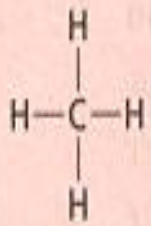
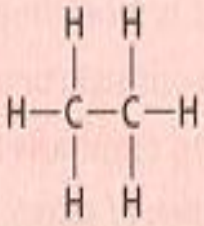
REPRESENTAÇÃO E NOMENCLATURA DE COMPOSTOS ORGÂNICOS

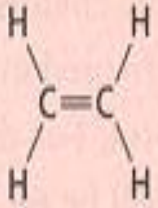
CARBONO TETRAVALENTE E OCTETO COMPLETO



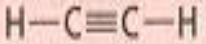
metano



etano

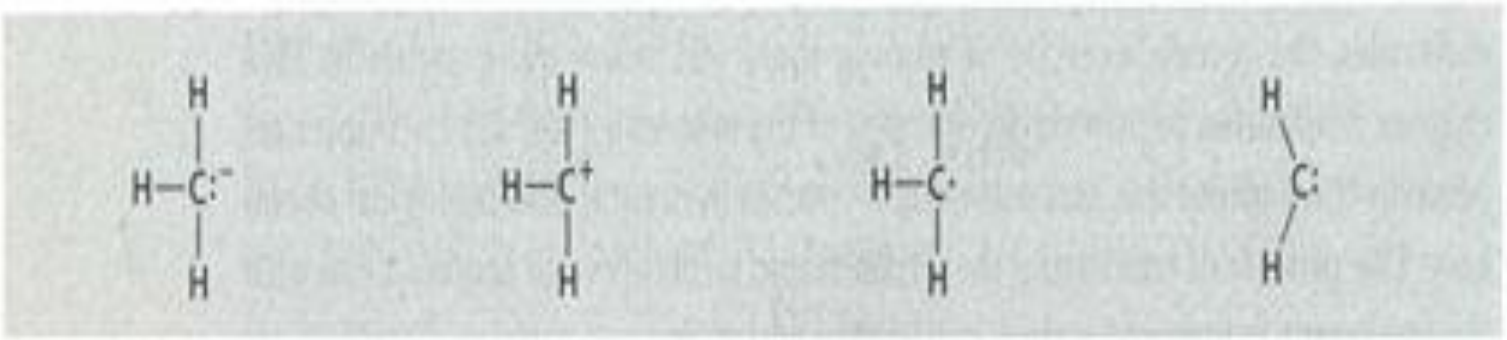


etileno



etino ou acetileno

ESPÉCIES DERIVADAS DE CARBONO – INTERMEDIÁRIOS DE REÇÃO

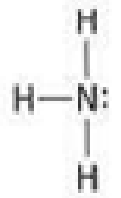


carbânion metílico

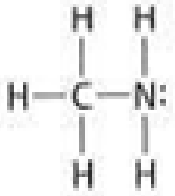
carbocátion metílico

radical metila

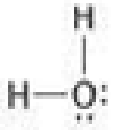
carbeno metilênico



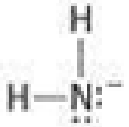
amônia



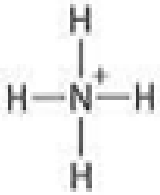
aminometano ou
metilamina



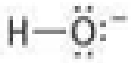
água



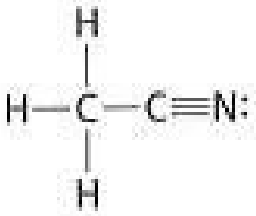
ion amideto



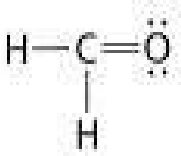
ion amônio



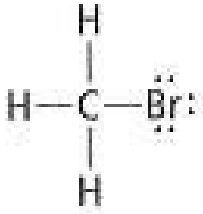
ion hidróxido



acetonitrila



formaldeído

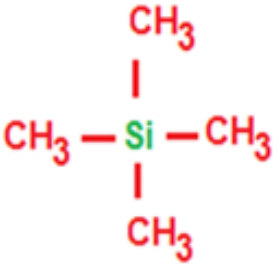


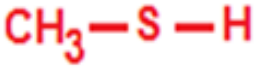
bromometano

CARACTERÍSTICAS DOS COMPOSTOS ORGÂNICOS

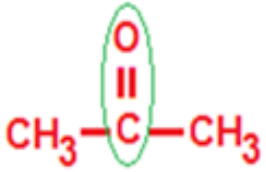
- TODOS CONTÊM CARBONO, USUALMENTE CONTÊM TAMBÉM HIDROGÊNIO, MAS PODEM CONTER HETEROÁTOMOS TAIS COMO O, S, P, Si, Halogêneo

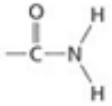
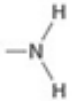
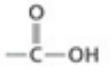
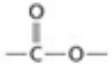
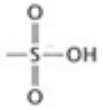
Ex:



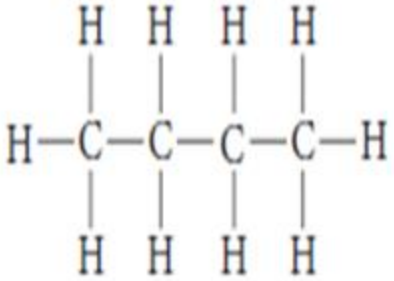


- A MAIORIA CONTERÁ UM GRUPO FUNCIONAL, QUE É QUALQUER GRUPO DE ÁTOMOS QUE NÃO C-C ou C-H. O GRUPO FUNCIONAL É O GRUPO REATIVO DA MOLÉCULA

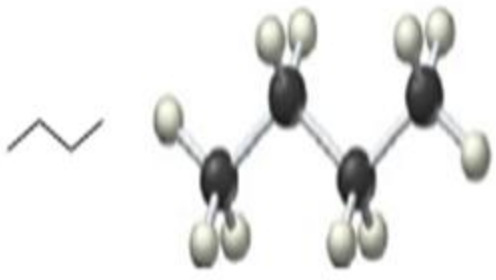


estrutura	estrutura condensada	nome	terminação
	—COCl	cloreto de ácido	oila
—OH	—OH	álcool	ol
	—CHO	aldeído	al (caboxaldeído)
		alceno ou olefina	eno
—C≡C—	—C≡C—	alcino	ino
	—$CONH_2$	amida	amida
	—NH_2	amina	amina
	—COOH or —CO_2H	ácido carboxílico	óico (ácido..... carboxílico)
	—COO— or —CO_2—	éster	oato de .... (.....carboxilato de...)
—O—	—O—	éter	éter
	—CO—	cetona	ona (cetona)
—C≡N	—CN	nitrila	nitrila
—S—	—S—	sulfeto	sulfeto
	—SO_3H	ácido sulfônico	ácido sulfônico
-SH	-SH	tiol	tiol

