAC system of nomenclature, certain groups are not considered as functional groups but instead are treated as substituents. They are arranged in alphabetical order to denote the substituent or the side chains.

Side chain

Alkane $\xrightarrow[+yl]{-ane}$ **Alkyl** e.g., $\underset{\text{methyl}}{-CH_3}$ $\underset{\text{ethyl}}{-C_2H_5}$

Cycloalkane $\xrightarrow[+yl]{-ane}$ **Cycloalkyl e.g.,** 

cyclopropyl cyclobutyl

Unsaturated side chain

Alkene $\xrightarrow[+yl]{-e}$ **Alkenyl** e.g., $\underset{\text{ethenyl}}{-CH=CH_2}$ $\underset{\text{propenyl}}{-CH_2-CH=CH_2}$

Alkyne $\xrightarrow[+yl]{-e}$ **Alkynyl** e.g., $\underset{\text{ethenyl}}{-C\equiv CH}$ $\underset{\text{2-Butenenyl}}{-CH_2-C\equiv C-CH_3}$

Aromatic side chain

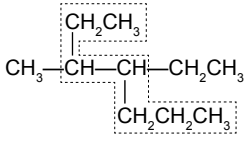
Phenyl-ϕ; Ph–; C_6H_5–;

Benzyl $C_6H_5CH_2$–;

21.3 RULES FOR WRITING NOMENCLATURE OF ORGANIC COMPOUNDS HAVING NO FUNCTIONAL GROUP

21.3.1 Selection of Principal Chain

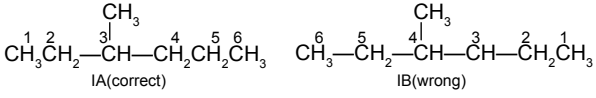
Select the longest continuous chain of carbon atoms contaning maximum number of side chains or substitutents in the molecule. For example



21.3.2 Numbering of Principal Chain

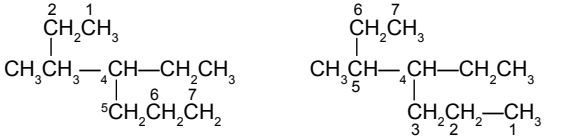
Numbering of principal chain is done on the basis of the following three rules in their given order of priority.

(a) **Lowest locant rule:** Number the carbon atoms of the parent chain starting from that end which gives the lowest possible number to the carbon atom carrying the substituent.



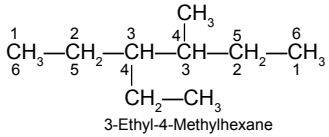
The number that indicates the position of the substituent on the parent chain is called the positional number or the locant.

(b) **Lowest sum rule:** When two or more substituents are present, then numbering of the carbon atoms of the parent chain is done in such a way that the sum of locants is the lowest. This is called the lowest sum rule.

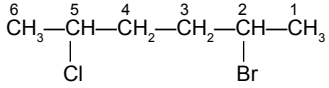


(d) Rule of equivalent position:

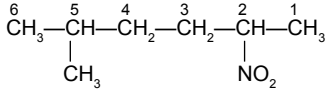
(i) When two different side chains are present at equivalent positions, the numbering of the parent chain is done in such a way that the side chain which comes first in the alphabetical order (written first in the name) gets the lower number. For example



(ii) When two different substituents are present at equivalent positions, the numbering of the parent chain is done in such a way that the substituent which comes first in the alphabetical order (written first in the name) gets the lower number. For example



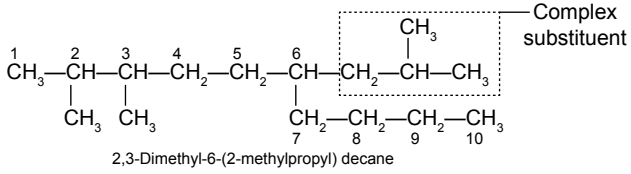
(iii) When a side chain and a substituent are present at equivalent position, then substituent gets less locant.



