

ORGANIC CHEMISTRY

Nomenclature

Examples of Compound containing different functional groups with common / trival names.

No. of carbon atoms	Prefix	-CHO (Aldehyde)	-COOH(-ic acid)	-COCl.(-yl chloride)	-CONH ₂ (Amide)
1	Form	HCHO Formaldehyde	HCOOH Formic acid	HCOCI Formyl chloride	HCONH ₂ Formamide
2	Acet	CH ₃ CHO Acetaldehyde	CH ₃ COOH Acetic acid	CH ₃ COCl Acetyl chloride	CH ₃ CONH ₂ Acetamide
3	Propion	CH ₃ CH ₂ CHO Propion aldehyde	CH ₃ CH ₂ COOH Propionic acid	CH ₃ CH ₂ COCl Propionyl chloride	CH ₃ CH ₂ CONH ₂ Propionamide
4	Butyr	CH ₃ CH ₂ CH ₂ CHO n-Butyraldehyde	CH ₃ CH ₂ CH ₂ COOH n-Butyric acid	CH ₃ CH ₂ CH ₂ COCl n-Butyryl chloride	CH ₃ CH ₂ CH ₂ CONH ₂ n-Butyramide
5	Valer	CH ₃ CH ₂ CH ₂ CH ₂ CHO n-Valeraldehyde	CH ₃ CH ₂ CH ₂ CH ₂ COOH n-Valeric acid	CH ₃ CH ₂ CH ₂ CH ₂ COCl n-Valeryl chloride	CH ₃ CH ₂ CH ₂ CH ₂ CONH ₂ n-Valeramide
3C+1 Double bond	Acryl	CH ₂ =CH-CHO Acrylaldehyde	CH ₂ =CH-COOH Acrylic acid	CH ₂ =CH-COCl Acryl chloride	CH ₂ =CH-CONH ₂ Acrylamide
4C + 1 Double bond (at 2 nd Carbon. atom)	Croton	CH ₃ -CH=CH-CHO Crotonaldehyde	CH ₃ CH ₂ =CH-COOH Crotonic acid	CH ₃ CH ₂ =CH-COCl Crotonyl chloride	CH ₃ CH ₂ =CH-CONH ₂ Crotonamide

No. of carbon atoms	Prefix	-CN(-O nitrile)	-N \equiv C(Oisonitrile) If Suffix isocyanide is used than. Carbon atom of -NC not counted. If suffix carbyl amine is used. Carbon atom of -NC not counted. If O-isonitrile is used \rightarrow Carbon atom of -NC counted	-COOR Ester
1	Form	H-C \equiv N Formonitrile	H-N \equiv C Formoisonitrile	HCOOCH ₃ Methyl formate
2	Acet	CH ₃ C \equiv N Acetonitrile	CH ₃ -N \equiv C Acetoisonitrile	CH ₃ COOCH ₃ Methyl acetate
3	Propion	CH ₃ CH ₂ C \equiv N Propionitrile	CH ₃ CH ₂ N \equiv C Propionisonitrile	CH ₃ CH ₂ COOCH ₃ Methyl propionate
4	Butyr	CH ₃ CH ₂ CH ₂ C \equiv N n-Butyronitrile	CH ₃ CH ₂ CH ₂ N \equiv C n-Butyroisonitrile	CH ₃ CH ₂ CH ₂ COOCH ₃ Methyl n-butyrate
5	Valer	CH ₃ CH ₂ CH ₂ CH ₂ C \equiv N n-Valeronitrile	CH ₃ CH ₂ CH ₂ CH ₂ N \equiv C n-Valeroisonitrile	$\left[\begin{array}{c} \text{CH}_3 - \text{CH} - \text{CH}_2 - \text{COOCH}_3 \\ \\ \text{CH}_3 \end{array} \right]$ Methyl isovalerate
3 C + 1 Double bond	Acryl	CH ₂ = CH - C \equiv N Acrylonitrile	CH ₂ = CH-NC Acrylisonitrile	CH ₂ =CHCOOCH ₃ Methyl acrylate
4C + 1 Double bond (at 2 nd Carbon. atom)	Croton	CH ₃ CH = CH - C \equiv N Crotononitrile	CH ₃ -CH=CH-NC Crotonoisonitrile	CH ₃ CH=CHCOOCH ₃ Methyl crotonate

Secondary suffix of some common functional groups (IUPAC)

A secondary suffix is added to the primary suffix to indicate the nature of the functional group present in the organic compounds. Secondary suffix of important functional groups are given below in their decreasing order of seniority.

