NEET 2018 CHEMISTRY IMPORTANT AREAS TO BE COVERED
வேதியியல் – நீட் 2018 தேர்விற்கு படிக்க வேண்டிய முக்கிய பகுதிகள்

1. CHEMICAL BONDING (VSEPR MODEL)
2. BASIC ORAGNIC CHEMISTRY (IUPAC & ISOMERISM)
3. ORGANIC REACTION CONVERSIONS & MECHANISMS
4. PERIDIC TABLE & PERIODIC PROPERTIES
5. AROMATICITY
6. COORDINATION CHEMISTRY
7. BIOMOLECULES, POLYMERS & CHEMISTRY IN ACTION
8. THERMODYNAMICS & THERMOCHEMISTRY
9. SOLUTIONS AND CONCENTRATION TERMS
10. METALLURGY
11. STRUCURE OF ATOM AND WAVE MECHANICS
12. LAWS OF CHEMISTRY
13. STATES OF MATTER
14. EQUILIBRIUM & KINETICS
15. ELECTROCHEMISTRY & SURFACE CHEMISTRY

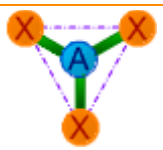
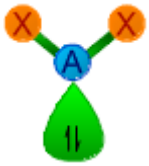
The following table shows the NCERT/CBSE curriculum And questions asked previously in NEET exam 2016 & 2017

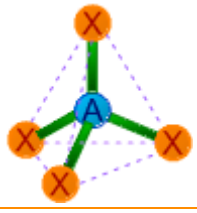
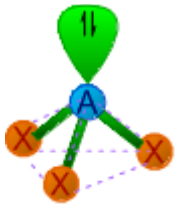
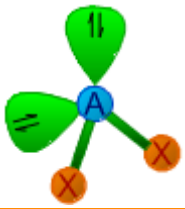
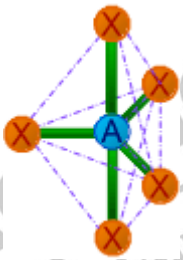
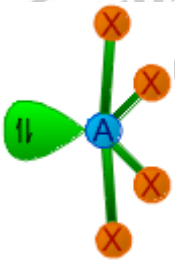
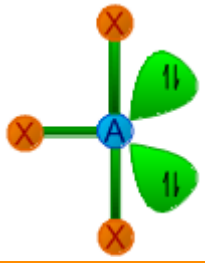
S.No	Class XI & XII topics	தமிழில்	Questions asked	
			NEET 2016	NEET 2017
01	Some Basic Concepts of Chemistry	வேதியியல் அடிப்படைக் கருத்துக்கள்	1	2
02	Structure of Atom	அணு அமைப்பு	2	1
03	Classification of Elements and Periodicity in Properties	தனிமங்களை வகைப்படுத்துதல் & ஆவர்த்தன பண்புகள்	-	1
04	Chemical Bonding and Molecular Structure	வேதிப்பிணைப்பு & மூலக்கூறுகளின் அமைப்பு	9	5
05	States of Matter: Gases and Liquids	பொருட்களின் நிலைகள்: வாயுக்கள் & திரவங்கள்	-	-
06	Thermodynamics	வெப்ப இயக்கவியல்	1	2
07	Equilibrium	வேதிச்சமநிலை	2	3
08	Redox Reactions	ஆக்ஸிஜனேற்ற & ஒடுக்க வினைகள்	-	-
09	Hydrogen	ஹைட்ரஜன்		

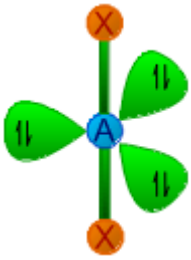
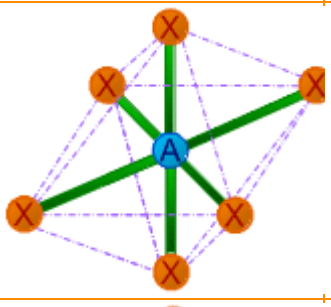
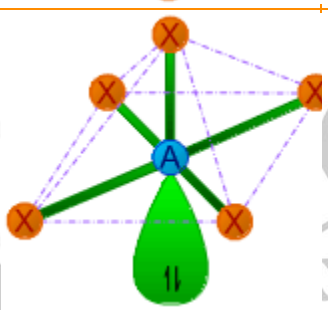
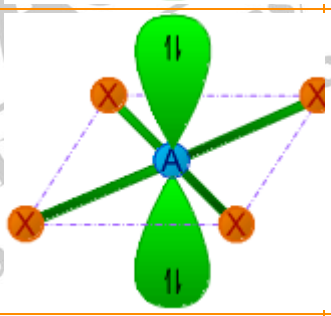
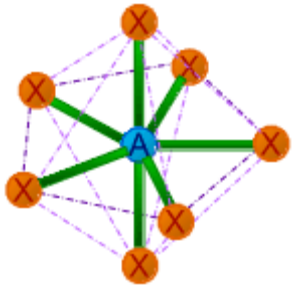
10	s-Block Element (Alkali and Alkaline earth metals)	s -தொகுதி தனிமங்கள் (கார & கார மண் உலோகங்கள்)	1	1
11	Some p-Block Elements	p -தொகுதி தனிமங்கள்	-	1
12	Organic Chemistry-Some Basic Principles and Techniques	கரிம வேதியியல் அடிப்படைக் கருத்துக்கள் & ஆய்வு நுட்பங்கள்	5	5
13	Hydrocarbons	ஹைட்ரோகார்பன்கள்	1	
14	Environmental Chemistry	சுற்றுச் சூழல் வேதியியல்	-	1
15	Solid State	திட நிலைமை	1	1
16	Solutions	கரைசல்கள்	2	1
17	Electrochemistry	மின் வேதியியல்	3	1
18	Chemical Kinetics	வேதிவினை வேகவியல்	1	2
19	Surface Chemistry	புறப் பரப்பு வேதியியல்	1	1
20	General Principles and Processes of Isolation of Elements	உலோகங்களைப் பிரித்தல் தத்துவங்கள் & முறைகள்	5	2
21	p-Block Elements	p தொகுதி தனிமங்கள்	1	1
22	d and f Block Elements	d& f தொகுதி தனிமங்கள்	2	2
23	Coordination Compounds	அணைவுச் சேர்மங்கள்	2	4
24	Haloalkanes and Haloarenes	ஹேலோ ஆல்கேன்கள் & ஹேலோ அரீன்கள்	1	1
25	Alcohols, Phenols and Ethers	ஆல்கஹால்கள், ஃபீனால்கள் & ஈதர்கள்	1	1
26	Aldehydes, Ketones and Carboxylic Acids	ஆல்டிஹைடுகள், கீட்டோன்கள் & கார்பாக்சிலிக் அமிலங்கள்	-	4
27	Organic Compounds Containing Nitrogen	கரிம நைட்ரஜன் சேர்மங்கள்	2	-
28	Biomolecules	உயிரியல் மூலக்கூறுகள்	-	1
29	Polymers	பலபடிகள்	1	-
30	Chemistry in Everyday Life	நடைமுறை வேதியியல்	-	1
		மொத்தம்	45	45

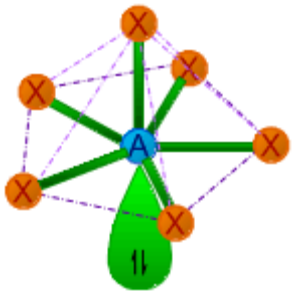
1. CHEMICAL BONDING (VSEPR MODEL) வேதிப்பிணைப்பு (VSEPR கொள்கை)

