



CLASS 12 ACADEMIC PROGRAM 2020

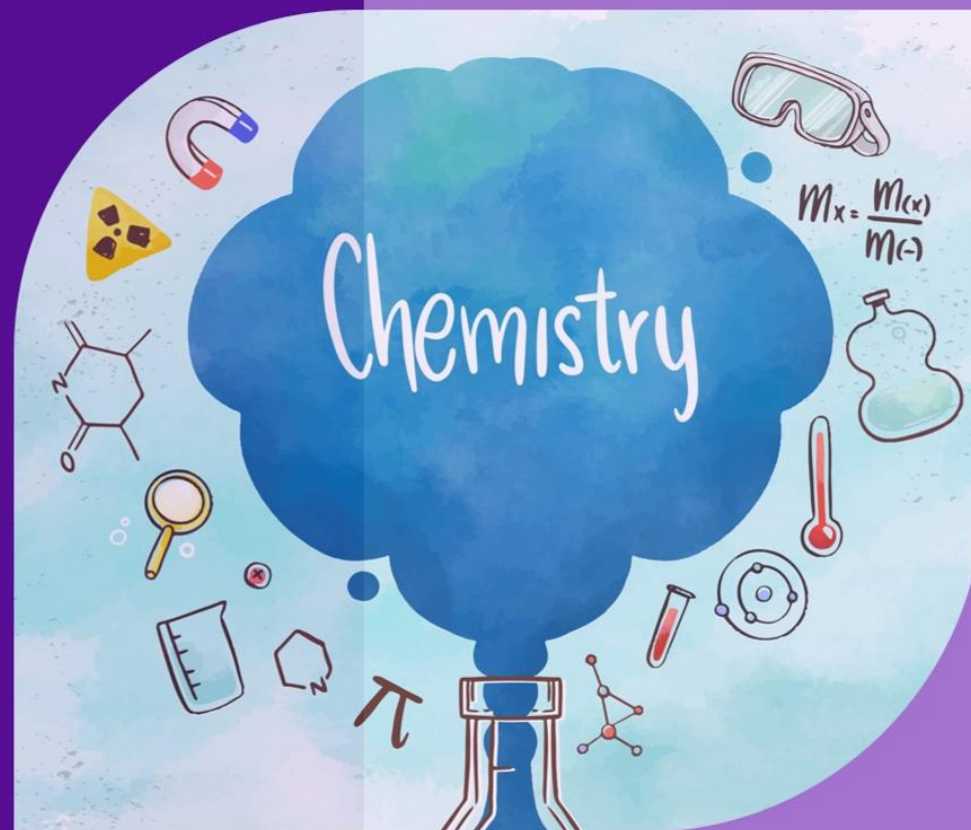
CHEMISTRY 2ND PAPER

LECTURE : C-07 \rightarrow C-06 extended

CHAPTER 2 : ORGANIC CHEMISTRY

nomenclature

Sadat Ahmed Dipro



উদ্ভাস

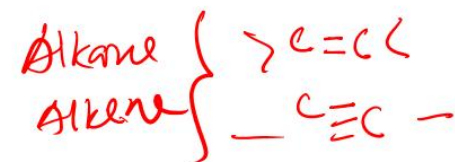
একাডেমিক এন্ড এডমিশন কেয়ার

Activate Windows
Go to Settings to activate Windows.

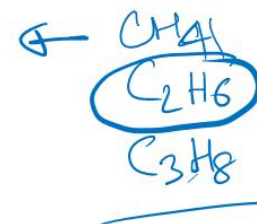
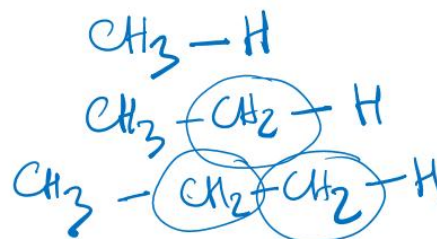


www.udvash.com

Homologous Series & Functional Group



A homologous series is a series of compounds with the **same general formula**, usually varying by a single parameter—such as the **length of a carbon chain** and thus **molecular mass** and the next member of the series has a **$(-CH_2-)$** group more than the previous member then that series is called a homologous series. The members are called **Homologue of one another**.



✓ The **atom or group** in the molecule of a organic compound that denotes its **chemical properties** and directs its reactions is called the functional group of that compound. **Because of the presence of functional group, the homologues show same properties and reactions.**



উদ্ভাস

একাডেমিক গ্রন্থ এডমিশন কেয়ার

Activate Windows
 Go to Settings to activate Windows.

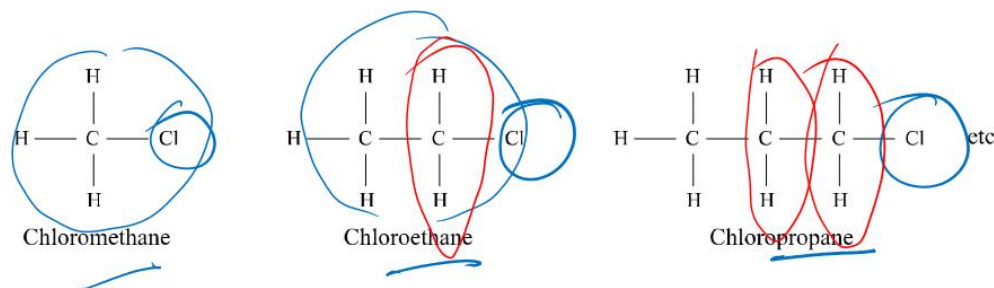
Chemistry 2nd Paper

Chapter 2 : Organic Chemistry

Homologous Series & Functional Group

Characteristics of the Compounds in Homologous Series

01. **Similar structural formula.** example: structural formula of alkyl chloride series,



Halo alkane,

02. **Molecular formula:** The molecular formula differs by one or more $\text{-CH}_2\text{-}$ group

03. **Similar functional group:** example: alcohol has the functional group -OH , amine has -NH_2 , and aldehyde has -CHO etc



উদ্ভাস

একাডেমিক এন্ড এডমিশন কেয়ার

Activate Windows
Go to Settings to activate Windows.

Chemistry 2nd Paper

Chapter 2 : Organic Chemistry

Homologous Series & Functional Group

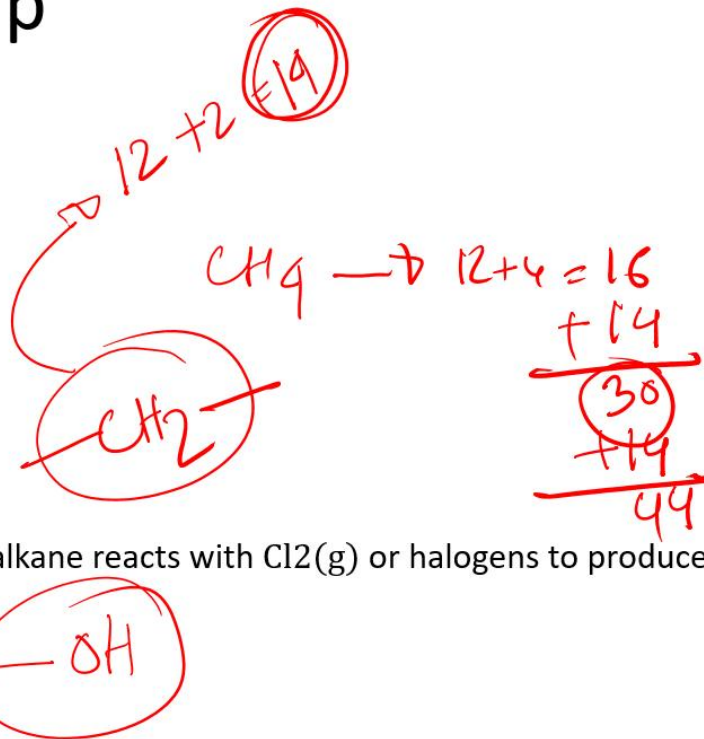
04. **General formula:** example: C_nH_{2n+2} , $C_nH_{2n+1}-OH$, $C_nH_{2n+1}-Cl$, $C_nH_{2n+1}-CHO$, $C_nH_{2n+1}-COOH$ etc ✓

05. **Molecular mass:** The mass of a member is 14 more than the previous member.

06. **Similar chemical properties:** example: in presence of sunlight all members of alkane reacts with $Cl_2(g)$ or halogens to produce alkyl chloride/halides.

07. **Similar preparation process:** example: Alkanes can be produced by hydrogenation of alkene or decarboxylation of carboxylic acid.

Chemical Reaction



উদ্ভাস

একাডেমিক গ্রন্থ এডমিশন কেয়ার

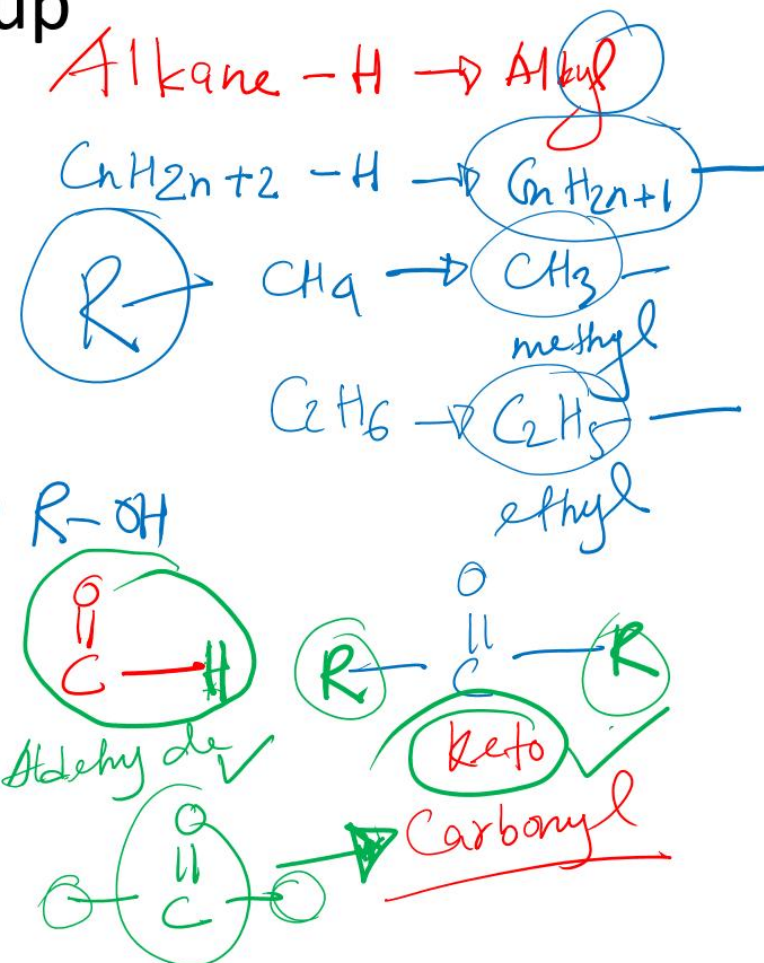
Activate Windows
Go to Settings to activate Windows.

