IUPAC nomenclature:

IUPAC name of compound consists of

i) Root word ii) Suffix iii) Prefix

- Root word gives the number of carbons in parent skeleton
- Suffix gives the nature of the functional group
- Prefix gives the nature of the substituent.

Side chains:

i) Alkyl: It contains one hydrogen less than that of alkane. Ex.

$CH_3 -$	Methyl
$C_2H_5 -$	Ethyl
$CH_3 - CH_2 - CH_2 -$	n – propyl
$CH_3 - \underset{\displaystyle CH_3}{\underset{\vert}{CH}} -$	iso propyl
$CH_3 - CH_2 - CH_2 - CH_2 -$	n–Butyl
$CH_3 - \underset{\displaystyle CH_3}{\underset{\vert}{CH}} - CH_2 -$	Iso butyl
$CH_3 - \underset{\vert}{CH} - CH_2 - CH_3$	Sec – butyl
$CH_3 - \underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{\vert}{\underset{\vert}{C}}}} - CH_3$	ter – butyl
$CH_3 - CH_2 - CH_2 - CH_2 - CH_2 -$	n – pentyl (Amyl)
$CH_3 - \underset{\displaystyle CH_3}{\underset{\vert}{CH}} - CH_2 - CH_2 -$	Iso pentyl (Iso amyl)
$CH_3 - \underset{\displaystyle CH_3}{\overset{\displaystyle C_2H_5}{\overset{\vert}{\underset{\vert}{C}}}}$	Ter-Pentyl
$CH_3 - \underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{\vert}{\underset{\vert}{C}}}} - CH_3$	Neo – Pentyl

Alkenyl : It contains one hydrogen less than that of Alkene.

Ex : $CH_2 = CH -$ Ethenyl (Vinyl)

$CH_3 - CH = CH -$ 1–Propenyl

$CH_2 = CH - CH_2 -$ Allyl

$CH_3– CH_2 – CH = CH –$ 1–Butenyl

Alkynyl: It contains one hydrogen less than that of alkyne

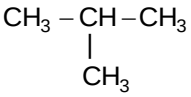
Ex: $HC \equiv C –$ ethynyl

$H_3C– C \equiv C –$ 1– propynyl

$H_3C – CH_2 – C \equiv C –$ 1– butynyl

- When all the carbons are present in a straight chain, the alkane is called normal alkane.
- When all the carbons are not present in straight chain, it may be called iso alkane.

Ex: $CH_3 – CH_2 – CH_2 – CH_3$ n – Butane

 Iso butane

Root word :

No. of carbons:	Root word
1	Meth
2	Eth
3	Prop
4	But
5	Pent
6	Hex
7	Hept
8	Oct
9	Non
10	Dec

1. **Longest chain rule :** Select the continuous chain of carbons having maximum number of carbon atoms.
2. **Lowest sum rule:** Gives the lowest possible numbers to the substituents and functional groups.
3. Longest chain rule can be violated to include the double bonds triple bonds, functional groups.
4. If two or more functional groups are present, senior functional group is given suffix and junior functional group is given prefix.
5. If two or more different substituents are present at various positions, consider the lowest sum irrespective of the nature of substituents.
6. If two similar substituents are present at identical positions from opposite ends, then follow alphabetical order to give lowest number.