Steric Number ↓ / Lone pair →	Zero lone pair பூஜ்ய தனி இணை	1 lone pair 1 தனி இணை	2 lone pairs 2 தனி இணை	3 lone pairs 3 தனி இணை	4 lone pairs 4தனி இணை
2(sp hybridization) sp இனக்கலப்பு	Linear நேர்கோடு	-	-	-	-
3(sp^2 hybridization) sp^2 இனக்கலப்பு	Triangular Planar முக்கோண தளம்	Angular (bent) வளைந்த	-	-	-
4(sp^3 hybridization) sp^3இனக்கலப்பு	Tetrahedral நான்முகி	Pyramidal பிரமிடு	Angular வளைந்த	-	-
5(sp^3d hybridization) p^3d இனக்கலப்பு	Trigonal bipyramidal முக்கோண இரு பிரமிடு	See saw or distorted tetrahedral குழைந்த நான்முகி	T – shape T – வடிவம்	Linear நேர்கோடு	-
6(sp^3d^2 hybridization) sp^3d^2இனக்கலப்பு	Octahedral எண்முகி	Square Pyramidal சதுரபிரமிடு	Square planar சதுரதளம்	T – shape T – வடிவம்	Linear நேர்கோடு
7(sp^3d^3 hybridization) sp^3d^3இனக்கலப்பு	Pentagonal bipyramidal ஐகோண இரு பிரமிடு	Pentagoanal pyramidal ஐகோண பிரமிடு	-	-	-

Steric number	Number of Bond pairs	Number of Lone pairs	Formula	Shape of molecule		Approximate Bond angles	Examples
1	1	0	AX	Linear		-	ClF, BrF, BrCl, HF, O_2
2	2	0	AX_2	Linear		180^o	$BeCl_2$, $HgCl_2$, CO_2
3	3	0	AX_3	Trigonal planar		120^o	BF_3, CO_3^{2-}, NO_3^-, SO_3
	2	1	AX_2E	Angular		120^o	SO_2, $SnCl_2$, O_3, NSF, NO_2^-

4	4	0	AX_4	Tetrahedral		$109^o28'$	CH_4, $SiCl_4$, NH_4^+, PO_4^{3-}, SO_4^{2-}, ClO_4^-
	3	1	AX_3E	Trigonal pyramidal		around $109^o28'$	NH_3, PCl_3, XeO_3
	2	2	AX_2E_2	Angular		around $109^o28'$	H_2O, SCl_2, Cl_2O, OF_2
5	5	0	AX_5	Trigonal bipyramidal		120^o & 90^o	PCl_5, SOF_4
	4	1	AX_4E	See saw or distorted tetrahedral		-	SF_4, $TeCl_4$
	3	2	AX_3E_2	T-Shape		90^o	ClF_3, BrF_3, $BrCl_3$

	2	3	AX_2E_3	Linear		180°	XeF_2, I_3^-
6	6	0	AX_6	Octahedral		90°	SF_6
	5	1	AX_5E	Square pyramidal		90°	ClF_5, BrF_5, ICl_5
	4	2	AX_4E_2	Square planar		90°	XeF_4
7	7	0	AX_7	Pentagonal bipyramidal		72° & 90°	IF_7

	6	1	AX_6E	Pentagonal pyramidal		around 72^o & 90^o	$XeOF_5^-$, IOF_5^{2-}

Problems for Practice:

1. BeH_2, $BeCl_2$, BH_2^+, NO_2^+, CO
2. $AlCl_3$, CH_3^+, CO_3^{2-}, NO_3^-, NO_2^-, SO_2
3. BH_4^-, $SnCl_3^-$, SeO_3^{2-}, H_2O, Cl_2O, NH_2^-
4. XeO_3F_2, PCl_5, SF_4, SF_2Cl_2, $XeOF_2$, ClF_3, BrF_3, XeF_2
5. SF_6, $TeCl_6$, XeO_6^{4-}, XeO_2F_4, IF_5, XeF_5^+, XeF_4
6. XeF_6, ICl_7, IF_6^-, $[XeF_5]^-$

Test module I (Chemical Bonding and molecular structure)

1. Among SF_4, BF_4^- XeF_4 and ICl_4^- the number of species having two lone pair of electrons according to VSEPR theory
a) 2 b) 3 c) 4 d) 0
2. In the molecules H_2O, NH_3 and CH_4
a) the bond angles are same b) the bond distances are same
c) the hybridization are same d) the shapes are same
3. The total number of lone pairs of electrons in I_3^-
a) 0 b) 3 c) 6 d) 9
4. Which ones among CO_3^{2-}, SO_3, XeO_3 and NO_3^- have planar structure?
a) CO_3^{2-}, SO_3, and XeO_3 b) NO_3^-, SO_3, and XeO_3
c) CO_3^{2-}, NO_3^-, and XeO_3 d) CO_3^{2-}, SO_3, and NO_3^-
5. The number of lone-pairs are identical in the pairs
a) XeF_4, ClF_3 b) XeO_4, ICl_4^- c) XeO_2F_2, ICl_4^- d) XeO_4, ClF_3
6. According to VSEPR theory, the geometry (with lone pair) around the central iodine in I3+ and I_3^- ions respectively
a) tetrahedral and tetrahedral b) trigonal bipyramidal, trigonal bipyramidal
c) tetrahedral, trigonal bipyramidal d) tetrahedral, octahedral
7. The structure of $SbPh_5$ and PPh_5 respectively are
a) trigonal bipyramidal, square pyramidal b) square pyramidal, trigonal bipyramidal
c) trigonal bipyramidal, trigonal bipyramidal d) square pyramidal, square pyramidal
8. The correct non-linear and iso-structural pair is
a) SCl_2, I_3^- b) SCl_2, I_3^+ c) SCl_2, ClF_2^- d) I_3^+, ClF_2^-
9. According to VSEPR theory, the molecule/ion having tetrahedral shape is

a) SF_4 b) SO_4^{2-} c) S_2Cl_2 d) SO_2Cl_2

10. The molecule with highest number of lone pairs and has linear shape based on VSEPR theory

a) CO_2 b) I_3^- c) NO_2^- d) NO_2^+

11.The NH_4^+ and SO_4^{2-} ions have

a) Square planar geometry b) Pyramidal geometry

c) Tetrahedral geometry d) Triangular geometry

12. The geometry around the central atom in ClF_4^+ is

a) Square planar b) Square pyramidal c) Octahedral d) trigonal bipyramidal

13. The shape of the molecule XeO_2F_2

a) distorted tetrahedral b) square planar c) trigonal bipyramidal d) tetrahedral

14. The bond angle of Cl_2O is ..a) smaller than F_2O b) greater than that of H_2O

c) smaller than that of H_2O d) same as that of F_2O

15.The species which has a square planar structure is

a) BF_4^- b) $FeCl_4^-$ c) SF_4 d) XeF_4

16. Which of the following species has two non-bonded electron pairs on the central atom?

a) $TeCl_4$ b) ClF_3 c) ICl_2 d) PCl_3

17. The xenon compounds that are isostuctural with IBr_2^- and BrO_3^- respectively are

a) linear XeF_2 and pyramidal XeO_3 b) bent XeF_2 and pyramidal XeO_3

c) bent XeF_2 and pyramidal XeO_3 d) linear XeF_2 and tetrahedral XeO_3

18. The compound $(SiH_3)_3N$ is expected to be

a) pyramidal and more basic than $(CH_3)_3N$

b) planar and less basic than $(CH_3)_3N$

c) pyramidal and less basic than $(CH_3)_3N$

d) planar and more basic than $(CH_3)_3N$

19. The structures of O_3 and N_3^- are

a) linear and bent respectively b) both linear c) both bent d)bent and linear respectively

20. The predicted geometry of TeF_4 by VSEPR theory is

a) octahedral b) square planar c) tetrahedral d) trigonal bipyramidal

2. BASIC ORAGNIC CHEMISTRY (IUPAC & ISOMERISM)

IUPAC NOMENCLATURE OF ORGANIC COMPOUNDS RULES

In the earlier days, the conventional names for organic compounds were mainly derived from the source of occurrence. However organic chemists realized the need for a systematic naming for organic compounds since a large number of organic compounds are synthesized in due course. This leads to setting up a system of nomenclature by ***"International Union of Pure and Applied Chemistry, IUPAC"*** .

The **IUPAC system of nomenclature** is a set of logical rules framed which are mainly aimed at giving an unambiguous name to an organic compound. By using this system, it is possible to give a systematic name to an organic compound just by looking at its structure and it

is also possible to write the structure of organic compound by following the IUPAC name for that compound.