Chemistry 2nd Paper

Chapter 2 : Organic Chemistry

Homologous Series & Functional Group

- ☐ Alkane $\begin{array}{c} | \\ \text{C} - \text{C} - \\ | \end{array}$ C_nH_{2n+2}
- ☐ Alkene $>C=C<$ C_nH_{2n}
- ☐ Alkyne $-C \equiv C-$ C_nH_{2n-2}
- ☐ Alcohol $-OH$ $C_nH_{2n+1}-OH \rightarrow R-OH$
- ☐ Aldehyde $\rightarrow -CHO$ $R-CHO$
- ☐ Ketone $\rightarrow -C(=O)-$ $R-C(=O)-R'$
- ☐ Carboxylic Acid $\rightarrow -COOH$ $R-COOH$



উদ্ভাস

একাডেমিক গ্রন্থ এডমিশন কেয়ার

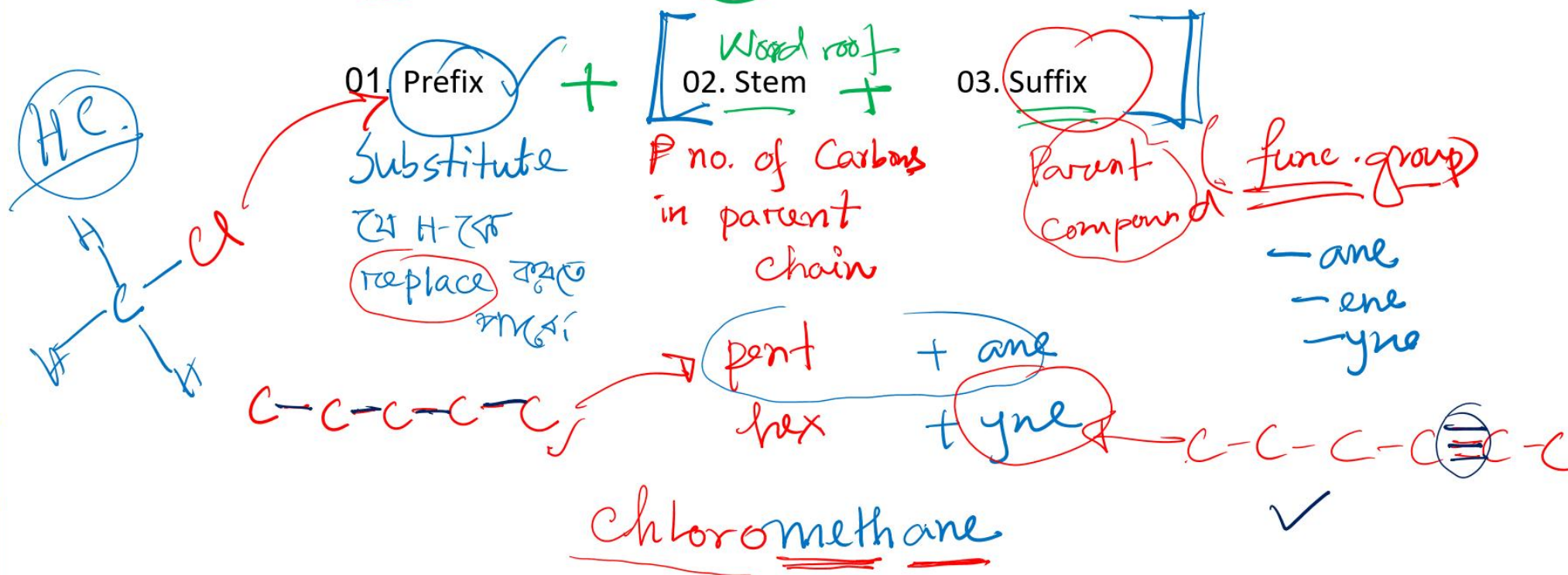
Activate Windows
Go to Settings to activate Windows.

Chemistry 2nd Paper

Chapter 2 : Organic Chemistry

Nomenclature of Organic Compounds

According to IUPAC system there are three parts in the nomenclature of organic compounds



উদ্ভাস

একাডেমিক এন্ড এডমিশন কেয়ার

Activate Windows
Go to Settings to activate Windows.

Chemistry 2nd Paper

Chapter 2 : Organic Chemistry



Nomenclature of Organic Compounds

C Atom in parent chain
C ₁
C ₂
C ₃
C ₄
C ₅
C ₆
C ₇
C ₈
C ₉
C ₁₀

meth
eth
prop
but
pent
hex
hept
oct
non
dec

root + Suffix

6 C. → Alcohol

↓
hexanol

7 C → Alkene

↓
heptene



উদ্ভাস

একাডেমিক গ্রন্থ এডমিশন কেয়ার

Activate Windows
Go to Settings to activate Windows.

Chemistry 2nd Paper

Chapter 2 : Organic Chemistry

Nomenclature of Organic Compounds

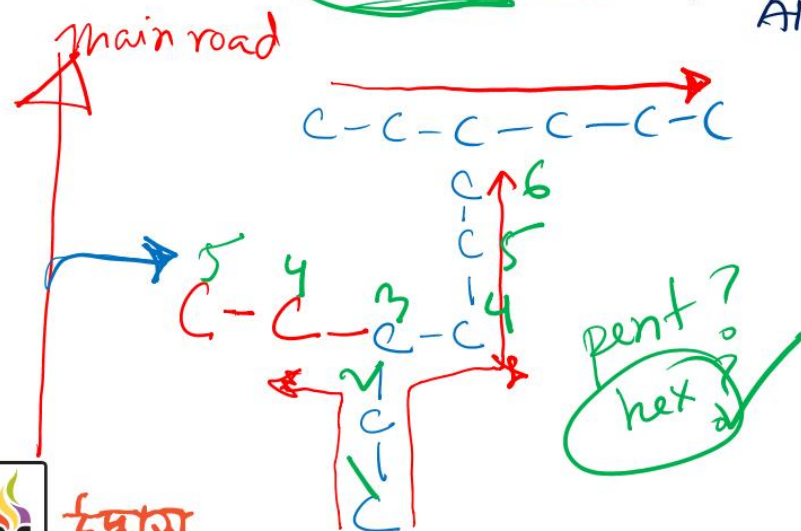
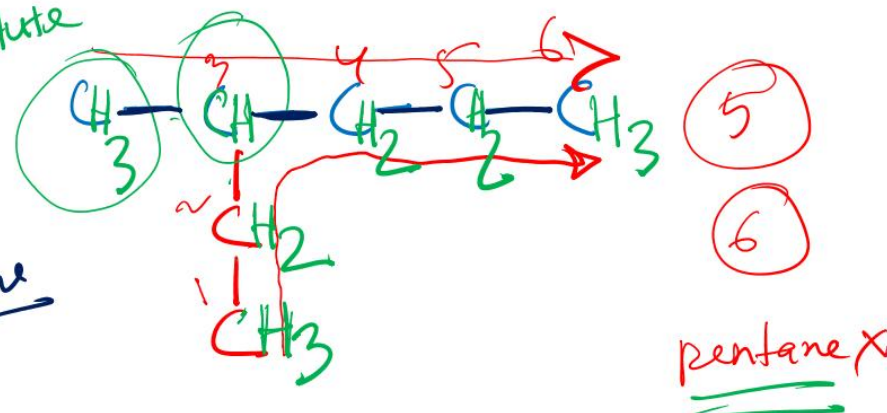
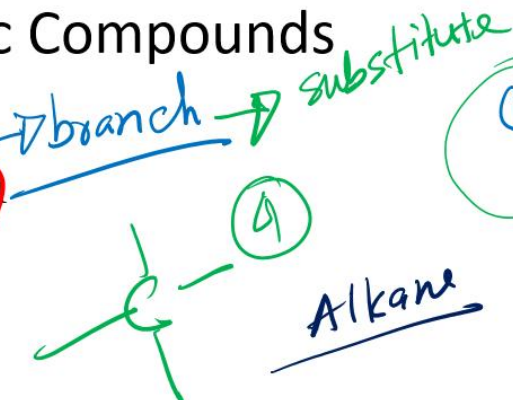
Characteristic of parent chain

☐ C-C chain

☐ longest

☐ Presence of functional group

Alkene
Alkyne



উদ্ভাস

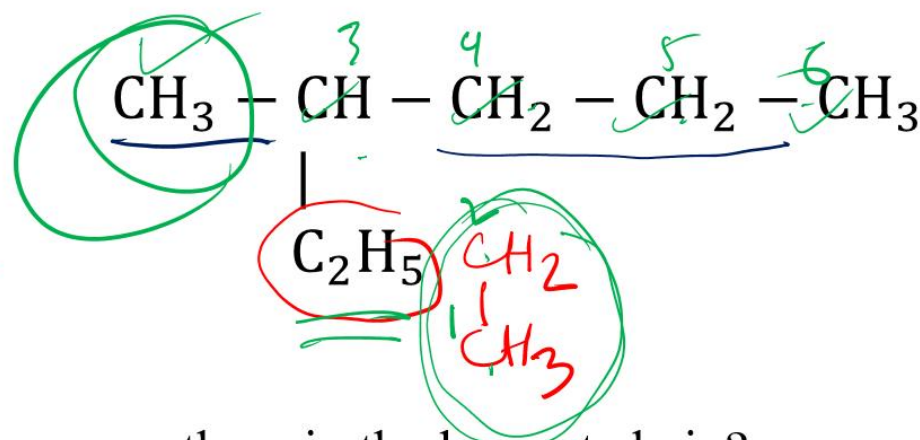
একাডেমিক এন্ড এডমিশন কেয়ার

Activate Windows
Go to Settings to activate Windows

Chemistry 2nd Paper

Chapter 2 : Organic Chemistry

Nomenclature of Organic Compounds



Total = 6



hexane



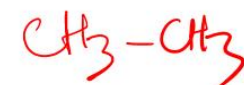
How many carbons are there in the longest chain?