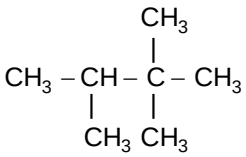
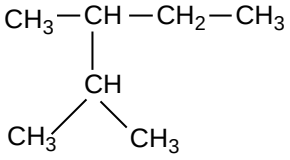
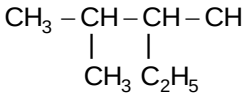
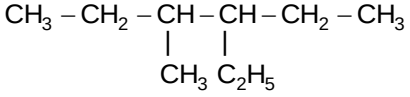
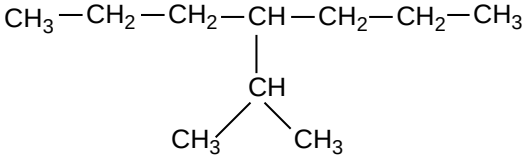
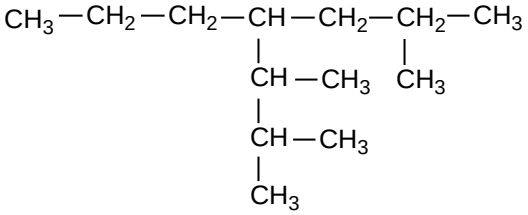
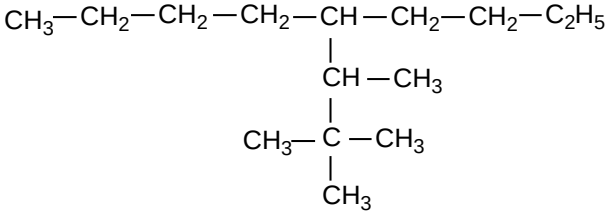
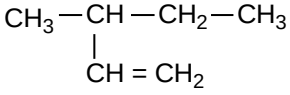
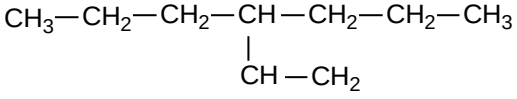
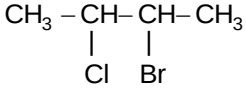
7. If two or more carbon chains having the same number of carbons are present then the chain having more number of branches is selected as parent chain.
8. If the compounds contact more than one functional group the principal group form the suffix while the other functional group is considered as the substitutent.
9. The preference order is COOH > Acid derivatives > CHO > CN > C = O > – OH > NH_2 > – O –
 > C = C > C ≡ C.

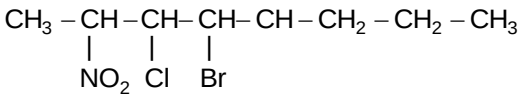
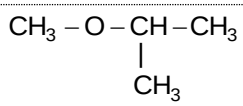
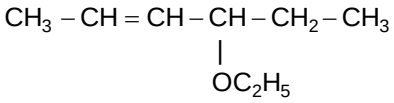
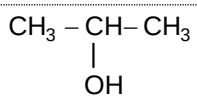
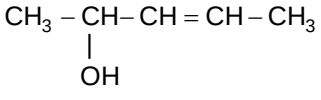
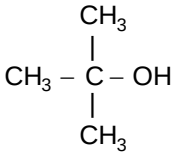
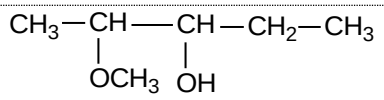
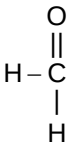
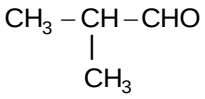
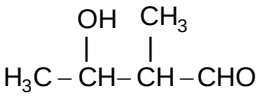
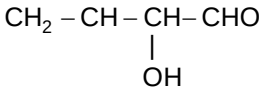
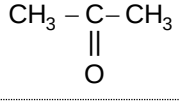
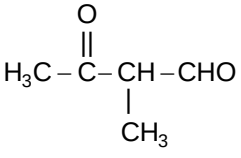
Name	Formula	Suffix	Prefix
Carboxylic acid	– COOH	oic acid	carboxy
Acid chloride	– COCl	oyl chloride	Chloro formlye
Acid amide	– $CONH_2$	Amide	Carbomyl
Ester	– COOR	ate	Alkoxy carbonyl
Aldehyde	– CHO	al	Aldo or formyl
Cyanide	– CN	nitrile	Cyano
Ketone	–C = O |	one	Keto or oxo
Alcohol	– OH	ol	Hydroxy
Amine	– NH_2	amine	Amino
Ether	– O –	–	Alkoxy
Alkene	–C = C– | |	ene	ene
Alkyne	–C ≡ C –	yne	yne