(e) **Naming of the complex substituent:**

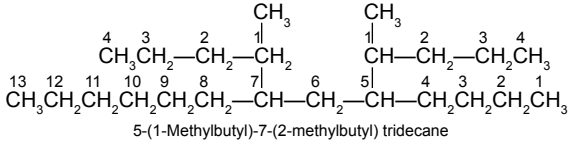
If a side chain contains a side chain or a substituent inside is called complex side chain.

The name of such a substituent is always enclosed in brackets to avoid confusion with the numbers of the parent chain. For example



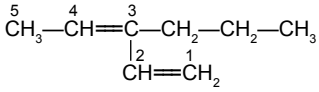
(b) While deciding the alphabetical order of the various substituents, the name of the complex substituent is considered to begin with the first letter of its complete name.

(c) When the names of two or more substituents are composed of identical words, priority of citation is given to that substituent which has the lowest locant at the first cited point of difference within the complex substituent. For example

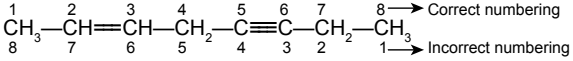


21.4 RULES FOR IUPAC NOMENCLATURE OF UNSATURATED HYDROCARBONS

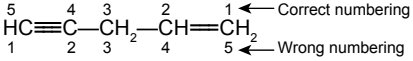
1. The parent chain must contain the multiple bond regardless of the fact whether it also denotes the longest continuous chain of carbon atoms or not. For example



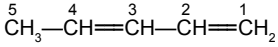
2. If both double and triple bonds are present, the numbering of the parent chain should always be done from that end which is nearer to the double or the triple bond, i.e., the lowest locant rule for the multiple bonds must be followed. For example



3. If, however, there is a choice in numbering the double bond is always given preference over the triple bond. For example



4. If both double and triple bonds are present in the compound, their locants are written immediately before their respective suffixes and the terminal 'e' from the suffix 'ene' is dropped while writing its complete name.

   For example, 

   Pent + 3-en(e) + 1-yne

   = Pent-3-en-1-yne

21.5 IUPAC NOMENCLATURE OF COMPOUNDS CONTAINING FUNCTIONAL GROUP

Classification of functional group: Functional groups are of two types as discussed hereunder.

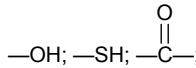
21.5.1 Chain Terminating Functional Group

Functional group in which the carbon of functional group is appeared to be trivalent belongs to this category. Carbon of these functional groups always gets number one locant and number is usually not written with these functional group. E.g.,

—CN; —CHO; —COOH; —$CONH_2$; —COX; —COOH, etc.

21.5.2 Nonchain Terminating Functional Group

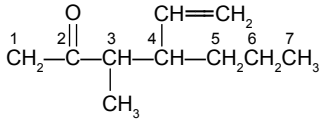
Carbon of these groups gets lowest locant but it may or may not get number one locant. E.g.,



While naming organic compounds containing one functional group, double and triple bonds and substituents, the following additional rules are observed.

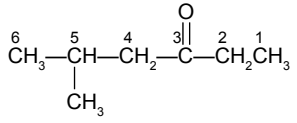
(a) Selection of parent chain: Select the longest possible chain of carbon atoms containing the functional group and the maximum number of multiple bonds as the parent chain without caring

whether it also denotes the longest possible carbon chain or not. Parent chain contains four rather than five carbon atoms

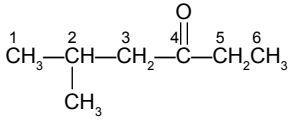


Parent chain contains six rather than seven carbon atoms.

(b) **Numbering of principal chain:** Number the parent chain in such a way that the functional group gets the lowest possible number followed by double and triple bonds even if it violates the lowest sum rule.