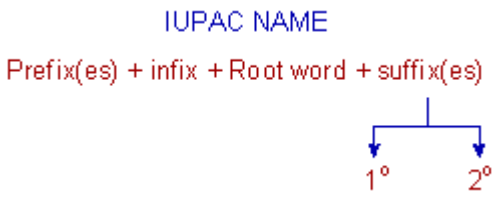
On this page, I have given a logical introduction to IUPAC nomenclature. A concise and unified approach is followed to help in giving IUPAC names to almost all types of compounds. This is not an exhaustive reference to IUPAC nomenclature. However this is more than suffice to all the students at various levels of their learning curve.

SYSTEMATIC IUPAC NAME

The systematic **IUPAC name** of an organic compound consists of four parts.

1. Root word
2. Suffix(es) and
3. Prefix(es)
4. infix

The suffix is again divided into primary and secondary.



The complete systematic IUPAC name can be represented as:

* The root word and 1°suffix together is known as **base name**.

* The Prefix(es), infix and 2° suffix may or may not be required always.

1) Root word:

It indicates the number of carbon atoms in the longest possible continuous carbon chain also known as parent chain chosen by a set of rules. The root words used for different length of carbon chain (upto 20) are shown below.

Number of carbon atoms in the parent chain	Root word

1	Meth
2	Eth
3	Prop
4	But
5	Pent
6	Hex
7	Hept
8	Oct
9	Non
10	Dec
11	Undec
12	Dodec
13	Tridec
14	Tetradec
15	Pentadec
16	Hexadec
17	Heptadec
18	Octadec
19	Nonadec
20	Icos

2) Suffix:

It is again divided into two types.

i. Primary suffix and
ii. Secondary suffix

i) Primary suffix:

It is used to indicate the degree of saturation or unsaturation in the main chain. It is added immediately after the root word.

Type of carbon chain	Primary suffix
Saturated (all C-C bonds)	-ane
Unsaturated: one C=C	-ene
Unsaturated: two C=C	-diene
Unsaturated: one C≡C	-yne
Unsaturated: two C≡C	-diyne
Unsaturated: one C=C & one C≡C	-enyne

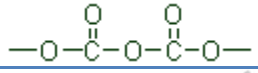
ii) Secondary suffix:

It is used to indicate the main functional group in the organic compound and is added immediately after the 1^{o} suffix.

Note: If there are two or more functional groups in a compound, the functional group with higher priority is to be selected as main functional group, which must be indicated by a secondary suffix. The remaining functional groups with lower priority are treated as substituents and are indicated by prefixes.

The suffixes as well as prefixes used for some important functional groups are shown in the following table in the decreasing order of their priority.

Also note that different suffix is used when carbon atom of the functional group is not part of the main chain.

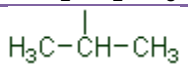
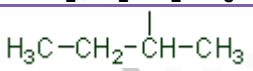
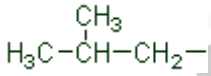
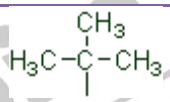
Name of Functional group	Representation	Suffix When carbon of the functional group is part of the parent chain	Suffix When carbon of the functional group isNOT part of the parent chain	Prefix
carboxylic acid	-COOH	-oic acid	-carboxylic acid	carboxy-
Acid anhydride		-oic anyhydride	-carboxylic anhydride	-
Ester	-COOR	alkyl -oate	alkyl -carboxylate	alkoxycarbonyl-
Acid halide	-COX	-oyl halide	-carbonyl halide	halocarbonyl-
Acid amide	$-CONH_2$	-amide	-carboxamide	carbamoyl-
Nitrile	-CN	-nitrile	-carbonitrile	cyano-
Aldehyde	-CHO	-al	-carbaldehyde	oxo-
Ketone	-CO-	-one	-	oxo-
Alcohol	-OH	-ol	-	hydroxy
Thiol	-SH	-thiol	-	mercapto
Amine	$-NH_2$	-amine	-	amino-
Imine	=NH	-imine	-	imino-
Alkene	C=C	-ene	-	-
Alkyne	C≡C	-yne	-	-

Note: This is not the complete reference.

3) Prefix:

The prefix is used to indicate the side chains, substituents and low priority functional groups (which are considered as substituents). The prefix may be added immediately before the root word or before the infix.

The prefixes used for some common side chains and substituents are shown below. (the prefixes for functional groups are already given)

Side chain or Substituent	Prefix
$-CH_3$	methyl-
$-CH_2CH_3$ (or) $-C_2H_5$	ethyl-
$-CH_2CH_2CH_3$	propyl-
	isopropyl-
$-CH_2CH_2CH_2CH_3$	butyl
	sec-butyl (or) (1-methyl)propyl
	isobutyl (or) (2-methyl)propyl
	tert-butyl (or) (1,1-dimethyl)ethyl
-X	halo-
-OR	alkoxy-
$-NO_2$	-nitro

Remember that the alkyl groups along with halo, nitro and alkoxy have the same preference. They have lower priority than double and triple bonds.

3) Infix:

The infixes like cyclo, spiro, bicyclo are added between the prefix(es) and root word to indicate the nature of parent chain.

* The "Cyclo" infix is used to indicate the cyclic nature of the parent chain.

* The "Spiro" infix is used to indicate the spiro compound.

* The "Bicyclo" infix is used to indicate the bicyclic nature of the parent chain.

The infixes are some times called as primary prefixes.

STEPS INVOLVED IN WRITING IUPAC NAME

1) The first step in giving IUPAC name to an organic compound is to select the parent chain and assign a root word.

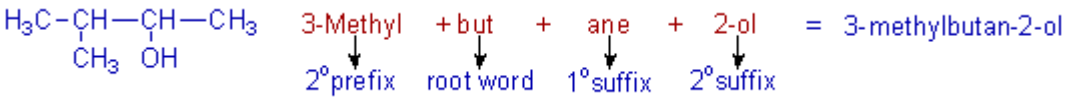
2) Next, the appropriate primary prefix(es) must be added to the root word to indicate the saturation or unsaturation.

3) If the molecule contains functional group or groups, a secondary suffix must be added to indicate the main functional group. This is optional and not necessary if the molecule contains **no** functional group.

4) Prefix the root word with the infix "cyclo" if the parent chain is cyclic; or with the infix "spiro" if it is a spiro compound; or with the infix "bicyclo" if the compound is bicyclic.

5) Finally add prefix(es) to the name if there are side chains or substituents on the parent chain.

E.g. The IUPAC name of the following compound is arrived in steps mentioned below.



Step-1	How many carbons are there in the parent chain?	4	Root word = "but"
Step-2	Saturated or Unsaturated?	Saturated	1°suffix = "ane"
Step-3	Is there any functional group?	Yes. There is an alcohol group on 2nd carbon.	2°suffix = "2-ol"
Step-4	Are there any side chains or substituents?	Yes. There is a methyl group on 3rd carbon.	2°prefix = "3-methyl"

Now add them to makeup the IUPAC name of the compound.

You will learn how to select a parent chain?; how to number the carbon atoms and give the locants to the functional groups, side chains ? etc., in the following section.

IUPAC RULES

The following rules are helpful in assigning the systematic IUPAC name of an organic compound.

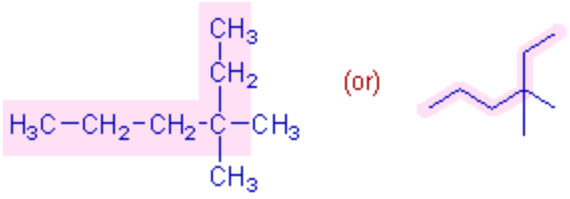
1) The selection of parent chain:

The first step in naming an organic compound is to select the parent chain and give the root word depending on the number of carbons in it.

The longest continuous carbon chain containing as many functional groups, double bonds, triple bonds, side chains and substituents as possible is to be selected as parent chain.

Illustrations:

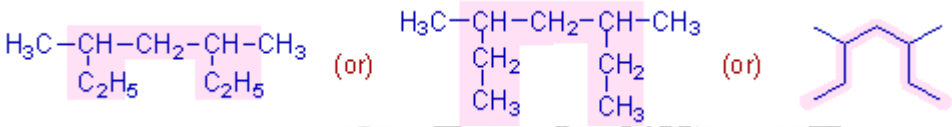
i) In the following molecule, the longest chain has 6 carbons. Hence the root word is "hex-". Note that the parent chain may not be straight.