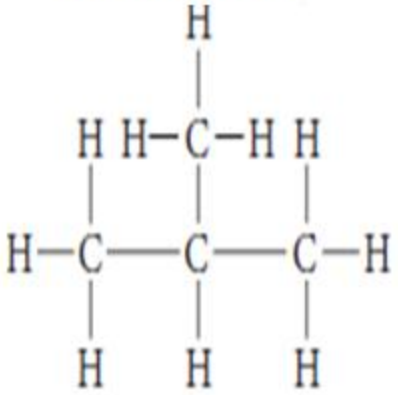
butano



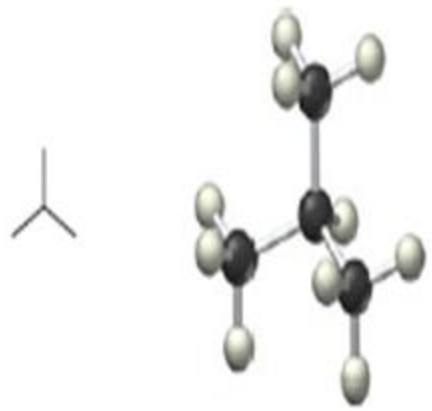
$CH_3-CH_2-CH_2-CH_3$



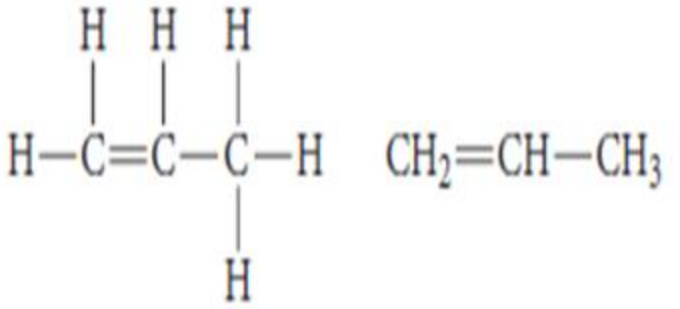
isobutano



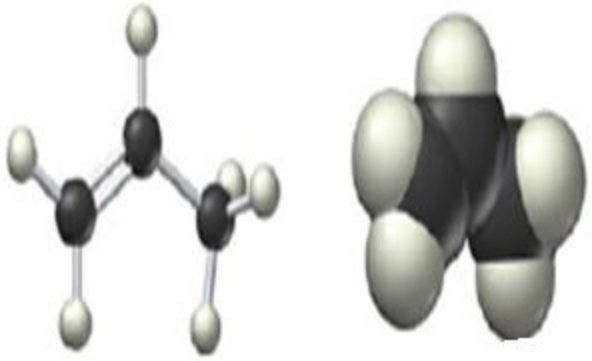
$CH_3-CH(CH_3)-CH_3$



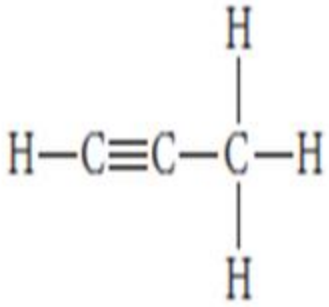
propeno



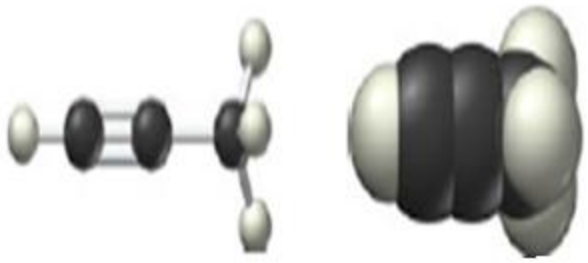
$CH_2=CH-CH_3$



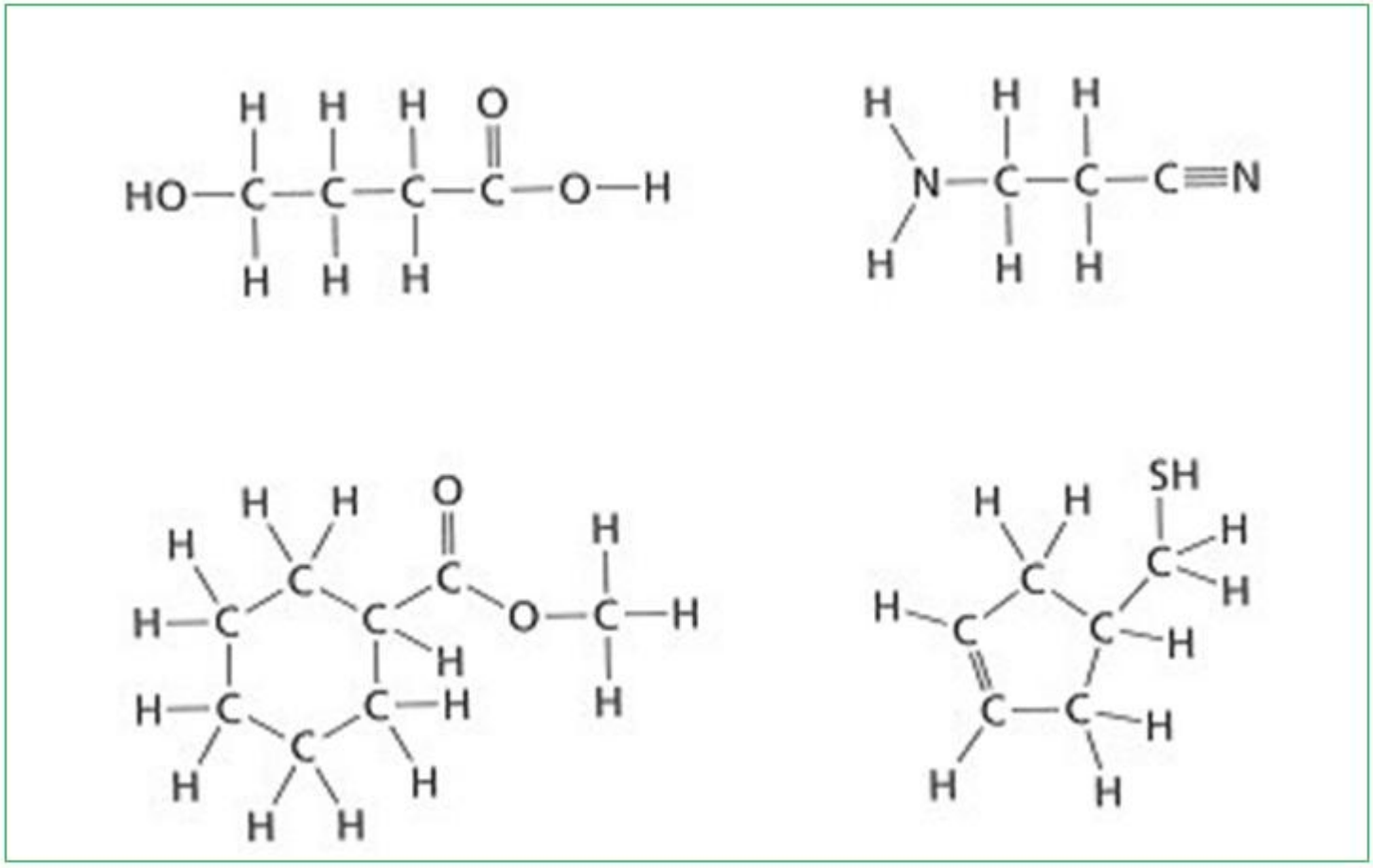
propino

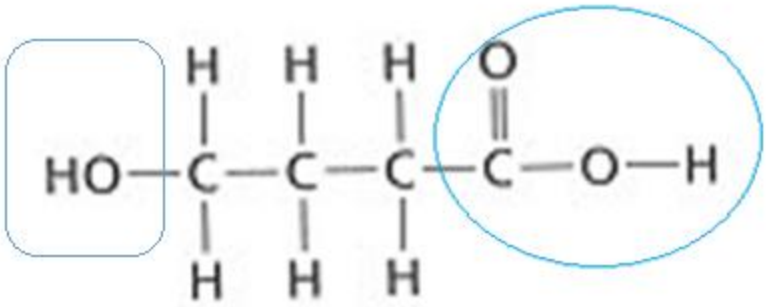


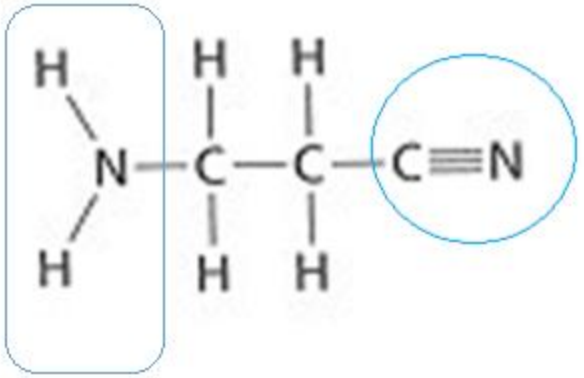
$CH\equiv C-CH_3$

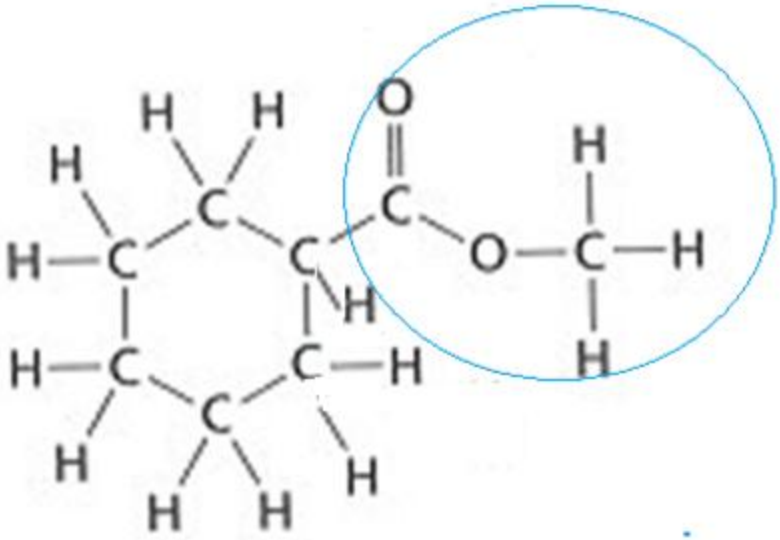


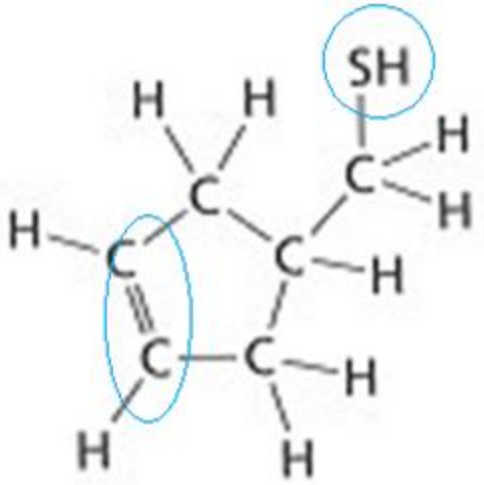
Exercício 1. Identifique o grupo funcional das seguintes moléculas



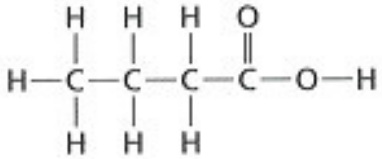


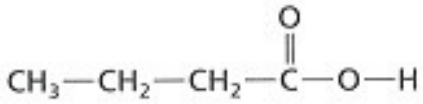


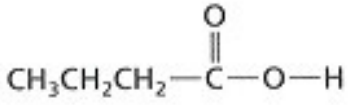




FÓRMULAS ESTRUTURAIS CONDENSADAS







$CH_3—CH_2—CH_2—COOH$

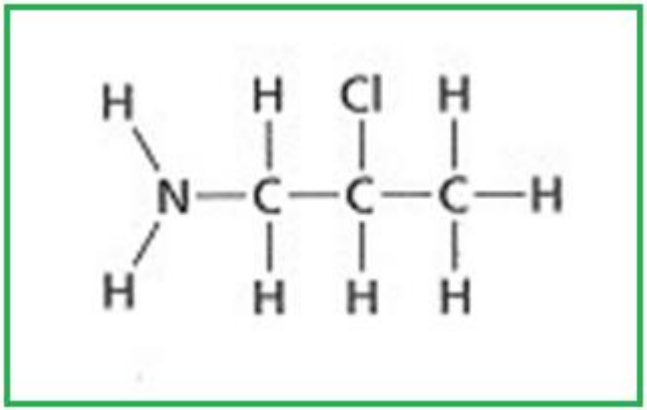
$CH_3—CH_2—CH_2—CO_2H$

$CH_3CH_2CH_2—COOH$

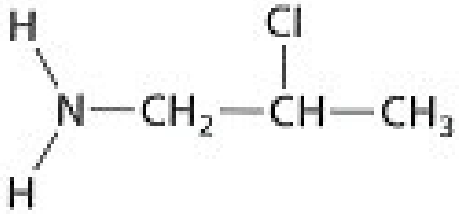
$CH_3CH_2CH_2COOH$

$CH_3CH_2CH_2CO_2H$

Exercício 2. Represente o seguinte composto com uma fórmula condensada



1. Condense a parte hidrocarbônica

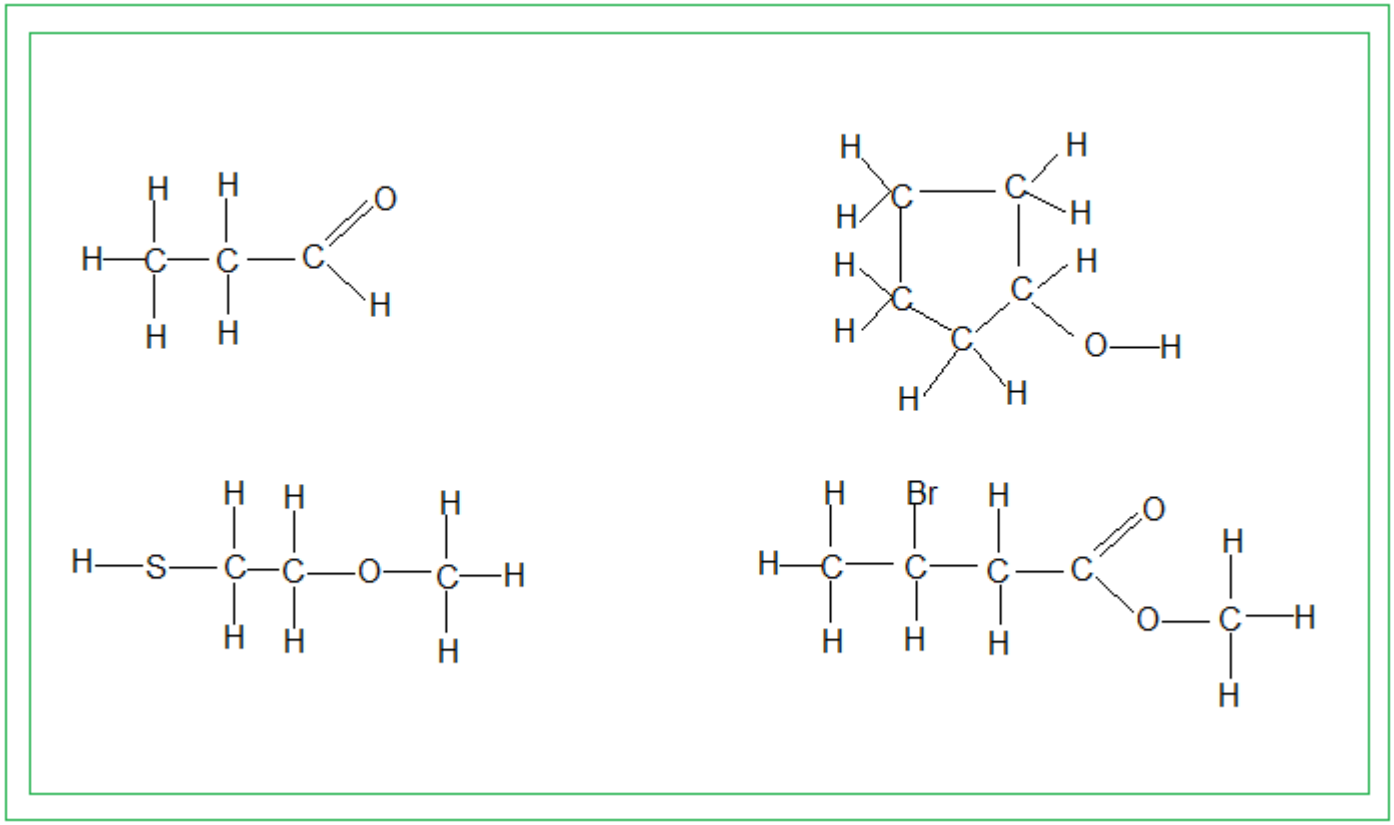


2. Escreva o grupo funcional de forma condensada

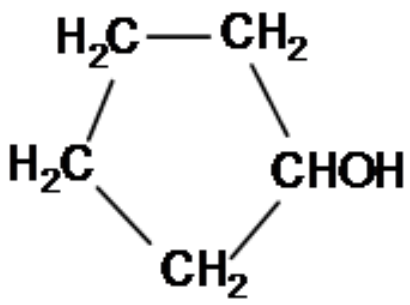
3. Há três possibilidades para as fórmulas condensadas:

$H_2NCH_2CHClCH_3$

Exercício 3. Represente os seguintes compostos com fórmulas condensadas



CH_3CH_2CHO



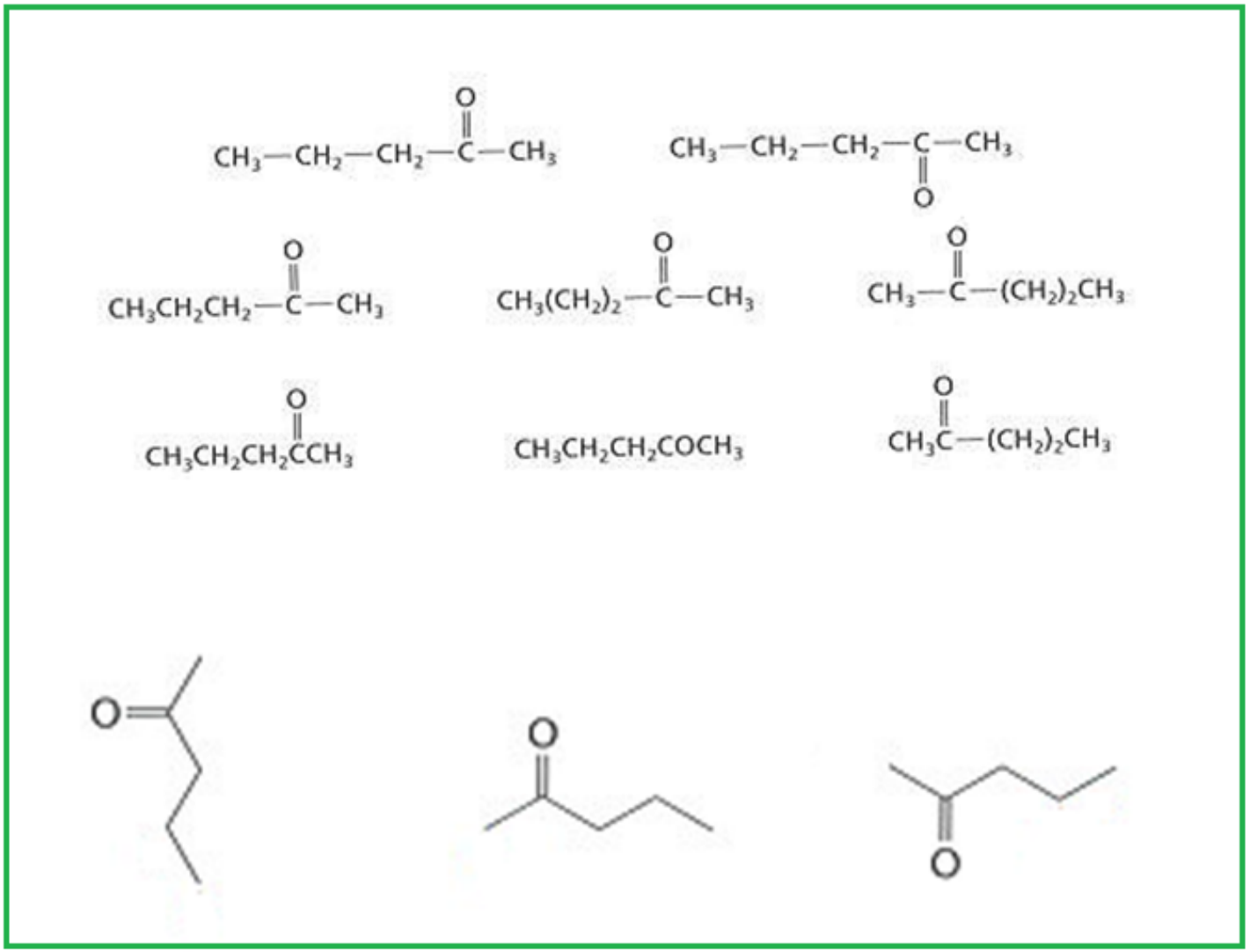
$HSCH_2CH_2OCH_3$

$CH_3CHBrCH_2COOCH_3$

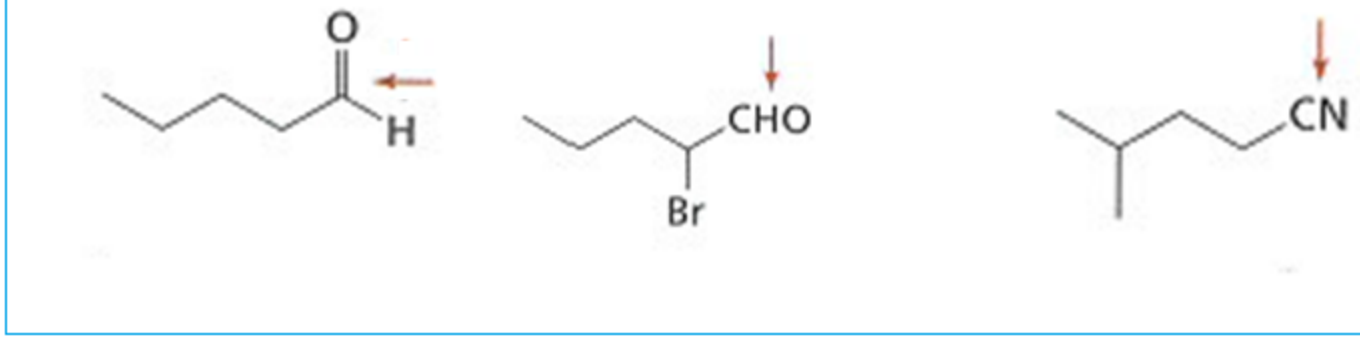
FÓRMULAS AINDA MAIS SIMPLIFICADAS

$CH_3CH_2CH_2C(O)CH_3$ ou $CH_3CH_2CH_2COCH_3$

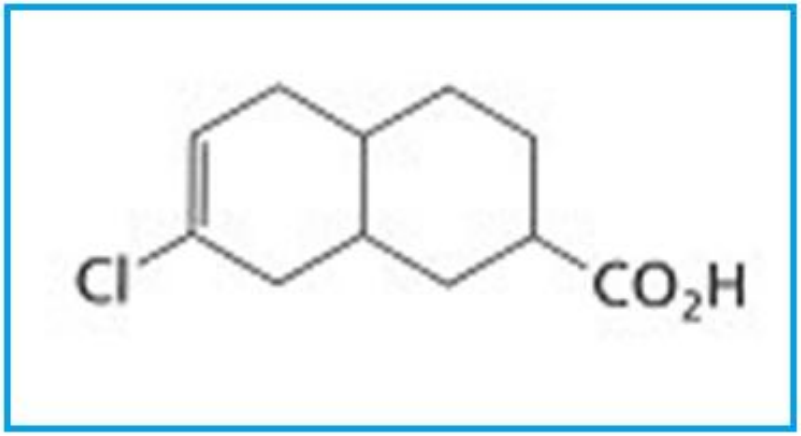
ORIENTAÇÃO NA PÁGINA – NÃO ALTERA A FÓRMULA !!!!

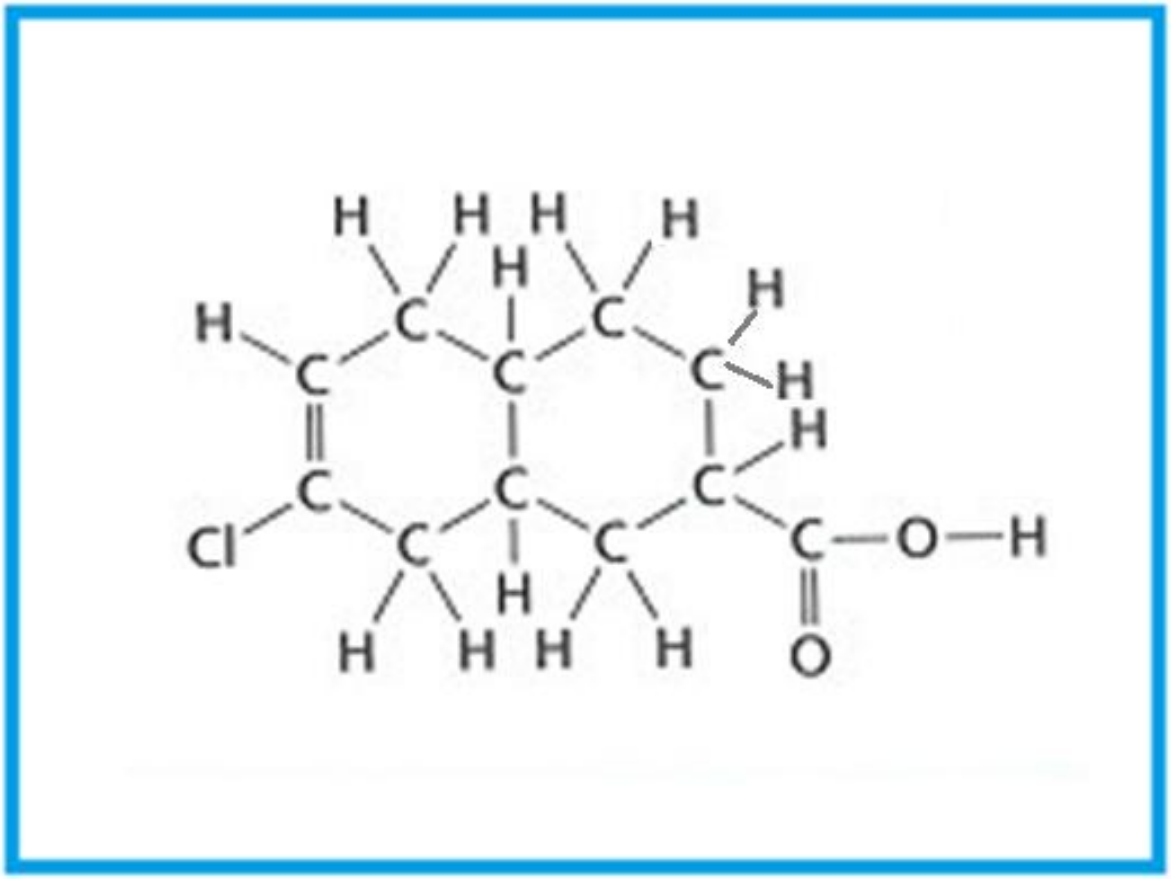


O GRUPO FUNCIONAL DEVE ESTAR CLARAMENTE REPRESENTADO NA FÓRMULA DE TRAÇOS



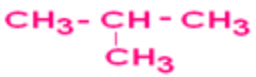
Exercício 4. Represente a estrutura completa do seguinte composto




H H H H
H
H
C C C
H
C C C
H
H
C C C
Cl C C C C O H
H
H H H H
O

ISÔMEROS ESTRUTURAIS

butano



2-metilpropano

ISÔMEROS DE POSIÇÃO

1-propanol

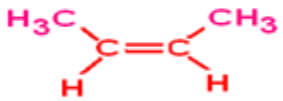
2-propanol

ISÔMEROS DE FUNÇÃO

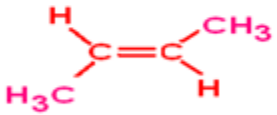
dimetiléter

etanol

ISÔMEROS GEOMÉTRICOS

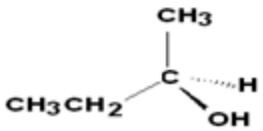


cis-2-buteno

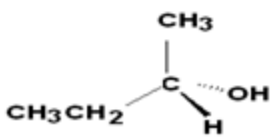


trans-2-buteno

ISÔMEROS ÓTICOS



(R)- 2-butanol



(S)- 2-butanol

número de alcanos isoméricos

número de carbonos	número de isômeros
1	1
5	3
10	75
20	366.319

NOMENCLATURA SISTEMÁTICA

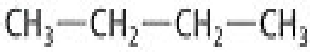
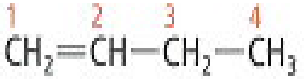
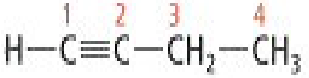
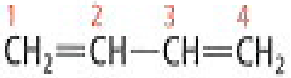
Primeiras tentativas :

1892 – Regras de Genebra
1930 – Regras de Liège

} **IUC** International Union of Chemistry

1949 } **IUPAC** **I**nternational **U**nion of **P**ure and **A**pplied **C**hemistry

HIDROCARBONETOS : FORMADOS APENAS POR CARBONO E HIDROGÊNIO

TERMINAÇÃO	SIGNIFICADO		EXEMPLO
-ANO	Não há duplas ou triplas	n-Butano	
-ENO	Há uma dupla	1-Buteno	
-INO	Há uma tripla	1-Butino	
-DIENO	Há duas duplas	1,3-Butadieno	

C_nH_{2n+2}

ESTRUTURA	NOME DO ALCANO	RAIZ
CH_4	METANO	MET
$CH_3—CH_3$	ETANO	ET
$CH_3—CH_2—CH_3$	PROPANO	PROP
$CH_3—CH_2—CH_2—CH_3$	BUTANO	BUT
$CH_3—CH_2—CH_2—CH_2—CH_3$	PENTANO	PENT
$CH_3—CH_2—CH_2—CH_2—CH_2—CH_3$	HEXANO	HEX
$CH_3—CH_2—CH_2—CH_2—CH_2—CH_2—CH_3$	HEPTANO	HEPT
$CH_3—CH_2—CH_2—CH_2—CH_2—CH_2—CH_2—CH_3$	OCTANO	OCT
$CH_3—CH_2—CH_2—CH_2—CH_2—CH_2—CH_2—CH_2—CH_3$	NONANO	NON
$CH_3—CH_2—CH_2—CH_2—CH_2—CH_2—CH_2—CH_2—CH_2—CH_3$	DECANO	DEC

ALCANOS : apenas ligações simples

C_nH_{2n+2}

No. de carbonos	Fórmula molecular	Nome
10	$C_{10}H_{22}$	Decano
11	$C_{11}H_{24}$	Undecano
12	$C_{12}H_{26}$	Dodecano
13	$C_{13}H_{28}$	Tridecano
20	$C_{20}H_{42}$	Eicosano
21	$C_{21}H_{44}$	Heneicosano
30	$C_{30}H_{62}$	Triacontano
	$CH_3(CH_2)_{28}CH_3$	