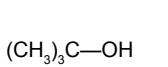


III (correct)
(>C═O group gets towest number 3)

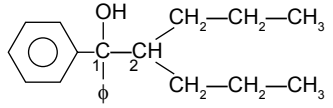


III (wrong)
(>C═O group gets number 4 which is not lowest)

(c) **IUPAC name of alcohols:** General name: Alkanol. E.g.,

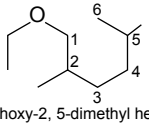


2-methyl-2-propanol

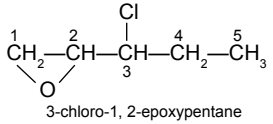


1-cyclohexyl-1-phenyl-2-propyl-1-pentane

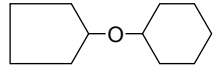
(d) **IUPAC name of ethers:** General name**:** Alkoxy alkane or alkoxy cycloalkane



1-ethoxy-2, 5-dimethyl hexane

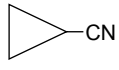


3-chloro-1, 2-epoxypentane

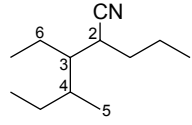


cyclopentoxy cyclohexane

(e) IUPAC name of cyanides: General name**:** Alkane nitrile or cycloalkane carbonitrile

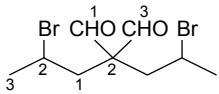


Cyclopropane carbonitrile

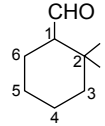


3-ethyl-4-methyl-2-propyl-hexane-nitrile

(f) IUPAC name of aldehyde: General name**:** Alkanal or cycloalkane carboldehyde

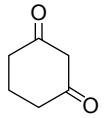


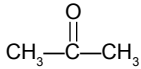
2,2-bis(2-bromopropyl)-1,
3-propanedial



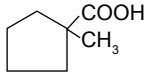
2,2-dimethyl
cyclohexane-carboldehyde

(g) **IUPAC name of ketones:** General name**:** Alkanone or cycloalkanone


Cyclohexane-1, 3-dione


Propane-2-one

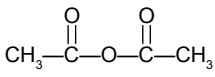
(h) **IUPAC name of carboxylic acid:** General name: Alkanoic acid or cycloalkane carboxylic acid

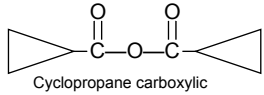

1-methyl-cyclopentane carboxylic acid


Ethane-1, 2-dioic acid

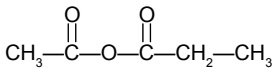
(i) **IUPAC name of acid anhydride:**

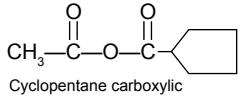
1. **Simple anhydride:** General name: Alkanoic anhydride or cycloalkane carboxylic anhydride


Ethanoic anhydride

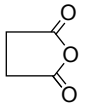

Cyclopropane carboxylic anhydride

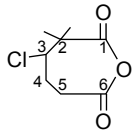
2. **Mixed anhydride:** General name**:** Alkanoic alkanoic anhydride or cycloalkane carboxylic cycloalkane carboxylic anhydride or cycloalkane carboxylic alkanoic anhydride.

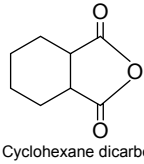

Ethanoic-propanoic anthydride


Cyclopentane carboxylic ethanoic anhydride

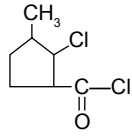
3. **Cyclic anhydride: General name:** Alkanedioic anhydride or cycloalkane dicarboxylic anhydride.


Butanedioic anhydride

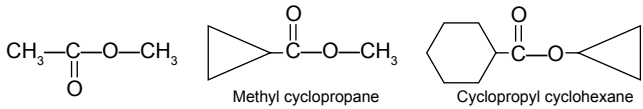

3-chloro-2, 2-dimethyl-hexandioic anhydride


Cyclohexane dicarboxylic anhydride

(j) **IUPAC name of Acid halide:** General name**:** Alkanoyl halide or cycloalkane carbonyl halide.

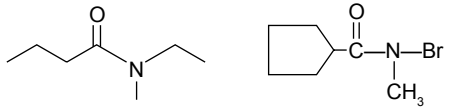

2-chloro-3-methyl-cyclopentane-carbonyl chloride

(k) **IUPAC name of esters:** General name**:** Alkyl alkanoate or alkyl cycloalkane carboxylate.

