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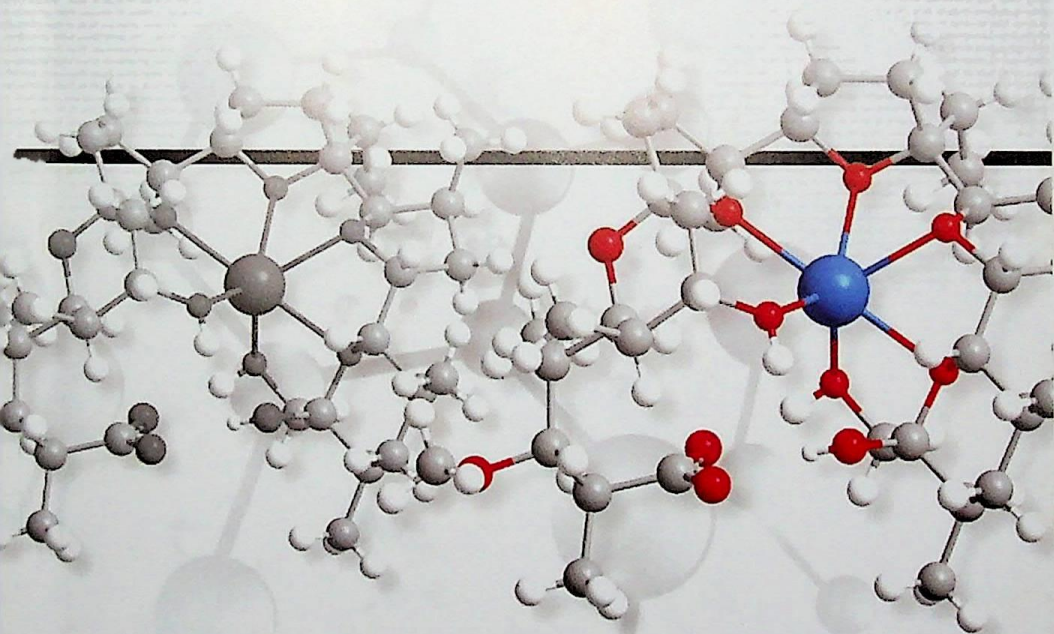
O-64

H.S.Tojimuhamedov, T.S.Xoliqov,
N.H.Qutlimurotova, J.B.Tursunqulov

ORGANIK KIMYO

ORGANIK BIRIKMALARNI

NOMLASH



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O'ZBEKISTON RESPUBLIKASI
OLIY VA O'RTA MAXSUS TA'LIM VAZIRLIGI

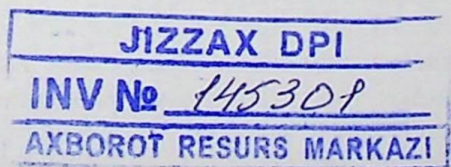
MIRZO ULUG'BEK NOMIDAGI
O'ZBEKISTON MILLIY UNIVERSITETI

KIMYO FAKULTETI

H.S.Tojimuhamedov, T.S.Xoliqov,
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ORGANIK KIMYO ORGANIK BIRIKMALARNI NOMLASH

Universitet talabalari uchun o'quv qo'llanma



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O 64

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ANNOTATSIYA

O'quv qo'llanmada organik birikmalarni IUPAC qoidalariga muvofiq zamonaviy nomlashga doir materiallar berilgan. IUPAC nomenklaturasi tarkibiga kiruvchi tarixiy, ratsional, o'rinbosarli, additiv, subtraktiv, "a" nomenklatura qoidalari misollar bilan tushuntirilgan. Kraun efirlari, ba'zi tabiiy birikmalar, dorivor preparatlar, pestisidlar va ularning hosilalarini nomlash to'g'risida ham ma'lumotlar berilgan.

O'quv qo'llanma universitet talabalariga mo'ljallangan. Undan o'rta maktab, akademik lisey, kasb-hunar kollejlarining yuqori sinf o'quvchilari, yosh o'qituvchilar ham foydalanishlari mumkin.

В учебном пособии даны материалы, связанные с современной номенклатурой органических соединений в согласии с правилами IUPAC. Правила тривиальной, рациональной, заместительной, аддитивной, субтрактивной, "а" номенклатур, входящие в состав номенклатуры IUPAC подробно объяснены на примерах. Даны сведения по номенклатуре краун эфиров, некоторых природных соединений, лекарственных препаратов, пестицидов и их производных.

Учебное пособие предназначено студентам университетов. Им могут пользоваться также ученики старших классов средних школ, академических лицеев, профессиональных колледжей и молодые преподаватели.

The training manual provides materials related to the modern nomenclature of organic compounds in accordance with the rules of IUPAC. The rules of trivial, rational, substitutive, additive, subtractive, "a" nomenclature included in the IUPAC nomenclature are explained in detail by examples. Information on the nomenclature of crown esters, some natural compounds, drugs, pesticides and their derivatives is given.

The training manual is intended for University students. It can also be used by students of senior secondary schools, academic lyceums, professional colleges and young teachers.

Kirish

Bugungi kunda oliy ta'lim muassasalarida o'quv-tarbiyaviy jarayonlarni yuqori ilmiy-metodik, ma'naviy-ma'rifiy darajada olib borish, talabalarni fanning oxirgi yutuqlari doirasida o'rgatib borish dolzarb vazifalardan xisoblanadi.

O'zbekiston Respublikasi Prezidentining "Oliy ta'lim tizimini yanada rivojlantirish chora-tadbirlari to'g'risida"gi 2017-yil 20-apreldagi PQ-2909-, "Mirzo Ulug'bek nomidagi O'zbekiston Milliy Universitetida talab yuqori bo'lgan malakali kadrlar tayyorlash tizimini tubdan takomillashtirish va ilmiy salohiyatini rivojlantirish chora-tadbirlari to'g'risida"gi 2019-yil 17-iyundagi PQ-4358- va "Kimyo va biologiya yo'nalishlarida uzluksiz ta'lim sifatini va ilm-fan natijadorligini oshirish chora-tadbirlari to'g'risida"gi 2020-yil 12-avgustdagi PQ-4805 qarorlaridagi ustuvor yo'nalishlar mazmunidan kelib chiqqan holda darsliklar va o'quv qo'llanmalar tayyorlash muhim ahamiyat kasb etadi.

Shu munosabat bilan universitetlarda kimyo fanidan, shu jumladan organik kimyo fanidan zamonaviy o'quv adabiyotlarini tayyorlash dolzarbdir. Organik kimyo fanini chuqur o'rganishda organik birikmalarni zamonaviy qoidalar asosida nomlash katta ahamiyatga egadir.