ciclopropano

ciclobutano

ciclopentano

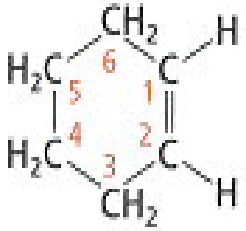
cicloexano

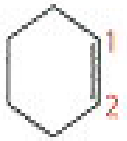
cicloeptano

A ATRIBUIÇÃO DE NÚMEROS

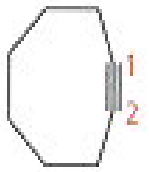
1-Penteno

2-Hexino



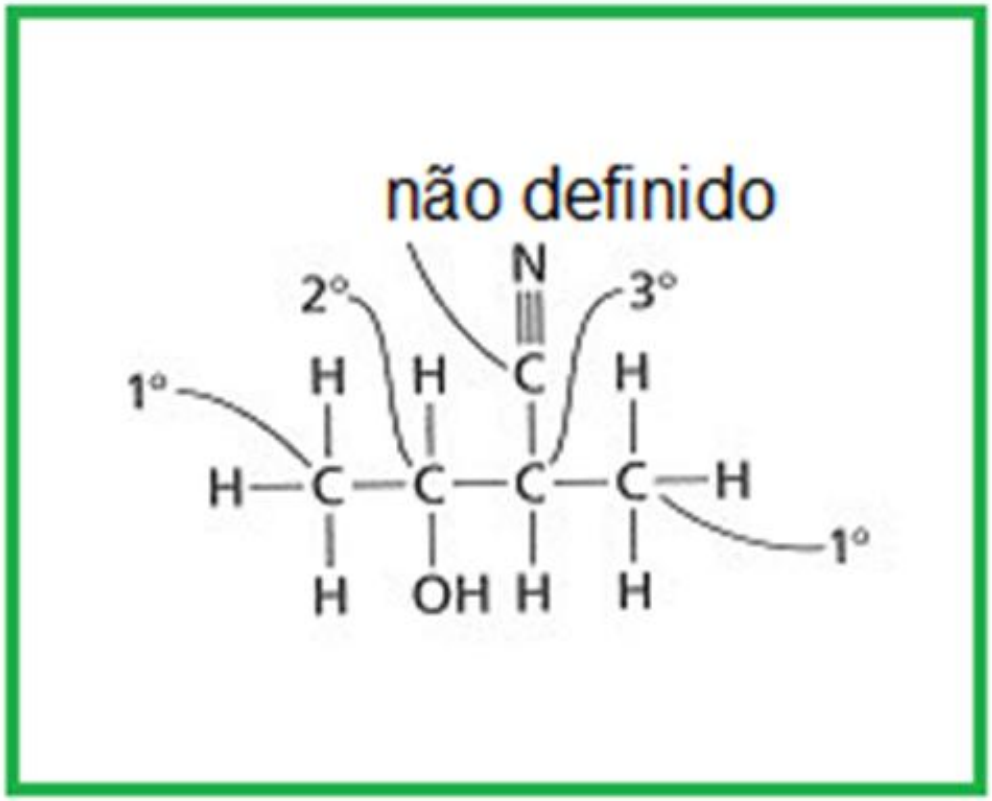


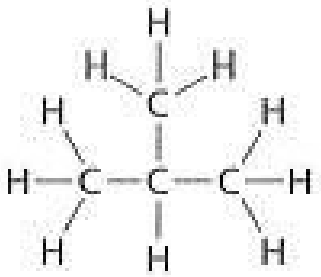
cicloexeno



ciclooctino

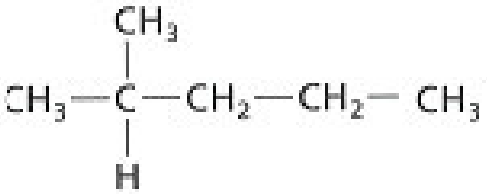
TIPOS DE CARBONO





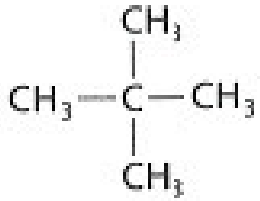
ISOBUTANO

2-METILPROPANO



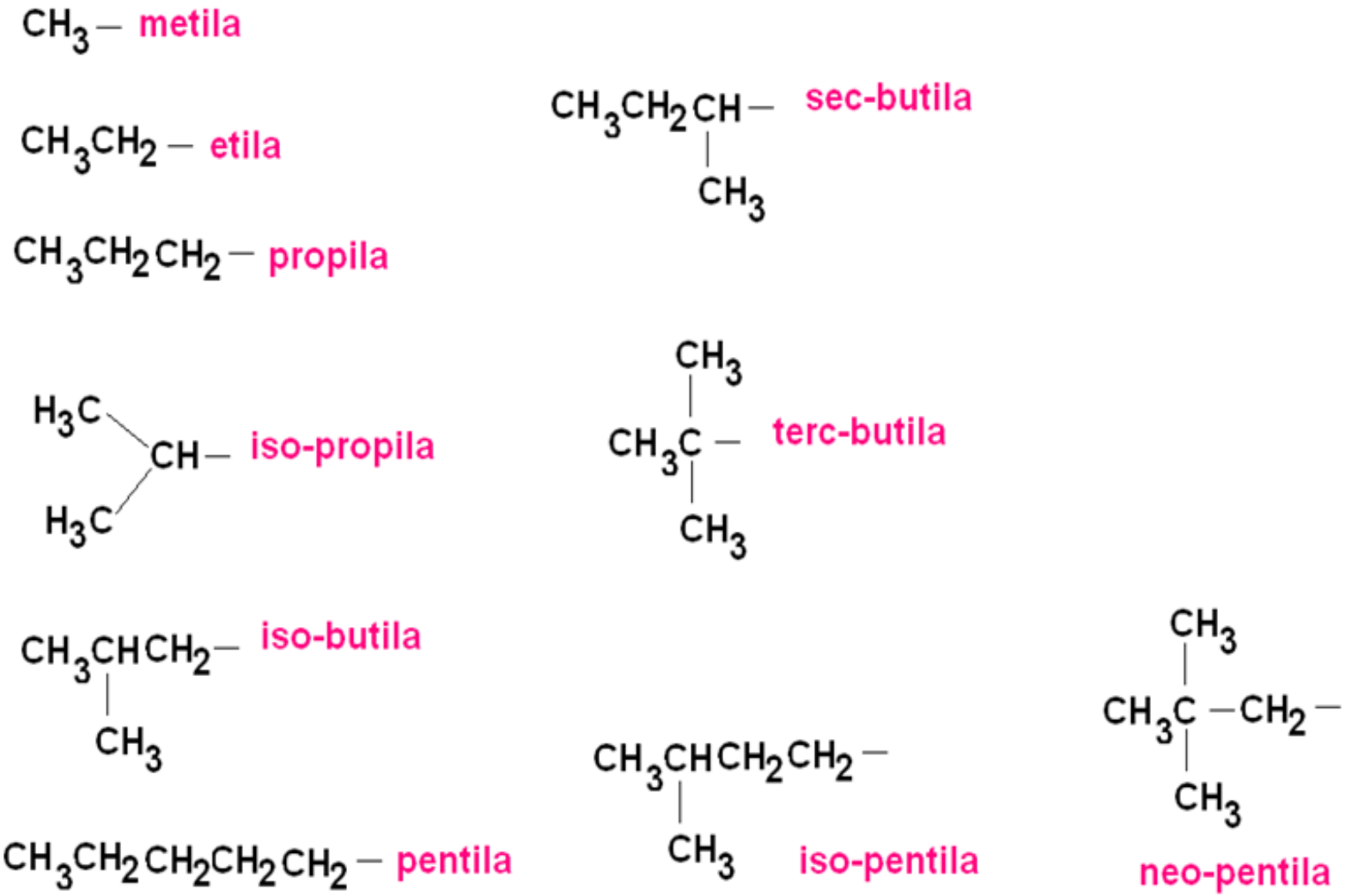
ISOEXANO

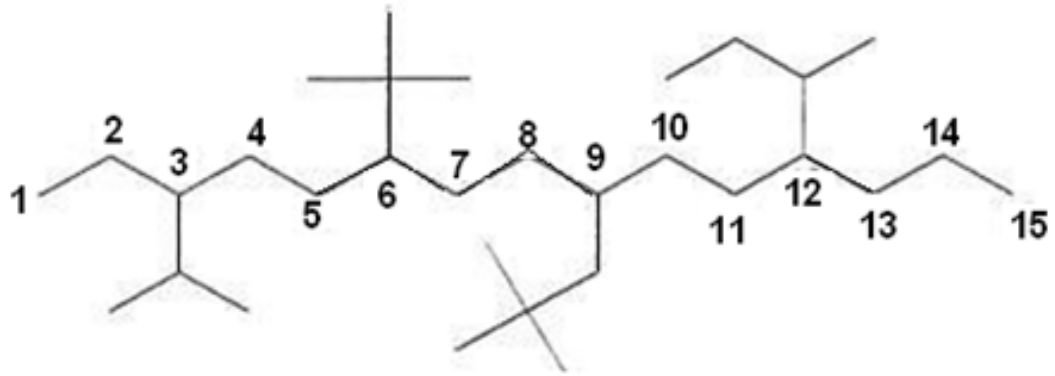
2-METILPENTANO



NEOPENTANO

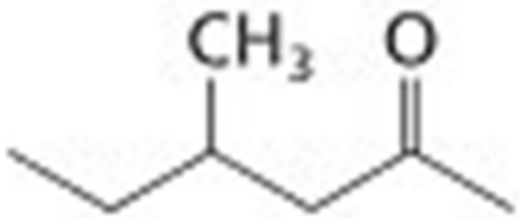
2,2-DIMETILPROPANO

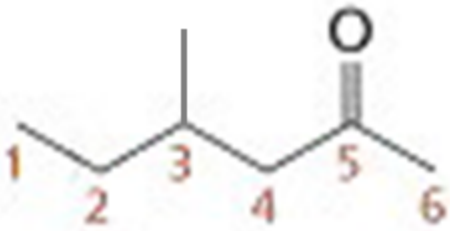

CH3 – metila
CH3CH2 – etila
CH3CH2CH2 – propila
H3C
CH –
H3C
iso-propila
CH3CHCH2 –
CH3
iso-butila
CH3CH2CH2CH2CH2 – pentila
CH3
CH3C –
CH3
terc-butila
CH3CH2CH –
CH3
sec-butila
CH3CHCH2CH2 –
CH3
iso-pentila
CH3
CH3C – CH2 –
CH3
neo-pentila

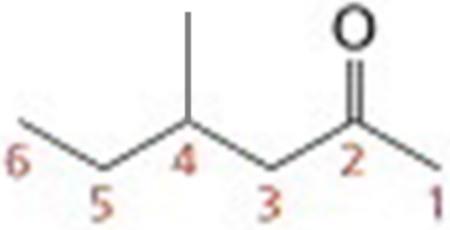


6-terc-butil-12-sec-butil-3-isopropil-9-neopentilpentadecano

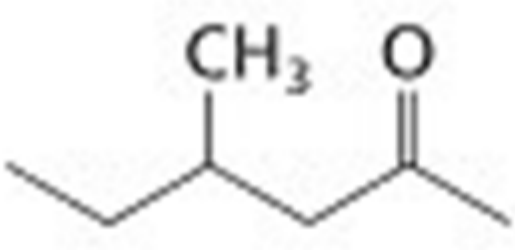
di, tri,tetra, sec e terc são ignorados em termos de ordem alfabética mas, iso, ciclo e neo são considerados


CH3
O

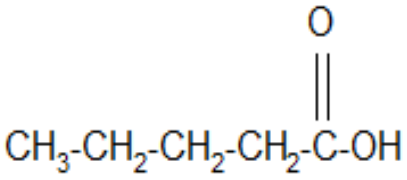

O
1
2
3
4
5
6


O
6
5
4
3
2
1

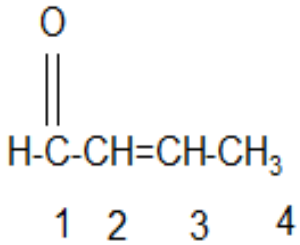
??????????????



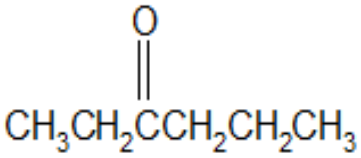
4-metil-2-hexanona



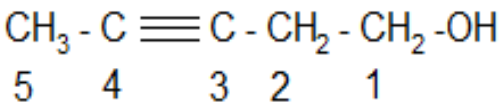
Ácido pentanóico



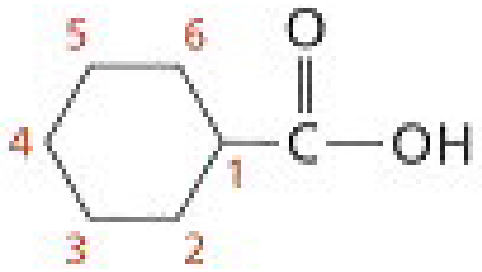
2-butenal



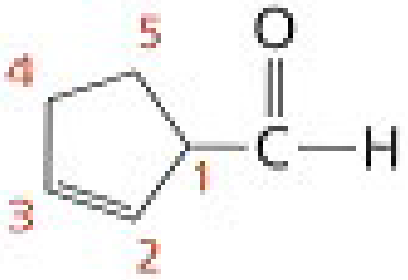
3-hexanona



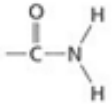
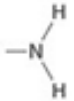
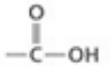
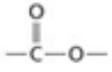
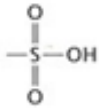
3-pentin-1-ol



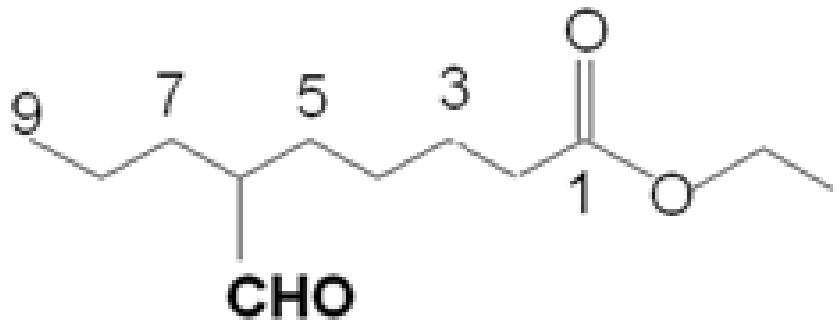
Ácido ciclohexanocarboxílico



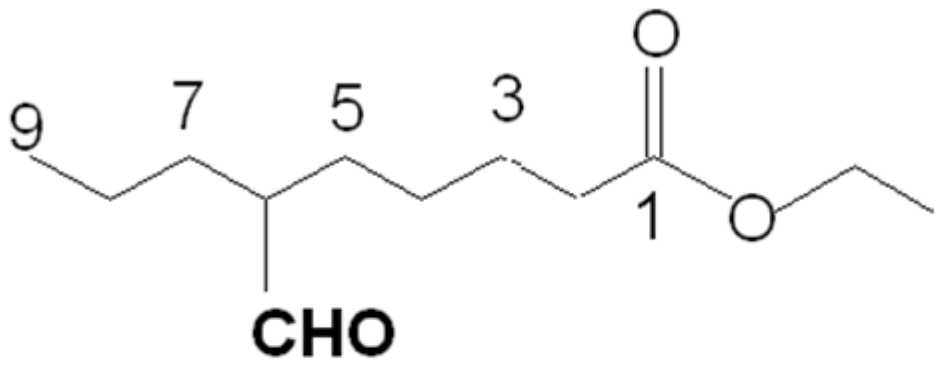
2-ciclopentenocarboxaldeído

estrutura	estrutura condensada	nome	terminação
	—COCl	cloreto de ácido	oila
—OH	—OH	álcool	ol
	—CHO	aldeído	al (caboxaldeído)
		alceno ou olefina	eno
—C≡C—	—C≡C—	alcino	ino
	—$CONH_2$	amida	amida
	—NH_2	amina	amina
	—COOH or —CO_2H	ácido carboxílico	óico (ácido..... carboxílico)
	—COO— or —CO_2—	éster	oato de .... (.....carboxilato de...)
—O—	—O—	éter	éter
	—CO—	cetona	ona (cetona)
—C≡N	—CN	nitrila	nitrila
—S—	—S—	sulfeto	sulfeto
	—SO_3H	ácido sulfônico	ácido sulfônico
-SH	-SH	tiol	tiol

Exemplo de uso de nome de substituinte

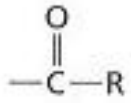


?