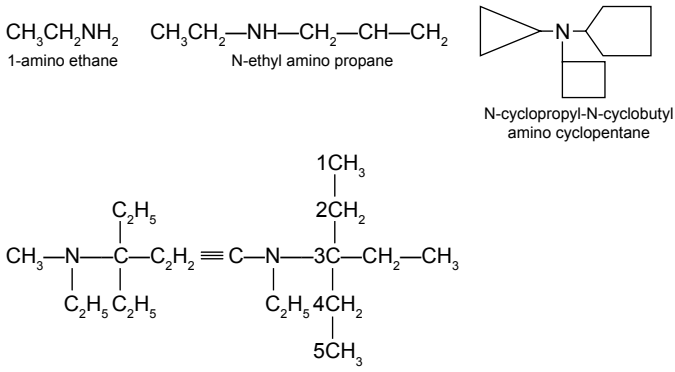


Alkyl group attaches with oxygen atom and in case of ester is always written first though it follows whatsoever order alphabatically.

(l) **IUPAC name of amide:** General name: Alkanamide or cycloalkane carboxamide.



(m) **IUPAC name of amines:** General name**:** Alkanamine (old name) and Amino alkane (new name).



21.6 RULES FOR IUPAC NOMENCLATURE OF POLYFUNCTIONAL COMPOUNDS

Organic compounds which contain two or more functional groups are called polyfunctional compounds. Their IUPAC names are obtained as follows:

21.6.1 Principal Functional Groups

If the organic compound contains two or more functional groups, one of the functional groups is selected as the principal functional group while all the remaining functional groups (also called the secondary functional groups) are treated as substituents.

21.6.2 Selection of the Principal Chain

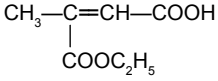
Select the longest continous chain of carbon atoms containing the principal functional group and maximum number of secondary functional groups and multiple bonds, if any.

21.6.3 Numbering of Principal Chain

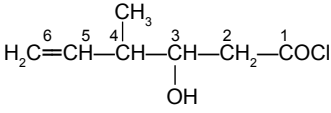
Number the principal chain in such a way that the principal functional group gets the lowest locant followed by double bond, triple bond and the substituents.

21.6.4 Alphabetical Order

Identify the prefixes and the locants for the secondary functional groups and other substituents and place them in alphabetical order before the word root as explained hereunder:

(i) 

IUPAC name: 2-carboethoxybut-2-en-1-oic acid

(ii) 

IUPAC name: 3-hydroxy-4-methylhex-5-yn-1-oyl chloride

21.7 NOMENCLATURE OF BICYCLO AND SPIRO COMPOUNDS

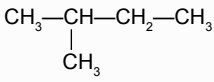
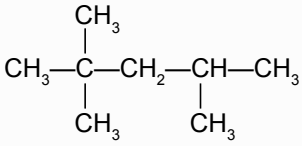
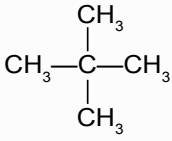
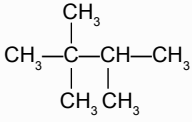
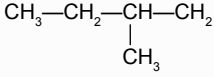
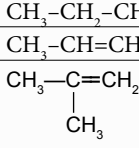
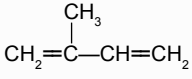
21.7.1 Bicyclic Compounds

Compounds having two cyclic rings and two shared carbon atoms at the apex are called bicyclic compounds. Numbering in a bicyclic compound starts from one of the bridgehead carbon atom and longest bridge is numbered first followed by longer bridge followed by smallest bridge. This numbering rule is followed even in presence of principal functional group and mulptiple bond. General rule for writing IUPAC name is Prefixes+Bicyclo [x, y, z] + Root word + Primary suffix + Secondary suffix, where x > y > z.

21.7.2 Spiro Compounds

Compounds having two cyclic rings and one shared quaternary carbon atom are called spiro compounds. Numbering starts from adjacent to bridgehead carbon atom and smaller bridge is numbered first followed by longer bridge. This rule is followed even in presence of principal functional group and multiple bond. General rule for writing IUPAC name is Prefixes + Spiro [x, y] + Root word + Primary suffix + Secondary suffix, where x < y.