(a) 4

(b) 5

✓ (c) 6

(d) 7



উদ্ভাস

একাডেমিক গ্রন্থ এডমিশন কেয়ার

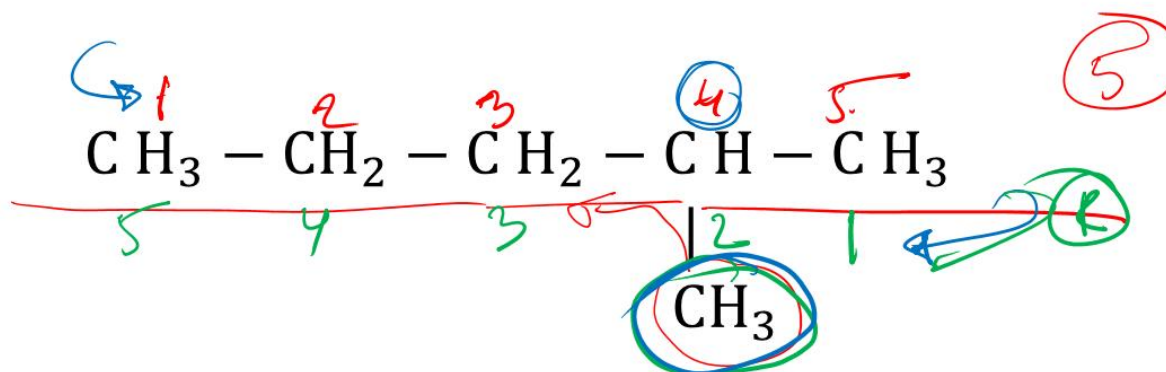
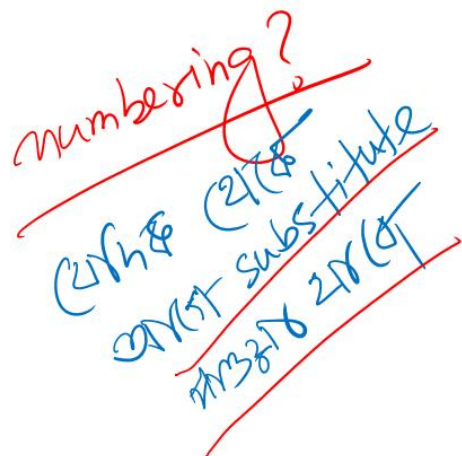
Activate Windows
 Go to Settings to activate Windows.

Chemistry 2nd Paper

Chapter 2 : Organic Chemistry

Nomenclature of Organic Compounds

In case of naming branched alkanes, at first the longest chain is determined


$$\begin{array}{cc} L & \rightarrow & A \\ R & \rightarrow & T \end{array}$$

4-methylpentane ✗
2-methylpentane ✓



উদ্ভাস

একাডেমিক এন্ড এডমিশন কেয়ার

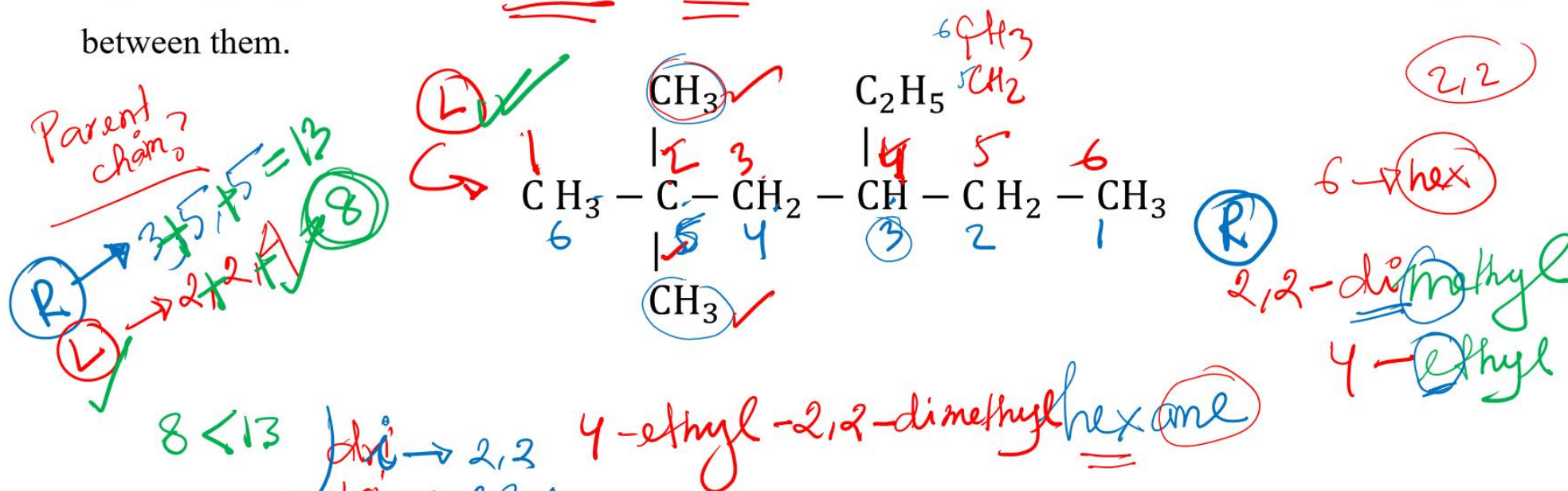
Chemistry 2nd Paper

Chapter 2 : Organic Chemistry

Pre + root + suf.

③ ① ② : Step

- A, B, C —



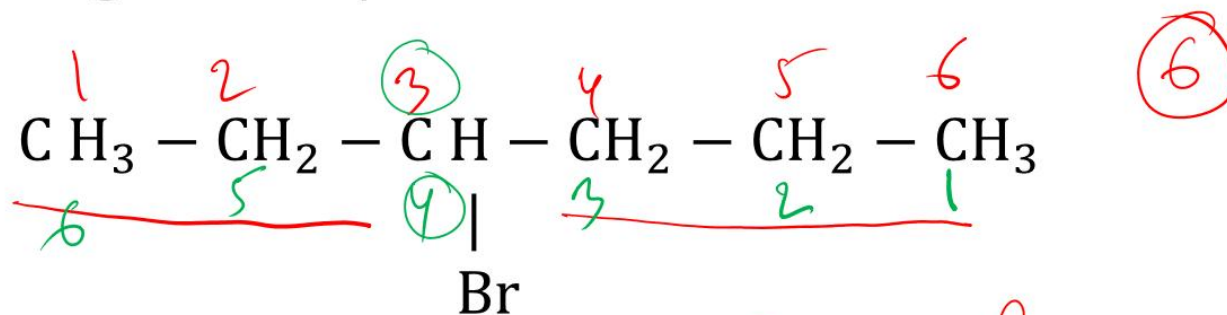
উদ্ভাস

একাডেমিক এন্ড এডমিশন কেয়ার

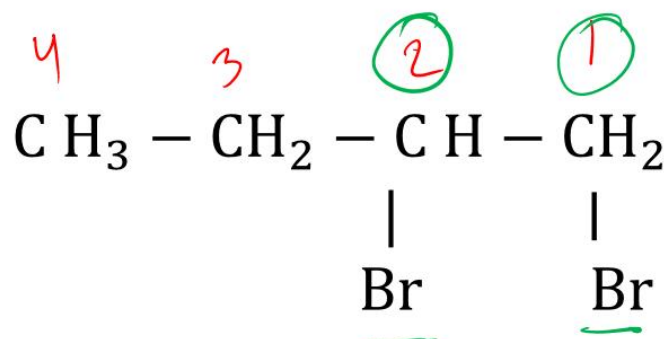
di → 2, 3 4 - s
 tri → 2, 3, 4
 tetra → 2, 12, 4, 4

Nomenclature of Organic Compounds

1 → 3 ✓
R → 4



3-bromohexane



1,2-dibromobutane

Halogens
F-
Cl-
Br-
I-



উদ্ভাস

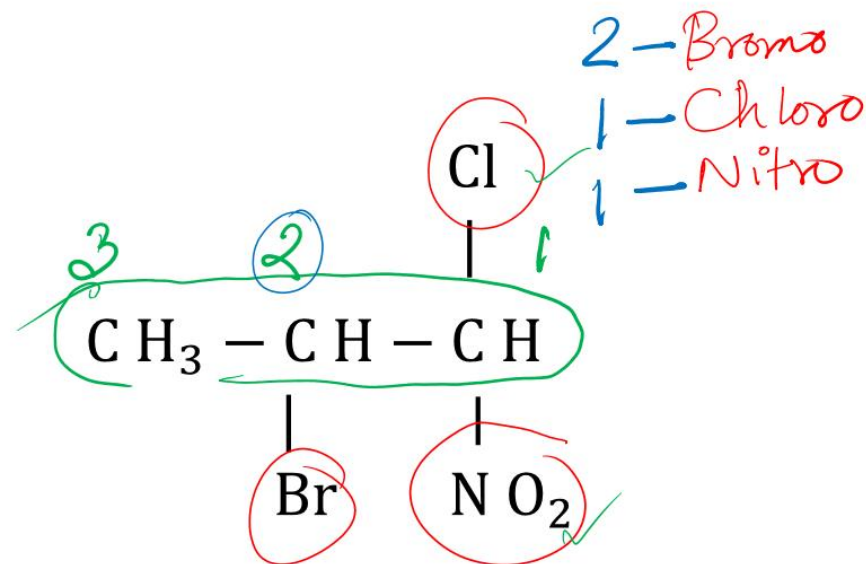
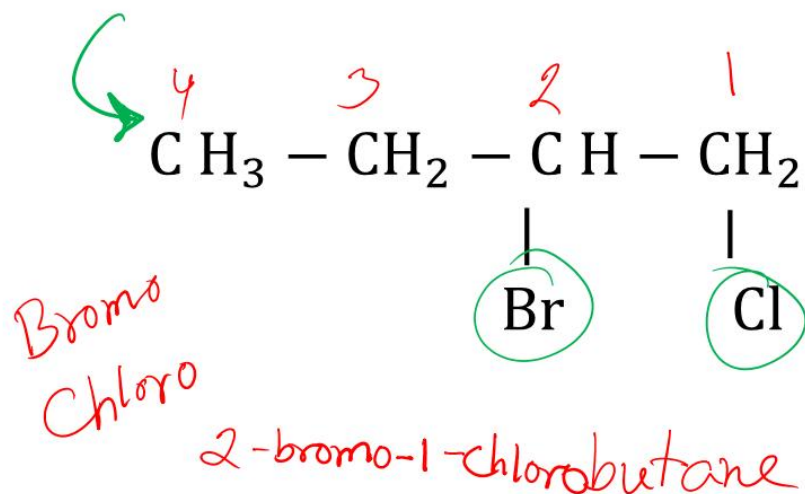
একাডেমিক এন্ড এডমিশন কেয়ার

Activate Windows
Go to Settings to activate Windows.