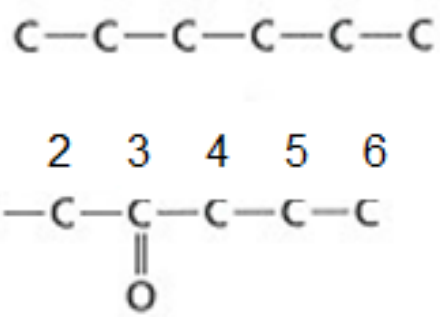


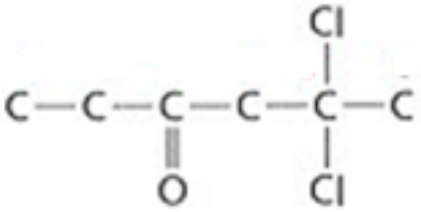
6-formil-nonanoato de etila

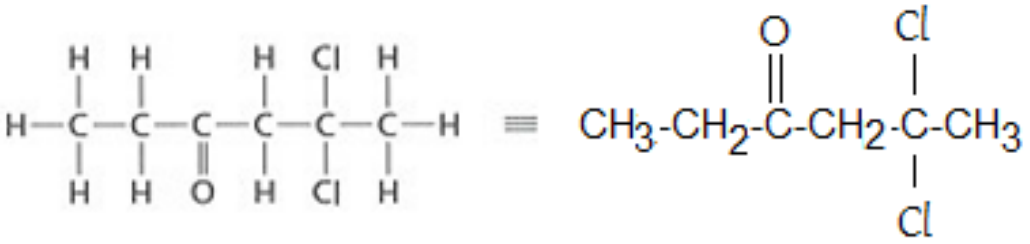
NOMES DE SUBSTITUINTES

substituinte	nome	substituinte	nome
—R	alquila	—C≡N	ciano
—OR	alcóxi	—F	fluoro
	acila	—CHO	formila
		—OH	hidróxi
—NH_2	amino	—I	iodo
—Br	bromo	—NO_2	nitro
—COOH	carbóxi	—SH	mercapto
—Cl	cloro	=O	oxo

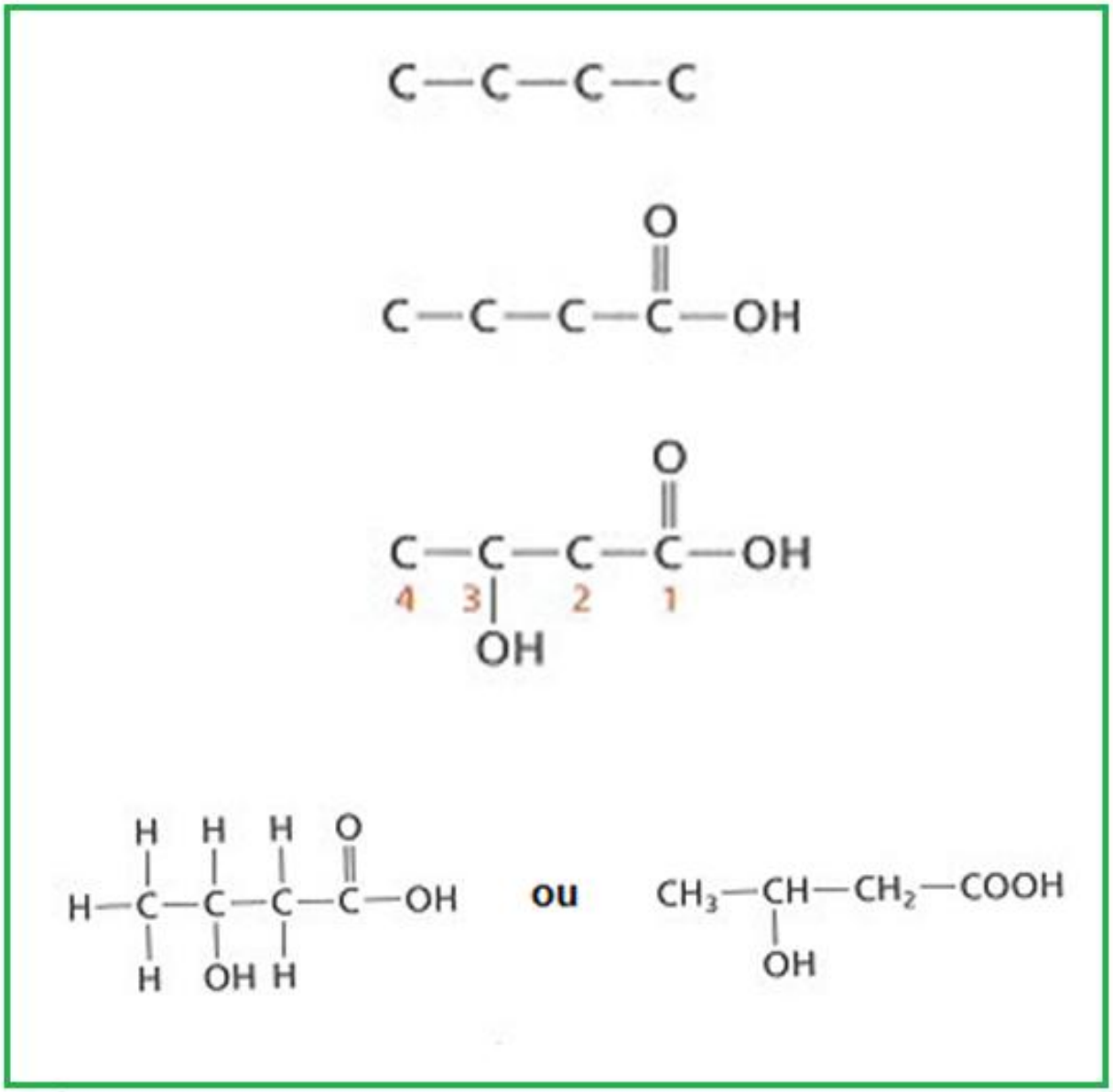
Exercício 5. Escreva a fórmula estrutural da 5,5-dicloro-3-hexanona


1 2 3 4 5 6
O

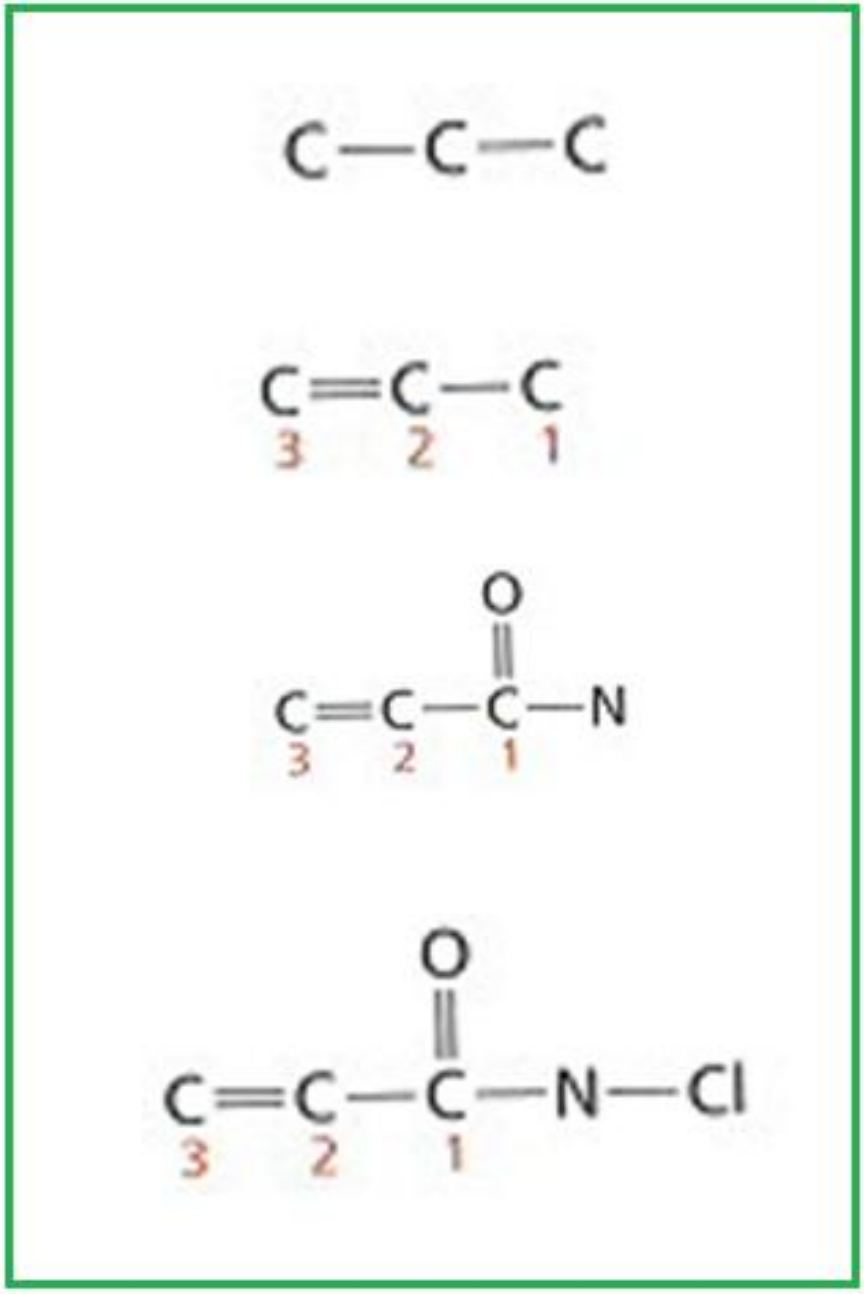

Cl
O
Cl


O
Cl
CH3-CH2-C-CH2-C-CH3
Cl

Exercício 6. Escreva a fórmula estrutural do ácido 3-hidroxibutanóico


C—C—C—C
O
C—C—C—C—OH
O
C—C—C—C—OH
4 3 2 1
OH
H H H O
H—C—C—C—C—OH
H OH H
ou
CH3—CH—CH2—COOH
OH

Exercício 7. Escreva a fórmula estrutural da *N*-cloro-2-propenamida

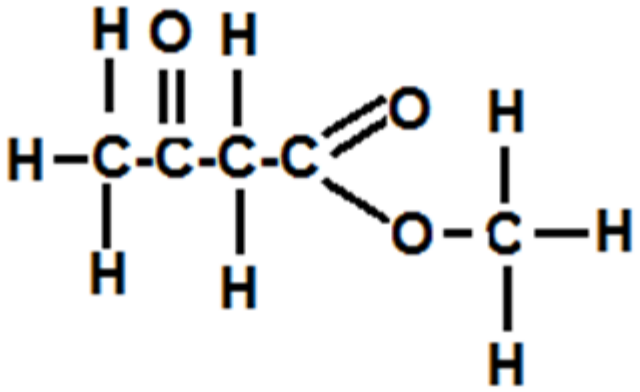

C—C—C
C=C—C
3 2 1
O
C=C—C—N
3 2 1
O
C=C—C—N—Cl
3 2 1

Exercício 8. Escreva a fórmula estrutural do 3-oxobutanoato de metila

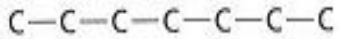
C-C-C-C

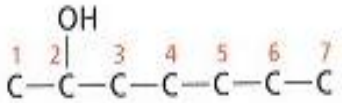
C-C-C-COOCH$_3$

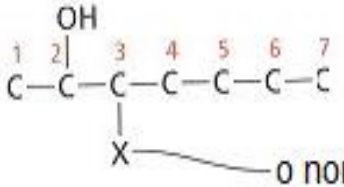
C-C-C-COOCH$_3$
4 3 2 1

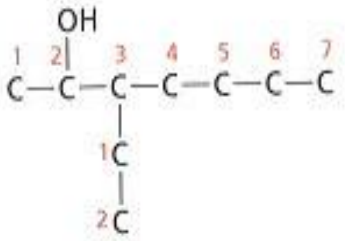


Exercício 9. Escreva a fórmula estrutural do 3-(2,2-dicloroetil)-2-heptanol

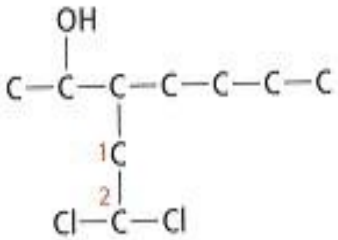




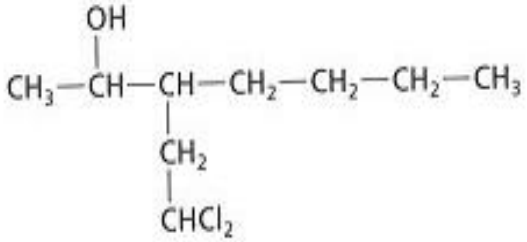




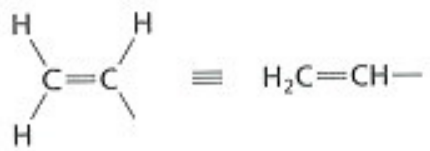
A



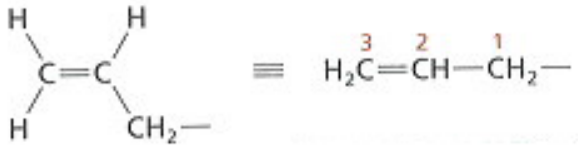
B



OUTROS GRUPOS SUBSTITUINTES

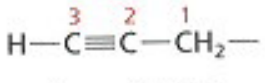


GRUPO VINILA OU ETENILA



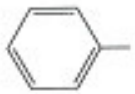
GRUPO ALILA ou

1-(2-PROPENIL)-

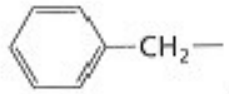


GRUPO PROPARGILA ou

1-(2-PROPINIL)-

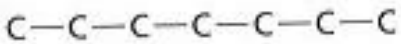


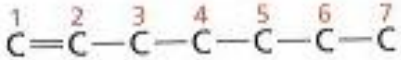
GRUPO FENILA

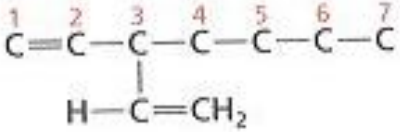


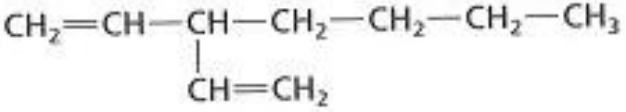
GRUPO BENZILA

Exercício 10. Escreva a fórmula estrutural do 3-vinil-hepteno

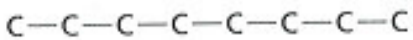


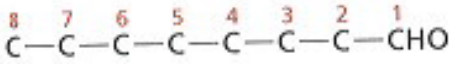


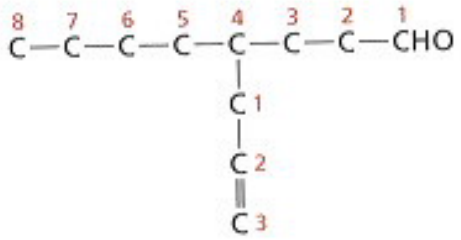




Exercício 11. Escreva a fórmula estrutural do 4-(2-metil-2-propenil)octanal







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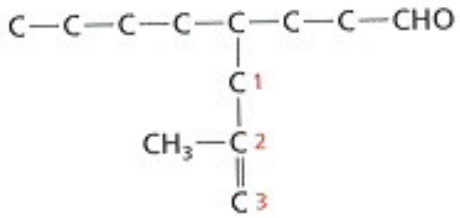