	Class	Name	Suffix	Prefix
1.	R-COOH	Alkanoic Acid	- oic acid (carboxylic acid)	carboxy
2.	R-SO ₃ H	Alkane sulhonic Acid	- sulphonic acid	sulpho
3.	$\begin{array}{c} \text{R}-\text{C}-\text{O}-\text{C}-\text{R} \\ \parallel \quad \parallel \\ \text{O} \quad \text{O} \end{array}$	Alkanonic Anhydride	- oic anhydride (carboxylic anhydride)	-----
4.	R-COOR	Alkyl alkanoate	- oate (carboxylate)	alkoxy carbonyl or alkanoyl oxy halo carbonyl
5.	$\begin{array}{c} \text{R}-\text{C}-\text{X} \\ \parallel \\ \text{O} \end{array}$	Alkanoyl halide	-oyl halide (carbonyl halide)	
6.	$\begin{array}{c} \text{R}-\text{C}-\text{NH}_2 \\ \parallel \\ \text{O} \end{array}$	Alkanamide	- amide (carboxamide)	carbamoyl
7.	R-C≡N	Alkanenitrile	- nitrile (carbonitrile)	cyano
8.	R-C-H	Alkanal	- al (carbaldehyde)	formyl / oxo
9.	$\begin{array}{c} \text{R}-\text{C}-\text{R} \\ \parallel \\ \text{O} \end{array}$	Alkanone	- one	oxo
10.	R-OH	Alkanol	- ol	hydroxy
11.	R-SH	Alkanethiol	- thiol	mercapto
12.	R-NH ₂	Alkanamine	- amine	amino