Chemistry 2nd Paper

Chapter 2 : Organic Chemistry

Nomenclature of Organic Compounds



2-bromo-1-chloro-1-nitropropane



উদ্ভাস

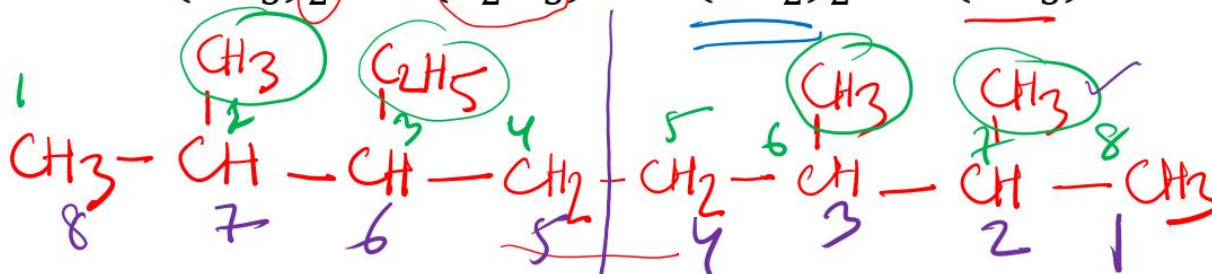
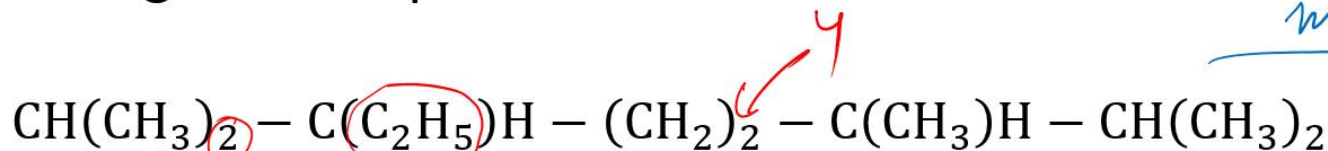
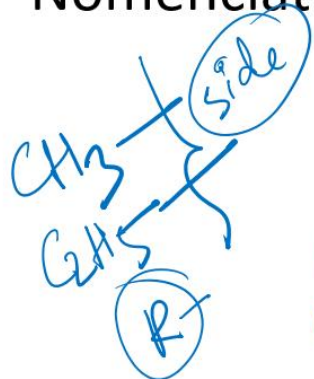
একাডেমিক এন্ড এডমিশন কেয়ার

Activate Windows
Go to Settings to activate Windows.

Chemistry 2nd Paper

Chapter 2 : Organic Chemistry

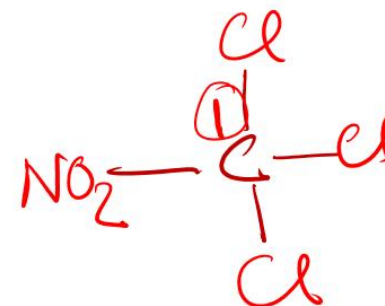
Nomenclature of Organic Compounds



3-ethyl-2,6,7-trimethyloctane

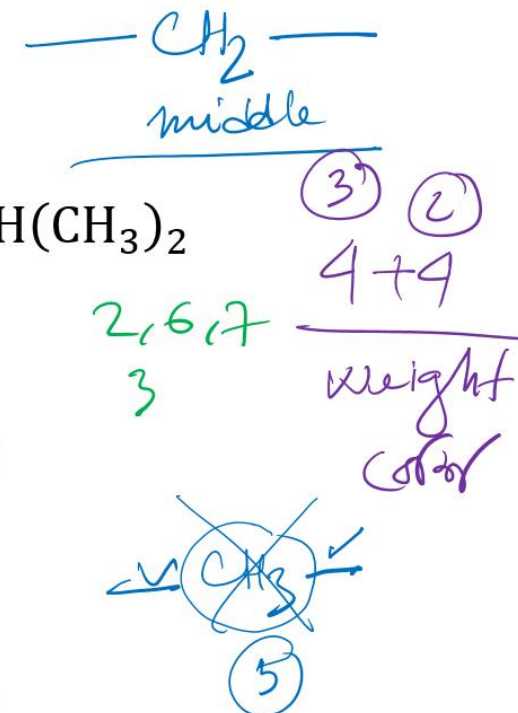


Chloropicrin ✓



IUPAC

1,1,1-trichloro-1-nitro methane ✓



উদ্ভাস

একাডেমিক এন্ড এডমিশন কেয়ার

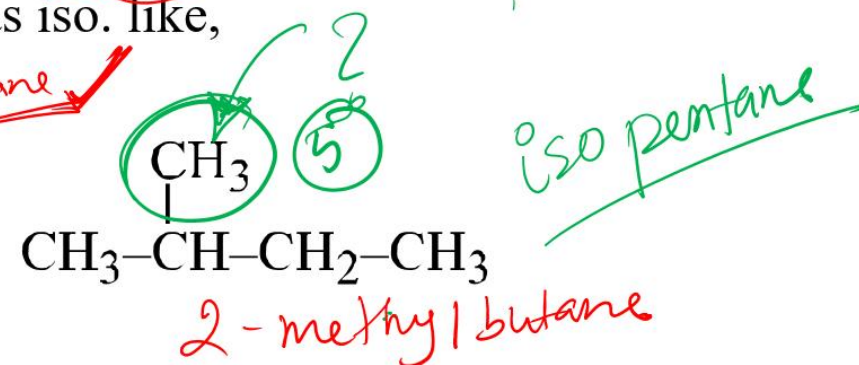
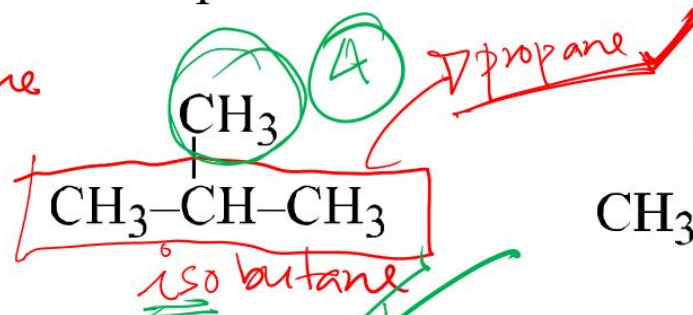
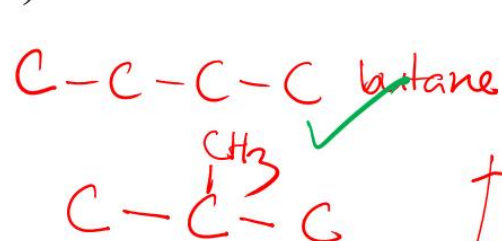
Activate Windows
 Go to Settings to activate Windows.

Chapter 2 : Organic Chemistry

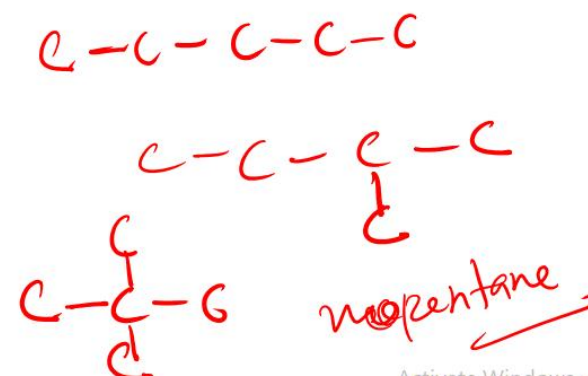
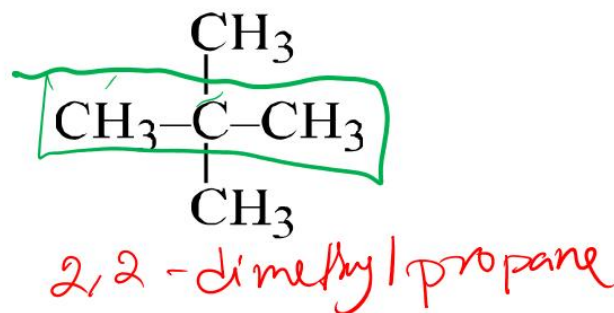
Nomenclature of Organic Compounds

~~IPUAC~~ 2016

long time ago ^{not applicable} when organic compounds are named as iso, neo etc. When a methyl group (-CH₃) is there as a branch the compound is named as iso. like,



if there are two methyl groups with the same carbon as branches in that case it is named as neo. like, ^{ethyl}



উদ্ভাস

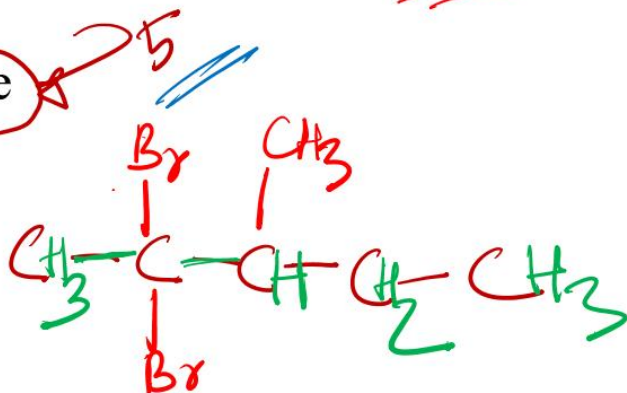
একাডেমিক এন্ড এডমিশন কেয়ার

Chemistry 2nd Paper

Chapter 2 : Organic Chemistry

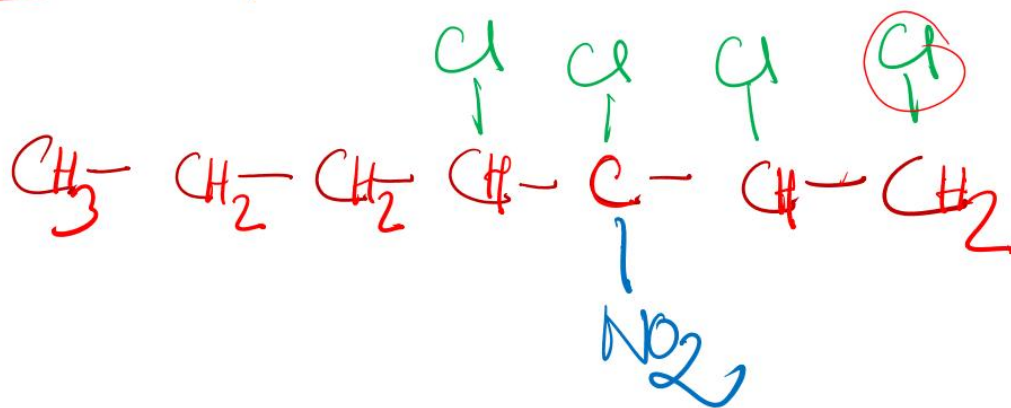
Determining formula from Name

2,2-dibromo-3-methylpentane



same
Left / Right
As your wish

1,2,3,4-tetrachloro-3-nitroheptane



উদ্ভাস

একাডেমিক গ্রন্থ এডমিশন কেয়ার

Activate Windows
Go to Settings to activate Windows.