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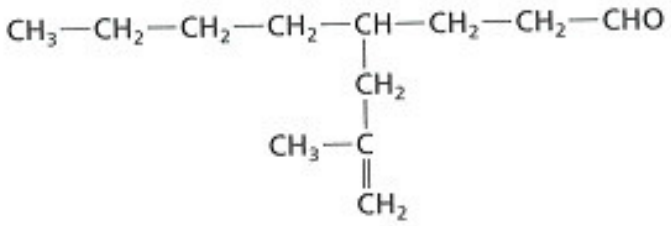
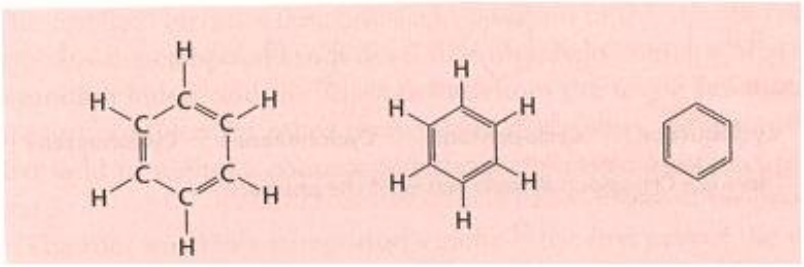
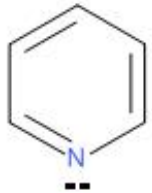
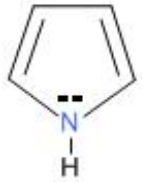


ALGUNS COMPOSTOS AROMÁTICOS

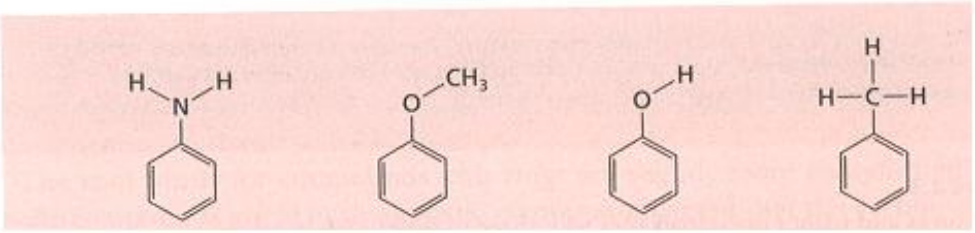




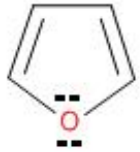
PIRIDINA

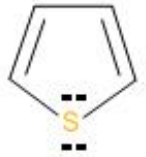


PIRROL

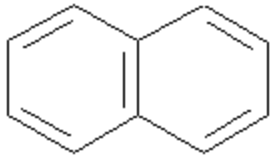


ANILINA ANISOL FENOL TOLUENO

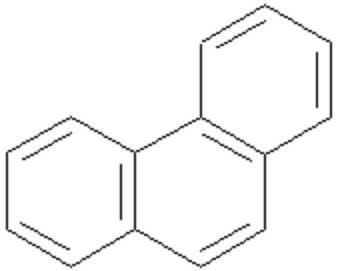




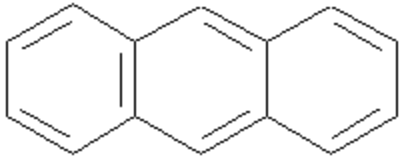
FURANO TIOFENO



NAFTALENO

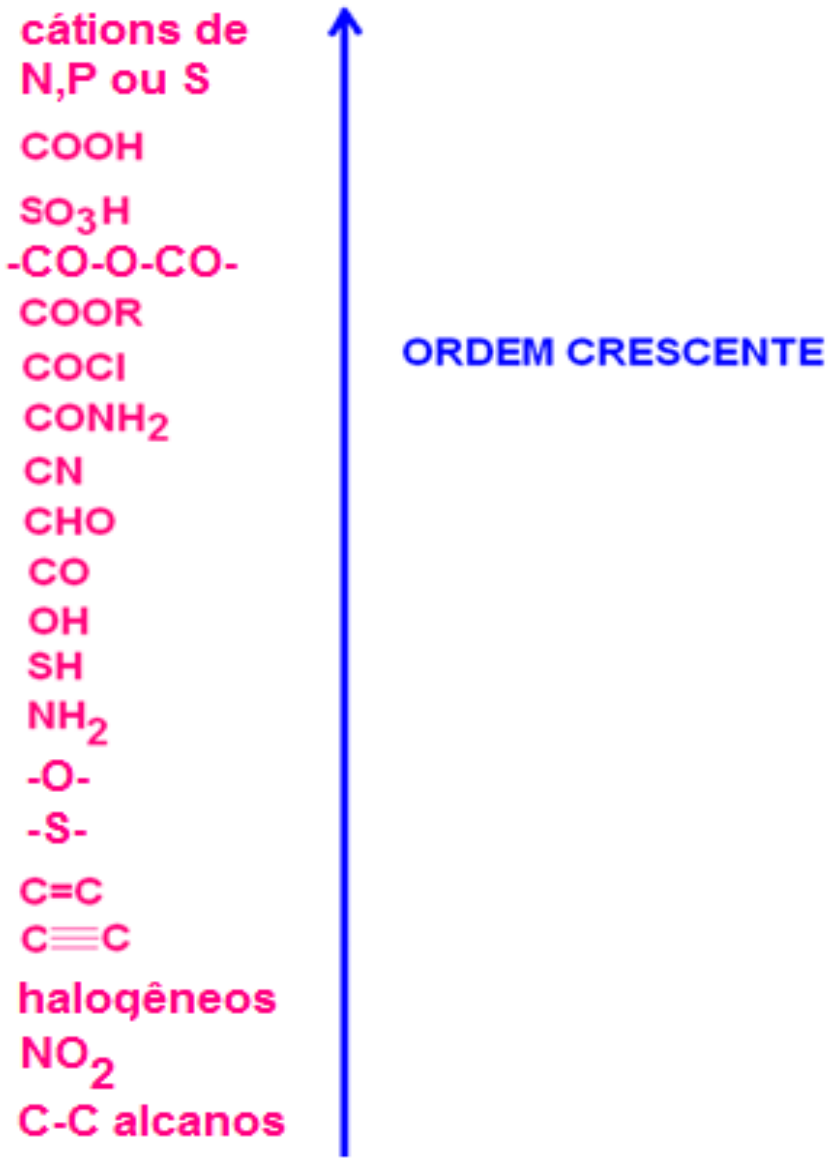


FENANTRENO

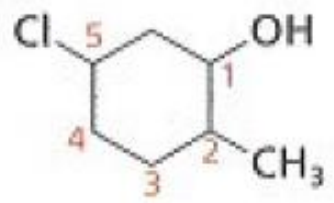


ANTRACENO

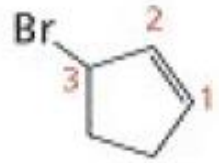
ORDEM DE PRIORIDADE



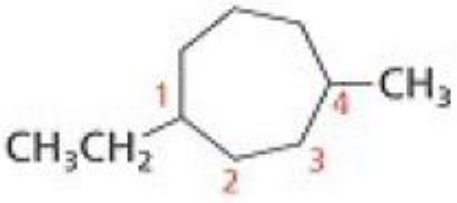
A ATRIBUIÇÃO DE NÚMEROS EM COMPOSTOS CÍCLICOS