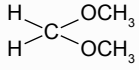
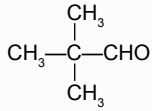
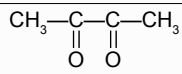
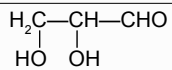
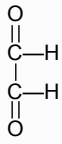
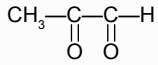
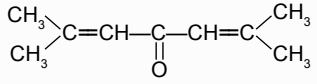
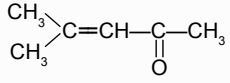
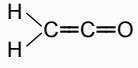
21.8 COMMON NAME OF ORGANIC COMPOUNDS

S. No.	Compound	Common Name	Specific Properties, if any
	Group A: ALKANES		
1.		Isopentane	–––––
2.		Isooctane	Having octane number = 100
3.		Neopentane	–––––
4.		Triptane	–––––
5.		Iso-pentyl i.e., active amyl	–––––
6.	CH_3–CH_2–CH_2–CH_2–CH_2–	n-pentyl	Amyl group
	Group B: ALKANES		
7.	CH_3–CH_2–CH=CH_2	α-Butylene	–––––
8.	CH_3–CH=CH–CH_3	β-Butylene	–––––
9.		Isobutylene	–––––
10.	CH_2=CH–CH_2–	Allyl group	–––––
11.	CH_2=C=CH_2	Allene	–––––
12.		Isoprene	–––––
13.	CH_2 = CH-	Vinyl group	–––––
	Group C: ALKYNES		
14.	CH≡CH	Purified acetylene or Norcelyne	–––––––
15.	CH_2=CH–CH=CH_2	Vinyl acetylene	------

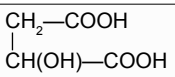
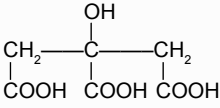
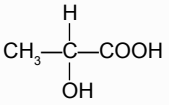
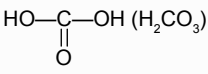
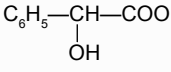
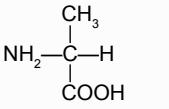
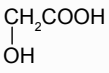
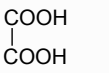
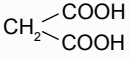
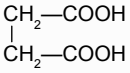
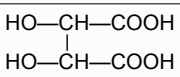
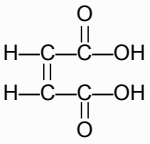
(Continued)

16.	CH_3–C≡CH	Allylene	--------
17.	HC ≡ C-CH_2-	Propargyl group	--------
	Group D: ALKYLHALIDE		
18.	CH_3CHCl_2	Ethylidene chloride	A gem dihalide
19.	CH_2Cl—CH_2Cl	Ethylene dichloride	A vic dihalide
20.	CH_2Cl—CH_2—S—CH_2—CH_2Cl	Mustard gas or sulphur musted	Poisonous; used in war
21.	$CHCl_2$—$CHCl_2$	Westron	Solvent
22.	$ClCH=CCl_2$	Westrosol or triclene	Solvent
23.	$Cl_2C=CCl_2$	Tetraclene or perclene	Solvent
24.	$Cl_3C—NO_2$	Chloropicrin	Tear gas or nitrochloro-form
25.	$CH_3—C(CCl_3)(OH)—CH_3$	Chloretone	Hypnotic agent used in sleeping pill
26.	$CH_2=C(Cl)—CH=CH_2$	Chloroprene	A monomer
27.	H—C(—Cl)=C(H)—$AsCl_2$	Lewisite	Highly poisonous also called as war gas
	Group E: ALCOHOL		
28.	CH_2OH—CH_2OH	Ethylene glycol	Anti-freezing agent
29.	CH_2OH—$CHOH$—CH_2OH	Glycerol	Trihydric alcohol
30.	CH≡C–CH_2–OH	Propargyl alcohol	-------
31.	CH_2=CH–CH_2–OH	Allyl alcohol	Vinyl carbinol
32.	CH_2=CH–OH	Vinyl alcohol	-------
33.	$CH_3—C(CH_3)(OH)—C(CH_3)(OH)—CH_3$	Pinacol	-------