Chemistry 2nd Paper

Chapter 2 : Organic Chemistry

Naming of alkenes

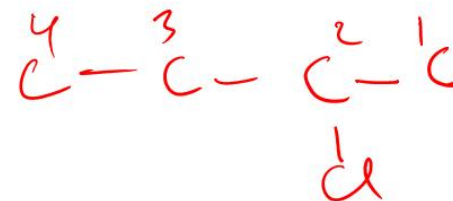
01. 'ene' is written after the name of the compounds

02. Including the carbon carbon double bond the longest chain is considered the main chain.

03. The parent chain is selected in such a manner that all the side chains must be directly connected to the parent chain. This implies that none of the side chains will have additional branches.

04. The carbons in the main chain are numbered. Numbering is started from where the carbon carbon

double bond is near



উদ্ভাস

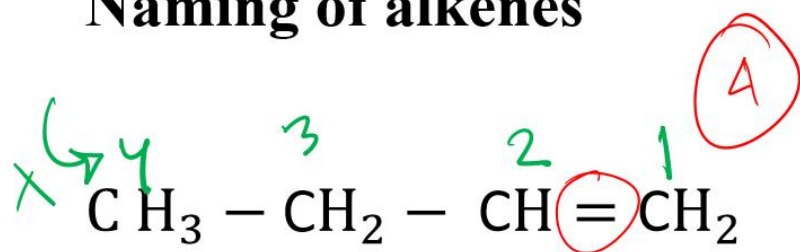
একাডেমিক গ্রন্থ এডমিশন কেয়ার

Activate Windows
Go to Settings to activate Windows.

Chemistry 2nd Paper

Chapter 2 : Organic Chemistry

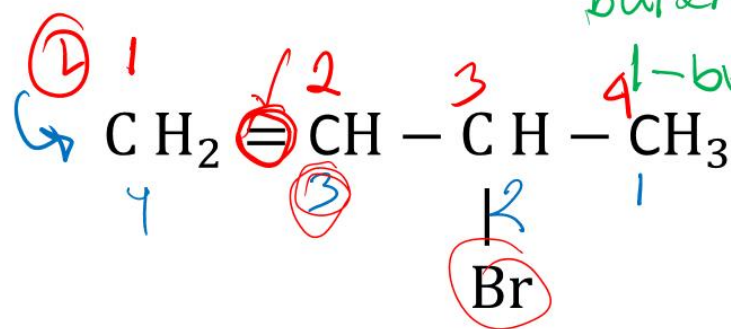
Naming of alkenes



but-1-ene

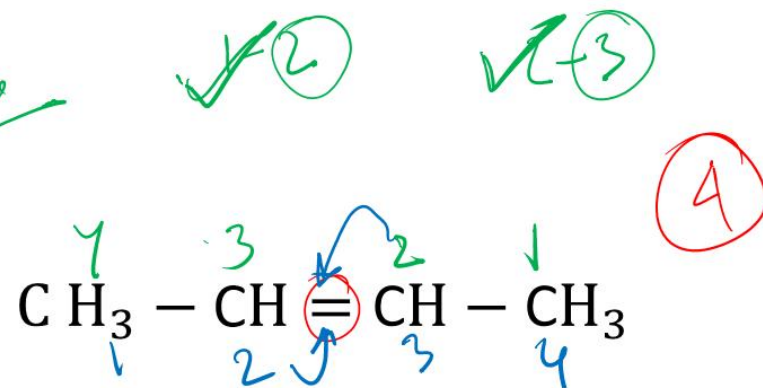
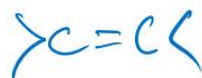
butene-1

1-butene

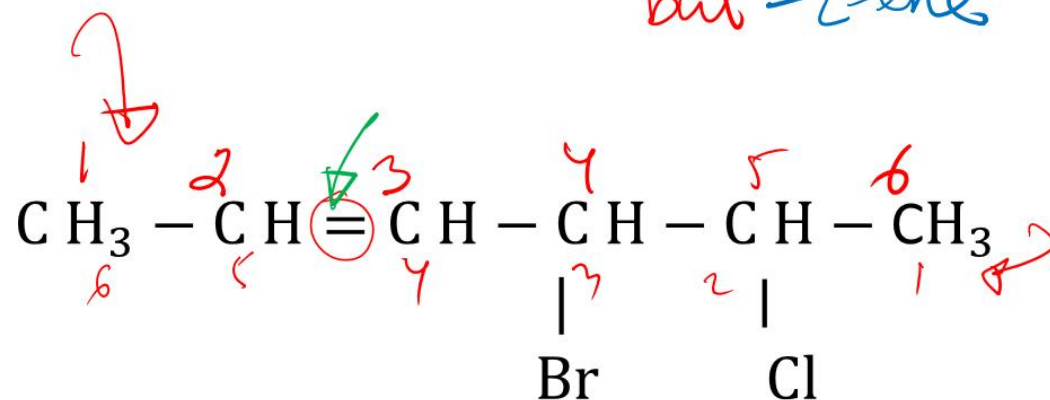


3-bromobut-1-ene

priority:



but-2-ene



4-bromo-5-chlorohex-2-ene



উদ্ভাস

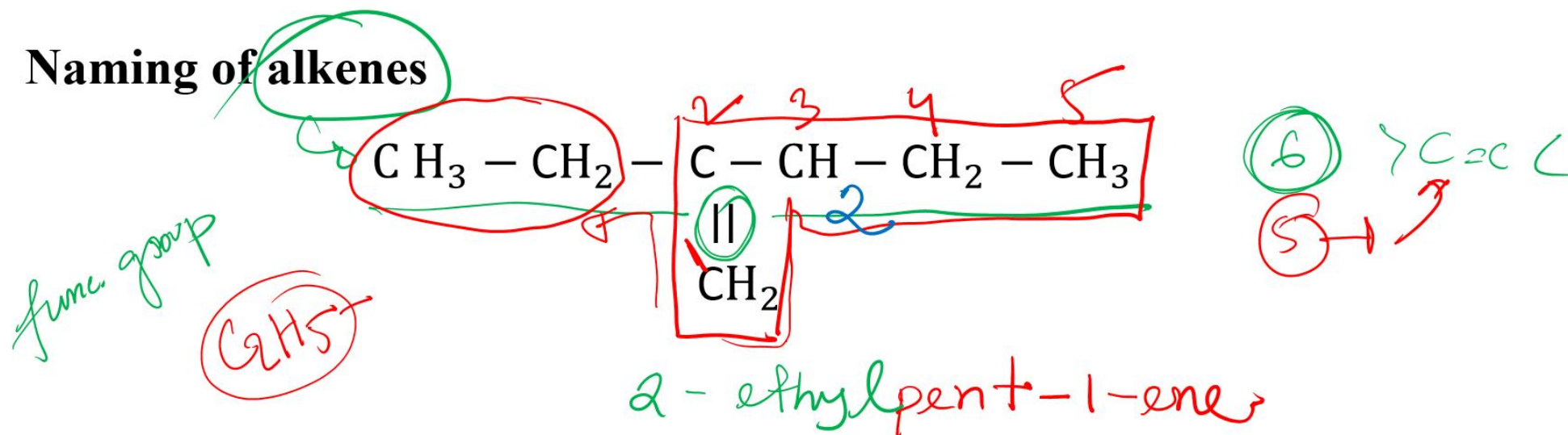
একাডেমিক গ্রন্থ এডমিশন কেয়ার

Activate Windows
Go to Settings to activate Windows.

Chemistry 2nd Paper

Chapter 2 : Organic Chemistry

Naming of alkenes



How many carbons are there in the parent chain of the compound?

- (a) 4
- ☒ (b) 5
- (c) 6



উদ্ভাস

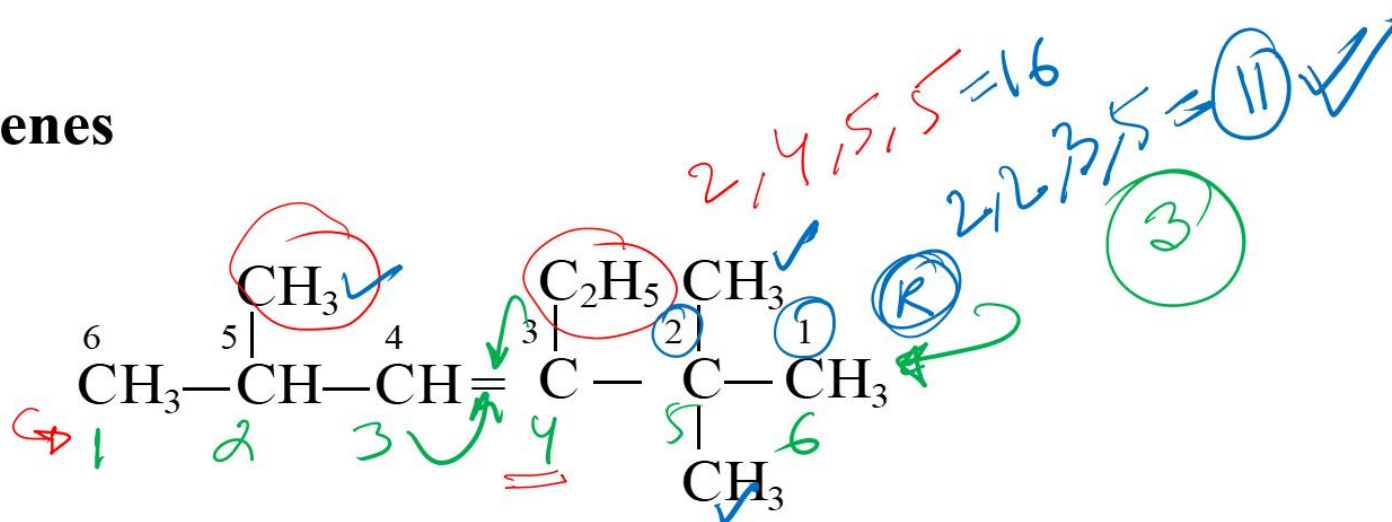
একাডেমিক এন্ড এডমিশন কেয়ার

Activate Windows
Go to Settings to activate Windows.