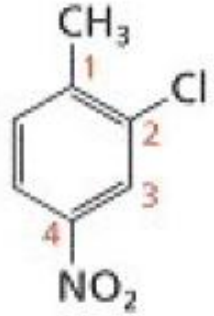
5-Cloro-2-metilcicloexanol



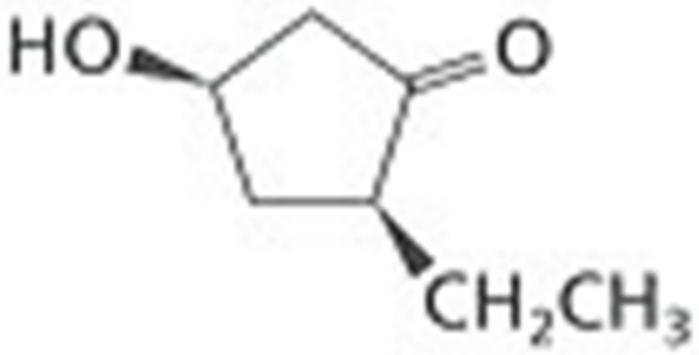
3-Bromociclopenteno

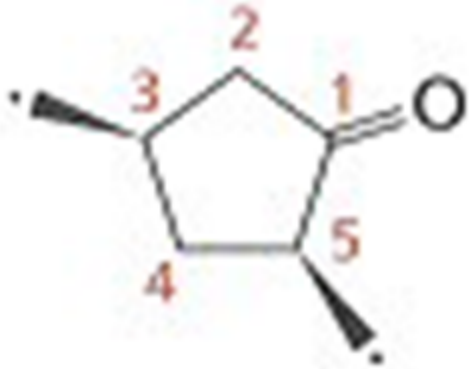


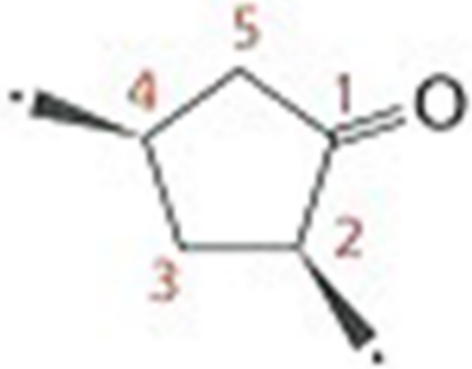
1-etil-4-metilcicloheptano



2-Cloro-4-nitrotolueno

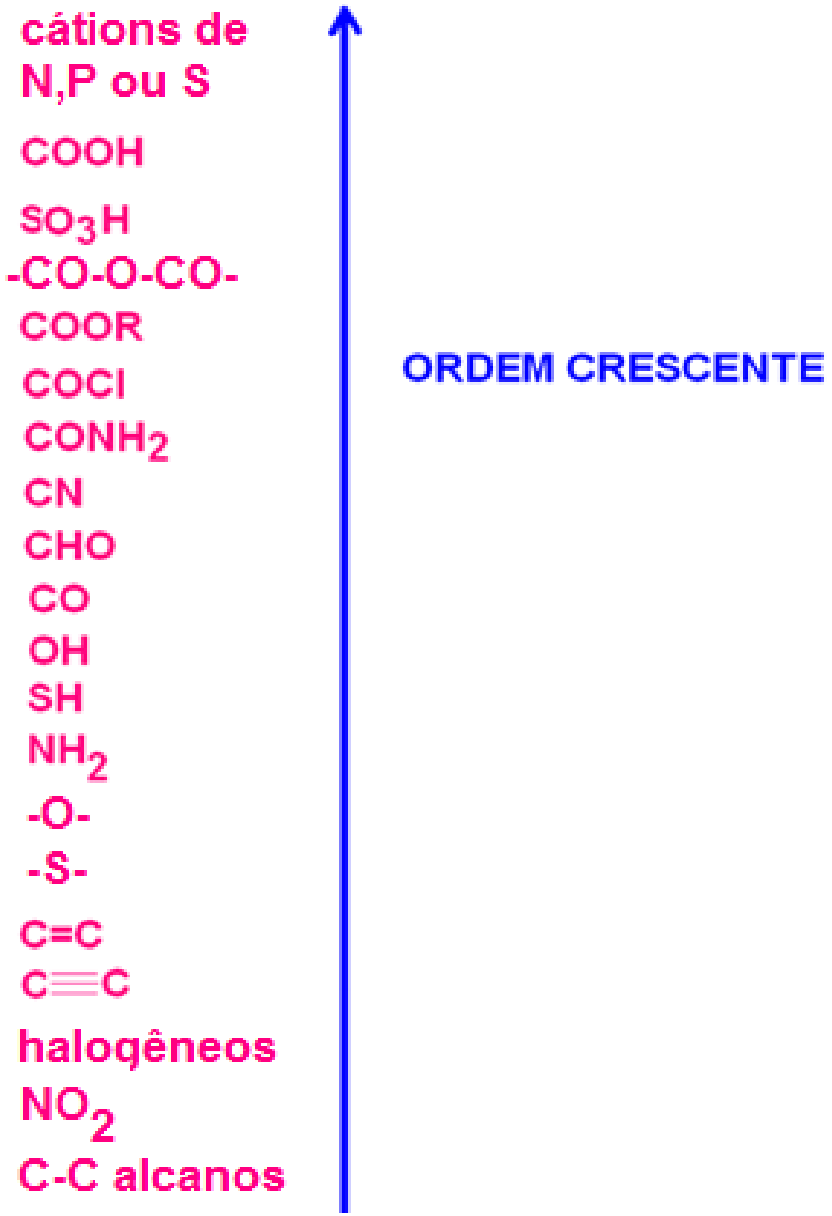

HO
O
CH2CH3

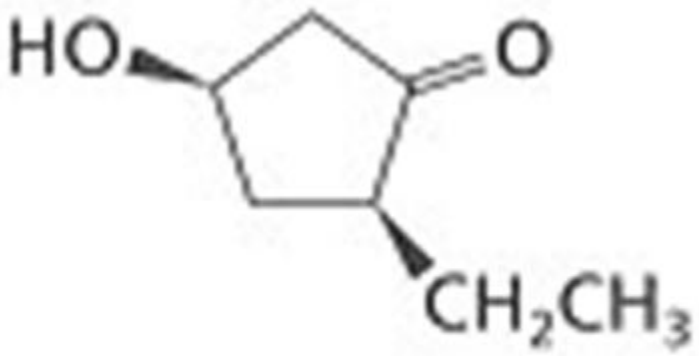

2
3
1
O
5
4


5
4
1
O
2
3

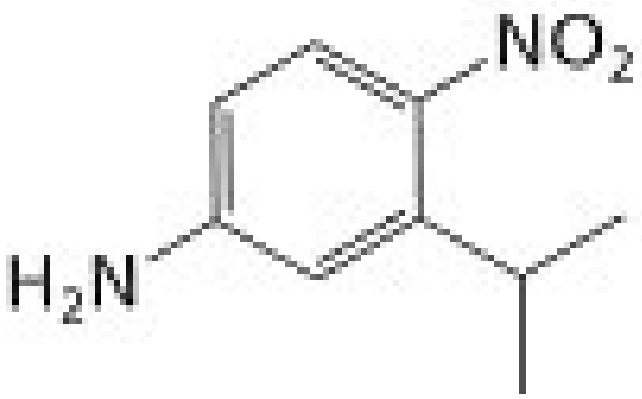
??????????????????????????????

ORDEM DE PRIORIDADE

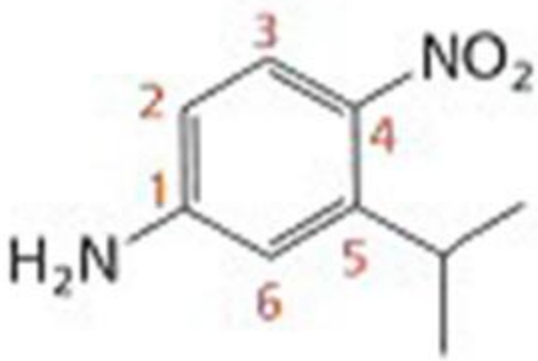


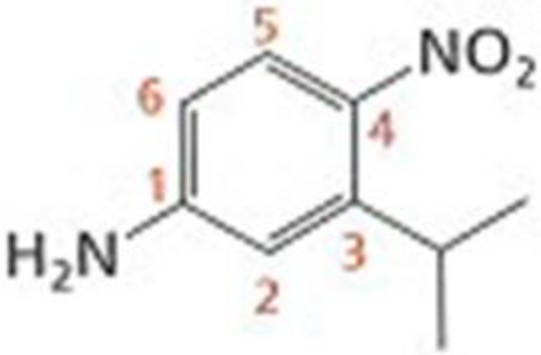


***cis*-2-etil-4-hidroxiciclopentanona**

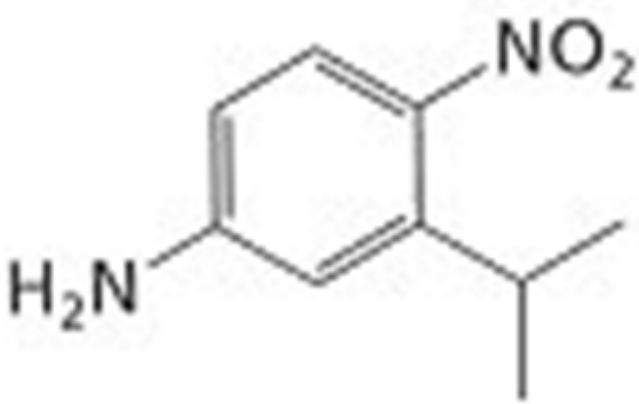


Qual é a prioridade? Grupo amino ou grupo nitro ????????


3
NO2
2
4
1
H2N
5
6

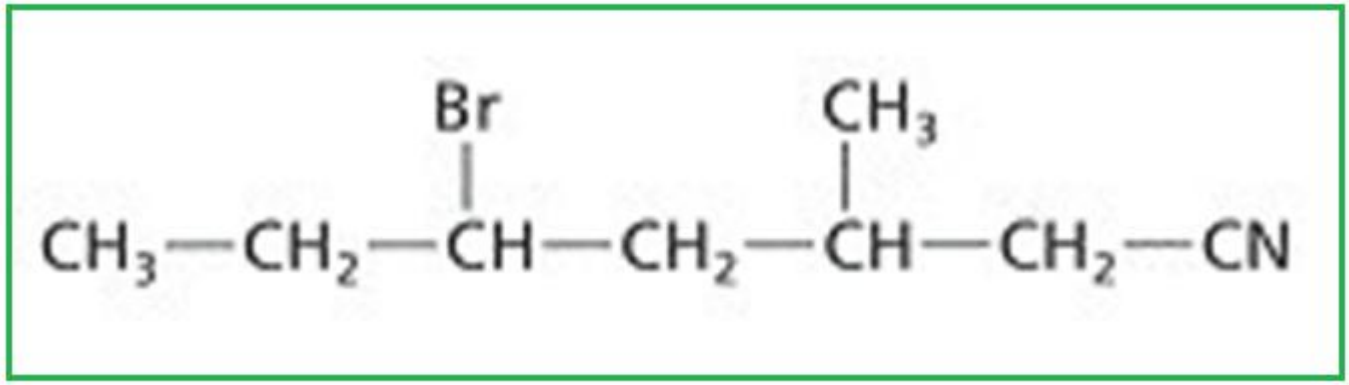

5
NO2
6
4
1
H2N
3
2

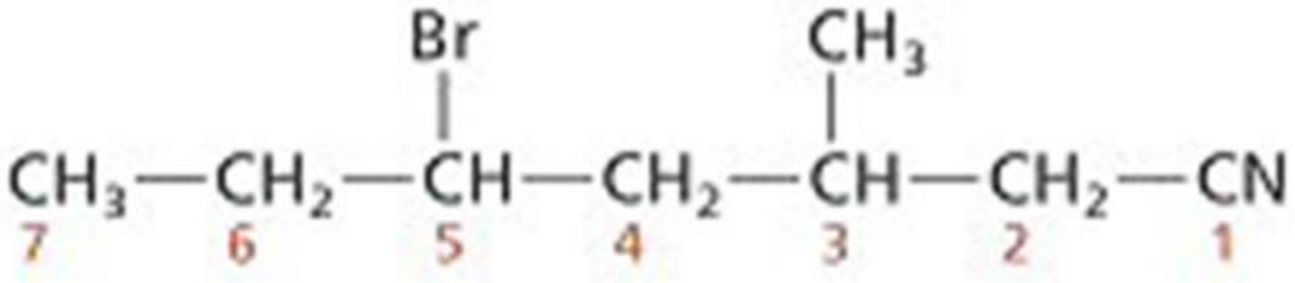
??????????????????????????



3-isopropil-4-nitroanilina

Exercício 12. Dê o nome do seguinte composto

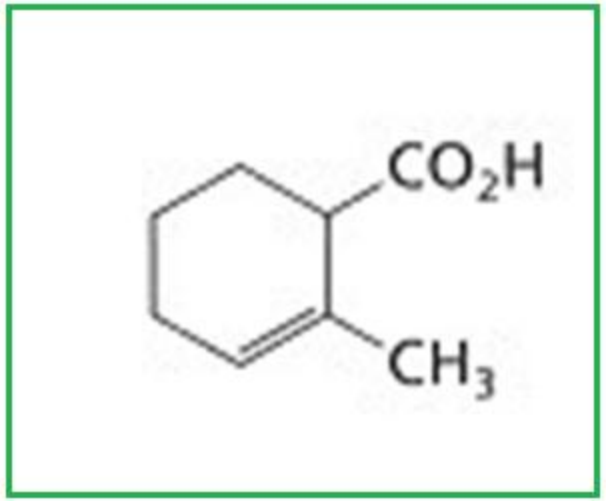




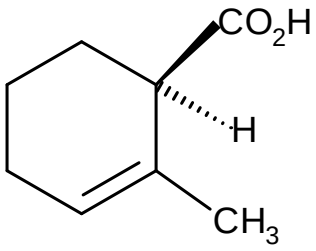
5-bromo-3-metil-heptanonitrila

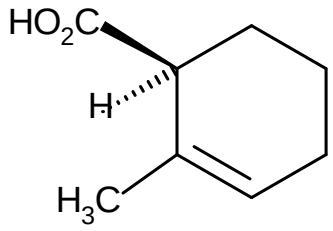
SUBSTITUINTES EM ORDEM ALFABÉTICA

Exercício 13. Dê o nome do seguinte composto



ESPELHO

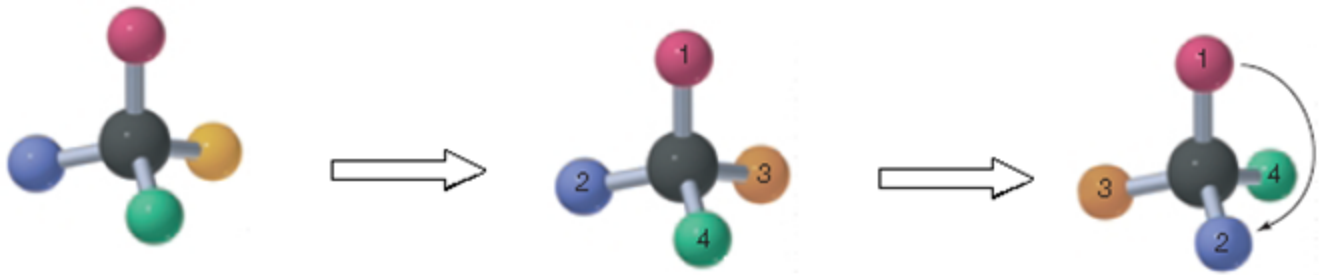




?

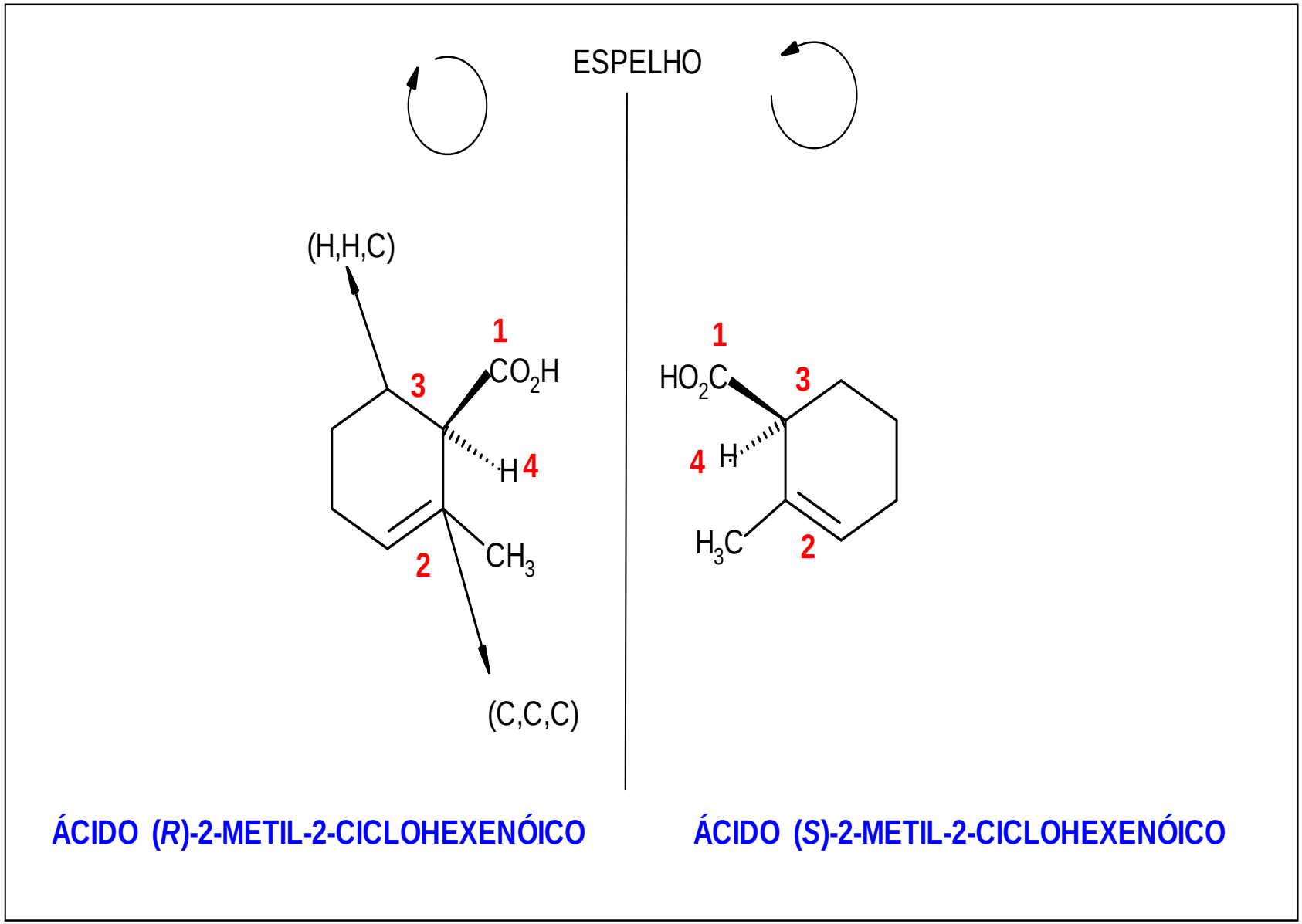
?