Kimyoviy birikmalarni nomlash kimyoviy til bo'lib, uning odatdagi tillardan asosiy farqi ham shu nomlashdir. Kimyoviy tilning yana bir o'ziga xos tomoni, uning yozma shaklining og'zaki shakliga nisbatan juda muhim ekanligidir. Kimyoviy birikmalarni hozirgi vaqtdagi sistematik nomlashning asosiy maqsadi bu nomlash orqali kimyoviy birikmaning tarkibini va iloji boricha uning tuzilishini bayon qilishdir. Kimyoviy birikmalarning IUPAC nomenklaturasi deb ataladigan hozirgi zamon nomlanishi ularning eski, yangi va turli nomenklaturalarining majmuasidan iboratdir. Ularni turli usullar bilan, ayniqsa sistematik usul bilan nomlash o'quvchidan ma'lum bilimni talab qiladi. Shuning uchun har bir kimyogar kimyoviy birikmalarni zamonaviy nomlashni o'rganishi va bilishi zarur.

Tajriba shuni ko'rsatadiki, turli mutaxassislikdagi kimyogarlarning ko'pchiligi organik birikmalarni nomlashda kamchiliklarga yo'l

qo'yadilar. Organik kimyo bo'yicha o'zbek tilida chiqarilgan darsliklar va o'quv qo'llanmalarda bu masala yetarli darajada to'liq yoritilmagan.

Mazkur o'quv qo'llanma shu kamchiliklarni bartaraf qiladi va o'quvchilarga organik kimyo fanini o'rganishga yordam beradi degan umiddamiz.

O'quv qo'llanmani yanada takomillashtirish bo'yicha bildiriladigan takliflarni minnatdorlik bilan qabul qilinadi.

I. ORGANIK BIRIKMALARNI NOMLASH TURLARI

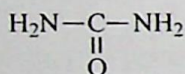
Organik birikmalarni nomlashning IYuPAK (IUPAC) nomeklaturasi tarkibiga kiruvchi turlari quyidagilardan iborat:

- Tarixiy yoki trivial nomenklatura;
- Ratsional nomenklatura;
- O‘rinbosarli nomenklatura;
- Additiv nomenklatura;
- Subtraktiv nomenklatura;
- “a” nomenklatura;
- Boshqa nomenklaturalar.

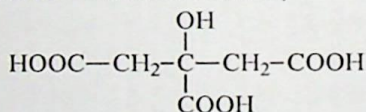
I.1. Tarixiy yoki trivial nomenklatura

Organik kimyo fani rivojlanishining tarixiy yo‘lini aks ettiruvchi bu nomeklatura moddalarning olingan tabiiy manbai, o‘ziga xos xususiyatlari, olinish usullari, birinchi marta olgan va xossalarini o‘rgangan olimning nomi bilan bog‘liq bo‘lgan nomeklaturadir. Quyida keltirilgan moddalarning nomlari shu xususiyatlarni aks ettiradi.

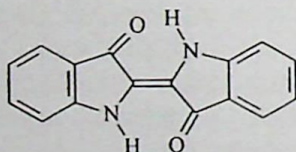
Tabiiy manbalardan olinganlar: HCOOH – chumoli kislota,



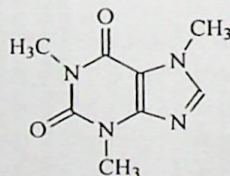
mochevina



limon kislota

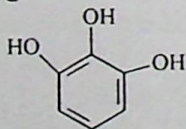


indigo

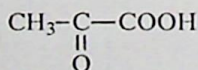


kofein

Olinish usuliga ko‘ra:

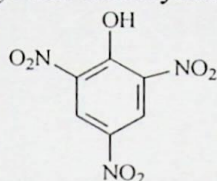


pirogallol

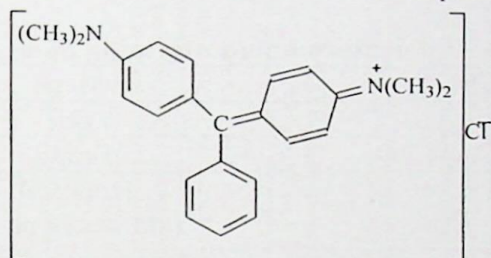
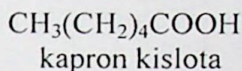


pirozum kislota

Oʻziga xos xususiyatli:

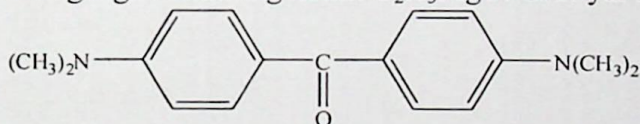


pikrin kislota



malaxit yashili

Xossalarini oʻrgangan olimning nomi: $\text{C}_2\text{H}_5\text{MgCl}$ Grin'yar reaktivi,



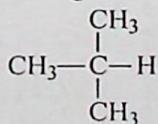
Mixler ketoni va x.k.

I.2. Ratsional nomenklatura

Bu nomenklatura IUPAC nomenklatura majmuasida *radikal-funksional* nomenklatura deb xam ataladi.

Organik birikmalarni ratsional nomenklaturada nomlashda bu birikma *gomologik qatorining eng sodda vakillarining* yoki *uglevodorod qoldig'ining nomi* asos qilib olinadi. Ularning H atomini radikallarga almashingan hosilasi deb qaraladi. H atomiga almashgan radikallarning sonini di-, tri-, tetra- va x.k. deb belgilanadi.

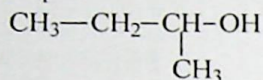
Masalan: trimetilmetan (metanning nomi asosidagi nomenklatura)



CH_4 metan molekulasidagi 3 ta vodorod atomi 3 ta metil guruhga almashgan.

Radikal-funksional nomenklaturada nomlashda o'sha funksional guruxga, sinfga xos nom va radikal nomi keltiriladi.

Masalan: ikkilamchi butil spirt



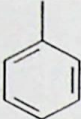
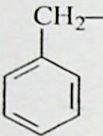
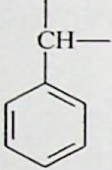
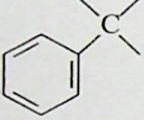
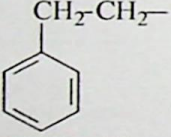
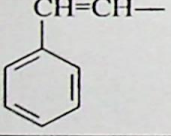
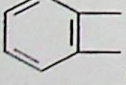
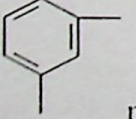
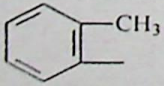
Ratsional nomenklatura bo'yicha organik birikmalarni nomlashda uglevodorodlar qoldiqlarining quyidagi nomlaridan foydalaniladi.