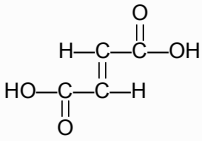
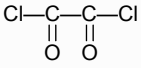
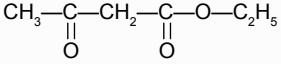
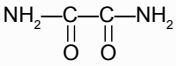
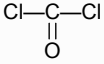
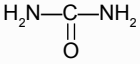
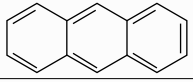
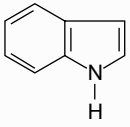
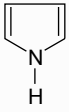
(Continued)

	Group F: ETHER		
34.	$C_6H_5–O–CH_3$	Anisole	Methyl phenyl ether
35.	$C_6H_5–O–C_2H_5$	Phenetole	Ethyl phenyl ether
36.		Methylal	Acetal of formaldehyde
	Group G: ALDEHYDE		
37.		Glyoxalic acid	––––––
38.	 or $(CH_3)_3C–CHO$	Pivaldehyde	––––––
39.	$CH_3CH=CH–CHO$	Crotonaldehyde	––––––
40.	$CH_2=CH–CHO$	Acrylaldehyde or acrolein	Having pungent odour
41.	$(CH_3)_2CHCHO$	Isobutyraldehyde	––––––
42.		Dimethyl glyoxal	––––––
43.		Glyceraldehyde	––––––
44.		Glyoxal	––––––
45.		Methyl glyoxal or pyruvaldehyde	––––––
	Group H: KETONE		
46.	CH_3COCH_3	Acetone	––––––
47.		Phorone	––––––
48.		Mesityl oxide	––––––
49.		Ketene	––––––
	Group I: CARBOXYLIC ACID		
50.	$CH_3–CH_2–CH_2–CH_2–COOH$	Valeric acid	n-Pentanoic acid
51.	$CH_3(CH_2)_4COOH$	Caproic acid	n-Hexanoic acid

(Continued)

52.		Malic acid	Present in apple
53.		Citric acid	Present in lemon
54.	$CH_2=CH-COOH$	Acrylic acid	–––––––
55.		Lactic acid	Present in curd
56.		Carbonic acid	––––––––
57.	$CH_3-CO-COOH$	Pyruvic acid	––––––––
58.	$CH_3-CH=CH-COOH$	Crotonic acid	––––––––
59.		Mendelic acid	––––––––
60.	NH_2-CH_2-COOH	Glycine	Amino acetic acid
61.	NH_2COOH	Carbamic acid	Amino formic acid
62.	$COOH-(CH_2)_4-COOH$	Adipic acid	–––––––
63.	$C_6H_5CH=CHCOOH$	Cinnamic acid	–––––––
64.		Alanine	–––––––
65.		Glycolic acid	–––––––
66.		Oxalic acid	–––––––
67.		Malonic acid	–––––––
68.		Succinic acid	–––––––
69.		Tartaric acid	–––––––
70.		Maleic acid	Cis form/z-form

(Continued)

71.		Fumaric acid	Trans form/E-form
	Group J: ACID DERIVATIVES		
72.		Oxalyl chloride	–––––––
73.	NH_2COONH_4	Ammonium Carbamate	–––––––
74.		Aceto acetic ester or Ethyl aceto acetate	-
75.		Oxamide	-
76.		Phosgene	Poisonous gas
77.		Urea	-
	Group K: N-DERIVATIVES		
78.	$CH_2=CH-C\equiv N$	Vinyl cyanide or Acrylo nitrile	-
79.	$H-C\equiv N$	Formo nitrile	-
80.	$CH_3-C\equiv N$	Aceto nitrile	-
81.	CH_3-NCO	Methyl isocyanate (MIC)	Responsible for bhopal tragedy
	Group L: AROMATIC COMPOUNDS		
82.		Anthracene	-
83.		Indole	-
84.		Pyridine	-
85.		Thiophene	-
86.		Pyrrole	-