IUPAC system of nomenclature

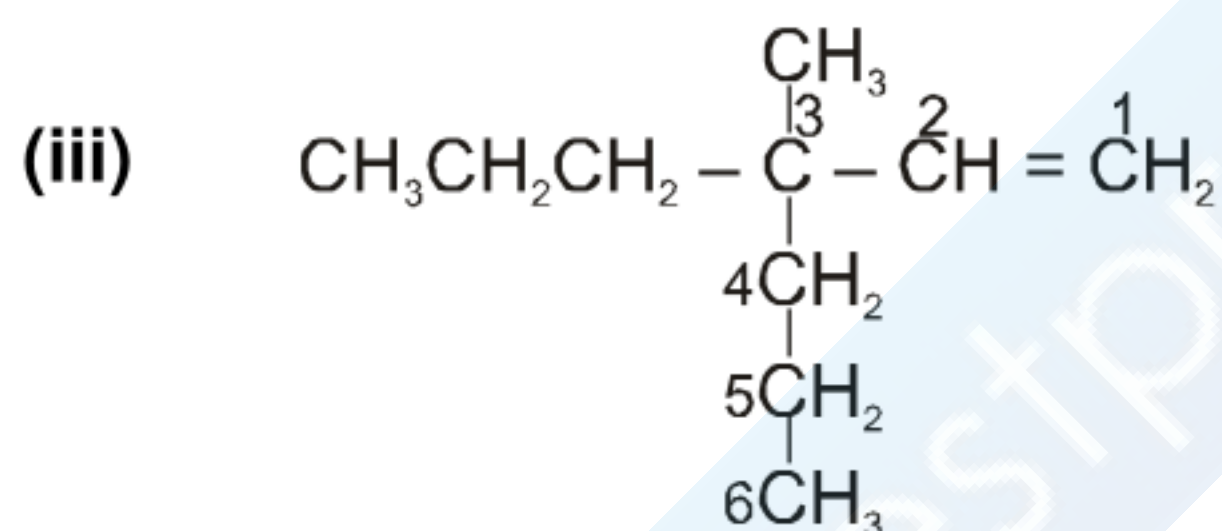
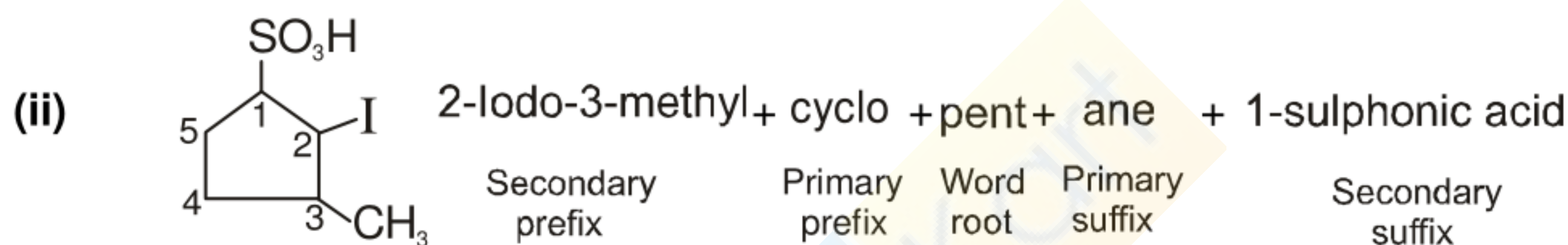
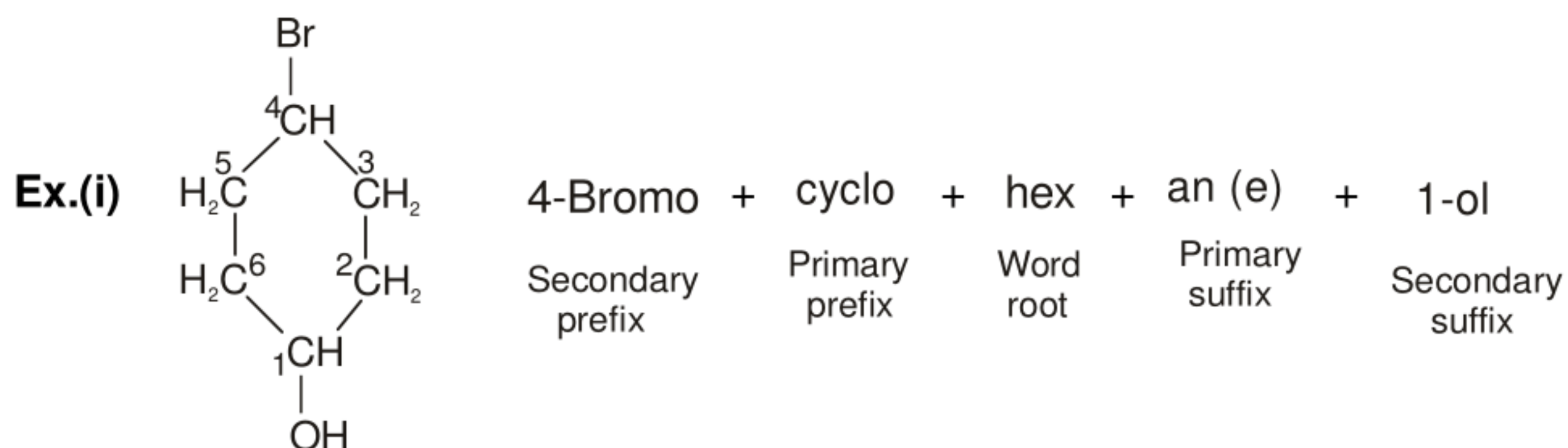
The IUPAC name of any organic compound consists of maximum five parts in the following sequence.

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

The following examples illustrate the use of word root, primary suffix and secondary suffix in naming of organic compounds.