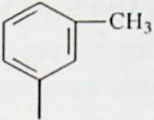
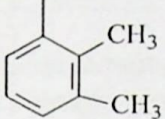
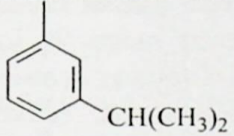
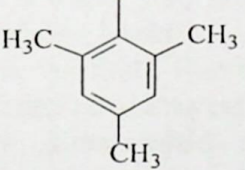
1 – jadval

Uglevodorod qoldiqlarining nomlari

CH_3-	Metil
CH_3-CH_2-	Etil
$\text{CH}_3-\text{CH}_2-\text{CH}_2-$	Propil
$\begin{array}{c} \text{CH}_3-\text{CH}- \\ \\ \text{CH}_3 \end{array}$	Izopropil, Ikkilamchi propil
$\text{CH}_3-\text{CH}_2-\text{CH}_2-\text{CH}_2-$	n-butil-, birlamchi butil
$\begin{array}{c} \text{CH}_3-\text{CH}_2-\text{CH}- \\ \\ \text{CH}_3 \end{array}$	Ikkilamchi butil
$\begin{array}{c} \text{CH}_3 \\ \\ \text{CH}_3-\text{C}- \\ \\ \text{CH}_3 \end{array}$	Uchlamchi butil
$\begin{array}{c} \text{CH}_3-\text{CH}-\text{CH}_2- \\ \\ \text{CH}_3 \end{array}$	Izobutil
$\begin{array}{c} \text{CH}_3-\text{CH}-\text{CH}_2-\text{CH}_2- \\ \\ \text{CH}_3 \end{array}$	Izoamil
$\begin{array}{c} \text{CH}_3 \\ \\ \text{CH}_3-\text{C}-\text{CH}_2- \\ \\ \text{CH}_3 \end{array}$	Neopentil
$\begin{array}{c} \text{CH}_3 \\ \\ \text{CH}_3-\text{CH}_2-\text{CH}-\text{CH}-\text{CH}_2- \\ \quad \\ \text{CH}_2 \quad \text{CH}_3 \\ \\ \text{CH}_3 \end{array}$	2-etil-3-metilpentil

$ \begin{array}{c} \text{CH}_3 \\ \\ \text{CH}_3-\text{CH}_2-\text{CH}-\text{CH}-\text{CH}_2- \\ \\ \text{CH}_2 \\ \\ \text{CH}_3 \end{array} $	3-etil-2-metilpentil
$ \begin{array}{c} \text{CH}_3 \\ \\ \text{CH}_3-\text{CH}_2-\text{CH}-\text{CH}- \\ \\ \text{CH}_2 \\ \\ \text{CH}_3 \end{array} $	2-etil-1-metilbutil
$ \begin{array}{c} \text{CH}_3 \\ \\ \text{CH}_3-\text{CH}_2-\text{CH}-\text{C}- \\ \quad \\ \text{CH}_2 \quad \text{CH}_3 \\ \\ \text{CH}_3 \end{array} $	2-etil-1,1-dimetilbutil
$\text{CH}_2=\text{CH}-$	Vinil, etenil
$\text{CH}_3-\text{CH}=\text{CH}-$	Propen-1-il-1
$\text{CH}_2=\text{CH}-\text{CH}_2-$	Allil, propen-2-il-1
$ \begin{array}{c} \text{CH}_2=\text{C}-\text{CH}_3 \\ \end{array} $	Izopropenil, propen-1-il-2, 1-metilvinil
$ \begin{array}{c} \text{CH}_2=\text{CH}-\text{CH}-\text{CH}_3 \\ \end{array} $	Buten-1-il-3, metilallil
$\text{CH}\equiv\text{C}-$	Etilin
$\text{CH}\equiv\text{C}-\text{CH}_2-$	Propin-2-il-1, propargil
$ \begin{array}{c} \\ -\text{CH} \\ \end{array} $	Metilidin
$-\text{CH}_2-$	Metilen
$ \begin{array}{c} \text{CH}_3-\text{CH}- \\ \\ \text{CH}_3-\text{CH}= \end{array} $	Etiliden
$ \begin{array}{c} \\ \text{H}_3\text{C}-\text{C}- \\ \end{array} $	Etilidin
$-\text{CH}_2-\text{CH}_2-$	Etilen
$-\text{CH}_2-\text{CH}_2-\text{CH}_2-$	Trimetilen
$-(\text{CH}_2)_5-$	Pentametilen
$ \begin{array}{c} \text{H}_3\text{C}-\text{CH}-\text{CH}_2 \\ \quad \end{array} $	Propilen

$\text{CH}_3-\text{C}(\text{CH}_3)=$	Izopropiliden
$\text{H}_2\text{C}=\text{C}-$	Viniliden
	Fenil
	Benzil
	Benzal (benziliden)
	Benzilidin
	Fenetil
	Stiril
 o-C ₆ H ₄ -	o-Fenilen 1,2-fenilen
 m-C ₆ H ₄ -	m-Fenilen 1,3-fenilen
	o-Tolil 2-tolil

	m-Tolil
	2,3-ksilil
	3-kumenil m-kumenil
	Mezitil
$\Delta(C_3H_5-)$	Siklopropil

Organik birikma molekulasi molekulyar massasining ortishi va tuzilishining murakkablashishi bilan ularni tarixiy yoki ratsional nomenklatura bo'yicha nomlash qiyinlashadi yoki mumkin bo'lmay qoladi. Bu vaqtda o'rinbosarli (yoki sistematik, ilmiy) nomenklatura yordamga keladi.

I.3. O'rinbosarli nomenklatura

Bu nomenklatura *ilmiy* yoki *sistematik* nomenklatura deb xam ataladi. Ilmiy nomenklaturaga 1892-yilda Jenevada kimyogarlarning xalqaro kongressida asos solingan. Jeneva nomenklaturasi deb nom olgan bu nomenklatura o'rinbosarli nomenklaturaning birinchi varianti bo'lib hisoblanadi. Kimyogarlarning Lej shaxrida 1930 yilda bo'lib o'tgan kongressida o'rinbosarli nomenklatura masalalari yanada takomillashtirildi va u nomenklatura Lej nomenklaturasi deb ham ataldi. Urushdan keyingi yillarda o'rinbosarli nomenklatura "Nazariy va amaliy kimyoning xalqaro ittifoqi" (qisqacha IUPAC) deb nomlangan tashkilotning nomenklatura masalalari bilan shug'ullanuvchi maxsus komissiyasi tomonidan rivojlantirildi. Bu komissiya tomonidan

tayyorlangan nomenklaturaning IUPAC qoidalari 500 betli kitob bo'lib, u 1979 yilda nashr qilingan, 1993 yilda esa qoidalarni aniqlashtiruvchi va to'ldiruvchi tavsiyalar e'lon qilingan. Bu qoidalar asosidagi IYUPAK nomenklaturasi hozirda qo'llaniladigan barcha turdagi nomenklaturalarning majmuasidir.