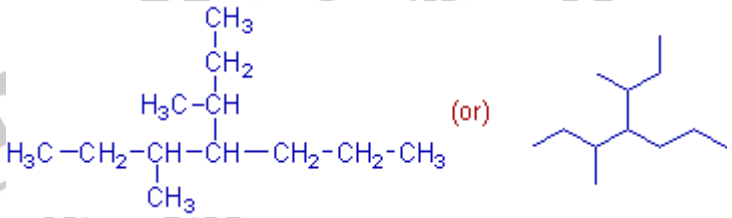
ii) The root word for the following molecule is "hept-" since the longest chain contains 7 carbons.

Do not come under the impression that the ethyl groups ($-C_2H_5$) are side chains and the longest chain contains 5 carbons.

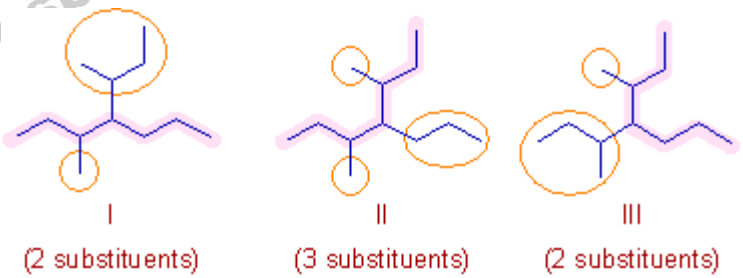
The shaded part shows the longest chain that contains 7 carbons. Also look at the alternate way of writing this molecule in which the ethyl groups are expanded to $-CH_2CH_3$.



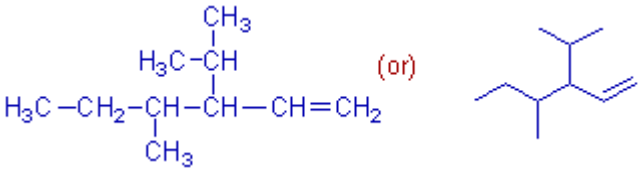
iii) In the following molecule, there are three chains of equal length (7 carbons).



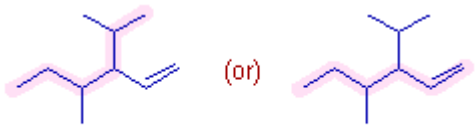
However the chain with more number of substituents (that with 3 substituents as shown in the following diagram) is to be taken as the parent chain.



iv) *The double bonds and triple bonds have more priority than the alkyl side chains and some other substituents like halo, nitro, alkoxy etc. Hence, whenever there are two or more chains with equal number of carbons, the chain that contains double or triple bond is to be selected as the parent chain irrespective of other chain containing more number of substituents.*



There are two chains with 6 carbons. But the chain with the a double bond as shown in the diagram (II) is to be selected as the parent chain.

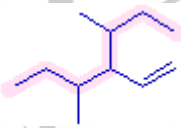


(I) (II)

Note: The double bond has more priority than the triple bond.

v) However, the longest chain must be selected as parent chain irrespective of whether it contains multiple bonds or not.

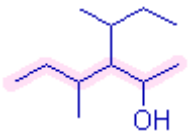
E.g. In the following molecule, the longest chain (shaded) contains no double bond. It is to be selected as parent chain since it contains more carbons (7) than that containing double bond (only 6 carbons).



vi) *The chain with main functional group must be selected as parent chain even though it contains less number of carbons than any other chain without the main functional group.*

The functional group overrides all of above rules since it has more priority than the double bonds, triple bonds, side chains and other substituents.

E.g. The chain (shaded) with 6 carbons that includes the -OH functional group is to be selected as parent chain irrespective of presence of another chain with 7 carbons that contains no functional group.



There are other situations which will decide the parent chain. These will be dealt at appropriate sections.

2) Numbering the parent chain:

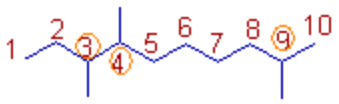
i) The positions of double bonds or triple bonds or substituents or side chains or functional groups on the parent chain are to be indicated by appropriate numbers (or locants). The locants are assigned to them by numbering carbon atoms in the parent chain.

Even though two different series of locants are possible by numbering the carbon chain from either sides, the correct series is chosen by following the rule of first point of difference as stated below.

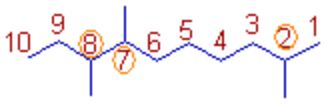
The rule of first point of difference:

When series of locants containing the same number of terms are compared term by term, that series which contains the lowest number on the occasion of the first difference is preferred.

For example, in the following molecule, the numbering can be done from either side of the chain to get two sets of locants. However the 2,7,9 is chosen since it has lowest number i.e., 2 on the first occasion of difference when compared with the other set: 3,4,9.



Series of locants
3,4,9
Not preferred



Series of locants
2,7,9
Preferred since it has lowest number on first point of difference.

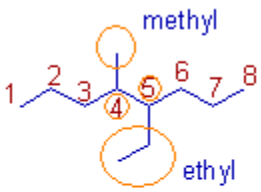
Actually the so called “Least Sum Rule” is the special case of above “Rule of First point of Difference”. Though looking simple, the least sum rule is valid only to chains with two substituents, a special case. However use of Least sum rule is not advisable when there are more than two substituents since it may violate the actual rule of first point of difference.

Therefore, while deciding the positions, we should always use "the rule of first point of difference" only.

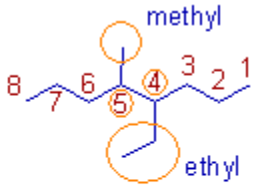
ii) *If two or more side chains are at equivalent positions, the one to be assigned the lower number is that cited first in the name.*

In case of simple radicals, the group to be cited first in the name is decided by the alphabetical order of the first letter in case of simple radicals. While choosing the alphabetical order, the prefixes like di, tri, tetra must not be taken into account.

In the following molecule, 4-ethyl-5-methyloctane, both methyl and ethyl groups are at equivalent positions. However the ethyl group comes first in the alphabetical order. Therefore it is to be written first in the name and to be given the lowest number.



Ethyl group gets highest number, 5.
Hence not preferred



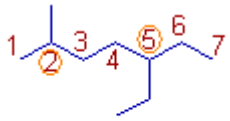
Ethyl group gets least number, 4.
Hence preferred.

The name is
4-ethyl-5-methyloctane

Note: The groups: sec-butyl and tert-butyl are alphabetized under "b". However the Isobutyl and Isopropyl groups are alphabetized under "i" and not under "b" or "p".

iii) *However, if two or more groups are **not** at equivalent positions, the group that comes first alphabetically may not get the least number.*

E.g. In the following molecule, 5-ethyl-2-methylheptane, the methyl and ethyl groups are not at equivalent positions. The methyl group is given the least number according to the rule of first point of difference.

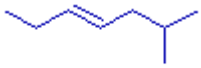


The name is
5-ethyl-2-methylheptane

But note that the ethyl group is written first in the name.

iv) *The multiple bonds (double or triple bonds) have higher priority over alkyl or halo or nitro or alkoxy groups, and hence should be given lower numbers.*

E.g. In the following hydrocarbon, 6-methylhept-3-ene, the double bond is given the lower number and is indicated by the primary suffix 3-ene. The position of methyl group is indicated by locant, 6.



6-methylhept-3-ene

v) The double bond is preferred over the triple bond since it is to be cited first in the name.

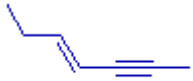
Therefore the double bond is to be given the lower number whenever both double bond and triple bond are at equivalent positions on the parent chain.

E.g. In the following hydrocarbon, hept-2-en-5-yne, both the double and triple bonds are at equivalent positions. But the position of double bond is shown by 2-ene. The counting of carbons is done from the left hand side of the molecule.

hept-2-en-5-yne

vi) *However, if the double and triple bonds are not at equivalent positions, then the positions are decided by the rule of first point of difference.*

E.g. In the following hydrocarbon, hept-4-en-2-yne, the double and triple bonds are not at equivalent positions. The triple bond gets the lower number.