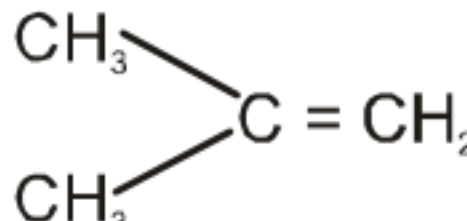
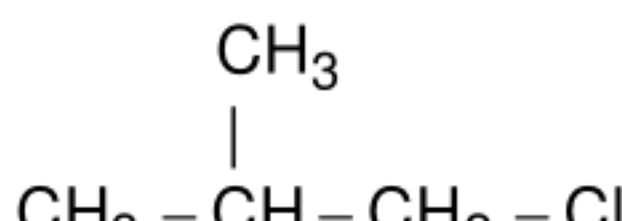
Organic compounds	Word root	Primary suffix	Secondary suffix	IUPAC name
CH ₃ CH ₂ OH	Eth	an(e)	ol	Ethanol
CH ₃ CH ₂ CH ₂ NH ₂	Prop	an(e)	amine	Propanamine
CH ₃ CH ₂ CH ₂ COOH	But	an(e)	oic acid	Butanoic acid
CH ₃ CH ₂ CN	Prop	an(e)	nitrile	Propanenitrile
CH ₂ =CHCHO	Prop	en(e)	al	Propenal
HC≡CCOOH	Prop	yn(e)	oic acid	Propynoic acid

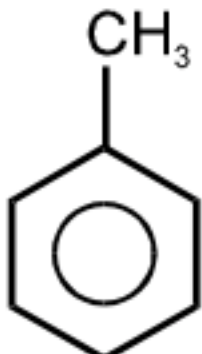
The following examples illustrate the use of word root , primary prefix and secondary prefix in naming of organic compounds.



Position of double bond will be indicated as no. 1, Hence name will be 3-Methyl-3-propylhex-1-ene

Common and IUPAC Names of Some Organic Compounds

S.No.	Compound	Common names	IUPAC name
1.	$\text{CH}_3\text{CH}=\text{CH}_2$	Propylene	Propene
2.		Isobutylene	2-Methylpropene
3.	$\text{H}_3\text{C}-\text{C}\equiv\text{CH}$	Methyl acetylene	Propyne
4.		Isobutyl chloride	1-Chloro-2-methylpropane

5.	$\begin{array}{c} \text{CH}_2 - \text{Br} \\ \\ \text{CH}_2 - \text{Br} \end{array}$	Ethylene dibromide	1, 2-Dibromoethane
6.	$\text{CH}_2 = \text{CH} - \text{Cl}$	Vinyl chloride	Chloroethene
7.	$\begin{array}{c} \text{CH}_3 - \text{CH} - \text{CH}_3 \\ \\ \text{OH} \end{array}$	Isopropyl alcohol	Propan-2-ol
8.	$\text{CH}_2 = \text{CH} - \text{CH}_2 - \text{OH}$	Allyl alcohol	Prop-2-en-1-ol
9.	$\begin{array}{c} \text{CH}_2 - \text{CH} - \text{CH}_2 \\ \quad \quad \\ \text{OH} \quad \text{OH} \quad \text{OH} \end{array}$	Glycerol or Glycerine	Propane-1, 2, 3-triol
10.	$\text{CH}_3 - \text{CHO}$	Acetaldehyde	Ethanal
11.	$\text{CH}_3 - \text{CO} - \text{CH}_2\text{CH}_3$	Ethyl methyl ketone	Butanone
12.	$\text{CH}_3 - \text{COOH}$	Acetic acid	Ethanoic acid
13.	$\begin{array}{c} \text{COOH} \\ \\ \text{COOH} \end{array}$	Oxalic acid	Ethanedioic acid
14.	$\begin{array}{c} \text{O} \\ \\ \text{H}_3\text{C} - \text{C} - \text{COOH} \end{array}$	Pyruvic acid	2-Oxopropanoic acid
15.	$\text{CH}_3 - \text{COCl}$	Acetyl chloride	Ethanoyl chloride
16.	$\text{CH}_3 - \text{CONH}_2$	Acetamide	Ethanamide
17.	$\text{CH}_3 - \text{NH}_2$	Methylamine	Methanamine
18.	$\text{CH}_3 - \text{CN}$	Methyl cyanide or Acetonitril	Ethanenitrile
19.	$\text{CH}_3 - \text{N}^+ \equiv \text{C}^-$	Methyl isocyanide or Methyl carbylamine	Methane isocyanide
20.		Toluene	Methylbenzene or Toluene