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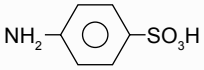
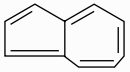
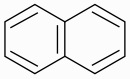
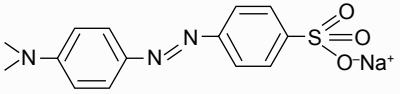
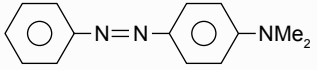
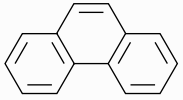
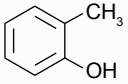
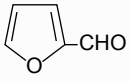
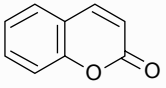
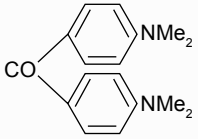
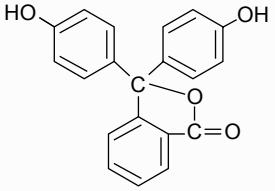
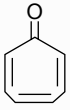
87.		Sulphanilic acid	-
88.		Azulene	having zwitter ionic character
89.		Naphthalene	-
90.		Methyl orange II	Coloured substance used as indicator
91.		Butter yellow	Coloured dye
92.		Phenanthrene	-
93.		Cresol	O-hydroxy toluene
94.		Furfural	-
95.		Furan	-
96.		Coumarin	-
97.		Michler's ketone	----------
98.		Phenolphthalein	Acid–base indicator
99.		Tropone	Cycloheptatrienone

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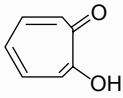
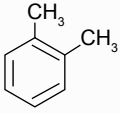
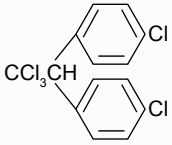
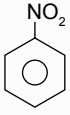
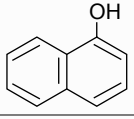
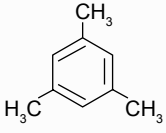
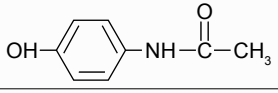
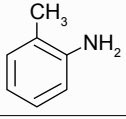
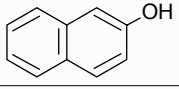
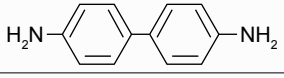
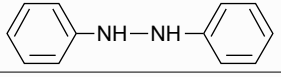
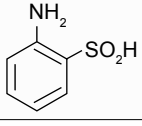
100.		Tropolone	Cycloheptatrienolone
101.		O-xylene	----------
102.		DDT	Dichlorodiphenyltri-chloroethane (powerful insecticide)
103.		Nitrobenzene	Oil of mirbane
104.		α–naphthol	----------
105.		Mesitylene	----------
106.		p-hydroxy acetanilide	Paracetamol
107.		O-toluidine	----------
108.		β–naphthol	----------
109.		Benzidine	----------
110.		Hydrazobenzene	----------
111.		Orthanilic acid	----------

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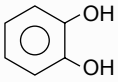
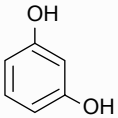
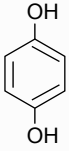
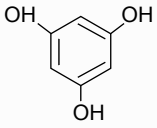
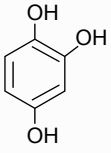
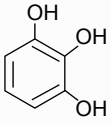
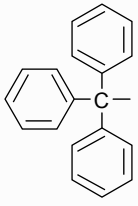
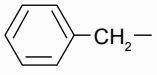
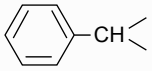
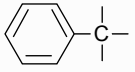
112.		Catechol	----------
113.		Resorcinol	----------
114.		Quinol or hydroquinone	---------
115.		Phloroglucinol	---------
116.		α-hydroxy quinol	----------
117.		Pyrogallol	Used as an absorbent for oxygen
118.		Trityl group	Triphenyl methyl group
119.		Benzyl group	Phenyl methyl group
120.		Benzal group	Benzylidene
121.		Benzo group	Benzylidyne