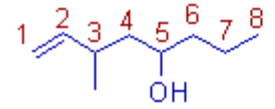


hept-4-en-2-yne

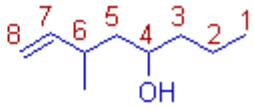
Again note that the 4-ene is written first.

vii) *Nevertheless, the main functional group must be given the least number even though it violates the rule of first point of difference. It has more priority over multiple bonds also.*

For example, in the following organic molecule, 6-methyloct-7-en-4-ol, the -OH group gets lower number (i.e., 4) by numbering the carbons from right to left.



wrong way of assigning numbers



correct way of assigning numbers

The name is
6-methyloct-7-en-4-ol

3) Grammar to be followed in writing the IUPAC name:

i) *The IUPAC name must be written as one word.* However there are exceptions.

ii) *The numbers are separated by commas.*

iii) *The numbers and letters are separated by hyphens.*

iv) *If there are two or more same type of simple substituents they should be prefixed by di, tri, tetra, penta etc.*

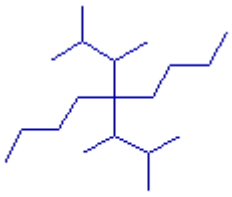
E.g. The number of methyl groups are indicated by di and tri in the following cases.

2,3-dimethylbutane

2,3,3-trimethylhexane

v) *If the side chains themselves contain terms like di, tri, tetra etc., the multiplying prefixes like bis, tris, tetrakis etc., should be used.*

E.g. The two 1,2-dimethylpropyl groups are indicated by the prefix "bis" as shown below.

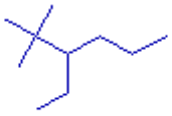


5,5-Bis(1,2-dimethylpropyl)nonane

vi) *If two or more side chains of different nature are present, they are cited in alphabetical order.*

* In case of simple radicals, they are alphabetized based on the first letter in the name of simple radical without multiplying prefixes.

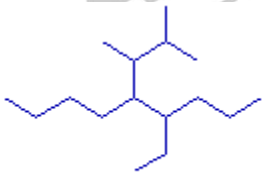
E.g. In the following molecule, the ethyl group is written first since the letter 'e' precedes the letter 'm' of methyl in the alphabetical order. We should not compare 'e' in the word 'ethyl' and 'd' in the word 'dimethyl'



3-Ethyl-2,2-dimethylhexane

* However the name of a complex radical is considered to begin with the first letter of its complete name.

E.g. In the following case, “dimethylbutyl” is considered as a complete single substituent and is alphabetized under "d".



4-ethyl-5-(1,2-dimethylbutyl)nonane

IUPAC Nomenclature of cyclic compounds

i) T*he IUPAC name of an alicyclic compound is prefixed with "cyclo".*

E.g.

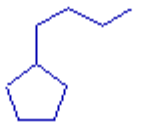
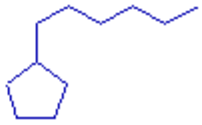
cyclopentane cyclohexane

ii) *Cycles are seniors to acyclics.*

Hence when cyclic nucleus is attached to the non cyclic chain, it is always named as the derivative of the cyclic hydrocarbon irrespective of the length of the non cyclic chain. This is a very new IUPAC recommendation.

However, according to the 1979 convention: “a hydrocarbon containing a small cyclic nucleus attached to a long chain is generally named as a derivative of the acyclic hydrocarbon; and a hydrocarbon containing a small group attached to a large cyclic nucleus is generally named as a derivative of the cyclic hydrocarbon.” Most of the textbooks and teachers still follow this convention.

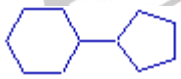
E.g. In the following examples, the old IUPAC system suggests different name when the acyclic chain contains more number of carbons than in cyclic system.

New IUPAC name	butylcyclopentane	hexylcyclopentane
Old IUPAC (1979) name	butylcyclopentane	cyclopentylhexane

iii) When two non-aromatic rings (alicyclic) are connected to each other, the compound is considered as the derivative of larger ring. The root word is derived from the larger ring. Whereas the smaller ring is indicated by the prefix.

E.g. The following compound is considered as the derivative of cyclohexane. The smaller ring is indicated by the prefix: cyclopentyl.



cyclopentylcyclohexane

iv) However if two alicyclic rings of same size are connected to each other, they are named as x,x'-bi(cycloalkyl). Where x and x' indicate the locants given to carbons through which the rings are connected. The x refers to the locant of carbon in first ring and x' represents the locant of carbon in second ring.

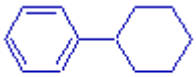
E.g. The following compound is named as 1,1'-bi(cyclopentyl) since there are two cyclopentane rings are connected to each other through their 1 and 1' carbons.

1,1'-bi(cyclopentyl)

E.g. In the following compound two cyclopentane rings are attached to each other. Hence the name is 1.1'-bi(cyclopentyl)

v) The aromatic rings have more preference over the non-aromatic rings, when the sizes of both the rings are same.

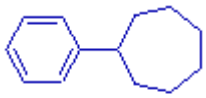
E.g. The root word is benzene in the following compound.



cyclohexylbenzene

However the larger ring has more priority irrespective of its nature (whether it is aromatic or not).

E.g. In the phenylcycloheptane, the non-aromatic ring, cycloheptane is larger. Hence this compound is named as the derivative of cycloheptane.

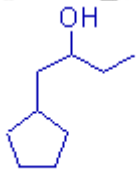


phenylcycloheptane

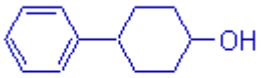
vi) Nevertheless the functional group is always the king. It will decide the root word of the IUPAC name when present in the compound.

E.g. In the first compound as shown below, the acyclic chain is taken as parent chain since it has the -OH functional group on it. The cyclopentane part is considered as substituent.

In the second compound also the benzene ring is considered as substituent since it contains no functional group.



1-cyclopentylbutan-2-ol



4-phenylcyclohexanol

IUPAC name of Compounds with multi functional groups

Whenever there are more than one functions group, the main functional group is indicated by the 2^{o} suffix in the IUPAC name, whereas the remaining functional groups are considered as substituents and are indicated by the appropriate prefixes.

E.g. In the following organic compound, 5-hydroxyhexanoic acid, both -OH and -COOH groups are the functional groups. But the -COOH group has more priority than the -OH group. Hence it is considered as the main functional group and indicated by secondary suffix, "oic acid". Whereas the -OH group is considered as substituent and is indicated by the prefix, "hydroxy".

5-hydroxyhexanoic acid

Jump to next page - more examples.

IUPAC nomenclature of Spiro compounds

The spiro compounds contain two cyclic rings that share one common carbon atom, which is called as the spiroatom.

The IUPAC name of spiro compound has the infix "spiro" followed by square brackets inside of which the number of atoms in the smaller ring followed by the number of atoms in the larger ring, excluding the spiroatom itself, are shown. These numbers are separated by a period (dot).

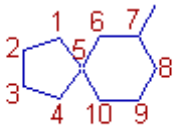
The root word of the compound is based on the total number of skeletal carbons in the two cycles including the spiroatom. Do not include the carbons of side chains and substituents over the rings while counting this number.

E.g. In the following spiro compound, there is one carbon atom common to 5 membered and 6 membered rings. The IUPAC name is spiro[4.5]decane. Notice that the spirocarbon is not taken into account while giving the numbers in the square bracket.

spiro[4.5]decane

The numbering is done starting from skeletal carbon of small ring and continued until the spiro carbon. Then the skeletal carbons in the larger ring are numbered.

E.g. In the following spiro compound the methyl group has got the locant, 7. It is because the numbering of the spiro skeleton is done first and it is not necessary that the methyl group should get the least number always.



7-methylspiro[4.5]decane

More illustrations of spiro compounds on the next page.

IUPAC nomenclature of Fused bicyclic compounds

The bicyclo compounds contain two fused rings containing two common carbon atoms. These connecting atoms are called bridge head carbons. The carbon chain or covalent bond connecting these bridge heads is considered as a bridge. There are three bridges in a simple bicyclic compound.

The IUPAC name of bicyclic compound has the infix "bicyclo" followed by square brackets showing the numbers separated by periods (dots). They indicate the number of atoms in the bridges. Again the bridge head carbons are not counted. These numbers are arranged in the decreasing order i.e., from larger bridge to smaller one.