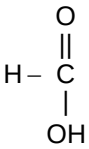
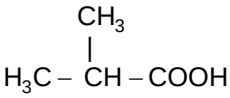
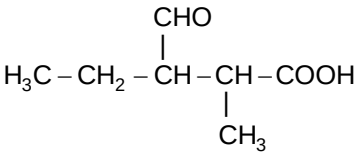
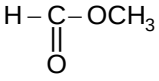
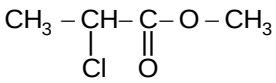
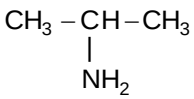
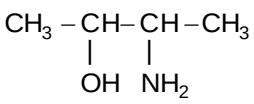
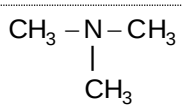
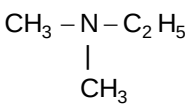
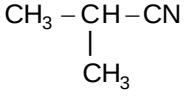
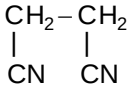
Substituents: Which are given only prefixes:

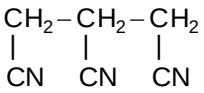
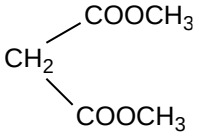
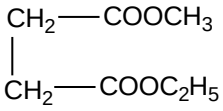
– X (Cl, Br, I)	halo
– ONO	nitrite
– NO_2	nitro
– NO	nitroso
– OR	Alkoxy
– R	Alkyl

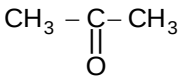
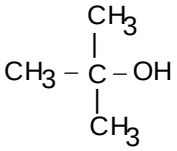
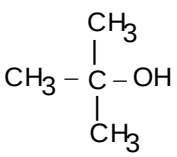
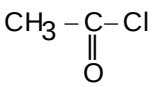
EXERCISES:

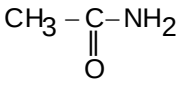
	Structure	**IUPAC name**
1.		2, 2, 3 – trimethyl butane
2.		2, 3 – dimethyl pentane
3.		2, 3 – dimethyl pentane
4.		3–ethyl – 4 – methyl hexane
5.		4 – isopropyl heptane
6.		2, 3, 6 – trimethyl – 4 - propyl heptane
7.		5 – (1, 2, 2 – trimethyl propyl) nonane
8.		3 – methyl pent – 1 – ene
9.	$CH_2 = CH - CH = CH_2$	But – 1, 3 – diene
10.		3 – propyl hex – 1 – ene
11.	$CH \equiv C - CH = CH - CH_3$	Pent – 3 – en – 1 – yne
12.	$CH \equiv C - CH = CH_2$	But – 1 – en – 3 – yne
13.		2 – Bromo – 3 – chloro butane

14.		4 – bromo – 3 – chloro – 2 – nitro octane
15.	$CH_3 - O - C_2H_5$	Methoxy ethane
16.	$C_2H_5 - O - C_2H_5$	Ethoxy ethane
17.		2 – Methoxy propane
18.		4 – Ethoxy hex – 2 – ene
19.		propan – 2 – ol
20.		pent – 3 – en – 2 – ol
21.		2 – methyl propan – 2 – ol
22.		2 – Methoxy pentan – 3 – ol
23.		Methanal
24.	$CH_3 - CHO$	Ethanal
25.		2 – Methyl propanal
26.		3 – Hydroxy – 2– Methyl Butanal
27.		2 – Hydroxy – But – 3 – enal
28.		Propanone
29.		3 – keto – 2– Methyl Butanal