Ochiq uglerod zanjirli birikmalarning zamonaviy o'rinbosarli nomenklaturasi asosida normal (tarmoqlanmagan) uglerod zanjirining nomlari yotadi. Uglerod atomlarining soniga qarab bu zanjirlar quyidagicha nomlanadi:

met-bitta uglerod atomi

et-ikkita uglerod atomi

prop-uchta uglerod atomi

but-to'rtta uglerod atomi

pent-beshta uglerod atomi

geks-, **gept**-, **okt**-, **non**-, **dek**- va x.k.lar grek va lotin sonlari o'zaklaridan olingan so'zlar mos ravishda oltita, ettita, sakkizta, to'qqizta, o'nta uglerod atomlarini bildiradi.

Xalqasimon tuzilishli birikmalarning nomlari asosida siklogeksan, benzol, naftalin, piridin, indol, furan kabi ko'plab tarixiy nomlar yotadi. Organik modda tuzilishining qolgan barcha o'ziga xos tomonlari modda nomi asosida *qo'shimcha* (suffiks) yoki *old qo'shimcha* (prefiks) qo'shish bilan xosil qilinadi.

2-jadval

**Organik kimyoda qo'llaniladigan sonli
old qo'shimchalar (prefikslar)**

Ko'paytiruvchi omil	Prefiks	Ko'paytiruvchi omil	Prefiks
1	Mono	21	Geneykoza
2	Di	22	Dokoza
3	Tri	23	Trikoza
4	Tetra	24	Tetrakoza
5	Penta	...	...
6	Geksa	30	Triakonta
7	Gepta	31	Gentriakonta
8	Ohta	32	Dotriakonta
9	Nona	...	...
10	Deka	40	Tetrakonta
11	Undeka	...	...

12	Dodeka	100	Gekta
13	Trideka	...	...
...	...	132	Dotriakonta- gekta
20	Eykoza		

Uglerod zanjirining to'yinganlik yoki to'yinmaganlik darajasi **-an**, **-en** va **-in** qo'shimchalar qo'shish bilan ko'rsatiladi.

Birikma tarkibidagi funksional guruhlar maxsus qo'shimchalar bilan ifodalanadi. Masalan spirtlar **-ol** qo'shimchasi bilan, aldegidlar **-al**, ketonlar **-on**, aminobirikmalar **-amin**, karbon kislotalar **kislota** qo'shimchalari bilan ko'rsatiladi. Agar bu funksional guruhlarini nomning boshida yoki o'rtasida berish kerak bo'lsa ular **gidroksi-**, **oksos-**, **amino-**, **karboksi-**, kabi old qo'shimchalar bilan ifodalanadi.

Birikma tarkibida funksional guruhlar ko'p bo'lsa, ularning bittasi so'z oxiridagi qo'shimcha bilan, boshqalari (kichiklari) esa so'z boshida nomlanadi. Yon zanjirda joylashgan barcha guruhlar alfavit tartibda keltiriladi.

Organik birikma tarkibida bir nechta funksional guruhlar mavjud bo'lganda bu funksional guruhlarining katta-kichikligi quyidagi shartli kichiklashib boruvchi jadval ketma-ketligi asosida aniqlanadi.

3-jadval

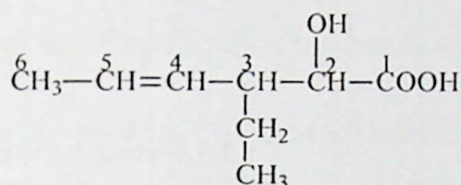
Organik birikma tarkibidagi funksional va xarakteristik guruhlarining nomlari, formulalari, so'z oldidagi (*prefiks*), so'z oxiridagi (*suffiks*) qo'shimchalari va kichiklashib borish qatori

Nomi	Formulasi	Qo'shimchalari	
		So'z oldida	So'z oxirida
Kationlar	X^+ ($-N^+R_3$, $-O^+R_2$)	Onio-	-oniy
Karboksil	-COOH	Karboksi-	-kislota
Sulfo	-SO ₃ H	Sulfo-	-sulfokislota
Tuzlar	-COOM	-	metal... -karboksilat
Kislota angidridi	(-CO) ₂ O	-	Angidrid
Murakkab efir	-COOR -(C)OOR	Alkoksikarbonil	R...- karboksilat Oat
Galogenangidrid	-COCl	Xlorformil-	-oilxlorid

	-CONH_2	Karbamoil-	-karboksamid -amid
	-C(=O)NH_2	Amidino-	- karboksiamidi n - amidin
	-CN	Siano-	-karbonitril -nitril
	-CHO	Formil- Okso-	-karbaldegid -al
	-C=O	Okso-	-on
	-OH	Gidroksi-	-ol
	-SH	Merkapto-	-tiol
Gidroperekis (gidroperekisid)	-O-O-R	R-gidroperoksi	R- gidroperoksid (R- gidroperekis)
Amin	-NH_2	Amino-	-amin
Imin	=NH	Imino-	-imin
Oksid (efir)	-OR	Alkoksi-	oksid (efir)
Sulfid	-SR	Alkiltio-	Sulfid
Peroksid	-O-O-	Dioksi-	-peroksid
Galogenid	-F, -Cl, -Br, -I	ftor, xlor, brom, yod	Galogenid
	-ClO	Xlorozil-	
	-ClO_2	Xloril-	
	-ClO_3	Perxloril-	
	-IO	Yodozil-	
	-IO_2	Yodil-	
	-I(OH)_2	Digidroksiyod-	
	=N_2	Diazo-	
	-N_3	Azido-	
	-NO	Nitrozo-	-
	-NO_2	Nitro-	-
	-N(O)OH	Atsi-nitro-	-
	-OR	R-oksi-	
	-NR	R-tio-	

Alken	-C=C-	-	-en
Alkin	-C≡C-	-	-in

Yuqorida aytilganlarga muvofiq quyidagi birikmani nomlaymiz.



O'zak – **geks-**, to'yinmaganlik darajasi – **en**, bosh (asosiy) funksional guruh qo'shimchasi **kislota**, yon zanjirdagi guruhlar **2-gidroksi** va **3-etil**.

To'liq nomi **3-etil-2-gidroksigeksen-4-kislota**.

Organik birikmani uning formulasi asosida nomlashda yoki uning o'rinbosarli nomenklaturadagi nomi asosida formulasi yozilganda quyidagi qoidalarga amal qilish kerak:

1. Birikma tarkibidagi asosiy (bosh) funksional guruhni va uning so'z ohiridagi qo'shimchasini aniqlash.

2. Bosh va asosiy funksional guruhlarini o'z ichiga oluvchi eng uzun va eng ko'p tarmoqlangan uglerod zanjirining yoki xalqaning nomini aniqlab, bosh funksional guruh uglerod atomidan boshlab zanjirni raqamlash, raqamlarni (lokantlarni) qo'shimchadan oldin yoki so'z ohirida qo'shimchadan keyin qo'yish.