Chemistry 2nd Paper

Chapter 2 : Organic Chemistry

Naming of alkenes



3-ethyl-2,2,5-trimethylhex-3-ene

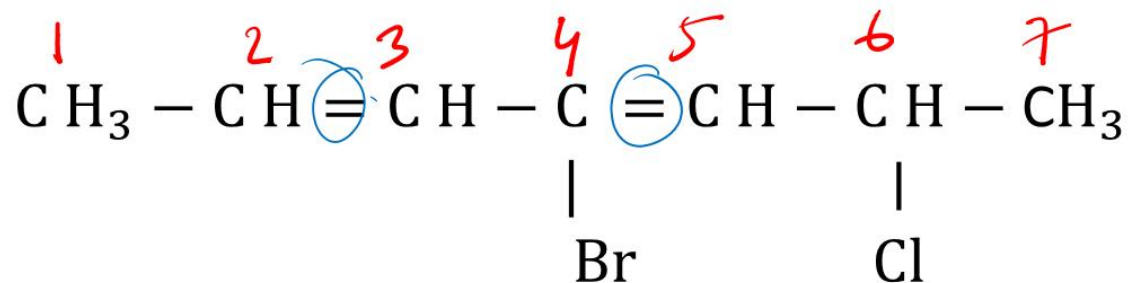


উদ্ভাস

একাডেমিক এন্ড এডমিশন কেয়ার

Naming of alkenes

Practice



hint: diene

Solve:

4-bromo-6-chlorohept-2,4-diene



উদ্ভাস

একাডেমিক এন্ড এডমিশন কেয়ার

Activate Windows
Go to Settings to activate Windows.

Chemistry 2nd Paper

Chapter 2 : Organic Chemistry

Naming of alkynes

01. Yne will be their after the names of each compounds.
02. Keeping carbon carbon triple bond included ($-\text{C} \equiv \text{C}-$) the longest chain is taken as the main chain.
03. Rest of the rules similar to alkene



উদ্ভাস

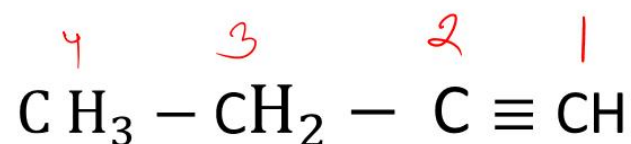
একাডেমিক এন্ড এডমিশন কেয়ার

Activate Windows
Go to Settings to activate Windows.

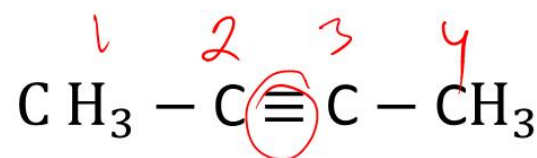
Chemistry 2nd Paper

Chapter 2 : Organic Chemistry

Naming of alkynes

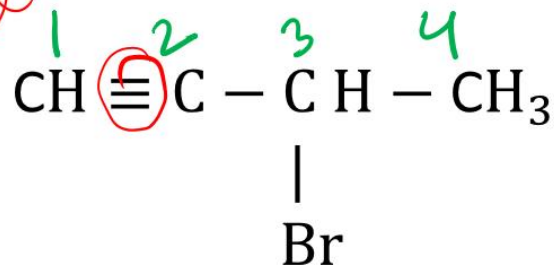


but-1-yne



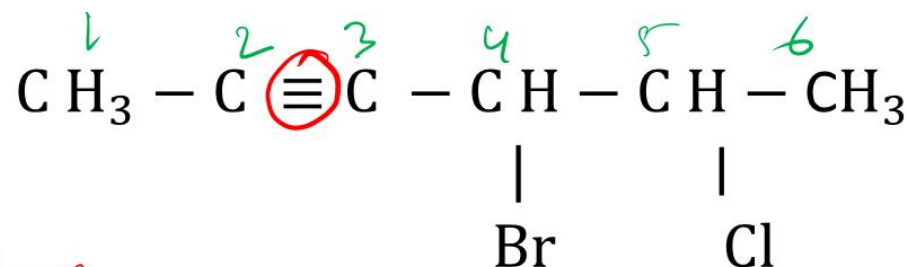
but-2-yne

Practice
→



Solve:

3-bromo-but-1-yne



Solve:

4-bromo-5-chlorohex-2-yne



উদ্ভাস

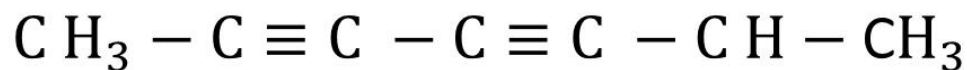
একাডেমিক এন্ড এডমিশন কেয়ার

Activate Windows
Go to Settings to activate Windows.

Chemistry 2nd Paper

Chapter 2 : Organic Chemistry

Naming of alkynes



Cl

mother compound

What will be the name of the compound?

(a) 2-chlorohept-3,5-diyne

(b) 6-chlorohept-2,4-diyne ✓



উদ্ভাস

একাডেমিক এন্ড এডমিশন কেয়ার

Activate Windows
Go to Settings to activate Windows.

Chemistry 2nd Paper

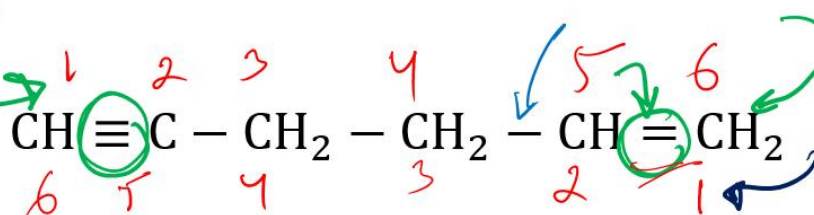
Chapter 2 : Organic Chemistry

Presence of both carbon carbon double bond ($\text{C}=\text{C}$) and carbon carbon triple bond ($\text{C}\equiv\text{C}$)

Priority
numbering

একটি ব্রাঙ্কি
একটি ব্রাঙ্কি

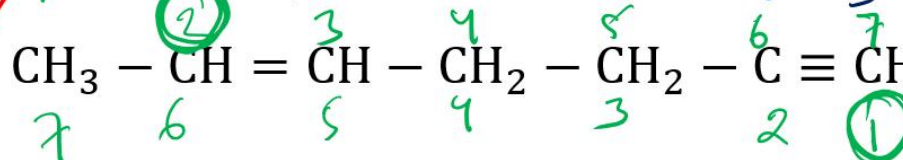
C.no. 1



L → hex-5-ene-1-yne

R → hex-1-ene-5-yne

complex: ①

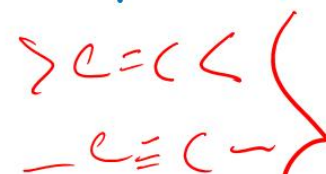


Alkene > Alkyne

hept-2-ene-6-yne

Alkemyne:

ene + yne



Alkene / Alkyne



উদ্ভাস

একাডেমিক এন্ড এডমিশন কেয়ার

Activate Windows
Go to Settings to activate Windows

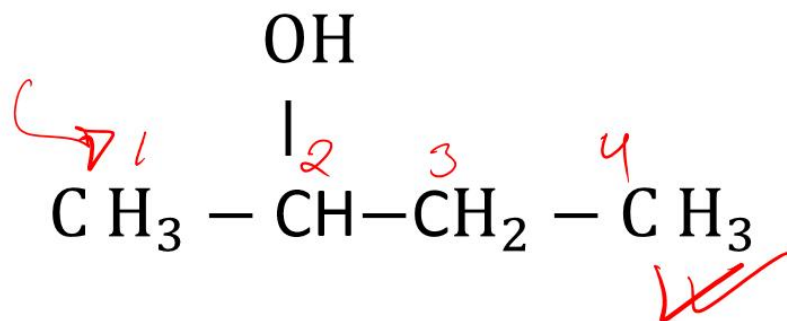
Chemistry 2nd Paper

Chapter 2 : Organic Chemistry

Naming of alcohols

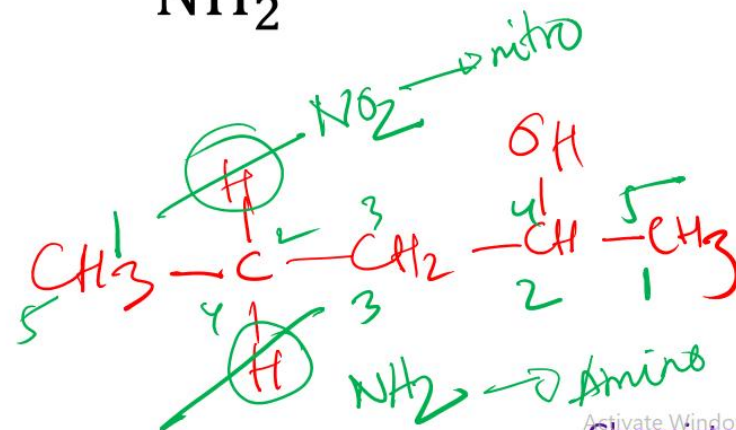
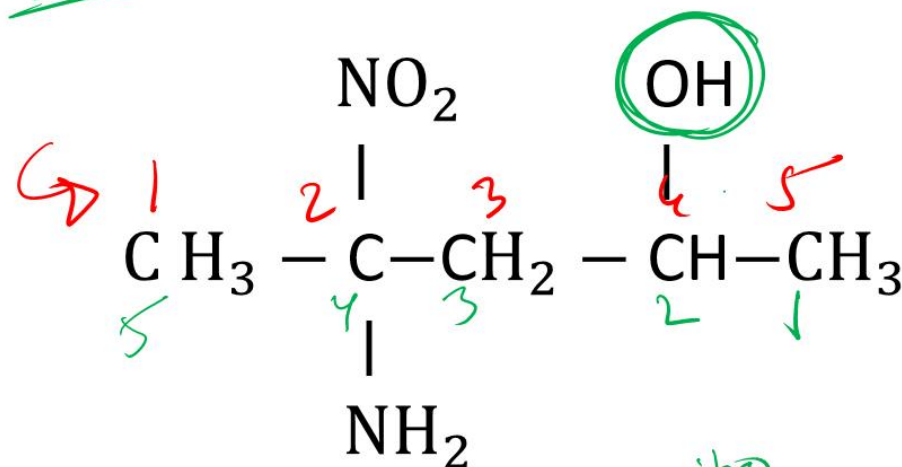
OH \rightarrow functional group