30.		Methanoic acid
31.		2– Methyl propanoic acid
32.		3 – Aldo -2 - Methyl pentanoic acid
33.		Ethan -dioic acid
34.		Methyl methanoate
35.	$CH_3 – COOC_2H_5$	Ethyl ethanoate
36.		Methyl – 2– chloro propanoate
37.	$CH_3 – CH_2 – NH_2$	Ethanamine
38.		Propan – 2- amine
39.		3 – Amino – Butan – 2– ol
40.	$CH_3 – NH – CH_3$	N – methyl amino methane
41.	$CH_3 – NH – C_2H_5$	N – Methyl amino ethane
42.		N, N – Dimethyl amino methane
43.		N, N – Dimethyl amino ethane
44.	H – CN	Methane nitrile
45.	$CH_3 – CN$	Ethane nitrile
46.		2– methyl propane nitrile
47.		butane –1, 4 – Dinitrile

48.		3–cyano pentane – 1, 5 – dinitrile
49.		Dimethyl propane dioate
50.		Ethyl methyl butane dioate

Common Name			**Structure**
1.	Acetic acid	–	$CH_3 - COOH$
2.	Formic acid	–	$HCOOH$
3.	Acetaldehyde	–	CH_3CHO
4.	Acetone	–	
5.	Vinyl cyanide	–	$CH_2 = CH - CN$
6.	Vinyl alcohol	–	$CH_2 = CH - OH$
7.	Acetonitrile	–	$CH_3 - CN$
8.	Methyl carbinol	–	$CH_3 - CH_2 - OH$
9.	Trimethyl carbinol	–	
10.	Ter – Butyl alcohol	–	
11.	Acetyl chloride	–	

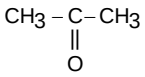
12. Acetamide – 

13. Methyl acetylene – $CH_3 - C \equiv CH$

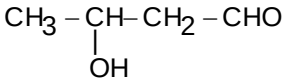
14. Pyrene – CCl_4

15. Formaldehyde – $HCHO$

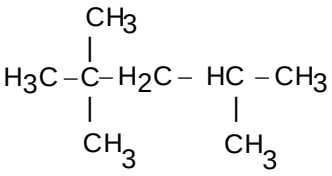
16. Phenyl isocyanide – $C_6H_5 - NC$

17. Dimethyl ketone – 

18. Ethyl acetate – $CH_3OOC_2H_5$

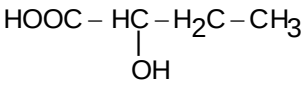
19. Aldol – 

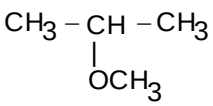
20. Marsh gas – CH_4

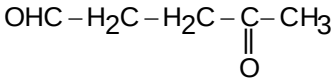
21. 2, 2, 4 – Trimethyl pentane – 

22. Hept – 2 – enal – $OHC - HC = CH - H_2C - H_2C - H_2C - CH_3$

23. Pent – 3 – en – 1 – yne – $HC \equiv C - HC = CH - CH_3$

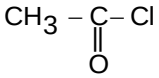
24. 2 – Hydroxy Butanoic acid – 

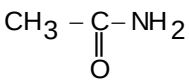
25. 2 – methoxy propane – 

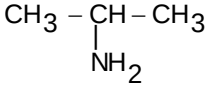
26. 4 – Keto pentanal – 

27. Ethyl methanoate – $HCOOC_2H_5$

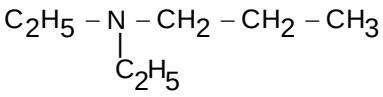
28. Ethoxy ethane – $C_2H_5 - O - C_2H_5$

29. Ethanoyl chloride – 

30. Ethanamide – 

31. Propan – 2 – amine – 

32. N – ethyl amino ethane – $C_2H_5 - NH - C_2H_5$

33. N, N – diethyl amino propane – 

34. Ethane nitrile – $CH_3 - CN$

35. Methyl carbyl amine – $CH_3 - NC$