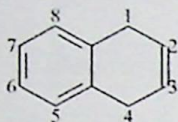
3. **-an**, **-en** va **-in** qo'shimchalaridan hamda siklik va geterosiklik qatorlarda digidro, tetragidro kabi old qo'shimchalardan foydalanib zanjir yoki xalqaning to'yinganlik darajasini aniqlash. Molekula tarkibida qo'shbog' xamda uchbog' birgalikda kelsa qo'shbog' yaqin omondan raqamlash.

4. **Di-**, **tri-**, **tetra-** kabi old qo'shimchalarning alfavitga ta'sir etmasligini hisobga olgan holda yon zanjirdagi turli guruhlarini nomlashning old qismida alfavit tartibida joylashtirish.

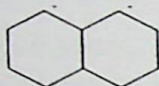
O'rinbosarli nomenklaturada ham 1-jadvalda keltirilgan uglevodorod qoldiqlarining nomlaridan foydalaniladi. Agar bu guruhlar tarkibida uglerod atomlari ko'payib, murakkab ko'rinish olsa u zanjirga ulangan o'yyidan boshlab alohida raqamlab nomlanadi.

I.4. Additiv nomenklatura

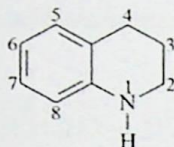
Additiv nomlashga misollar:



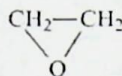
1,4-digidronaftalin
(1 va 4 raqamdagi uglerod-
larda qo'shibog' bo'lmagan-
ligi va u vodorod atomi
bilan birikanini anglatadi)



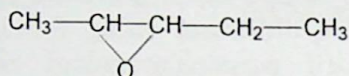
dekagidronaftalin



1,2,3,4-tetragidroxinolin
(1,2,3,4 raqamdagi atomlar
ham huddi shunday vodorod
bilan to'yingan)



etilenoksid



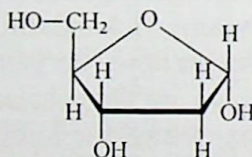
1-etil-2-metil-etilen oksid

I.5. Subtraktiv nomenklatura

Subtraktiv nomlashga misollar:



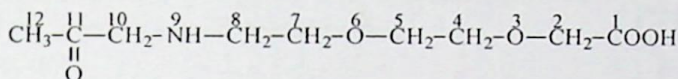
Degidrobenzol
(benzolda ikkita
vodorod atomi
yo'qligini
bildiradi)



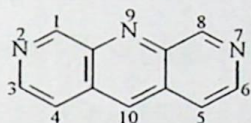
Dezoksiriboza
(riboza molekulasida bitta gidroksi
guruh yoqligini bildiradi)

I.6. "a" nomenklatura

"a" nomlashga misollar: (geteroatomlarning alfavit tartibda nomlanishi)



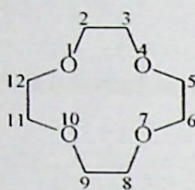
9-aza-3,6-dioksa-11-oksododekankislota



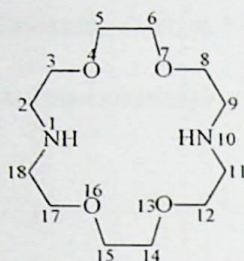
2,7,9-triazaantrasen

IYuPAK nomenklaturasi bo'yicha makrosiklik birikmalarni nomlashda qiyin va noqulaydir. Masalan (IV) birikmani ushbu nomenklaturada nomlasak uning to'liq nomi 2,3,11,12-dibenzo-, 4,7,10,13,16-geksaoksasiklooktadeka-2,11-dien. Olinayotgan makrosiklik birikmalar sonining ortishi va ular tuzilishining murakkablashishi bilan bu birikmalarni nomlashni sistemalashtirish zarur bo'ldi. Lekin taklif qilingan bir nechta nomlashlardan hech qaysisi keng qabul qilinmadi. Shunday nomlashlardan biriga asosan (IV) birikmani quyidagicha nomlash taklif etilgan 2,3,11,12-benzo-18-, 2,11-dien-, 4,7,10,13,16-O₆.

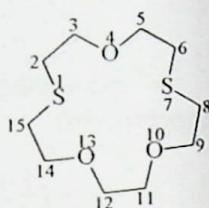
Makrosiklik birikmalarni nomlashda odatda ratsional nomenklatura qabul qilinadi. Poliefirlarni birinchi bo'lib sintez qilgan. Ch. Pedersen taklif qilgan nomenklaturada kraun efirlarni nomlashda xalqadagi umumiy uglerod va geteroatomlar soni yig'indisi ko'rsatiladi va u "kraun" so'zidan oldin qo'yiladi. "Kraun" so'zidan keyin esa geteroatomlar soni ko'rsatiladi. Agar xalqaga siklobirikma birikkan yoki xalqada kislorod atomidan boshqa geteroatom joylashgan bo'lsa, uning xalqadagi tartib nomeri va nomi eng avval ko'rsatiladi. IYuPAK nomenklaturasiga ko'ra kraun-efirlar siklik uglevodlarining hosilalari sifatida qaraladi. (IV) birikmani yuqoridagi taklif asosida nomlanadigan bo'lsa 2,3,11,12-benzoni dibenzo, siklooktadeka alqani 18-kraun deb, 1,4,7,10,13,16-geksaoksa ya'ni geteroatomlar soni 6 deb belgilanadi va u dibenzo-18-kraun-6 deb nomlanadi:



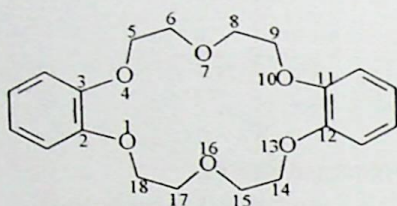
I



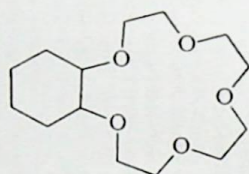
II



III



IV



V

formula I – 12-kraun-4; (1,4,7,10-tetraoksasiklododekan);

formula II – 1,10-diaza-18-kraun-6; (1,4,10,13-tetraoksa-7,16-diazasiklooktadekan);

formula III – 1,7-ditia-15-kraun-5;

formula IV – dibenzo-18-kraun-6;

formula V – siklogeksano-15-kraun-5.