The root word indicates the total number of skeletal carbon atoms in the two rings. Again do no include the carbons in side chains or substituents over the rings.

E.g. In the following bicyclo compound, there are three bridges with 2, 2 and 1 carbon atoms connecting the two bridge head carbons. Hence the name is bicyclo[2.2.1]heptane.

bicyclo[2.2.1]heptane

The numbering is done starting from one of the bridge head carbon and continued through the longest bridge until another bridge is reached. Then the skeletal carbons of next longer bridge are numbered. This process is continued until the shortest bridge in finally numbered.

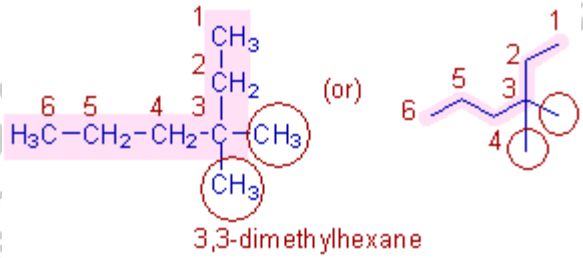
E.g. In the following bicyclo compound, the methyl group is getting the number, 7 since the locants are again given to the skeletal carbons of bicylco ring without considering the presence of methyl group.

7-methylbicyclo[2.2.1]heptane

ILLUSTRATIONS OF IUPAC NOMENCLATURE OF ORGANIC COMPOUNDS

Compound-1

The systematic IUPAC name of the following organiccompound is arrived at by following the steps described below.



3,3-dimethylhexane

* The parent chain contains 6 carbons and therefore the root word is "hex".

Note: The parent chain need not be straight.

* The bonds between all the carbons are single bonds i.e., saturated. Hence the primary suffix is "ane".

Note: In IUPAC nomenclature, only look at the bonds between carbon atoms to decide whether it is saturated or unsaturated.

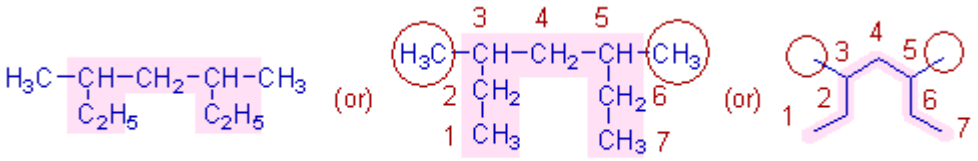
* There is no functional group. Hence no need of secondary suffix.

* There are two methyl groups on 3rd carbon (shown in circles). Hence the prefix is 3,3-dimethyl. The numbering is done such that the methyl groups get the least number.

Note: The prefix "di" is used to indicate the presence of two methyl groups.

* Hence the complete name is: 3,3-dimethyl + hex + ane = **3,3-dimethylhexane**.

Compound-2



3,5-dimethylheptane

* The longest chain contains 7 carbons. Hence the root word is "hept".

Note: Do not come under the impression that there are two ethyl groups on the straight chain containing only 5 carbons. Actually the carbons in $C_2H_5$are part of the parent chain. See the expanded chain also for the clarification.

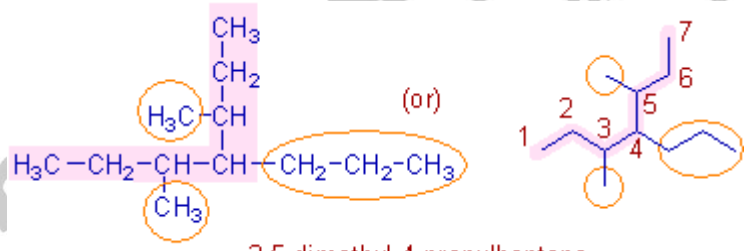
* The primary suffix is "ane" since there is no unsaturation.

* There is no functional group. Hence there is no secondary suffix.

* There are methyl groups on 3rd and 5th carbons (shown in circles). Hence the prefix is 3,5-dimethyl.

* Hence the complete name of this organic compound is: 3,5-dimethyl + hept + ane = **3,5-dimethylheptane**.

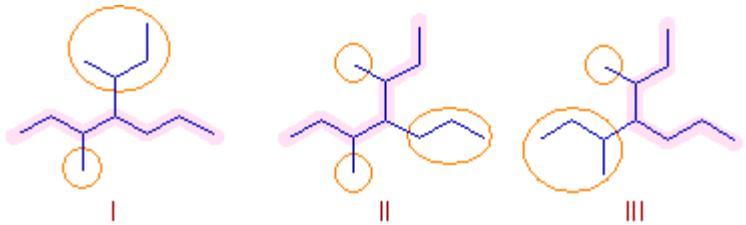
Compound-3



3,5-dimethyl-4-propylheptane

* The parent chain is so chosen that it contains most substituents. It has 7 carbons and hence the root word is "hept".

Note: There are three chains with 7 carbons. However the chain with more number of substituents (3) is taken as parent chain (see below).



I (2 substituents) II (3 substituents) III (2 substituents)

* The primary suffix is "ane".

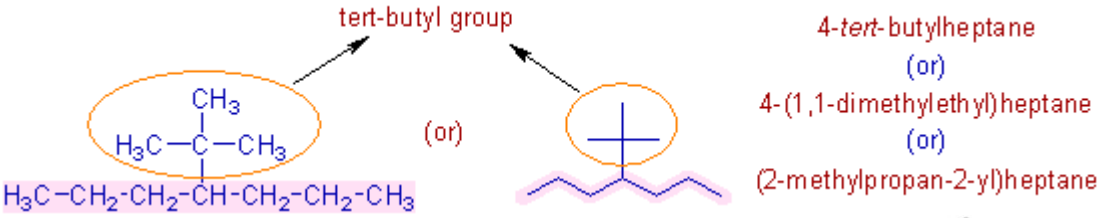
* No functional group. Hence no need of using secondary suffix.

* There are methyl groups on 3rd and 5th carbons as well as one propyl group on 4th carbon atom on the parent chain. Hence the prefix is 3,5-dimethyl-4-propyl.

Note: The dimethyl is written first since it is alphabetized under 'm' and not 'd'.

* The complete IUPAC name is: 3,5-dimethyl-4-propyl + hept + ane = **3,5-dimethyl-4-propylheptane.**

Compound-4



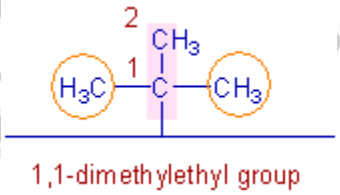
* There is tert-butyl group on 4th carbon.

* The tert-butyl group can also be named as "1,1-dimethylethyl".

The parent chain of this group is so chosen that the first carbon is attached to the main chain.

In this case, the parent chain of the group contains 2 carbons. Also there are two methyl groups on the 1st carbon. Hence the name of this group is "1,1-dimethylethyl".

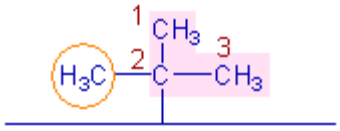
Since this group is present on the 4th carbon of the main chain, it is mentioned as 4-(1,1-dimethylethyl) in the name.



* However, according to a new system of IUPAC nomenclature the tert-butyl group can also be named as "2-methylpropan-2-yl".

According this new system, the longest chain is so chosen that one of the carbon is attached to the main chain. This need not be the first carbon. The numbering starts from that side to give lowest numbers to the side chains if any. The point of attachment to the main chain is also mentioned within the group name.

In this case, the longest chain of the group contains three carbons. This group is attached to the main chain at its second carbon. Also there is a methyl group on the 2nd carbon. Hence the name is "2-methylpropan-2-yl".



2-propan-2-yl group

Note: Some students name this organic compound as 2,2-dimethyl-3-propylhexane. They argue that the chain with 6 carbons is to be taken as the parent chain since it contains more number of groups.

But this argument is wrong since there is a longest chain with 7 carbons.

First we have to look at the longest chain.

If we get two or more chains with same number carbons then only compare the number of substituents.