4-Amino-4-nitropent-2-ol



but-2-ol ✓
butanol-2

pent-2-ol



উদ্ভাস

একাডেমিক এন্ড এডমিশন কেয়ার

Chemistry 2nd Paper

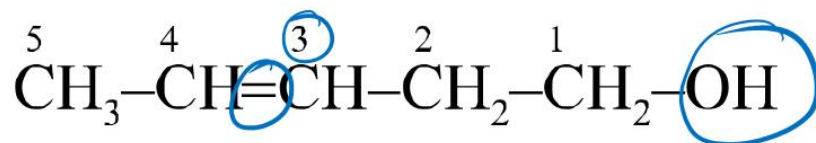
Chapter 2 : Organic Chemistry

Naming of alcohols

enol \rightarrow ene + al

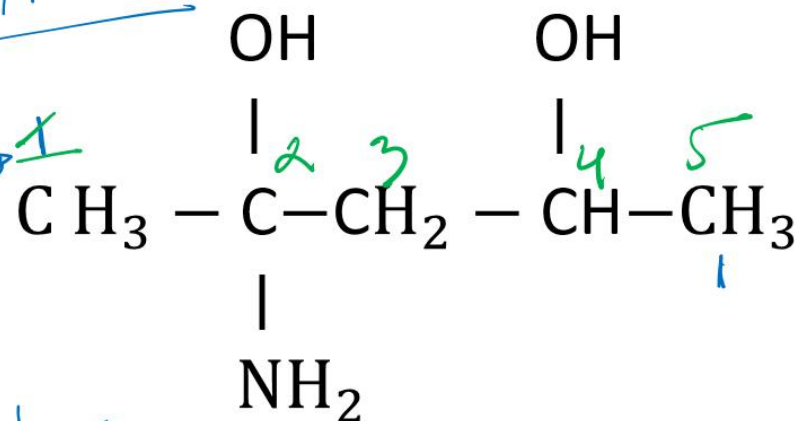
Practice:

diol



pent-3-ene-1-ol

C-1



Solve:

2-aminopent-2,4-diol



উদ্ভাস

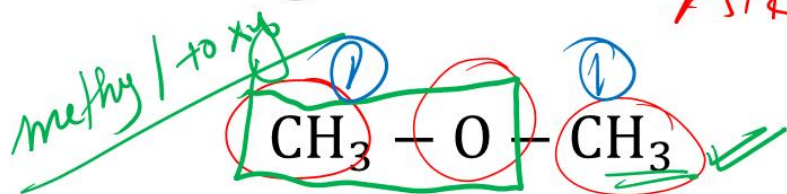
একাডেমিক গ্রন্থ এডমিশন কেয়ার

Activate Windows
Go to Settings to activate Windows.

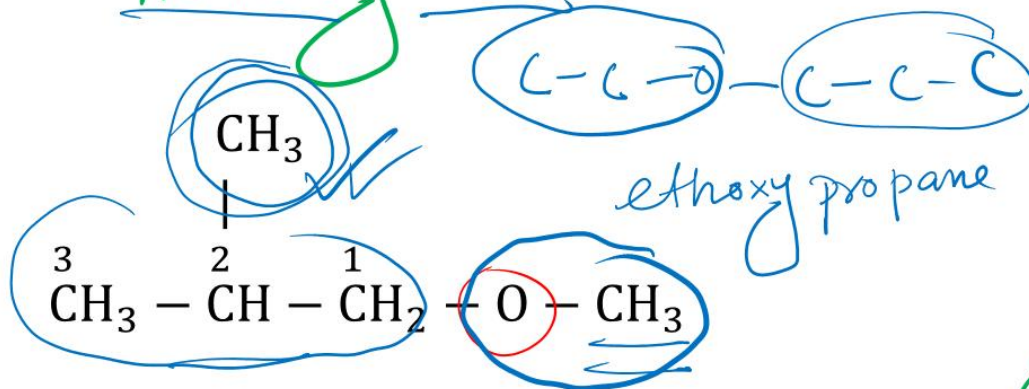
Chemistry 2nd Paper

Chapter 2 : Organic Chemistry

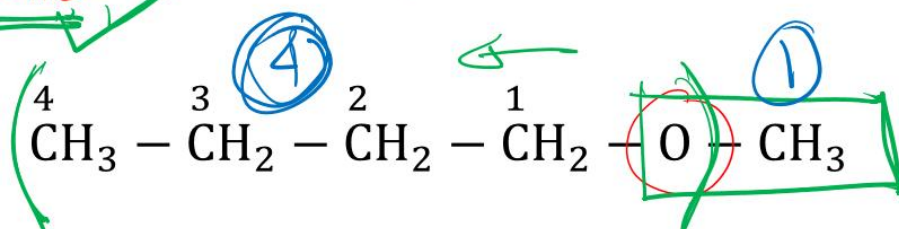
Naming of ethers



methoxymethane

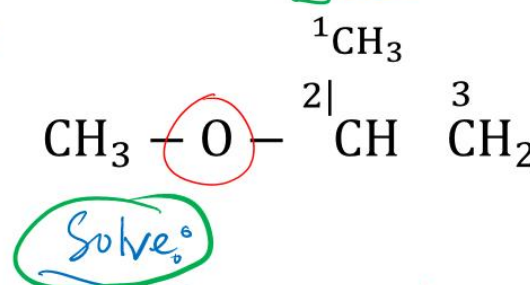


2-methylmethoxypropane



methoxybutane

butoxymethane



2-methoxypropane



উদ্ভাস

একাডেমিক এন্ড এডমিশন কেয়ার

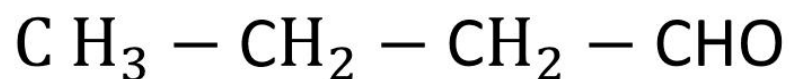
Activate Windows
Go to Settings to activate Windows.

Chemistry 2nd Paper

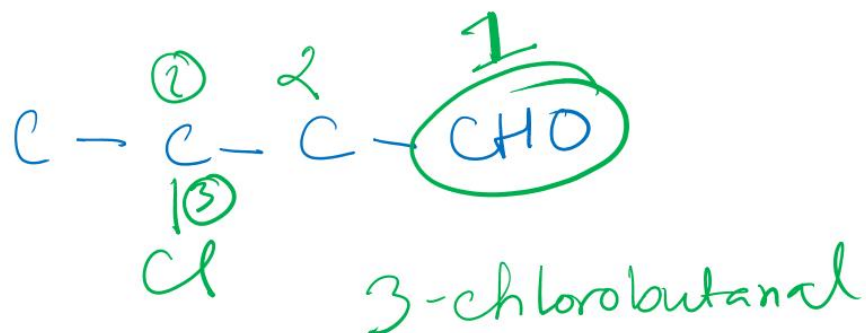
Chapter 2 : Organic Chemistry

Naming of aldehydes

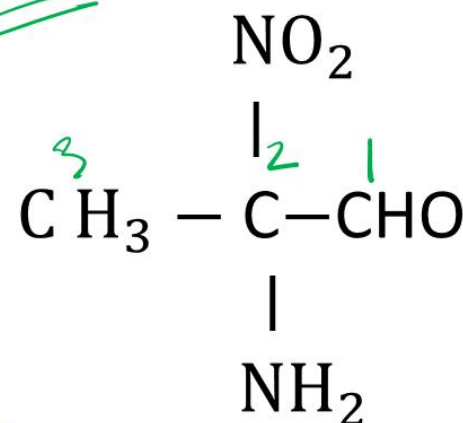
④



but-1-al \rightarrow butanal



$\rightarrow \underline{\text{CHO}} \rightarrow$ always (no. 1)



practice \rightarrow

Solve:

2-amino-2-nitropropanal



উদ্ভাস

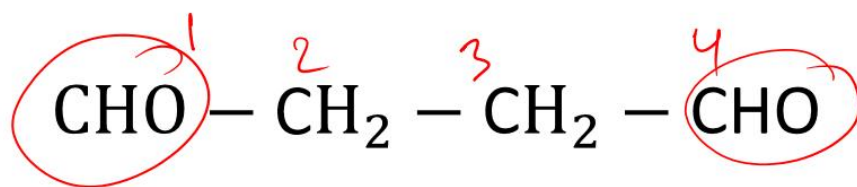
একাডেমিক এন্ড এডমিশন কেয়ার

Activate Windows
Go to Settings to activate Windows.

Chemistry 2nd Paper

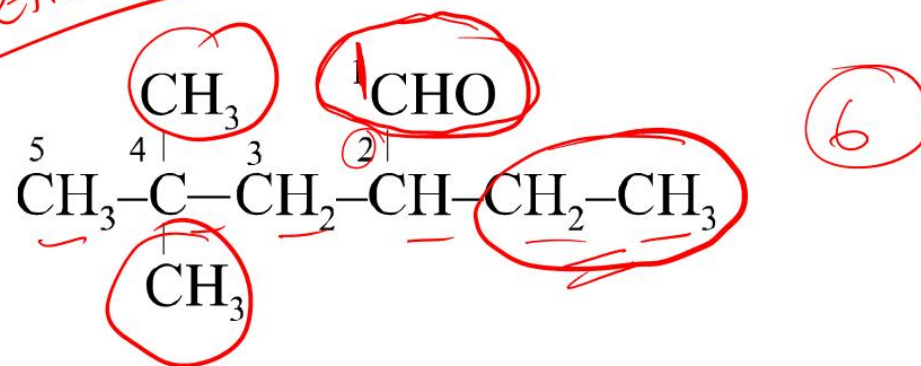
Chapter 2 : Organic Chemistry

Naming of aldehydes



but-1,4-dial

Practice:



2-ethyl-4,4-dimethylpent-1-al



উদ্ভাস

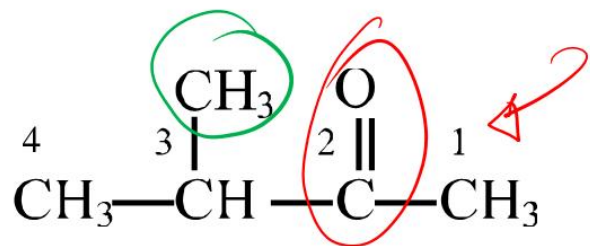
একাডেমিক গ্রন্থ এডমিশন কেয়ার

Activate Windows
Go to Settings to activate Windows.