1.7. Freonlarni nomlash

Freonlarda C, F, Cl, H atomlari bo'lishi mumkin. Freonni nomlash uchun biz quyidagi qoidalarni bilishimiz kerak. Freonni nomlashda uni F-C-1 H+1 F formulaga qo'yib nomlaymiz. Bunda freon tarkibidagi C atomini qiymatini C-1 formula orqali hisoblaymiz. Agar freon tarkibida bitta C atomi bo'lsa unda 1-1=0 ya'ni 0. H atomini soniga bir raqamini qo'shamiz. Agar H atomi bo'lmasa 0+1=1 raqami qo'yiladi. F nechta bo'lsa o'sha son qo'yiladi.

CF₂Cl₂ formulali freonni nomlasak.

C=1-1=0

H=0+1=1

F=2

Yuqoridagi freon nomi F-012 yoki oddiygina F-12 bo'ladi.

Freonning nomi asosida formulani yozishda esa $\boxed{F-C-1H} + 1 F (Cl)$ formuladan foydalanamiz. Uglarod atomining 4 valentligiga asoslanib H va F sonidan to'lmay qolgan valentligini Cl atomi bilan to'ldiramiz. Nomi F-022 yoki F-22 bo'lgan freon formulasini yozamiz.

$C=0$ ekan bu degani $1-1=0$ ya'ni 1 ta uglarod atomi bor.

$H=2$. $1+1=2$, demak 1 ta H atomi bor.

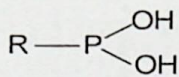
$F=2$ ta fluor bor.

CHF_2 . H va F lar yig'indisi 3 demak 1 ta Cl atomi xam bor ekan.
 CHF_2Cl

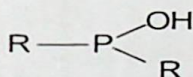
I.8. Fosfor organik birikmalarni nomlash

Fosfinlar: PH_3 , RPH_2 , R_2PH , R_3P , $R_4P^+X^-$.

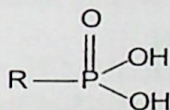
Trifenilfosfinmetilen, metilentrifenilfosforan, trifenilfosforilid
 $(C_6H_5)_3P=CH_2$



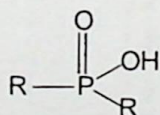
Fosfonit kislota



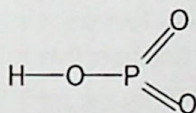
Fosfinit kislota



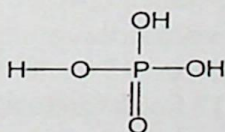
Fosfonat kislota



Fosfinat kislota

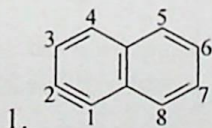


Metafosfat kislota



Ortofosfat kislota

Misollar.



1.

berilgan moddani nomlang.

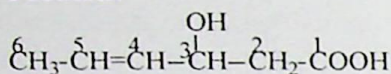
Yechish:

Birinchi va ikkinchi uglarodda vodorod yoqligi ko'rsatib o'tamiz.
 1,2-degidronaftalin.

2. Quyidagi moddani nomlang.

$$CH_3-CH=CH-\overset{\overset{OH}{|}}{CH}-CH_2-COOH$$

Yechish:

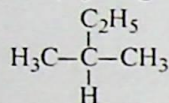


O'zak – **geks-**, to'yinmaganlik darajasi – **en**, bosh (asosiy) funksional guruh qo'shimchasi **kislota**, yon zanjirdagi funksional guruh **3-gidroksi**.

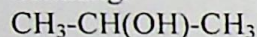
To'liq nomi **3-gidroksigeksen-4-kislota**.

Topshiriqlar.

1. Organik birikmalarning nomlash turlariga misollar keltiring.
2. Quyidagi moddani ratsional nomenklatura bo'yicha nomlang.



3. Quyidagi moddani radikal-funksional nomenklatura bo'yicha nomlang.

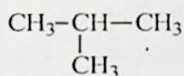


4. 2-metil-3-etilpentil radikalining tuzilishini yozing.
5. 3-etil-2-xlorgeksen-5 kislotaning tuzilish formulasini yozing.
6. 1,2-dimetiletilenoksidning tuzilish formulasini yozing.
7. 3-dezoksiribozaning tuzilish formulasini yozing.
8. Dibenzo-18-kraun-6 ning tuzilish formulasini yozing.
9. F-13 freon formulasini yozing.

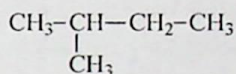
II. Turli sinf organik birikmalarini nomlash. To'yingan organik birikmalarni nomlash.

II.1. Alkanlar Trivial nomenklatura

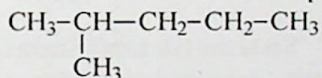
Alkanlarning boshlang'ich vakillari bu nomenklaturada tasodifiy nomlangan: CH_4 -metan, C_2H_6 -etan, C_3H_8 -propan, C_4H_{10} -butan. Odatda agar ikkita metil radikalni bitta oxirgi uglerodda joylashsa *izo-* old qo'shimchasi ishlatiladi.



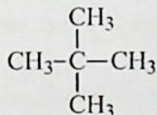
Izobutan



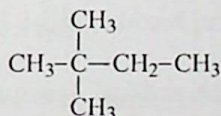
Izopentan



Izogeksan



Neopentan

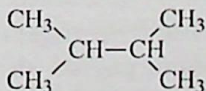


Neogeksan

To'rtlamchi uglerod atomli uglevodorod nomlarining oldiga neo- old qo'shimchasi qo'shiladi.

Ratsional nomenklatura

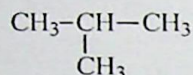
Agar tarmoqlangan uglevodorodning ikki tomoni simmetrik bo'lsa uni dialkil deb qarash ham bo'ladi. Masalan:



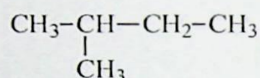
Diizopropil

Alkanlarni ratsional nomenklaturada nomlashda ularning birinchi vakili CH_4 - metaning vodorod atomlari uglevodorod radikaliga

almashgan hosilasi deb qaraladi. Agar o'xshash radikallar mavjud bo'lsa ularning soni di-, tri-, tetra-, penta- va x.k. deb ko'rsatiladi.

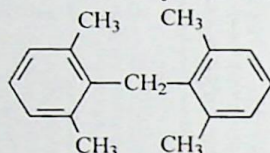


trimetilmetan



dimetiletilmetan

Agar di-, tri-, tetra-, penta- va x.k. ishlatilgan bo'lsa biz bis-, tris-, tetrakis- kabi qo'shimchalardan xam foydalanamiz.



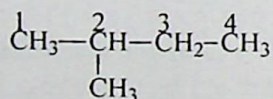
bis-(orto,orto'-dimetilfenil)-metan

Sistematik nomenklatura

Alkanlarni sistematik nomenklatura asosida nomlashda quyidagi qoidalarga amal qilish kerak.