Compound-5

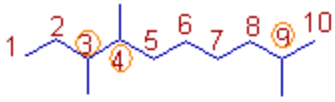
2,7,8-trimethyldecane

* The parent chain contains 10 carbons. Hence the root word is "dec".

* Primary suffix = "ane"

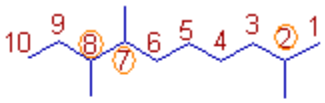
* No functional group. No need of secondary suffix.

* There are three methyl groups indicated by "2,7,8-trimethyl". The locants are given according to the rule of first point of difference as explained below.



Series of locants
3,4,9

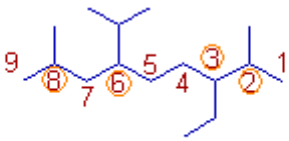
Not preferred



Series of locants
2,7,9

Preferred since it has lowest number on first point of difference.

Compound-6



3-ethyl-6-isopropyl-2,8-dimethylnonane

* Root word = "non"; indicating 9 carbons in the parent chain.

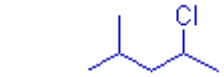
* Numbering of carbons according to the rule of first point of difference.

* "3-ethyl" is written before "6-isopropyl" since 'e' comes first alphabetically.

* "isopropyl" is written before "2,8-dimethyl" since 'i' precedes 'm' alphabetically. Do not compare 'i' with 'd'.

* It can be named as: 3-ethyl-2,8-dimethyl-6-(1-methylethyl)nonane or 3-ethyl-2,8-dimethyl-6-(propan-2-yl)nonane. See the explanation given for compound 4.

Compound-7



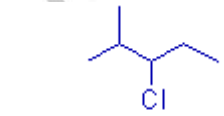
2-chloro-4-methylpentane

* Root word is "pent".

* Both the 'methyl' and 'chloro' groups are at equivalent positions. Hence the numbering is done such that the 'chloro' group gets lower number since it precedes the 'methyl' group alphabetically.

* Hence the IUPAC name of this organic compound is 2-chloro-4-methylpentane.

Compound-8



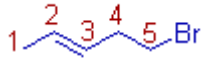
3-chloro-2-methylpentane

* In this molecule, the 'methyl' and 'chloro' groups are **not** at equivalent positions. Hence 'methyl' group is given the lower number according to the rule of first point of difference.

* However, the chloro group is written first in the name.

* Hence the IUPAC name is 3-chloro-2-methylpentane.

Compound-9



5-bromopent-2-ene

* There are 5 carbons in the parent chain. Hence the root word is 'pent'.

* There is a double bond between 2nd and 3rd carbon. Hence the primary suffix is 2-ene. The position of double bond is indicated by the lower number.

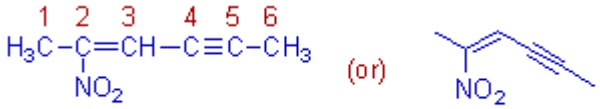
The numbering is done so as to give least number to the double bond. Since it has more priority than the 'bromo' group.

* The 'bromo' group is at 5th carbon. Hence the prefix is '5-bromo'.

* The complete name is: 5-bromo + pent + 2-ene = 5-bromopent-2-ene. It can also be written as 5-bromo-2-pentene.

Note: The complete name is (2E)-5-bromopent-2-ene. The meaning of stereo descriptor, (2E) will be explained under geometrical isomerism.

Compound-10



2-nitrohex-2-en-4-yne

* The root word is 'hex'.

* The double bond and triple bond are indicated by the 1^{o} prefixes: '2-ene' and '4-yne' .

* Both the double and triple bonds are at equivalent positions. Since 'ene' precedes 'yne' alphabetically, the 'ene' is given the lower number. It is also written before 'yne'

* There is a nitro group on the second carbon and is indicated by the prefix: '2-nitro'.

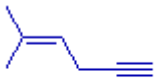
Note: The nitro group is not considered as a functional group in IUPAC nomenclature.

* The complete name is: 2-nitro + hex + 2-ene + 4-yne = 2-nitrohex-2-en-4-yne.

Note1: The end 'e' of ene is removed in the final name.

Note2: The complete name with the stereo descriptor is (2Z)-2-nitrohex-2-en-4-yne. See later the meaning of (2Z) under geometrical isomerism.

Compound-11

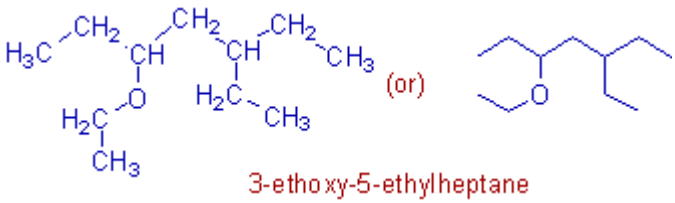


5-methylhex-4-en-1-yne

* The 'yne' is given least number since the double and triple bonds are not at equivalent positions.

It is rather confusing. This example illustrates that the IUPAC treats both double bond and triple bond at same level preference.

Compound-12



3-ethoxy-5-ethylheptane

* There is an ethoxy, $-OCH_2CH_3$ group on the chain.

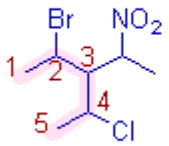
* Both 'ethyl' and 'ethoxy' groups are at equivalent positions.

* However among them, the ethoxy group has to be given the least number since 'o' precedes 'y' (4th letters) alphabetically.

Note: The 'alkyl' and 'ether' groups take same position in the priority order.

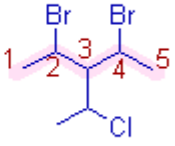
Compounds-13 (I) & (II)

(I)



2-bromo-4-chloro-3-(1-nitroethyl)pentane

(II)



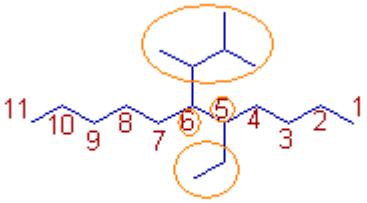
2,4-dibromo-3-(1-chloroethyl)pentane

* In above organic molecules, there are three chains with equal lengths (5 carbons) and with same number of substituents (3 in each case). However the parent chain is chosen such that it contains groups which come first in the alphabetical order.

For example, in the first compound, 2-bromo-4-chloro-3-(1-nitroethyl)pentane, the parent chain contains 'bromo' and 'chloro' since they precede 'nitro' in alphabetical order. The ethyl group contains a nitro group on its first carbon. Hence it is indicated as: '1-nitroethyl'. It is present on the 3rd carbon of the parent chain.

In the second compound, 2,4-dibromo-3-(1-chloroethyl)pentane, the parent chain is so chosen that it contains two 'bromo' groups since 'chloro' comes next alphabetically. In this case, the ethyl group contains 'chloro' group on 1st carbon of ethyl side chain. Hence it is indicated as '1-chloroethyl'.

Compound-14



6-(1,2-Dimethylpropyl)-5-ethylundecane

* The 1,2-Dimethylpropyl group is alphabetized under 'd' and not 'p' since the name of a complex radical is considered to begin with the first letter of its complete name. Hence it is written first in the name before the ethyl group.

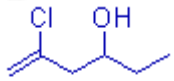
Note: The 'Di' in Dimethyl propyl group does not indicate the presence of two methylpropyl radicals.

* The root word is 'undec' since there are 11 carbons in the parent chain.

* Hence the name can be written as: 6-(1,2-Dimethylpropyl)-5-ethylundecane.

* However an alternate name: 5-ethyl-6-(3-methylbutan-2-yl)undecane can also be given. See the explanation given for compound 4.

Compound-15



5-chlorohex-5-en-3-ol

* Root word = 'hex'.

* Primary suffix = '5-ene'. Since there is a double bond between 5th and 6th carbons.

* Since there is an alcoholic functional group on 3rd carbon, the secondary suffix is given as '3-ol'. The chain is numbered such that the alcoholic group gets lower number.

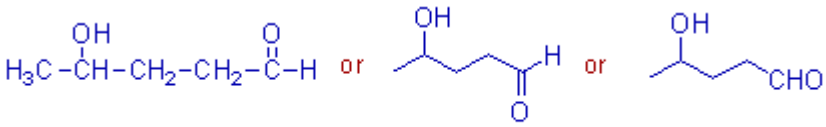
Remember that a functional group must be given the priority over a double or triple bond. Hence it must be given the lower number.