O SISTEMA R S



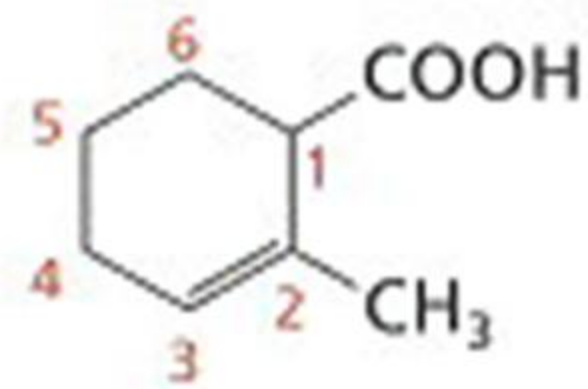
PRIORIDADE : de acordo com o número atômico do átomo ligado diretamente ao centro estereogênico

R



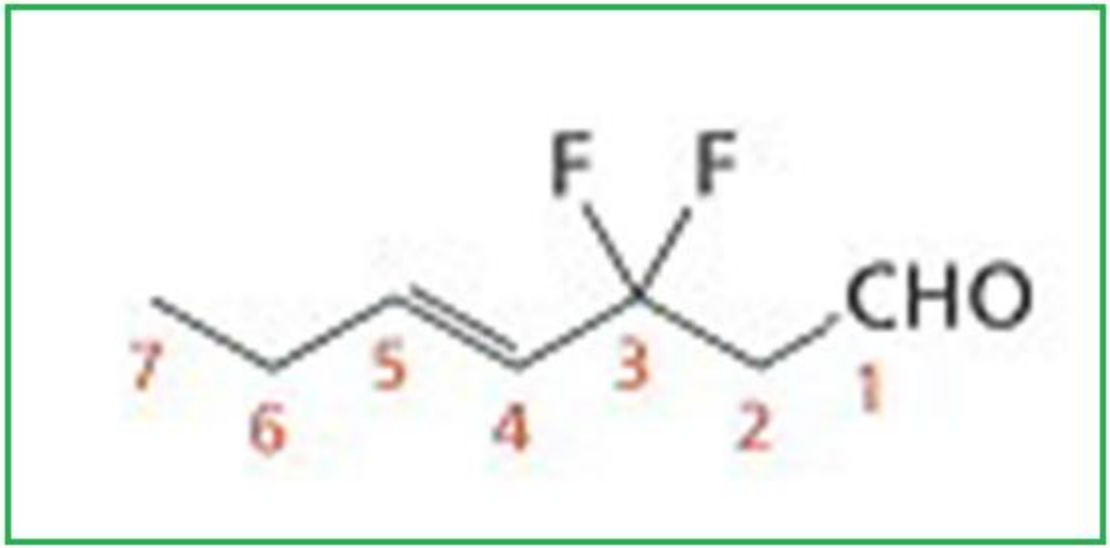
ÁCIDO (*R*)-2-METIL-2-CICLOHEXENÓICO

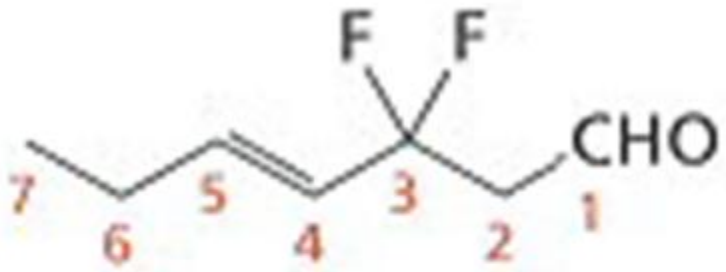
ÁCIDO (*S*)-2-METIL-2-CICLOHEXENÓICO



ÁCIDO 2-METIL-2-CICLOEXENÓICO

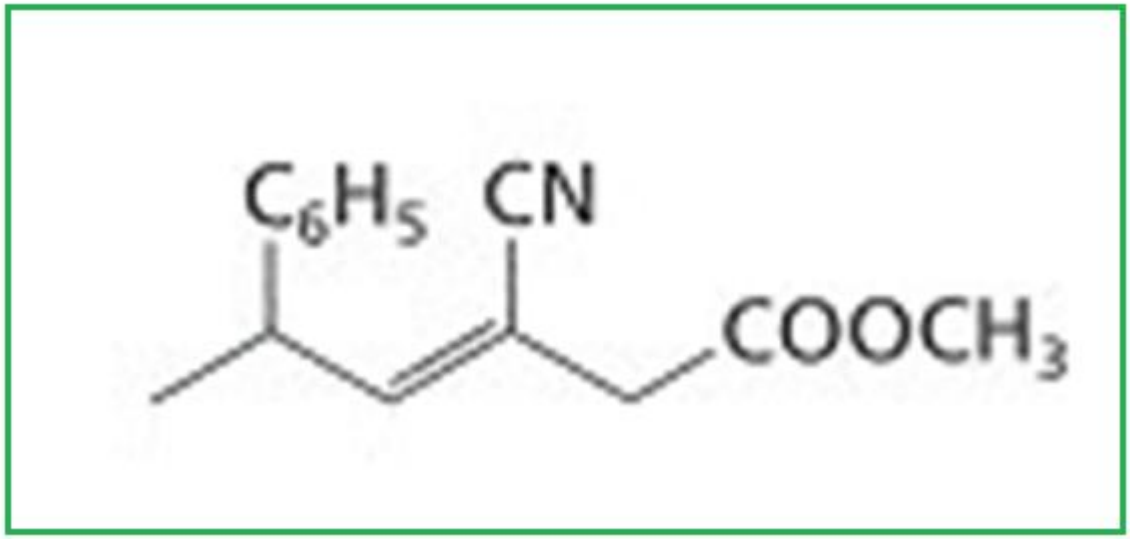
Exercício 14. Dê o nome do seguinte composto

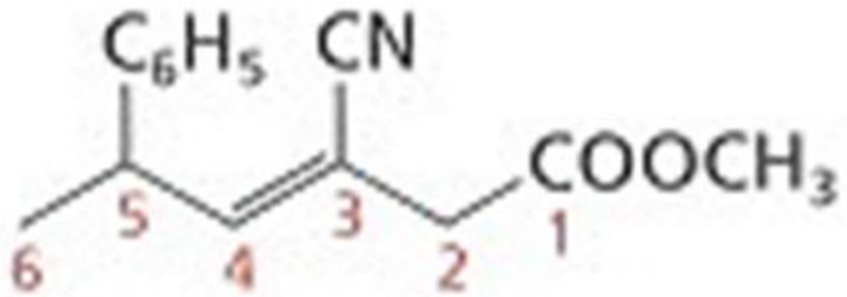




***trans*-3,3-difluoro-4-heptenal**

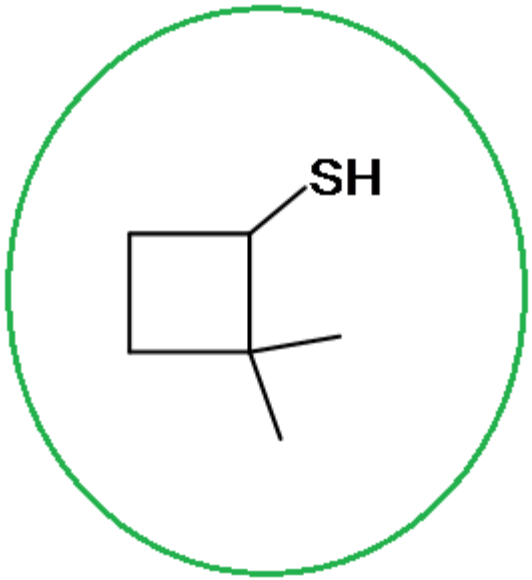
Exercício 15. Dê o nome do seguinte composto

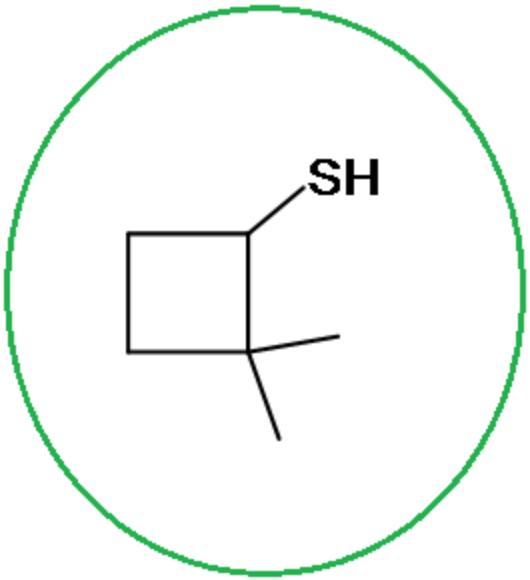




(*Z*)-3-ciano-5-fenil-3-hexenoato de metila

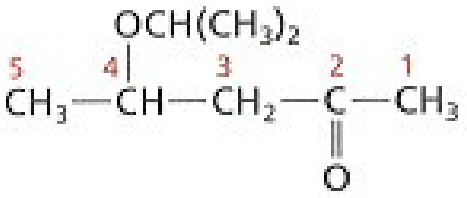
Exercício 16. Dê o nome do seguinte composto

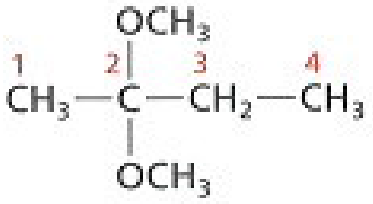




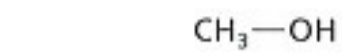
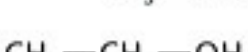
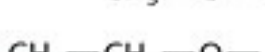
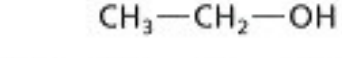
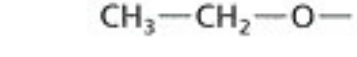
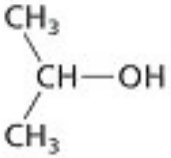
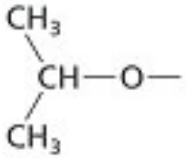
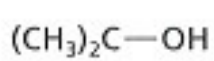
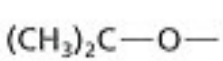
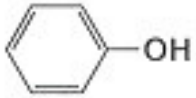
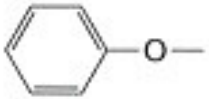
2,2-dimetilciclobutanotiol

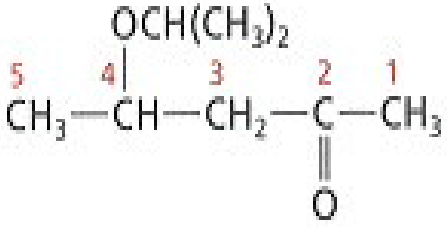
Exercício 17. Dê o nome dos seguintes compostos





ALGUNS GRUPOS DERIVADOS DE ÁLCOOIS

álcool ou fenol		grupo alcoxila
 metanol	→	 metóxi
 etanol	→	 etóxi
 propanol	→	 propóxi
 isopropanol	→	 isopropóxi
 terc-butanol	→	 terc-butóxi
 fenol	→	 fenóxi



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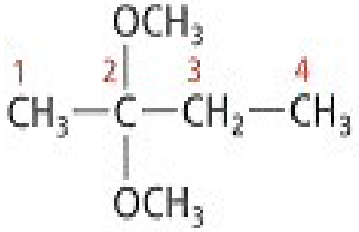
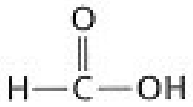
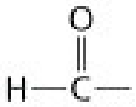
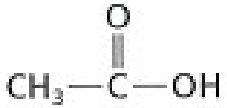
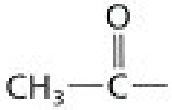
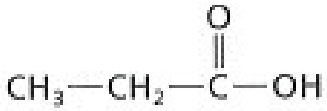
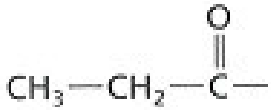
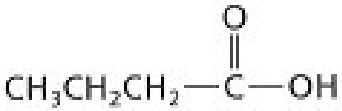
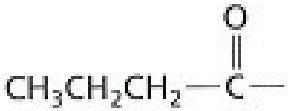
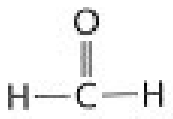


2,2-Dimetoxibutano

GRUPOS DERIVADOS DE ÁCIDOS CARBOXÍLICOS

ÁCIDO CARBOXÍLICO		GRUPO ACILA	
	ácido fórmico metanóico	→ 	formila
	ácido acético etanóico	→ 	acetila
	ácido propiônico propanóico	→ 	propionila
	ácido butírico butanóico	→ 	butirila



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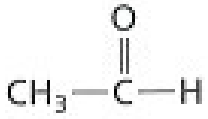

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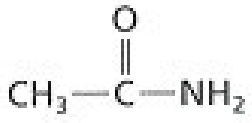
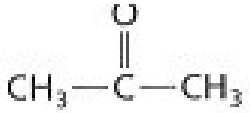


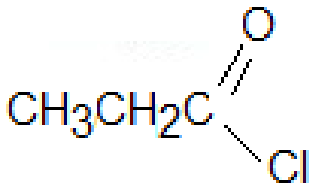
Acetamida



Acetona

Acetonitrila

Propionitrila



Cloreto de propionila