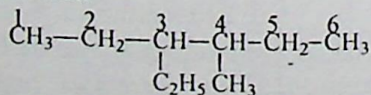
1. Tarmoqlangan uglevodorodning eng uzun va eng ko'p tarmoqlangan uglerod zanjiri belgilab olinadi. Ular arab sonlari bilan raqamlanadi.

2. Raqamlash radikal yaqin tomondan boshlanadi. Radikal bu asosiy uglerod zanjiri tarkibiga kirmagan uglevodorod qoldigi. Radikalning asosiy raqamlangan zanjirdagi nechanchi uglerodda turganligini arab raqami bilan ko'rsatib chiziqcha qo'yiladi va radikal nomi ko'rsatiladi. Keyin asosiy uglevodorod nomi keltiriladi.



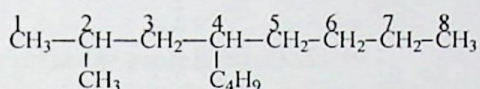
2-metilbutan

3. Agar asosiy uglerod zanjirini raqamlashda ikkita har xil radikal teng tomonda joylashib qolgan paytda alfavitda oldin keluvchi radikal yaqin tomondan raqamlanadi.



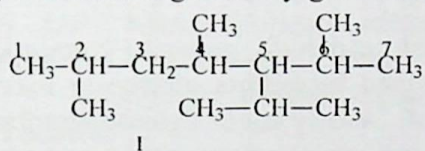
3-etil-4-metilgeksan

4. Radikallar ishlatilayotgan alfavit ketma-ketligida yoziladi. Quyidagi misolda ikkita metil va butil radikalni bor. Radikallar "m" va "b" xarfidan boshlanadi. Alfavit bo'yicha "b" xarfi birinchi keladi keyin "m" xarfi (di-, tri-, izo-, neo-, ikki-, uchlamchi- va boshqalar bundan mustasno).

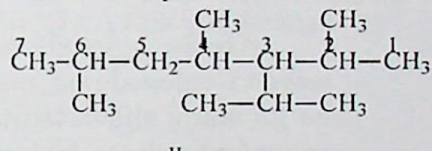


4-butil-2-metiloktan

5. Agar birikma tarkibida bir nechta radikalni bo'lsa, raqamlashda birinchi va oxirgi radikalni o'xshash bo'lsa asosiy uglerod zanjirini qaysi tomondan raqamlash to'g'riligini bilish uchun ikkala xoldagi radikalga mos keladigan uglerod raqamlarini yig'indisi topiladi. Qaysi xolatda eng kichik yig'indi chiqsa o'sha tomondan raqamlanadi.



$$(2+4+5+6=17)$$

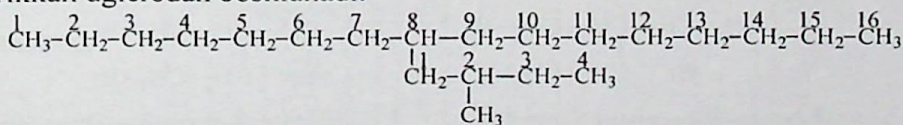


$$(2+3+4+6=15)$$

Demak II xolat bo'yicha raqamlanadi va nomi

3-izopropil-2,4,6-trimetilheptan bo'ladi.

6. Radikalni o'zi xam tarmoqlangan bo'lsa, radikalni o'zini nomlab qavs ichiga yoziladi. Radikalni nomlashda raqamlash asosiy zanjirga birikkan uglerodan boshlanadi.



8-(2-metilbutil)geksadekan

II.2. Organik galogenli birikmalar.

Trivial nomenklatura

CHCl_3 xloroform; CHI_3 yodoform; CHF_3 ftoroform; CHBr_3 bromoform.

CCl_4 uglerod tetraxlorid (to'rt xlorli uglerod); CF_4 uglerod tetraftorid (to'rt ftorli uglerod); CI_4 uglerod tetrayodid (to'rt yodli uglerod); CBr_4 uglerod tetrabromid (to'rt bromli uglerod).

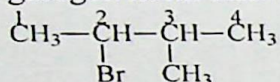
Radikal-funksional nomenklatura

Radikal nomi keltirilib ohirida galogen nomini 3-jadval asosida galogen suffiksi ishlatiladi.

CH_3Cl metilxlorid; CH_2Cl_2 metilensexlorid; $(\text{CH}_3)_3\text{CCl}$ uchlamchi butilxlorid.

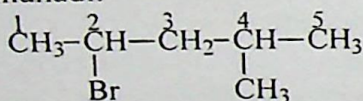
O'rinbosarli nomenklatura

Eng uzun uglerod zanjiri tanlab olinib galogen yaqin tomondan raqamlanadi. Galogen joyi esa arab raqami bilan ko'rsatilib galogen nomi keltiriladi. Radikal va galogen nomi alfavit tartibda yoziladi.

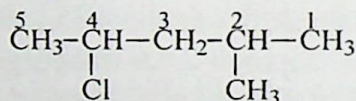


2-brom-3-metilbutan

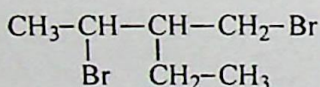
Asosiy uglerod zanjiri tuzilish tarkibida galogen atomlaridan tashqari uglevodorod radikallari bo'lgan bir nechta o'rinbosar mavjud bo'lsa ularni alfavit tartibda keltiriladi. Asosiy zanjir uglerod atomlarini raqamlanganda u birinchi nomlangan o'rinbosarga yaqin tomondan raqamlanadi.



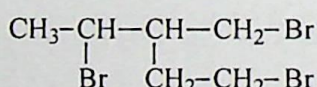
2-brom-4-metilpentan



2-metil-4-xlorpentan

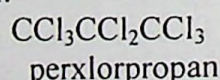
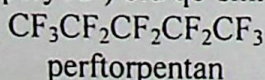


2-brom-3-brommetilpentan

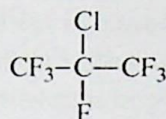


2,5-dibrom-3-brommetilpentan

Uglevodorod tarkibidagi xamma vodorod atomlari bir xildagi galogen atomlariga almashingan bo'lsa unda per- (perftor-, perxlor-, perbrom-, peryod-) old qo'shimchasi qo'llaniladi:



Agar uglevodorod tarkibidagi xamma vodorod atomi turli xildagi galogen atomlariga almashingan bo'lsa unda per- old qo'shimchasi qo'llanilmaydi:

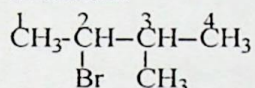


2-xlorheptaftorpropan

Misollar.

1. $\begin{array}{c} \text{CH}_3 - \text{CH} - \text{CH} - \text{CH}_3 \\ | \quad | \\ \text{Br} \quad \text{CH}_3 \end{array}$ berilgan moddani nomlang.