* There is also a chloro group at 5th carbon. It is indicated by the prefix: 5-chloro.

* The complete name is: 5-chloro + hex + 5-ene + 3-ol = 5-chlorohex-5-en-3-ol.

The 'e' at the end of '5-ene' is removed while adding it to '3-ol'.

Compound-16



4-hydroxypentanal

* The longest chain contains 5 carbons. The carbon of -CHO group must be included while counting the number of carbons. Hence the root word is "pent".

* There is no unsaturation between any two carbon atoms in the chain. Hence the 1^{o} suffix is "ane".

The double bond between C=O is not considered as unsaturation for this purpose.

* There are two functional groups i.e., -OH and -CHO on the parent chain. However the -CHO group is considered as main functional group and hence the 2^{o} suffix is "al".

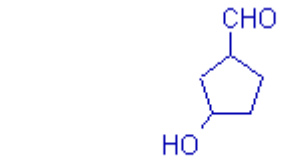
* The -OH group is now considered as a substituent and hence it is to be indicated by the prefix "hydroxy".

* Since the primary functional group must be given the lower number, the numbering of carbons starts from -CHO. Hence the "hydroxy" group gets 4th locant. i.e., 4-hydroxy is the complete prefix.

* The complete name is: 4-hydroxy + pent + ane + al = 4-hydroxypentanal.

Note: There is no need to mention the locant for the -CHO group since it is at the first carbon of the chain as the main functional group.

Compound-17



3-hydroxycyclopentanecarbaldehyde

* It is a cyclic compound. There are five carbons in the ring and hence the root word is 'pent'.

Note: The carbon of -CHO group is not included.

* Since there is no unsaturation, the 1^{o}suffix is 'ane'.

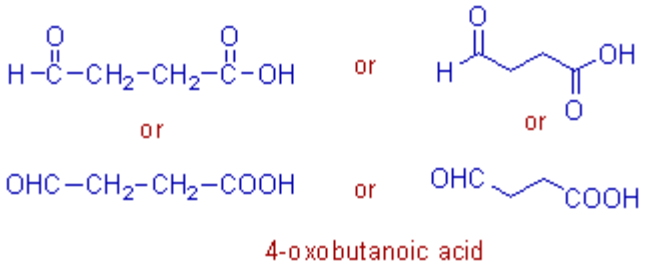
* The carbon in the primary functional group, -CHO is not the part of parent chain. Hence it is indicated by the 2^{o} suffix: carbaldehyde.

* The infix, 'cyclo' is used to indicate the cyclic nature of the parent chain. It is immediately written before the root word 'pent'.

* There is a hydroxy group on 3rd carbon.

* The complete name is: 3-hydroxy + cyclo + pent + ane + carbaldehyde = 3-hydroxycyclopentanecarbaldehyde.

Compound-18



4-oxobutanoic acid

* Root word = 'but'. The carbons in -CHO and -COOH groups are included.

* The main functional group is carboxylic acid, -COOH and hence the secondary suffix is -oic acid.

* The cabonyl group, C=O of -CHO is indicated by the prefix: 4-oxo.

* The IUPAC name of this compound is: 4-oxo + but + ane + oic acid = 4-oxobutanoic acid.

Note: Again there is no need of writing the locant for 'oic acid' since it is always present at the first carbon when considered as the only main functional group.

Compound-19

pentanedioic acid

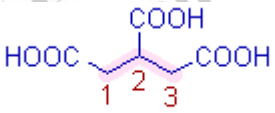
* The parent chain contains 5 carbons including the carbons of -COOH groups.

* The 2^{o} suffix is dioic acid since there are two carboxylic acid groups.

* Hence the name is pent + ane + dioic acid = pentanedioic acid.

Note: The end 'e' of ane is not removed while added to dioic acid.

Compound-20



propane-1,2,3-tricarboxylic acid

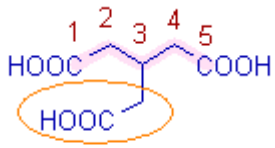
* The parent chain is selected so that it is connected to maximum number of -COOH groups. In this case it is possible to select the parent chain so that all the -COOH groups are connected to it.

The root word is 'prop' since there are three carbons in the parent chain. The carbons of -COOH groups are excluded while counting this number.

* Since the carbons of three -COOH groups do not make part of the parent chain, they are represented by the suffix 1,2,3-tricarboxylic acid.

Note: When the -COOH group is not the part of the main chain, it is indicated by the 2^{o} suffix, carboxylic acid.

Compound-21



3-(carboxymethyl)pentanedioic acid

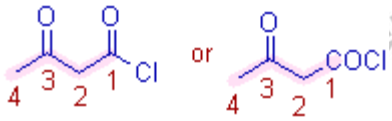
* Now it is not possible to include all the -COOH groups connected to the main chain. Therefore the parent chain is selected such that it includes the carbons of two -COOH groups (on 1st and 5th carbons). Thus the root word is 'pent'.

* Since the carbons of these two -COOH groups are now part of the parent chain, the 2^o suffix must be 1,5-dioic acid.

* The group on the 3rd carbon is named as: 'carboxymethyl'. The -COOH group on this group is considered as the substituent and is indicated by the prefix, 'carboxy'.

* The complete name is: 3-(carboxymethyl) + pent + ane + dioic acid = 3-(carboxymethyl)pentanedioic acid.

Compound-22



3-oxobutanoyl chloride

* Root word is 'but'. The carbon of COCl is also included in the parent chain.

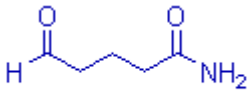
* The main functional group is acid chloride, -COCl since it has more priority over carbonyl group, C=O.

* The 2^o suffix is 'oyl chloride'.

* The C=O group at 3rd carbon is now considered as substituent and is indicated by the prefix, 3-oxo.

* The complete name is: 3-oxo + but + ane + oyl chloride = 3-oxobutanoyl chloride.

Compound-23



5-oxopentanamide

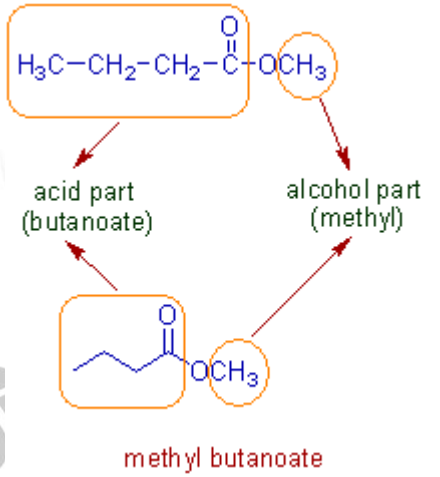
* The root word is 'pent' since there are 5 carbons in the parent chain including the carbons of aldehyde, -CHO and amide, -$CONH_2$ groups.

* Since the main functional group is amide, the 2^o suffix is 'amide'. No need of indicating the locant of amide group since it is present always at the first carbon when treated as main functional group.

* The C=O of aldehyde group is indicated by the prefix, '5-oxo'.

* The complete name if: 5-oxo + pent + ane + amide = 5-oxopentanamide.

Compound-24



methyl butanoate

* The above molecule is an ester (represented in bond line notation also).

* The name of ester has two parts:

1. The alcoholic part represented by 'alkyl'.
2. The carboxylic acid part represented by 'alkanoate'.

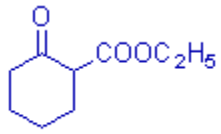
* Thus the name of an ester can be represented as **'alkyl alkanoate'**.

* In above example, the alcohol part is 'methyl' whereas the acid part is 'butanoate'.

Note: The acid part contains 4 carbons. It is considered to be derived from butanoic acid.

* The complete name is: methyl butanoate.

Compound-25



ethyl 2-oxocyclohexanecarboxylate

* The main functional group is ester. The acid part of the ester is derived from the cyclohexanecarboxylic acid. Hence it is indicated by cyclohexanecarboxylate. Note that the functional group is not the part of parent chain.

The alcoholic part is indicated by 'ethyl'.