Chemistry 2nd Paper

Chapter 2 : Organic Chemistry

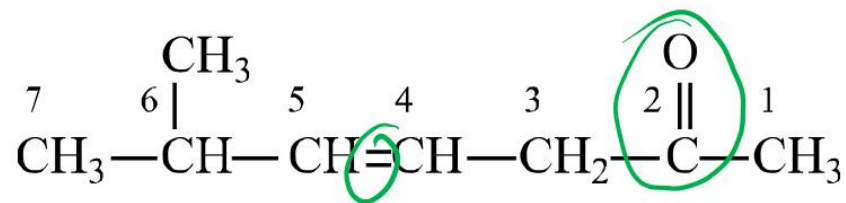
Naming of Ketones



3-methylbut-2-one

Practice:

4-one-2-one



Solve:

6-methylhept-4-ene-2-one



উদ্ভাস

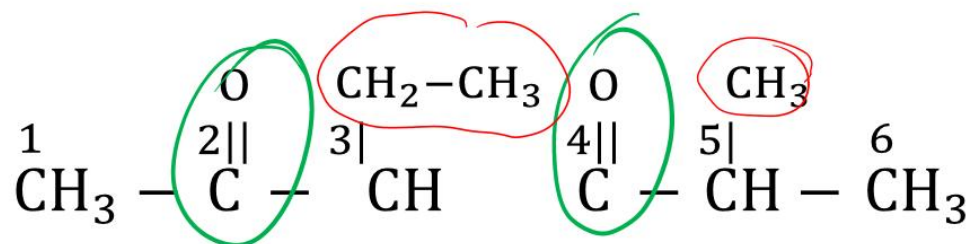
একাডেমিক গ্রন্থ এডমিশন কেয়ার

Activate Windows
Go to Settings to activate Windows.

Chemistry 2nd Paper

Chapter 2 : Organic Chemistry

Naming of Ketones



3-ethyl-5-methylhex-2,4-dione



উদ্ভাস

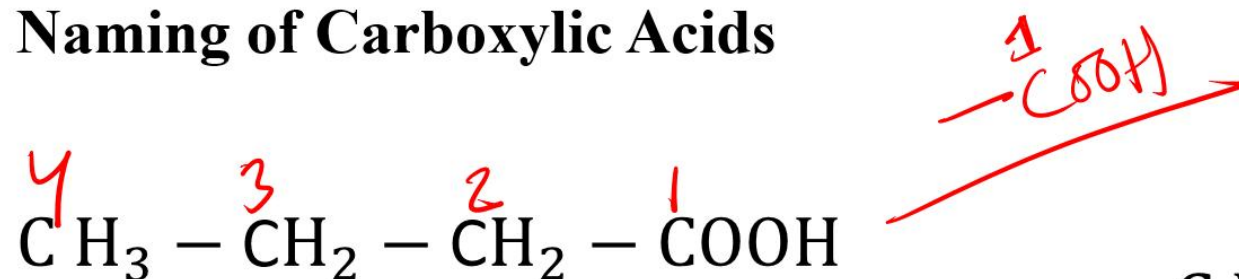
একাডেমিক এন্ড এডমিশন কেয়ার

Activate Windows
Go to Settings to activate Windows.

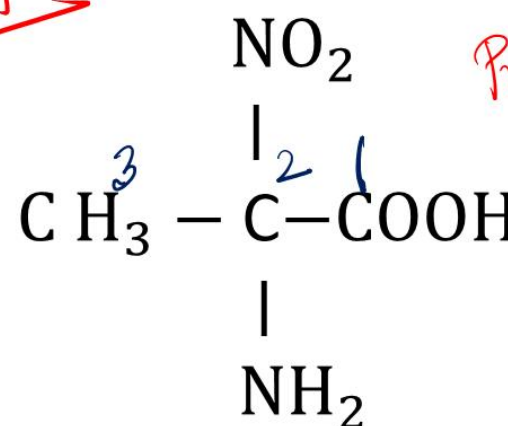
Chemistry 2nd Paper

Chapter 2 : Organic Chemistry

Naming of Carboxylic Acids

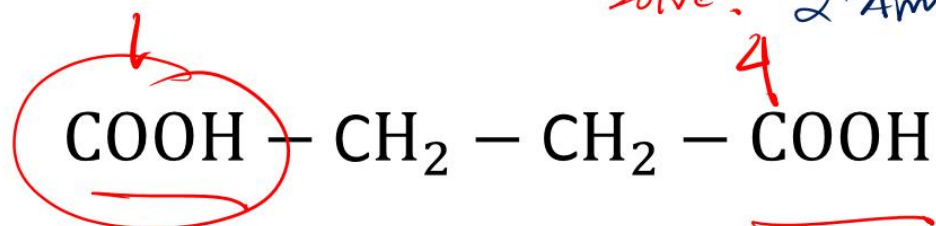


butanoic acid



Practice

Solve: 2-Amino-2-nitropropanoic acid



but-1,4-dioic acid



উদ্ভাস

একাডেমিক গ্রন্থ এডমিশন কেয়ার

Activate Windows
Go to Settings to activate Windows.

Chemistry 2nd Paper

Chapter 2 : Organic Chemistry

Naming Of Compounds if there are Two Functional Groups in the Molecule Of Organic Compound

01. The longest carbon chain is taken as the main chain which includes the functional group.
02. By keeping the main functional group nearest, numbering of the carbon is done.
03. The substituents or secondary functional groups are named in alphabetical order and expressed by their positions.
- If they are more than one in number they are expressed as di, tri, tetra etc.
04. According to the main functional group the compound is named as its homologue



উদ্ভাস

একাডেমিক গ্রন্থ এডমিশন কেয়ার

Activate Windows
Go to Settings to activate Windows.

Chemistry 2nd Paper

Chapter 2 : Organic Chemistry

Order of reactivity of functional groups

order	homologous series	Functional group	name of the secondary group	name of the main functional group
01	carboxylic acid *	$-\text{COOH}$	carboxy	oic acid
02	ester	$-\text{COOR}$	alcoycarbonyl	alkyl --- oate
03	acid halide	$-\text{COX}$	haloformyl	oyl halide
04	amide	$-\text{CONH}_2$	carbamoyl	amide
05	nitrile	$-\text{CN}$	cyano	nitrile
06	aldehyde *	$-\text{CHO}$	formyl	al or nal
07	ketone *	CO	oxo or keto	one
08	alcohol *	$-\text{OH}$	hydroxy	ol
09	oil	$-\text{SH}$	mercapto	thiol
10	amine	$-\text{NH}_2$	amino	amine
11	ether	$-\text{OR}$	alcoxy	-
12	alkene *	$-\text{C} \equiv \text{C}-$	yne	yne
13	alkyne *	$\text{>C}=\text{C}<$	ene	ene
14	halide	$-\text{X}$	halo	-
15	nitro	$-\text{NO}_2$	nitro	-



উদ্ভাস

একাডেমিক গ্রুপ এডমিশন কেয়ার

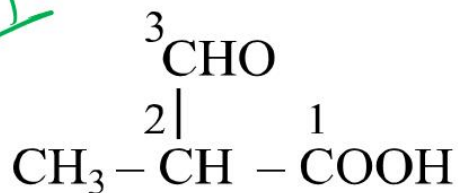
Activate Windows
Go to Settings to activate Windows.

Chemistry 2nd Paper

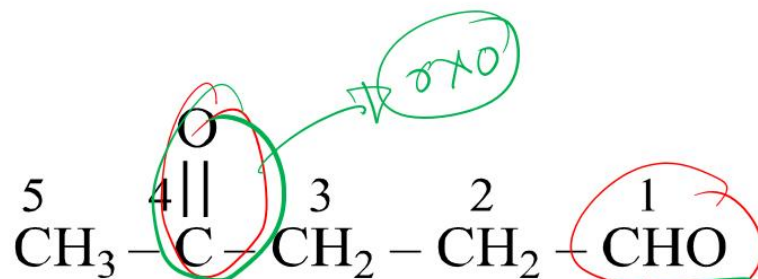
Chapter 2 : Organic Chemistry

Naming Of Compounds if there are Two Functional Groups in the Molecule Of Organic Compound

Practice

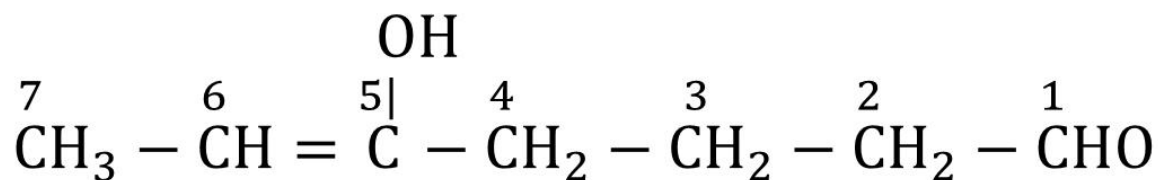


3-carbaldehyde-2-methyl propan-1-carboxylic acid



Aldhyde ✓
Ketone ✗

4-oxopent-1-al



5-hydroxyhept-5-ene-1-al



উদ্ভাস

একাডেমিক গ্রন্থ এডমিশন কেয়ার

Activate Windows
Go to Settings to activate Windows.

Chemistry 2nd Paper

Chapter 2 : Organic Chemistry

লেগে থাকো সৎ ভাবে,
স্বপ্ন জয় তোমারই হবে।



উদ্ভাস

মানবসম্পদ উন্নয়ন ও জ্ঞান-প্রযুক্তি পরিচালনা

Activate Windows
Go to Settings to activate Windows.

www.udvash.com