Yechish:



B xarfi birinchi kelgani uchun raqamlash Br yaqin tomondan boshlanadi. 2-brom-3-metilbutan.

2. Quyidagi moddani nomlang $\text{CCl}_3 - \text{CCl}_3$.

Yechish:

Uglevodorod tarkibidagi barcha vodorodlar xlor atomiga almashgani uchun per-old qo‘shimchasini qo‘llaymiz. Moddaning nomi perxloreten.

Topshiriqlar.

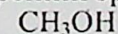
1. Galogen organik birikmalar qanday nomenklaturada nomlanadi. Misol bilan tushuntiring.

2. 1-brom-3-brommetilpentanning barcha izomerlarini yozing va nomlang.

II.3. Spirtlar va fenollar.

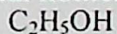
Trivial nomenklatura

Ko‘pchilik spirtlar trivial nomenklatura bo‘yicha nomlanadi.

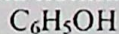


yog‘och spirti

yoki karbinol

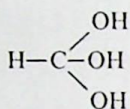


vino spirti

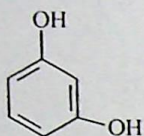


Fenol

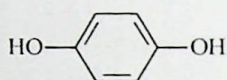
(karbol kislota)



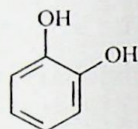
ortoĥumoli kislota



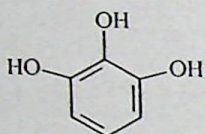
rezorsin



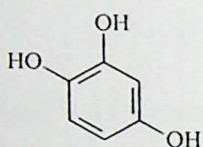
gidroksinon



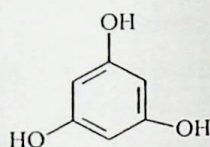
pirokatexin



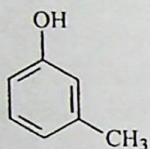
pirogallol



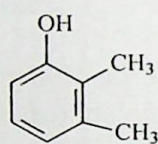
oksigidroksinon



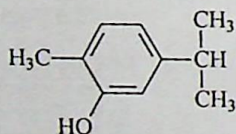
floroglyutsin



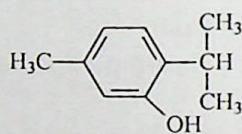
m-krezol



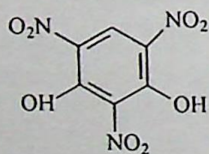
2,3-ksilenol



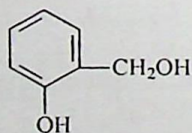
karvakrol



timol



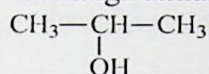
stifnin kislota



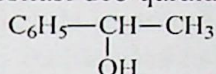
salitsil kislota

Ratsional nomenklatura

Alifatik spirtlarni nomlashda ularning birinchi vakili karbinolning vodorod atomlari radikalga almashgan hosilasi deb qaraladi.



dimetilkarbinol

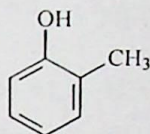


metilfenilkarbinol

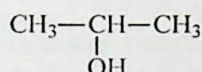
Radikal-funksional nomenklatura bo'yicha nomlaganimizda spirt so'zidan foydalanamiz.



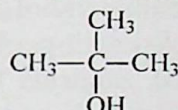
birlamchi butil spirt



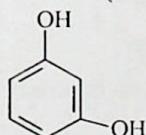
o-metil fenol



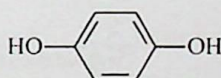
ikkilamchi propil spirti
(izopropil spirt)



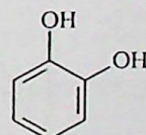
uchlamchi butil spirt



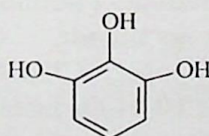
m-digidroksibenzol



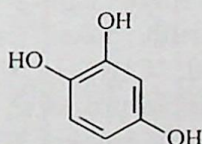
p-digidroksibenzol



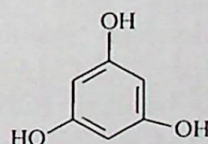
o-digidroksibenzol



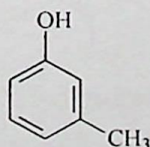
1,2,3-trigidroksibenzol



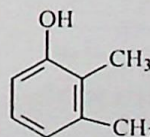
1,2,4-trigidroksibenzol



1,3,5-trigidroksibenzol



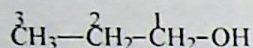
m-metilfenol



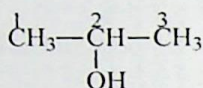
o,m-dimetilfenol

O'rinbosarli nomenklatura

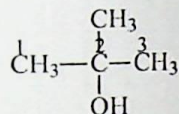
O'rinbosarli nomenklatura bo'yicha nomlashda doimgidek eng uzun uglerod zanjiri tanlib olinadi va raqamlash OH gurux yaqin joydan boshlanadi. OH guruxni **ol-** suffiks bilan nomlanadi va uning turgan joyi arab raqami bilan ko'rsatiladi.



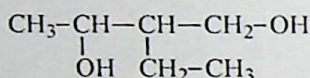
propanol-1



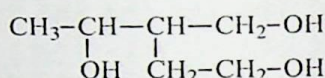
propanol-2



2-metilpropanol-2



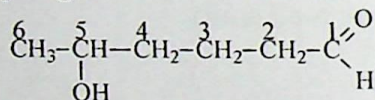
2-etilbutandiol-1,3



3-gidroksimetilpentandiol-1,4

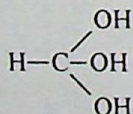
3-gidroksimetil-pentanol-2

Asosiy uglerod zanjirida OH- guruhdan tashqari boshqa OH- dan katta funksional guruh mavjud bo'lsa raqamlash OH- dan katta funksional guruhga yaqin ugleroddan boshlanadi:



5-gidroksigeksanal

Radikal holda kelgan RO-ni nomlash uchun xuddi HO dagi gidroski so'zidagi "**gidr**" so'zi o'rniga uglevodород radikali nomidagi il qo'shimchasi tushib qoldirilib "**oksi**" so'ziga qo'shiladi. CH₃O- metoksi; CH₃CH₂O- etoksi; CH₃CH₂CH₂O- propoksi; CH₃CH₂CH₂CH₂O- butoksi; (CH₃)₂CHO- izopropoksi; (CH₃)₂CHCH₂O- izobutoksi; CH₃CH₂CH(CH₃)O- ikkilamchi butoksi; (CH₃)₃CO- uchlamchi butoksi; -O-CH₂-O- metilendioksi; -O-CH₂-CH₂-O- etilendioksi; -O-CH₂-CH₂-CH₂-O- trimetilendioksi.



metantriol, trigidroksimetan