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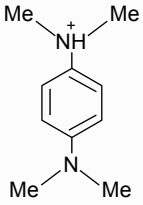
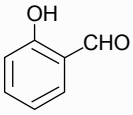
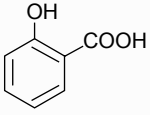
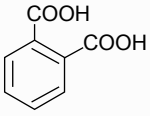
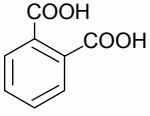
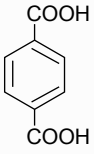
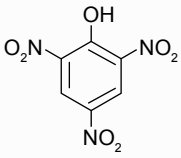
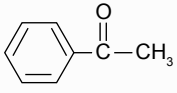
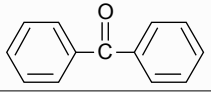
122.		Wurster salts	---------
123.		Salicylaldehyde	O-hydroxybenzaldehyde
124.		Salicylic acid	O-hydroxy benzoic acid
125.		Phthalic acid	---------
126.		Isophthalic acid	---------
127.		Terephthalic acid	---------
128.		Picric acid	Behaves as a strong acid
129.	$C_6H_5CONH_2$	Benzamide	---------
130.	$(C_6H_5CO)_2O$	Benzoic anhydride	---------
131.	$(C_6H_5CO)_2O_2$	Benzoyl peroxide	---------
132.		Acetophenone	---------
133.		Benzophenone	--------

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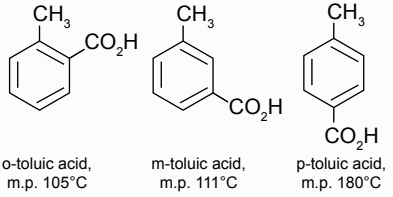
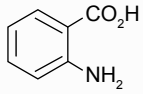
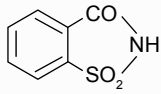
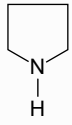
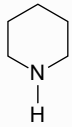
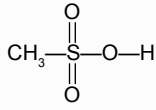
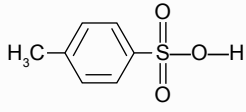
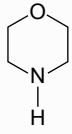
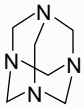
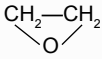
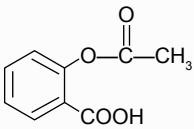
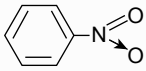
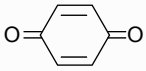
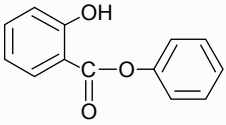
134.	$C_6H_5CO_3H$	Perbenzoic acid	--------
135.	 o-toluic acid, m.p. 105°C; m-toluic acid, m.p. 111°C; p-toluic acid, m.p. 180°C	Toluic acids	--------
136.		Anthranilic acid	O-aminobenzoic acid
137.		Saccharin	O-sulphobenzoic imide (artificial sweetener)
138.	$C_6H_5CH=CH_2$	Styrene	Monomer of polystyrene oil of bitter almond
139.	C_6H_5CHO	Benzaldehyde	-------
140.	$C_6H_5COCOC_6H_5$	Benzil	-------
141.	$(C_6H_5)_2C(OH)CO_2H$	Benzilic acid	-------
	Group M: HETROCYCLIC COMPOUNDS		
142.		Pyrrolidine	-------
143.		Piperidine	
144.		Mesylic acid or methyl sulphonic acid	Ms-OH
145.		Tosylic acid or p-toluene sulphonic acid	Ts-OH
146.		Morpholine	-------

(Continued)

147.		Aziridine	------
148.		Tatrahydrofuran (THF)	Important solvent
149.		Hexa-methlyenetetra-mine or urotropine	Urinary antiseptic
150.		Oxirane or ethylene Oxide or oxa cyclo propane	------
151.		Oxetane	------
152.		Aspirin	Pain reliver
153.		Nitro benzene	Oil of mirabane
154.		p-benzo-quinone	------
155.		Salol or phenyl salicylate	Oil of wintergreen